FINAL
MARKET SQUID
FISHERY MANAGEMENT PLAN

25 March 2005

STATE OF CALIFORNIA
RESOURCES AGENCY
DEPARTMENT OF FISH AND GAME
MARINE REGION

DEPARTMENT OF FISH AND GAME
Marine Region
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NOTICE

The California Department of Fish and Game (Department) has forwarded the final Market Squid Fishery Management Plan (MSFMP) to the Fish and Game Commission (Commission). The enclosed version represents the final project adopted by the Commission at its August 27, 2004 meeting in Morro Bay and December 3, 2004 meeting in Monterey.

The MSFMP establishes a management program for California's market squid resource and procedures by which the Commission will manage the market squid fishery. The goals of the MSFMP are to manage the market squid resource to ensure long term resource conservation and sustainability, reduce the potential for overfishing, and institute a framework for management that will be responsive to environmental and socioeconomic changes. The tools implemented to accomplish these goals include:

- Establishment of fishery control rules, including a seasonal catch limitation to prevent the fishery from over-expanding; continuing weekend closures, which provide for periods of uninterrupted spawning; continuing gear regulations regarding light shields and wattage used to attract squid, and maintaining monitoring programs designed to evaluate the impact of the fishery on the resource.
- Creation of a restricted access program, including provisions for initial entry into the fleet, types of permits, permit fees, and permit transferability that produces a moderately productive and specialized fleet.
- Establishment of a seabird closure restricting the use of attracting lights for commercial purposes in any waters of the Gulf of the Farallones National Marine Sanctuary.

The MSFMP has been developed under the provisions set forth by California's Marine Life Management Act (MLMA), which became law in 1999. The MLMA created state policies, goals, and objectives to govern the conservation, sustainable use, and restoration of California's living marine resources such as the squid resource.

The final plan will be available after 01 April 2005 on the Department's web site at www.dfg.ca.gov/mrd/marketsquid/index.html. Additional copies on CD-ROM may be requested from Bob Read, RRead@dfg.ca.gov, (858) 467-4213, 4949 Viewridge Avenue, San Diego, CA 92123.

If you have questions or need additional information on the MSFMP, please contact Mr. Dale Sweetnam, Senior Biologist with the California Department of Fish and Game, 8604 La Jolla Shores, La Jolla, California 92037, at (858) 546-7170, or the California Fish and Game Commission, 1416 Ninth St., Room 1320, Sacramento, CA 95814 at (916) 653-4899.

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Availability

The Final Market Squid Fishery Management Plan is available for reference beginning 1 April 2005 at the CDFG offices listed above. To comply with California's Paper Reduction Act, a CD-ROM of the MSFMP, with Appendices, will be at each office. Copies may be requested by contacting Bob Read, (858) 467-4213, RRead@dfg.ca.gov. Copies are available on CD-ROM, in Braille, in large print, on the computer (via the Web), and on audio cassette. To request a copy in an alternative format, please contact Bob Read (contact information above). The Final MSFMP is also available at http://www.dfg.ca.gov/mrd/marketsquid/index.html.

Final Market Squid Fishery Management Plan

Executive Summary

The Final Market Squid Fishery Management Plan (MSFMP) is presented in four sections. Section 1 presents background on the California market squid fishery as well as the MSFMP Project. Section 2 includes the environmental documentation (see California Code of Regulations Title 14 §15250-15253). This includes a review of alternatives and options presented to the Fish and Game Commission (Commission) during the adoption process. The environmental document was certified by the Commission as meeting California Environmental Quality Act (CEQA) requirements at its 27 August 2004 meeting. Section 3 includes the regulations that will implement the MSFMP Project's management strategy. Section 4 includes public comments and Fish and Game Department (Department) responses received during the adoption process.

The market squid (*Loligo opalescens*) fishery is one of the most important in the State of California in terms of landings and revenue. The fishery generates millions of dollars to the state annually from domestic and foreign sales. In addition to supporting the commercial fishery, the market squid resource is an important forage item for seabirds, marine mammals, and other fish taken for commercial and recreational purposes. It is also used by the recreational fishery as bait.

In 1997, the Legislature approved Senate Bill (SB) 364 (Sher), Chapter 785, Statutes of 1997, which established a moratorium on new vessels entering California's commercial market squid fishery. The initial three-year moratorium placed a cap on the number of vessels in the squid fishery, established a $2,500 permit fee to fund a Department study of the fishery, and provided the Commission with interim regulatory authority over the fishery for the duration of the moratorium. As part of this process, a Squid Fishery Advisory Committee, made up of resource stakeholders, and a Squid Research Scientific Committee, consisting of many of the world's leading squid fishery scientists, were established to advise the Director of the Department (Director) on recommendations for squid conservation and management and to provide input on the development of research protocols.

In 2001, the Legislature approved SB 209 (Sher), Chapter 318, Statutes of 2001, which established permanent management authority of the market squid fishery to the Commission. The statutes also require the Commission to manage the squid fishery under the guidelines set forth by the Marine Life Management Act (MLMA).

The goals of the MSFMP are to manage the market squid resource to ensure long term resource conservation and sustainability, and to develop a framework for management

that will be responsive to environmental and socioeconomic changes. The MSFMP establishes the management program for California's market squid fishery and procedures by which the Commission will manage the market squid resource.

Market squid fishery management, as described in Chapter 3, is based on four management components: 1) fishery control rules, 2) a restricted access program, 3) environmental considerations including a seasonal closure area for seabirds and 4) administrative items. The final project and the implementing regulations adopted by the Commission at the 27 August 2004 and 3 December 2004 meetings include:

Fishery Control Rules

- Establish a seasonal catch limitation of 118,000 tons;
- Continue existing closures from noon Friday to noon Sunday from the U.S.-Mexico border to the California-Oregon border;
- Continue existing squid monitoring programs (port sampling and logbooks);
- Continue existing regulations that do not require a squid permit when fishing for live bait or incidental take of two tons or less;
- Maintain existing wattage requirements (maximum of 30,000 watts) and modify shielding requirements that the lower edges of the shields shall be parallel to the deck of the vessel;

Restricted Access Program

- Establish a vessel-based capacity goal for the market squid fishery that produces a moderately productive and specialized fleet (55 vessels and 34 light boats, 18 brail vessels);
- Initial Issuance of Permits:
  - Transferable vessel permits - possession of a current market squid vessel permit (2004-2005) and a minimum of 50 landings in a window period (January 1, 2000 through March 31, 2003);
  - Transferable brail permits - possession of a current market squid vessel permit (2004-2005) and a minimum of 10 landings made with brail gear in a window period (January 1, 2000 through March 31, 2003);
  - Transferable light boat permits - possession of a current market squid permit (either vessel or light for 2004-2005) and have submitted one light boat log by December 31, 2000;
  - Non-transferable vessel permits - possession of a current market squid vessel permit (2004-2005), possessed a California commercial fishing license for at least 20 years and made a minimum of 33 squid landings at any time prior to August 27, 2004;
  - Non-transferable brail permits - possession of a current market squid vessel permit (2004-2005), possessed a California commercial fishing license for at least 20 years and made a minimum of 10 landings with brail gear during one fishing season in a window period (January 1, 2000 through March 31, 2003);
- Establish annual permit fees at:
  - Transferable Market Squid Vessel Permit: $2000;
  - Non-transferable Market Squid Vessel Permit: $1000;

  - Transferable Market Squid Brail Permit: $2000;
  - Non-transferable Market Squid Brail Permit: $1000;
  - Transferable Light Boat Permit: $600;
- Establish full transferability of market squid vessel permits based on comparable capacity (within 10%); establish transferability of market squid vessel permits to a vessel of larger capacity under a “2 for 1” permit retirement;
- Establish full transferability of market squid brail permits based on comparable capacity;
- Establish full transferability of light boat permits and establish an upgrade from a light boat permit to a transferable brail permit on a “1 for 1” permit retirement;
- Set the transfer fee at $500, and an upgrade fee of $1500;
- Establish 3 experimental non-transferable market squid vessel permits;

Ecological Concerns

- Seasonal Closures for Seabirds: Squid may not be taken using attracting lights in all waters of the Gulf of the Farallones National Marine Sanctuary at any time;

Administrative Items

- The Director may establish one advisory committee for the squid fishery, which includes scientific, environmental and industry representatives.

The MSFMP utilizes a framework composed of several elements that will allow the Commission to react quickly to changes in the market squid population off California without the need for a full amendment and provides the Commission specific guidelines for making management decisions. These guidelines will allow for other management strategies, should they become necessary, which would effectively achieve the goals and objectives of the MSFMP and MLMA. Since market squid is included in the Federal Coastal Pelagic Species Fishery Management Plan (CPS FMP) as a monitored species, the MSFMP framework structure is consistent with management by the Pacific Fishery Management Council outlined in the CPS FMP.

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Appendices

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The Department would like to thank the members of the Squid Research Scientific Committee who helped with the Market Squid Fishery Management Plan (MSFMP). Participants on the committee are:

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MSFMP 2000-2004 Contributors
The MSFMP has been in analysis and design phases since January 2001. The efforts of many CDFG staff members, NOAA Fisheries researchers, University researchers, and fishermen have contributed to the final document. The Department acknowledges the concerted work of the all of these people. For a listing of these contributors, please refer to the Draft MSFMP dated 12 April 2004.

MSFMP Lead Authors and Editors
The Final MSFMP is the result of revisions to a preliminary draft which was released for public review in May 2002. It also went through an extensive peer review process. Based on these reviews, substantial improvements were made to the 2003 and the

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The Peer Review Panel – Preliminary Draft MSFMP

Peer Review is the process of convening a panel of scientists to review any proposed Fishery Management Plan. The Peer Review Panel analyzes the strengths and weakness of the FMP and recommends strategies that will guide and secure a scientific basis for management. Under the guidance of Drs. William Leet and Christopher Dewees of the University of California, Davis, a Peer Review Panel of scientists was established to review the preliminary draft MSFMP. The Department would like to thank the contributions of the peer reviewers:

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Chapter 1. Introduction

Market squid (*Loligo opalescens*) is the state's largest fishery by tonnage and economic value. In addition to supporting this important commercial fishery, the market squid resource is important to the recreational fishery as bait and is forage for fishes, marine mammals, birds, and other marine life. The growing international market for squid and declining squid production from other parts of the world has resulted in an increased demand for California market squid. That demand resulted in rapid growth in the number of vessels harvesting squid and the amount of squid harvested. In order to provide for a sustainable fishery and protect against resource damage and ecological effects, the Legislature deemed it necessary to adopt and implement fishery management that sustains both the squid population and the marine life that depends on squid.

The following sections discuss the purpose and need for management action in the commercial market squid fishery, describe the goals and objectives of the Marine Life Management Act (MLMA) and other relevant law, and identify management objectives specific to the market squid fishery management plan (MSFMP). A description of regulatory authorities and responsibilities that will support these objectives completes this chapter.

1.1 Purpose and Need for Action

1.1.1 Problem Statement

Commercial landings of market squid in California increased almost 400% from the 1990-1991 to the 1997-1998 season. The squid fishing season runs from 1 April through 31 March the following year. Concern over the rapid increase in squid harvest and new vessels entering the fishery from other states led to industry sponsored legislation in 1997. This legislation, Senate Bill (SB) 364 (Sher), was incorporated into Fish and Game Code (FGC) §8420-8429.7 which identified the problem as follows:

> *(a) The Legislature finds and declares that the fishery for market squid (*Loligo opalescens*) is the state's largest fishery by volume, generating millions of dollars of income to the state annually from domestic and foreign sales. In addition to supporting an important commercial fishery, the market squid resource is important to the recreational fishery and is forage for other fish taken for commercial and recreational purposes, as well as for marine mammals, birds, and other marine life. The growing international market for squid and declining squid production from other parts of the world has resulted in an increased demand for California market squid, which, in turn, has led to newer, larger, and more efficient vessels entering the fishery and increased processing capacity.*
> *(b) The Legislature finds that the lack of research on market squid and the lack of annual at-sea surveys to determine the status of the resource, combined with the increased demand for, and fishing effort on, market squid could result in overfishing of the resource, damaging the resource, and financially harming*

> *those persons engaged in the taking, landing, processing, and sale of market squid.*
> *(c) The Legislature further finds that some individuals, vessels, and processing plants engaged in the market squid fishery have no other viable alternative fisheries available to them and that a decline or a loss of the market squid resource would cause economic devastation to the individuals or corporations engaged in the market squid fishery.*
> *(d) The Legislature declares that to prevent excessive fishing effort in the market squid fishery and to develop a plan for the sustainable harvest of market squid, it is necessary to adopt and implement a fishery management plan for the California market squid fishery that sustains both the squid population and the marine life that depends on squid.*
> *(e) The Legislature finds that a sustainable California market squid fishery can best be ensured through ongoing oversight and management of the fishery by the Commission. With regard to the market squid fishery, the Legislature urges that any limited entry component of a fishery management plan, if necessary, should be adopted for the primary purpose of protecting the resource and not simply for the purpose of diminishing or advancing the economic interests of any particular individual or group.*

This legislation further placed a moratorium on the number of vessels in the fishery, established a $2,500 permit for market squid vessels and light boats and initiated a three-year study of the fishery. In addition, a Squid Fishery Advisory Committee (SFAC) and a Squid Research Scientific Committee (SRSC) were formed to advise the California Department of Fish and Game (Department) on research and interim measures. Further, SB 364 required the Department to submit a report on the status of the market squid fishery with recommendations for a market squid conservation and management plan. In April 2001, the Department submitted the report, which was developed through the cooperative efforts of scientists, fishing industry representatives and other stakeholders. Late in 2001, the Legislature delegated management authority for the squid fishery to the Fish and Game Commission (Commission), including adoption of a MSFMP.

The Legislature recognized that little is known about market squid population dynamics, the size of the resource and other biological information. In 1998, the Department developed and implemented a large-scale monitoring and biological research program on the market squid fishery and resource. This program has and will continue to provide critical information necessary to the development of sound long-term management strategies.

During the initial three years of study, contracted independent researchers (in conjunction with Department employees) explored several science-based methods for developing management strategies for the fishery. Some of this research examined market squid life history and discovered that the lifespan of market squid is less than one year. Fishery dependent research shows that market squid availability, and likely their abundance, is highly variable among seasons. These findings indicate that

traditional assessment methods used to determine biomass cannot be applied to market squid.

1.1.2 Location and General Characteristics of the Project Area

The marine environment is composed of numerous microhabitats, each of which supports a distinct assemblage of species uniquely adapted to their environment. The harvest of market squid is proposed statewide, in all areas defined as ocean waters in the California Code of Regulations (CCR) Title 14 §27.00, except where prohibited or restricted, as specified, in state marine protected areas (MPAs), and as regulated by provision of this MSFMP. Generally, market squid are harvested nearshore on sandy bottom habitats. Landing records indicate that the fishery is concentrated in two distinct areas: Monterey Bay and the Southern California Bight, primarily around the Channel Islands. Thirty years ago, the commercial fishery was primarily focused in Monterey Bay; however, since the 1985-1986 season the vast majority of the catch is taken from the Southern California Bight. An in-depth description of the habitat preferences and life history characteristics of market squid is found in Chapter 2.

1.1.3 The Marine Life Management Act

The MLMA of 1998 created policies, goals, and objectives to govern the conservation, sustainable use and restoration of California's living marine resources. The MLMA opened a new chapter in the conservation and management of California's marine wildlife and fisheries (Weber and Heneman 2000) and gave the Commission and Department specific authorities, goals, objectives, and mandates for managing marine resources.

Goal I: Ensure Long-Term Resource Conservation and Sustainability
The MLMA's overriding goal is to ensure the conservation, sustainable use, and restoration of California's marine living resources [FGC §7050(b)]. This includes the conservation of healthy and diverse marine ecosystems and marine living resources [FGC §7050(b)(1)]. To achieve this goal, the MLMA calls for allowing and encouraging only those activities and uses that are sustainable [FGC §7050(b)(2)]. Sustainability is the overriding principle of the MLMA and the NFMP.
Within this overall policy on marine living resources, the MLMA sets the State's policy for marine fisheries [FGC §7055; §7056]. Objectives include:
1. Conserve the health and diversity of marine ecosystems and marine living resources [FGC §7050(b)(1)].
2. Allow and encourage only those activities and uses of marine living resources that are sustainable [FGC §7050 (b)(2)].
3. Maintain the health of marine fishery habitat, and to the extent feasible, restore or enhance that habitat where appropriate [FGC §7056(b) and §7084].

Goal II: Employ Science-based Decision-making
At the core of the MLMA is the principle of basing decisions on sound science and other useful information. With this in mind, the MLMA includes, as a general objective,

promotion of marine ecosystem research that will enable better management decisions [FGC §7050(b)(5)]. The MLMA also calls for basing decisions on the best available scientific information as well as other information that the Department and the Commission possess [FGC §7050(b)(6)]. While the MLMA emphasizes scientific information in making decisions regarding the conservation and sustainable use of California's marine living resources, it also recognizes the value and importance of relying upon other sources of information such as local knowledge [FGC §7056(h)]. Objectives include:

1. Encourage fishery management decisions that are adaptive and based on the best available information and that do not substantially delay the management process [FGC §7056(g) and FGC § 7072(b)].
2. Create cooperative and collaborative partnerships with fishery participants, public and private entities, and research institutions to acquire Essential Fishery Information and to design and conduct research and monitoring [FGC §7056(k)].
3. Periodically review the management system for effectiveness in achieving sustainability goals and for fairness and reasonableness in its interaction with people affected by management [FGC §7056(m)].

Goal III: Increase Constituent Involvement in Management

The MLMA focuses special attention on constituent involvement in marine fisheries management – not only in the development of management plans but in other key activities such as research and implementation of management decisions. The MLMA calls for involving "all interested parties" in making decisions regarding marine living resources [§7050(b)(7)] and for disseminating accurate information on the status of marine life and its management §7050(b)(8)]. Objectives include:

1. Develop an open decision-making process and seek the advice and assistance of interested parties so as to consider relevant information including local knowledge [FGC §7056(h)].
2. Allow fishery participants to propose methods to prevent or reduce excess effort in market squid fishery [FGC §7056(e)].
3. Involve constituents in preparing Fishery Management Plans (FMPs) [FGC §7076(a)].
4. Involve interested people in designing research protocols for individual FMPs [FGC §7074(b)].

Goal IV: Balance and Enhance Socio-economic Benefits

California's fisheries are a public trust resource. As such they are to be protected, conserved and managed for the public benefit, which may include food production, commerce and trade, subsistence, cultural values, recreational opportunities, maintenance of viable ecosystems, and scientific research. None of these purposes need be mutually exclusive and, ideally, as many of these purposes should be encouraged as possible, consistent with resource conservation. The MLMA requires recognition of important aesthetic, educational, scientific, and recreational uses that do not require taking marine wildlife, as well as the economic and cultural importance of sustainable sport and commercial fisheries [FGC §7050(b)(3)(4)]. Objectives include:

1. Recognize the importance of non-consumptive uses of California's marine resources [FGC §7050(b)(3)].

2. Observe the long-term interests of people dependent on fishing for food, livelihood, or recreation, and minimize the adverse impacts of fishery management on small scale fisheries, coastal communities, and local economies [FGC §7056(i)(j)].
3. Develop mechanisms to resolve disputes about issues such as, but not limited to, access, allocation, and gear conflicts [FGC §7056(k); FGC §7059(b)(2)].

Goal V: Identify Implementation Costs and Sources of Funding
The Department's management of commercial and recreational fisheries has been supported by general funds appropriated by the Legislature, by federal funds for commercial and recreational fishing, and by user fees in the form of permits, licenses, and other fees (FGC §710.5). In FGC §711(c), the Legislature stipulated that revenues for hunting and sport fishing programs not be used for other purposes, including commercial fishing. In 1993, the Legislature reiterated its intent to ensure adequate funding from appropriate sources (FGC §711).
Objectives:
1. Help ensure that fees more accurately reflect all costs of the Department's management [FGC §710.5].
2. Identify the resources and time necessary to acquire EFI [FGC §7081(b)].
3. Cooperate with the Legislature, the commercial fishing industry, recreational fishermen, the environmental community, and other interested people to identify alternative sources of funding for "the department's necessary marine resource management and protection responsibilities" [FGC §710.7(c)].

1.1.4 Specific Goals and Objectives of the Market Squid Fishery Management Plan

Goals:
- To manage the market squid resource to ensure long term resource conservation and sustainability;
- To develop a framework for management that will be responsive to environmental and socioeconomic changes.

Objectives:
- Provide for the sustainable use of the market squid resource by commercial and recreational fisheries for the optimum long-term benefits of present and future generations;
- Maintain an adequate forage reserve for marine mammals, fish and seabirds;
- Use adaptive management to provide for necessary changes and modifications of management measures in a timely and efficient manner;
- Ensure proper utilization, the avoidance of bycatch in the market squid fishery, and the avoidance of wastage of market squid in other fisheries;
- Support and promote increased understanding of market squid natural history, population dynamics, and its ecosystem's role to improve management;
- Ensure effective monitoring of the market squid population and its fisheries;
- Ensure enforcement of regulations;
- Identify, protect, and restore critical market squid habitat;

- Minimize the adverse impacts of management on small-scale fisheries, coastal communities, and local economies.

1.1.5 Constituent Involvement

The MLMA calls for meaningful constituent involvement in the development of each fishery management plan (FMP), and requires the Department to develop a process to involve interested parties in that process. In addition, the California Environmental Quality Act (CEQA) requires public consultation during lead agency review of all proposed projects subject to a certified regulatory program [See generally Public Resources Code (PCR) §21080.5(d)(2); see also CCR Title 14, §781.5]. The MSFMP and its associated implementing regulations is, of course, such a project under CEQA.

In 1998, two advisory committees were formed to examine the market squid fishery: the SFAC and the SRSC. The SFAC included fishery participants, environmentalists, and scientists and advised the Department on proposed management strategies and changes to the fishery. The SRSC comprised national and international university, agency, and private industry scientists and made recommendations on squid research protocols and methods as well as management strategies. These two committees met from 1998 through 2000 and played a major role in the interim management of the fishery.

The Department prepared and filed a Notice of Preparation (NOP) with the State Clearinghouse in December 2001 for distribution to appropriate responsible and trustee agencies for their input and comments. Further, the notice was provided to individuals and organizations that had expressed prior interest in regulatory actions regarding market squid. Comments received in response to the NOP and a preliminary draft MSFMP are addressed in Section 4.

The Department also conducted two public meetings to present options for management of the market squid fishery. The first meeting was held on 26 January 2001 in Port Hueneme and the second was in Monterey on 27 January 2001. The proposed project for management of the market squid fishery was developed through these venues.

The Department released the Preliminary Draft MSFMP for public review and comment on 15 May 2002. The Preliminary Draft MSFMP was sent to interested parties and was also posted on the Department's web site for public review. The Department accepted all written comments regarding the Preliminary Draft MSFMP that were received before 8 February 2003. Responses to comments regarding the Preliminary Draft MSFMP are addressed in Section 4.

The Department submitted to the Commission the Draft MSFMP on 7 July 2003. This document was the result of revisions to the Preliminary Draft MSFMP which was released for nearly a year of public review in 2002. It also went through an extensive scientific peer review process. Based on those reviews, substantial improvements were

incorporated into the 2003 Draft MSFMP, and it was completely reorganized into four sections and streamlined for clarity and content. Public testimony on the Draft MSFMP was taken at the 1 August 2003 and 5 December 2003 Commission meetings.

At the 3 December 2003 meeting, the Commission asked the Department to incorporate additional alternatives and analysis into the Draft MSFMP. A revised Draft MSFMP was released for public review and comment on 12 April 2004. Public testimony on the revised Draft MSFMP was taken by the Commission at the 4 May 2004, 27 August 2004, and 3 December 2004 meetings. In addition, the Commission held special hearings in Monterey (23 July 2004) and San Pedro (13 August 2004) to take public testimony directly from fishermen in the ports where the majority of squid fishing activity occurs.

The Commission adopted the MSFMP at its 27 August 2004 and 3 December 2004 meetings. The Department has addressed all written comments regarding the Draft MSFMP received through 3 December 2004 in Section 4.

1.1.6 Summary of Goals and Objectives

The goals and objectives above provide a framework and guide for the development and consideration of management measures and research for the market squid fishery. An evaluation of the contribution of these management measures to meeting the goals and objectives of both the MLMA and the MSFMP is presented in Table 1.1. They will also provide a guide for evaluating the effectiveness of research and management and other activities in the future.

Table 1.1 Contribution of management measures to ecological goals and objectives of the Marine Life Management Act and to the objectives of the Market Squid Fishery Management Plan

	Fishery Management Measures															
MLMA and MSFMP Goals and Objectives	Seasonal Catch Limitation	Monitor fishery through Egg Escapement method	Daily Trip Limits	Weekend Fishing Closures	Maintain current monitoring & research programs	Establish a Live bait Permit	Gear Restrictions	Establish Restricted Access (RA) Fleet Capacity Goal	Establish RA Initial Issuance Criteria	Establish RA Permit Fees	Establish RA Permit Transfer Criteria	Establish Experimental Gear Permits	Establish RA Regional Control Date	Set Aside Harvest Replenishment or General Habitat Closure Areas	Area and Time Closures for Seabirds	Market Squid Advisory Committee
MSFMP Option	A	B	C	D	E	F	G	H	I	J, N	K,L,M	O	P	Q	R	S
Ensure longterm resource conservation and sustainability	●	●	•	●			●	●	●					●	●	
Prevent overfishing	●	●	●	●	•			●	●	•	•		•	●		•
Provide for sustainable use of market squid resource by commercial and recreational fisheries	●	●	•	●	●	•	●	●	●	●	●		•	●		
Identify, protect and restore critical market squid habitat	●	●	•	●	●		•							●		
Maintain adequate forage reserve for marine mammals, fish and seabirds	●	●	•	●										●	●	
Management framework responsive to environmental and socioeconomic changes	•	●	•	•	●	•	•	●	●	•	•	•	●	●	●	●
Ensure proper utilization and avoidance of bycatch in market squid fishery and of wasted squid in other fisheries					●	•	●									
Use adaptive management to make necessary changes and modifications in efficient and timely manner		●			●		●			●	•					●
Minimize the adverse impacts of management on small-scale fisheries, coastal communities, and local economies			•	●	●	•	●	●	●			●		•		●
Employ science-based decision-making	●	●	•	●	●		●	●	●	●				●	●	
Effective monitoring of market squid resource and its fisheries		●			●			●	●	●						●
Support and promote market squid research		●				•				●						●
Identify implementation costs and sources of funding		●			●					●						●
Ensure effective enforcement		•	•		●	•	●	●	●	●		•	•			•
	● = Large Contribution			● = Smaller Contribution			• = Smallest Contribution									

1.2 The Structure of the Market Squid Fishery Management Process under the Marine Life Management Act

The MLMA recognizes the need to adapt to changing circumstances. It does so by embracing the principle of adaptive management. The MLMA defines this principle as a scientific policy that seeks to improve management "by viewing program actions as tools for learning" (FGC §90.1). Management measures must be designed to provide useful information whether they succeed or fail. Monitoring and evaluation of fisheries are needed to detect the effect of the measures.

The MLMA explicitly calls for ensuring that managers can respond to changing environmental and socio-economic conditions [FGC §7056(l)], and requires that FMPs establish a procedure for regular review and amendment, if that is appropriate [FGC §7087(a)]. Because the review and amendment of an FMP is generally a lengthy process, the MLMA allows greater flexibility in responding to changes in a fishery by allowing an FMP to specify the kinds of regulations that may be changed without amending the FMP itself [FGC §7087(b)]. This process mirrors the federal government's process, where annual quotas or in-seasons adjustments in management measures may generally be made without resorting to the lengthy process of amending the FMP itself.

To meet the standards of the MLMA for adaptive management, the MSFMP establishes a hierarchical framework within which adjustments to the management of the market squid fishery can be made in a responsible and timely manner. Depending upon the scale and significance of needed changes in management, the FMP itself may need to be amended or an in-season decision by the Commission or Department may be appropriate. The former action requires much greater analysis and public review than does the latter. Standards for determining the appropriate level of action are described below.

1.2.1 Process of Plan Review

The MLMA requires public and peer review for all fishery management plans (FMPs FGC §7075-7078). For public review, the Department solicits input and/or assistance from the various user groups who may be affected by the FMP or other interested parties prior to and during development of an FMP. The Department can also approach the National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NOAA Fisheries), Sea Grant, the Pacific Fishery Management Council (PFMC), or advisory committees established by the Department for advice. Once the FMP or amendment is developed, the plan must be submitted to the Commission and available to the public for review and comment. The Commission must hold at least two public hearings on the FMP. Any comments or proposals made to the Commission relative to the FMP may be considered by the Commission and forwarded to the Department for inclusion into the FMP.

For peer review, the Department set up a formalized procedure as required by FGC §7062 for examining the science that is used as the basis for any management recommendation. The peer review panel was given all pertinent comments received by the Department from fishery participants or other interested parties. Any suggestions made through peer review can be used in whole or part; however, if the Department disagrees with the findings and chooses not to use the recommendations, an explanation of why the peer review recommendations were not used must accompany the FMP or amendment. Comments received from the peer review committee and Department responses were presented in Section 4 of the Draft MSFMP dated 12 April 2004.

1.2.2 Types of Framework Actions

The Commission may take four general types of actions within the framework of the MSFMP: 1) FMP amendment, 2) full rulemaking, 3) notice action, and 4) prescribed action. Each type of action reflects a different degree of change in management - from changing a basic feature of the MSFMP itself to implementing a routine administrative matter, such as closing the fishery when seasonal catch limit is reached. Brief descriptions of each of these types and the conditions for their use follow.

1.2.2.1 FMP Amendment

FMP framework management is designed to be flexible and adaptable to a wide range of future conditions, and intended to function without the need for frequent amendment. However, unforeseen biological, environmental, social or economic developments may create a situation under which the MSFMP does not adequately provide effective management of the market squid fishery. Under such circumstances, the Commission could amend the MSFMP.

The MSFMP must be amended if the change in management is a major or controversial action outside the scope of the MSFMP. Examples of such actions include:

- changes to management objectives;
- a change in the “overfished” or “overfishing” definitions;
- amendments to any procedures required by the FMP;
- revisions to any management measures that are fixed in the FMP.

Besides obtaining the views of advisory bodies, holding public hearings, and soliciting public comments, preparation and adoption of an amendment to the MSFMP will require environmental analysis of proposed changes under CEQA.

1.2.2.2 Full Rulemaking Actions

If changes to management measures will have a long-term effect, allow discretion in their application, or have impacts that may not have been analyzed previously, a Full Rulemaking process is required. This process, which must follow standard Administrative Procedures Act procedures, normally requires at least three Commission

meetings. Full Rulemaking may also be used to declare a management measure "routine." In the Full Rulemaking process, the Commission reviews the issues at a first meeting and authorizes its staff to publish notice of its intent to adopt regulations at a later meeting. This notice, which begins a minimum 45-day period for public comment, includes specific documentation including an Informative Digest that summarizes existing law and the effect of the proposed action, the deadline for public comments, the time and place of any public hearings, and contact information for obtaining additional information. The notice is sent to persons on the Commission's and Department's active mailing lists and published in the California Regulatory Notice Register.

At its second meeting, the Commission reviews the proposed measures and alternatives in detail and receives public comment. At the third meeting, the Commission hears public comment and adopts the final rules. Commission staff then submits the final rules to the Office of Administrative Law for procedural review prior to publication.

The Commission or the Department may refer an issue to a standing committee or appoint an ad-hoc advisory committee to conduct further analyses and/or develop recommendations. The composition of such committees will include the Department, other agencies with statutory responsibility for the issue, representatives from affected groups, and any other persons chosen by the Commission.

This process does not diminish the authority of the Director of the Department (Director) or the Commission to take emergency regulatory action under FGC §7710, California Government Code §11346.1, or FGC §240.

1.2.2.3 Notice Actions

Once a measure (such as establishing annual catch quotas) has been classified as routine through the Full Rulemaking Action process, it may be modified after a single meeting of the Commission if both of the following conditions are met:

- the modification is proposed for the same purpose as the original measure;
- impacts of the modification are within the scope of the impacts analyzed when the measure was originally classified as routine.

Before acting on such a proposal, the Commission will send a written notice describing the proposed action to people on the Commission's and Department's active mailing list and will provide a 15-day period for comment.

1.2.2.4 Prescribed Actions

When an action is non-discretionary and the impacts have already been analyzed through Full Rulemaking, the Department may take the action without prior public notice, opportunity to comment, or a Commission meeting. An example of such a Prescribed Action is the closure of a fishery when a quota has been reached. The Full

Rulemaking process that authorized the Prescribed Action must specify methods for notifying the public.

1.2.2.5 Review of Management Measures

The MLMA requires periodic review of management measures because environmental, social, and economic changes during the year may lead to consideration of regulatory changes under the framework described above. The MSFMP proposes that the Department conduct a periodic review to determine the effectiveness of market squid regulations in accomplishing the goals and objectives of the MSFMP. This review will determine whether any resource, conservation, social, or economic issues exist that require a management response.

Examples of biological issues that might trigger further review and possible regulatory action are:

- catch that is projected to exceed the allowable catch limits;
- increased interaction with non-target species;
- any adverse or significant change in the biological characteristics of harvested market squid stock (e.g., age composition);
- existing or imminent overfishing;
- development of a stock assessment for market squid that significantly changes the estimates of impacts from current management;

Examples of social or economic issues that may be addressed in the periodic review are:

- gear conflicts, or conflicts between competing user groups;
- extension of fishing and marketing opportunities as long as practicable;
- improvements to product volume and flow to the consumer or user;
- to increase economic yield;
- to maintain or improve the safety of fishing operations;
- to increase or decrease fishing efficiency;
- to maintain or improve product quality;
- to maintain or improve data collection, including means for verification;
- to maintain or improve monitoring and enforcement;
- to address any other measurable benefit to the fishery.

If the Department determines that current management of the market squid fishery is not meeting the goals of the MSFMP, the Department will present the results of this review to the advisory committee(s) established under the MSFMP to seek their views and recommendations. The Department will then present its recommendations and views of the advisory committee(s) to the Commission regarding the need for changes in management of the market squid fishery. The Department needs to present the rationale, data and analyses in support of its recommendations for regulatory changes. The advisory committee(s) may also make management recommendations to the Department. The Commission will then determine whether to consider an amendment to the MSFMP or a full rulemaking action for the regulations implementing it.

1.3 Authority and Responsibility

As per the California Constitution, the State Legislature, through statute, may provide for the seasons and the conditions under which different species of fish may be taken. California law consists of 29 codes including the FGC. Laws in the FGC consist of statutes and propositions passed by the voters of the state. Statutes, such as MLMA, are chaptered bills that have passed through both houses of the Legislature and ultimately signed by the Governor and recorded by the Secretary of State. The FGC is administered and enforced through regulations. The rulemaking powers of the Commission, a body created by the Constitution and appointed by the Governor, are delegated to it by the Legislature.

The Department is the state agency charged with carrying out certain policies adopted by the State Legislature and the Commission. The Department enforces statutes and regulations governing recreational and commercial fishing activities, conducts biological research, monitors fisheries, and collects fishery statistics necessary to protect, conserve, and manage the living marine resources of California.

Other state agencies have functions and responsibilities that directly or indirectly affect the management of ocean and coastal resources. In addition, marine resources are also managed by federal laws governing the take of seabirds, marine mammals, fish, and shellfish (Weber and Heneman 2000).

1.3.1 California Environmental Quality Act (CEQA)

The Legislature enacted CEQA in 1970 to serve primarily as a means to require public agency decision makers to document and consider the environmental implications of their actions. In so doing, CEQA is premised on a number of Legislative findings and declarations, including a finding that it is "necessary to provide a high-quality environment that at all times is healthful and pleasing to the senses and intellect of man." [PCR §21000(b)] CEQA also codifies State policy to, among other things, "[p]revent the elimination of fish or wildlife species due to man's activities, insure that fish and wildlife populations do not drop below self perpetuating levels, and preserve for future generations representations of all plant and animal communities and examples of the major periods of California history" [Id., PCR §21001(c)]. A similar provision in the FGC also declares: "It is hereby declared to be the policy of the State to encourage the conservation, maintenance, and utilization of the living resources of the ocean and other waters under the jurisdiction and influence of the State for the benefit of all the citizens of the State and to promote the development of local fisheries and distant-water fisheries based in California in harmony with international law respecting fishing and the conservation of the living resources of the oceans and other waters under the jurisdiction and influence of the State." (FGC §7055) CEQA applies to all "governmental agencies at all levels" in California, including "state agencies, boards, and commissions" [PCR §21000(g), 21001(f)(g)]. Public agencies, in turn, must comply with CEQA whenever they propose to approve or carry out a discretionary project that may have a

significant effect on the environment (see generally Id., PCR §21080). For purposes of CEQA, a project includes "an activity which may cause either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment," that is, like the proposed project, "directly undertaken by any public agency" [Id., PCR §21065(a)]. Moreover, as mandated by the Legislature, "it is the policy of the state that projects to be carried out by public agencies be subject to the same level of review and consideration under [CEQA] as that of project projects required to be approved by public agencies" (Id., PCR §21001.1).

Unlike its "procedural" federal counterpart, the National Environmental Policy Act (NEPA) (42 USC §4321 et seq.), CEQA contains a "substantive mandate" that public agencies refrain from approving projects with significant environmental effects if there are feasible mitigation measures or alternatives that can substantially lessen or avoid those effects (Mountain Lion Foundation, supra, 16 Cal.4th at p. 134; PCR §21002). CEQA, as a result, "compels government first to identify the [significant] environmental effects of projects, and then to mitigate those adverse effects through the imposition of feasible mitigation measures or through the selection of feasible alternatives" [Sierra Club v. State Board of Forestry (1994) 7 Cal.4th 1215, 1233; see also Sierra Club v. Gilroy City Council (1990) 222 Cal. App.3d 30, 41.]. Public agencies fulfill CEQA's mandate through required consultation with other interested public agencies and the public; preparation of EIRs (Environmental Impact Reports), functional equivalent documents (see section 1.3.1.1), or other appropriate CEQA analysis; subjecting their environmental analyses to public review and comment, and preparing responses to public comments concerning the environmental impacts associated with their proposed projects; and ultimately adopting findings detailing compliance with CEQA's substantive mandate. In this respect, the CEQA process "protects not only the environment but also informed self-government" [Citizens of Goleta Valley v. Board of Supervisors (1990) 52 Cal.3d 553, 564 (internal quotation marks deleted)]. Indeed, as recently underscored by the California Supreme Court, compliance with these requirements, even in the context of a certified regulatory program, "ensures that members of the [governmental decision making body] will fully consider the information necessary to render decisions that intelligently take into account the environmental consequences. It also promotes the policy of citizen input underlying CEQA [Mountain Lion Foundation, supra, 16 Cal.4th at p. 133 (internal citations omitted)].

1.3.1.1 Functional Equivalent

There is one alternative to the CEQA Environmental Impact Report (EIR)/Negative Declaration (ND) requirement that exists for State agencies with activities that include protection of the environment as part of their regulatory program. Under this alternative, an agency may request certification of their program from the Resources Agency Secretary (PCR §21080.4 of CEQA). With certification, an agency may prepare functional equivalent environmental documents in lieu of EIRs or NDs (PCR §15252 CEQA Guidelines). The regulatory program of the Commission has been certified by the Resources Agency Secretary; thus, the Commission is eligible to submit an environmental document in lieu of an EIR. However, the exception for the certified state

regulatory program is not a blanket exemption from CEQA because the agency must still comply with CEQA policies, evaluation criteria, and standards.

1.3.1.2 MSFMP Environmental Document

The Environmental Document (ED) found in Section 2 describes the proposed project options, status quo options (no project alternative), and a range of alternative project options evaluated in the draft MSFMP. It discusses the potential effects of the proposed project, reasonable alternatives to the proposed action and cumulative effects related to the proposed project and its alternatives. The discussion of alternatives focuses on the alternatives to the project that are capable of avoiding or substantially lessening the significant effects of the project, even if the alternatives would impede to some degree the attainment of the project objectives, or would be more costly. Of those alternatives, the ED examines in detail only the ones that could feasibly attain most of the basic objectives of the project. It does not consider alternatives whose effect cannot be reasonably ascertained and whose implementation is remote and speculative.

At its 27 August 2004 meeting in Morro Bay, the Commission certified the Market Squid Fishery Management Plan's Environmental Document for consistency with the provisions of the California Environmental Quality Act and adopted the MSFMP.

1.3.1.3 Federal Law

The Federal government manages the marine resources and fishing activities of the United States (US) through the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA). The purpose of the MSFCMA is to provide conservation and management of US fishery resources, develop domestic fisheries, and phase out foreign fishing activity within the Exclusive Economic Zone (EEZ) consisting of ocean waters from three miles to 200 miles offshore. Under MSFCMA, the federal government also has jurisdiction over fish species that occur predominately in the EEZ, and may preempt state jurisdiction over such fisheries in state waters when state management conflicts with a federal FMP.

Eight Regional Fishery Management Councils implement the goals of the MSFCMA in coordination with NOAA Fisheries, United States Department of Commerce. PFMC manages several fisheries off Washington, Oregon, and California through FMPs. The State of California has representation on the PFMC. Five coastal pelagic species (CPS) are regulated under the federal Coastal Pelagic Species Fishery Management Plan (CPS FMP). Under this plan, two species are actively managed: Pacific sardine and Pacific mackerel; three species are monitored only: northern anchovy, jack mackerel, and market squid. The PFMC delegated management authority for market squid to the State.

1.4 State Management of Market Squid

Management of the market squid fishery has been divided between the Legislature and the Commission. The market squid fishery was minimally regulated until the passage of SB 364 in 1997. Since that time, both the Legislature and the Commission have adopted management measures for various components of this fishery (see Appendix B).

1.4.1 Legislative Responsibilities

Statues passed by the Legislature regulating commercial fishing are contained in the FGC. Some provisions of law apply specifically to market squid, while others apply generally to the take of all fish including some area closures and gear restrictions. Statutes pertaining specifically to the commercial take of market squid are listed in Appendix B.

The MLMA identifies a number of policies, goals, objectives, requirements, and processes for managing California's marine resources. These resources are to be managed to assure ecological, recreational, long-term economic, cultural, and social benefits.

The MLMA requires that FMPs form the primary basis for managing the State's marine fisheries. A FMP is a planning document that is based on best available scientific information and contains a comprehensive review of the fishery along with clear objectives and measures to promote sustainability of that fishery.

1.4.2 Commission and Department Responsibilities

The authority and responsibility of the Commission and the Department to make and enforce regulations governing recreational and commercial fishing are provided by the Legislature. General policies for the conduct of the Department are formulated by the Commission (FGC §704). General policy for conservation of aquatic resources is provided by FGC §7055, and specific policy for the management of marine resources (MLMA) is provided in FGC § 7050-7090.

1.4.3 Commercial Fisheries

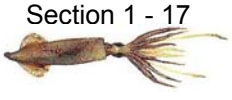
Commercial fishing is regulated by the Legislature through statutes and by the Commission through regulations. Provisions relating to the taking and possession of fish for commercial purposes are provided in FGC §7600-9101 and CCR Title 14. With the passage of the SB 209 (2001), authority to regulate the market squid fishery was delegated to the Commission.

1.4.4 Rulemaking Process under the Administrative Procedures Act (APA)

The California Constitution and Legislative statutes create public entities and can authorize them to make regulations in order to carry out their duties. The APA of the

California Government Code (CGC) §11340-11359 guides the rulemaking process for such entities.

The Commission's general rulemaking authority is provided in FGC §200-221 and in other statutes throughout the Fish and Game Code. Basic minimum procedural requirements for the adoption, amendment or repeal of regulations are provided in the CGC §11346. Emergency rulemaking authorities are found in CGC §11346.1 and in FGC §240.



Chapter 2. Background: A Description of the Species, the Fishery, and Social and Economic Components of the Market Squid Fishery

2.1 Species Description

Squid (also referred to as Cephalopods) belong to the class Cephalopoda of the phylum Mollusca. There are approximately 750 recognized species of squids alive today and more than 10,000 fossil forms of cephalopods. Squid have large, well-developed eyes and strong parrot-like beaks. They use their fins for swimming in much the same way fish do and their funnel for extremely rapid "jet" propulsion forward or backward. The squid's capacity for sustained swimming allows it to migrate long distances as well as to move vertically through hundreds of meters of water during daily foraging (feeding) bouts.

The common name for *Loligo opalescens* Berry, 1911 is market squid or opalescent squid. At a recent international cephalopod meeting (February 2003), the consensus was that, based on morphology and molecular evidence, the scientific name for market squid should be changed to *Doryteuthis (Amerigo) opalescens* (F. G. Hochberg, pers. comm.). This has not been formalized nor published. Current authority for the squid fishery [Fish and Game Code (FGC) §8420] refers to *L. opalescens* as “market squid” and this common name is used throughout the Market Squid Fishery Management Plan (MSFMP) (FGC §8045).

Market squid belong to the family Loliginidae. These squid generally have a mixed, iridescent (opalescent) coloration of milky white and purple; however, color changes occur rapidly in response to environmental conditions. Similar to most squid species, market squid possess an ink sac, which serves as a defense mechanism by expelling ink to confound predators. Market squid are less than 3 mm at hatching and grow to an average mantle length of 152 mm at the time of spawning. Squid have eight arms and two longer feeding tentacles. Males are larger and more robust than females. Market squid are terminal spawners, spawning occurs at the end of their lifespan. In California, commercial fisheries target adults during spawning events. Recent age studies indicate that squid are a semi-annual species; the average age of squid taken in the fishery is six months (range 4-10 months, Butler et al. 2001).

2.1.1 Distribution, Stock Biomass, Genetic Stock Structure and Migration

The range of market squid is from the southern tip of Baja California, Mexico (23° N latitude) to southeastern Alaska (55° N latitude). Juveniles and adults range throughout the California and Alaska Current systems (Roper and Sweeney 1984). Paralarvae, the life stage of market squid at the time of hatching, are often collected in the waters closer to the shoreline (Zeidberg and Hamner 2002). Their distribution is patchy, yet if squid are found at one site, it is likely that additional squid will be found in close proximity (contagious distribution).

The California fleet currently fishes only adult squid during spawning events in limited geographic areas. The abundance of market squid at these known fishing areas is dramatically affected by environmental conditions, especially during El Niño events (when landings are minimal).

An El Niño event occurs when the sea surface temperatures in the eastern equatorial Pacific region along the coasts of Peru and Ecuador increase significantly above the average temperature for three or more months. A La Niña is characterized by unusually cold ocean temperatures in the equatorial Pacific. Currently, El Niños have a return period of four to five years. An El Niño Southern Oscillation (ENSO) describes the full range of the Southern Oscillation that includes both warming and cooling of sea surface temperatures when compared to a long-term average. The ENSO has two parts: the El Niño is the oceanic component and the Southern Oscillation is the atmospheric component of the phenomenon.

Little is known about the present size, age structure, or status of the market squid population. At present, no direct, statistically valid population estimates are available.

Genetic analyses have not been successful in distinguishing separate stocks within the California fishery. Both Gilly (2003) and Reichow and Smith (2001) concluded that spawning populations that are commercially harvested from the Channel Islands are not genetically distinguishable from those landed in Monterey Bay. Although Gilly et al. (2001) found slight but significant genetic distances between samples taken from central California and southern California, no temporal or spatial genetic differences for market squid within the Southern California Bight and no temporal differences between samples in the Monterey areas were evident. Presently, additional genetic research is now focusing on genetic differences at the extremes of the market squid range (Alaska and Baja California). Thus, the number of different stocks or subpopulations of market squid along the entire Pacific Coast is unknown at this time.

Market squid paralarvae are dispersed off egg bed areas by ocean currents and are found most commonly inshore, concentrated in areas where water masses converge (Okutani and McGowen 1969, Zeidberg and Hamner 2002). Although they are often widely distributed, the migration patterns of juveniles and prespawning adults are unknown. Midwater trawl surveys in 1999 collected juvenile market squid at 45% of the stations throughout the Southern California Bight (CDFG, unpublished data). Adult market squid migrate from pelagic waters to nearshore areas and form dense aggregations for spawning. Their vertical distribution during daylight hours ranges from 100 to 600 meters. At night, adults are located within the upper 100 m of the water column (Zeidberg and Hamner 2002).

2.1.2 Age and Growth

Market squid egg hatching rate is determined by temperature, with incubation time ranging from 22 to 90 days at temperatures from 42-68°F (Isaac et al. 2001). Squid eggs are commonly deposited in areas with water temperatures between 50-58°F resulting in incubation periods lasting from 34 to 52 days.

The age of market squid was determined using statoliths, balance structures analogous to otoliths in fish. Rings are deposited daily on statoliths and used to determine the life span of these invertebrates. Daily ring deposition has been validated for several squid species including *L. opalescens* and other members of the family Loliginidae and has been shown to be an accurate method for ageing squid (Jackson and Domeier 2003; Hurley et al. 1985; Lipinski 1986; Jackson 1990a, b, 1994, 1998; Bettencourt et al. 1996; Spratt 1978).

Butler et al. (2001) found that market squid growth increases with age and is best described with a power function:

$$\text{DML (mm)} = 0.001342 * \text{Age}^{2.132}$$

where DML is dorsal mantle length in millimeters and age is in days ($r^2 = 0.95$, $df = 275$, $P < 0.001$). Paralarvae growth is slow [0.05 mm DML/day] during the first month, but growth rates increase dramatically as squid mature.

The market squid fishery in California targets spawning squid that are believed to die shortly after spawning, thus, samples collected directly from fishing vessels are assumed to represent squid at or very near the end of their life span. From port samples collected from November 1998 through July 2000, 908 statoliths were aged (Figure 2-1). The mean age of harvested market squid was 188 days. The average male (190 days) was slightly older than average female (186 days); however, the range for females (108 - 302 days) was broader than males (114 – 281 days).

The age data exhibit little variation between months. This strongly suggests that a new cohort, a group of squid spawned during a certain period, enters the fishery almost monthly. Further, ageing techniques indicate that the average market squid lives approximately six months, but may be sexually mature as early as 3.6 months (108 days) and can spawn as late as 10 months (302 days). Less than 1 percent (4/908 or 0.4%) of the squid aged could not be sexed, demonstrating that sexually immature squid are rare among spawning or harvested squid.

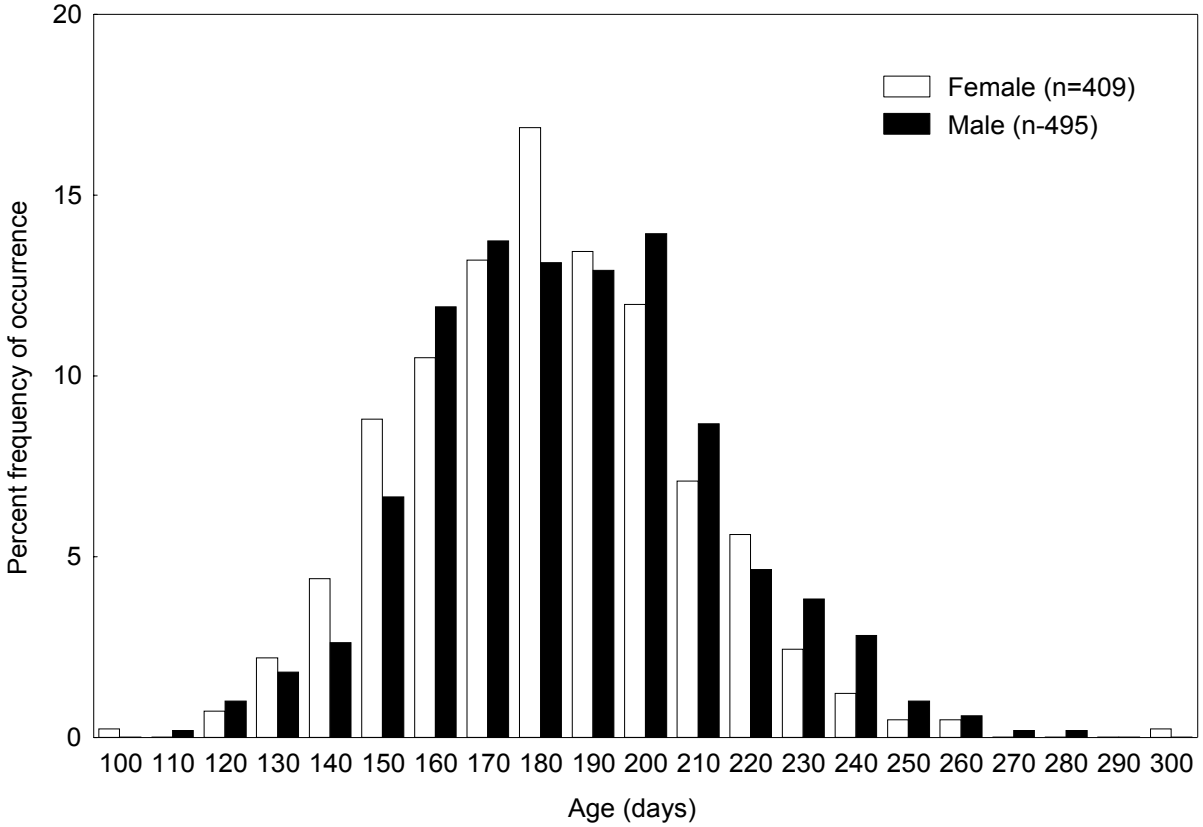


Figure 2-1. Number of market squid by age from port samples by sex. Source: CDFG Landing Receipts.

2.1.3 Reproduction, Seasonality and Fecundity

Spawning market squid tend to congregate in dense schools, usually over sandy habitats where they deposit extensive egg masses. In central California spawning activity starts around April and ends in October, while in southern California spawning events begin around October and end in April or May. The seasonality in spawning between central and southern California is attributable to ocean bottom temperatures rather than any biological difference. During some years, reproductive activity and landings may occur throughout most of the year. Year-round spawning in several areas statewide at different times of the year likely reduces the effects of poor local conditions on survival of eggs or hatchlings and indicates that stock abundance is not solely dependent on availability of squid from a single spawning area.

Mating takes place on spawning grounds but may also occur before squid move to their spawning sites. Male squid place spermatophores into the mantle cavity of females and eggs are fertilized as they are extruded (Hurley 1977). Off California, a female squid produces approximately 20 egg capsules (egg cases), with each capsule containing about 200 individual eggs that are suspended in a gelatinous matrix. The number of egg cases deposited and the number of eggs within egg cases vary by locale (numbers are reduced in Oregon). Further, the number of eggs within a capsule decline

throughout spawning. Females attach each egg capsule individually to the bottom substrate. As spawning continues, mounds of egg capsules covering more than 100 square meters may be formed and appear to carpet the sandy substrate. Market squid have been reported to die after completing their first and only spawning period (McGowan 1954, Fields 1965), but the duration of the spawning period is unknown. Recently, Hanlon et al. (2004) observed that females can spawn multiple times within a spawning period and do not die immediately after a single spawning event. In Monterey, spawning has been observed during daylight hours (Forsythe et al, 2004) as well as during the night (CDFG, unpublished data).

The lifetime fecundity of market squid is a critical life history trait; fecundity must be known to estimate the biomass using either egg deposition or larval production methods (Hunter and Lo 1997). Macewicz et al. (2001b, 2003) found that squid have a fixed reproductive output and die before developing and spawning all possible eggs in their ovaries. For an average female with a dorsal mantle length of 129mm, the potential fecundity is 3,844 eggs which increases with increasing length (Potential fecundity = 29.8 * dorsal mantle length (Macewicz et al. 2003).

2.1.4 Natural Mortality

Squid appear to exhibit a very high natural mortality rate and the adult population is composed of almost entirely new recruits. No spawner-recruit relationship has been demonstrated. These observations suggest that the entire stock is replaced annually, even in the absence of fishing. Thus, the stock is entirely dependent on successful spawning that occurs throughout each year coupled with good survival of recruits to adulthood.

Total mortality (natural and fishing) has been estimated to range from 0.3 to 0.6 per month (Maxwell 2001) based on squid ageing data (squid from six to 10 months) (Butler, et al. 2001). Full recruitment of market squid into the fishery occurs at six months. Additional studies on market squid mortality are needed.

2.1.5 Disease

Several marine worms utilize the squid as a host species; larval nematodes (roundworms), cestodes (tapeworms) and polychaetes (bristleworms) all have been recovered from squid and/or squid eggs. Nematodes, cestodes, and their larval stages have been found in market squid (Benjamins 2000). In Monterey Bay, Riser (1949) cited infestation of squid by two types of plerocercoid larvae. These larvae are tetraphyllidean cestodes that infest the large intestine of the squid. At Point Mugu, squid sampled from a commercial seafood outlet exhibited infestation by larval cestodes (orders Tetraphyllidea and Pseudophyllidea) and nematodes. These parasites were found to infect the eye, stomach, intestines, body cavity and tissues at a rate of 76.9% (Dailey 1969). The polychaete worm *Capitella ovincola* is a predator of market squid eggs. This worm has been found inside squid egg capsules (MacGinite and MacGinite 1949) but does not appear to affect squid fitness either by decreasing the egg hatching rate or triggering premature hatching (Morris et al. 1980).

2.1.6 Predator/Prey Relationships

2.1.6.1 Squid as Predators

Market squid feed on a variety of prey during their life cycle. As larvae and juveniles, squid consume copepods and euphasiids. These fast-moving prey items are a challenge to young squid; they enhance the development of prey-capture and escape skills (Preuss and Gilly 2000). As adults, market squid feed on fish, polychaete worms, squid (cannibalism),and crustaceans such as shrimp and pelagic red crab. Also, squid are found in commercial catches of anchovies, sardines, herring, mackerel, and sauries where they feed with and most likely upon these fish (Fields 1965). In Monterey Bay, larger squid have been found to feed chiefly on fish and cephalopods; however, there are significant differences in prey intake between depth and location rather than size classes (Karpov and Cailliet 1979).

Prey composition fluctuates with squid age, size, and reproductive status, as well as, spatially. The availability of prey and the behavior of market squid at different depths and locations may influence feeding behavior. Karpov and Cailliet (1978, 1979) found that crustaceans and cephalopod fragments were ingested at higher frequencies on spawning grounds than on non-spawning grounds. Inshore versus offshore samples of squid indicated differences in diet composition. In deeper waters, euphasiids and copepods were dominant prey items, while true cannibalism (intake of whole cephalopods) and fish consumption dominated in shallow waters.

2.1.6.2 Squid as Forage

Market squid are an integral part of the food web to many marine vertebrates. Fish, seabirds, and marine mammals all utilize squid as a prey item. Squid has been documented as an important dietary component of the sea otter, northern elephant seal, northern fur seal, California sea lion (Lowry and Carretta 1999), Dall's porpoise, Pacific striped dolphin, Risso's dolphin, toothed whales such as the short-finned pilot whale (Hacker 1992), the sperm whale, and the bottlenose whale (Fields 1965). In addition, seabirds such as the common murre, ashy storm-petrel, black storm-petrel, fork-tailed storm-petrel, and rhinoceros auklets feed on market squid (Morejohn et al. 1978). In Monterey Bay, 19 species of fish were found to feed upon market squid, including many commercially important species such as Pacific bonito, salmon, halibut, and tuna (Fields 1965, Morejohn et al. 1978) (Figure 2-2). These fishes include all depleted, threatened, and endangered salmon stocks along the coast. In fact predators from many trophic levels utilize both small pelagic fishes, such as northern anchovy and sardine, and squid as either a primary or supplementary food source (Table 2-1).

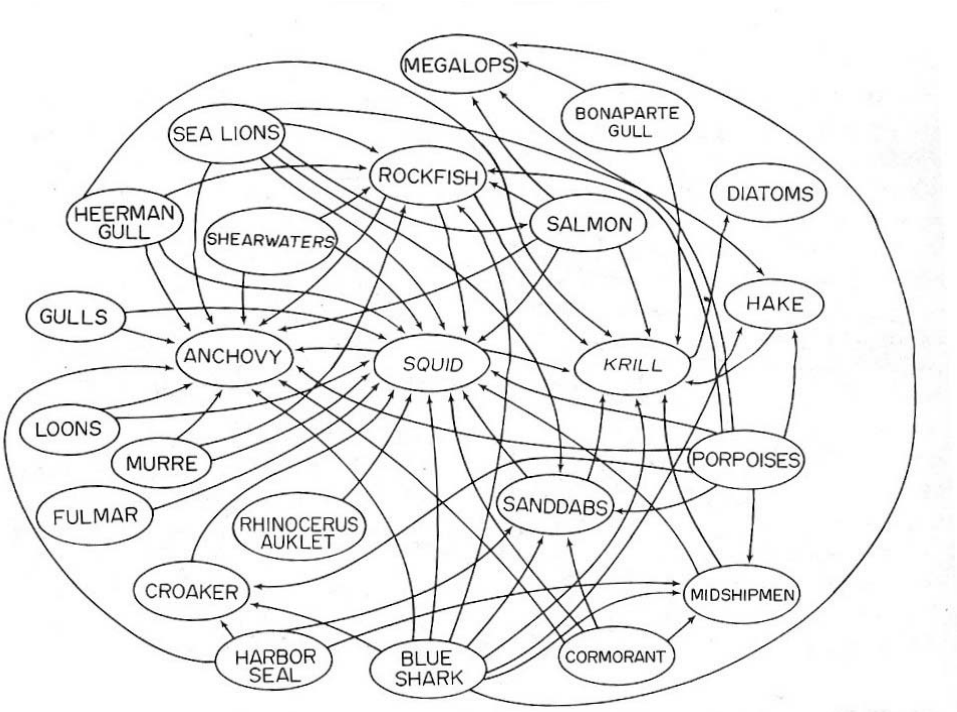


Figure 2-2. Food web for market squid, *Loligo opalescens*, involving commercially important or abundant fish, birds, and marine mammals (from Morejohn, et al. 1978).

Understanding how an ecosystem functions requires information on the trophic relationships of key species, including squid (May et al. 1979, Sydeman et al. 1997, Furness and Tasker 2000). Under MLMA, the Department must consider ecosystem impacts of a fishery, namely the conservation of not only the exploited species, but the other species that depend on that resource. In order to assess these fishery impacts on other species that also compete for that resource it is necessary to know how much that competitor depends on that resource. In fisheries which target lower trophic levels, such as market squid or sardines, natural predators are often thought of as competitors for the fishery resource (May et al. 1979, Dayton et al. 2002). At present, we do not have a complete understanding of the dynamics of many of these trophic relationships for squid; therefore, as additional research becomes available it will be incorporated into the MSFMP to better manage this fishery.

The proportion of the diet that squid makes up varies dramatically between species, geographical location, and environmental conditions. Most squid predators are not squid specialists, i.e., squid is rarely the sole prey item; because of its highly variable abundance, squid cannot be relied on as a stable food source, additionally, it has limited energetic value (O'Dor and Webber 1986). Therefore, squid predators often must switch to more abundant or energetically profitable prey species (Ainley et al. 1996, Sydeman et al. 1997), or target squid when they are most abundant during spawning aggregations and minimal energy is needed for capture.

For seabirds such as the common murre, squid composes 6-20% of the diet (by weight) depending on season, and is usually ranked 3rd or 4th after northern anchovy, Pacific

herring, and shiner surfperch (Ainley, et al. 1996). In terms of frequency-of-occurrence, the presence of squid varies dramatically. For diving birds such as rhinocerous auklets, common murres, artic loons, and Brandt's cormorants, the frequency-of-occurrence of squid in the diet can range from 33-85% (Baltz and Morejohn 1977). For plunging, surface feeding birds, such as shearwaters and gulls, the frequency-of-occurrence ranges from 0-67% (Baltz and Morejohn 1977).

Market squid are important as forage to a long list of fish and they serve as an important food source for many larger pelagic fish that are commercially and recreationally important, such as white seabass, yellowtail, kelp bass, barred sand bass, California barracuda, California halibut, and other nearshore species. For chinook salmon, squid composed 7-9% of diet (by volume) and ranked 3rd or 4th behind northern anchovy, euphausids, and juvenile rockfish depending on location, Monterey or San Francisco, respectively (Morejohn et al. 1978). At other locations along the west coast, squid is not an important prey item for chinook since they prey mainly on fish (Groot and Margolis 1991). In chilipepper rockfish, squid ranked 3rd behind juvenile rockfish and other fishes (Morejohn et al. 1978). Other fish predators in which squid ranked high as a prey item includes mainly bottom dwelling species including curlfin turbot, speckled and Pacific sanddabs, lingcod, petrale sole, and Pacific halibut (Morejohn et al. 1978). Several pelagic species also feed on squid when available such as blue shark, common thresher shark, and albacore (Morejohn et al. 1978).

For the California sea lion, squid occurs in 35-44% of scat samples collected at rookery sites in the Southern California Bight which can represent volumes as high as 27% of the diet by weight in non El Niño years and 16% in El Niño years (Lowry and Carretta 1999). In terms of prey rank, squid was either the primary or secondary prey item after northern anchovy, depending on location and environmental conditions. During an El Niño event, the presence of market squid in California sea lion and Pacific harbor seal scat samples decreased more than three-fold as compared to non El Niño periods (Henry 1997, Lowry and Carretta 1999).

Consumption estimates are known for some squid predators, although these can vary dramatically because squid availability changes with location and environmental conditions. For example, sea lions in southern California have been estimated to consume 68,000 tons of squid in non El Niño years and 30,000 tons in El Niño years (STAR Panel Working Paper #4, Appendix E). Dr. William Gilly estimated that three species, California sea lion, Dall's porpoise, and Risso's dolphin combined consume 125,000 tons of squid annually (pers. comm.). The changing availability of squid also affects potential predators. Short-finned pilot whales, blue sharks, and Pacific bonito increase their consumption of market squid during the squid spawning season. It has been suggested that short-finned pilot whales in the Southern California Bight (Hacker 1992, Miller et al. 1983, Dohl et al. 1980) and blue sharks near Santa Catalina Island (Tricas 1979) may move inshore as the squid spawning season begins. Pacific bonito consumption of squid is influenced by the shoaling behavior of squid spawning in nearshore waters of southern California (Oliphant 1971).

Seasonal landings of market squid in southern California ports have been strongly correlated with percent frequency-of-occurrence in sea lion diets (Figure 2-3). In El Niño years, resource availability is low for all species. In non El Niño years, squid appears to be serving as adequate forage for sea lions, even with high levels of fishing activities, as sea lion pup production or population trends do not appear to be affected. As a result of the 1998 El Niño, sea lion pup production at the Channel Islands declined 64% (Carretta et al. 2002). However in 1999, pup production increased by 185% resulting in the highest net productivity rate observed in sea lions for the past 20 years (Carretta et al. 2002). During that same period, commercial squid landings in California were the highest on record (126,772 tons) with over 99% of those landings coming from southern California. In recent years, concurrent with squid landings in excess of 100,000 tons annually, the sea lion population in California continues to increase at a rate of 5.4-6.1% per year (Carretta et al. in prep).

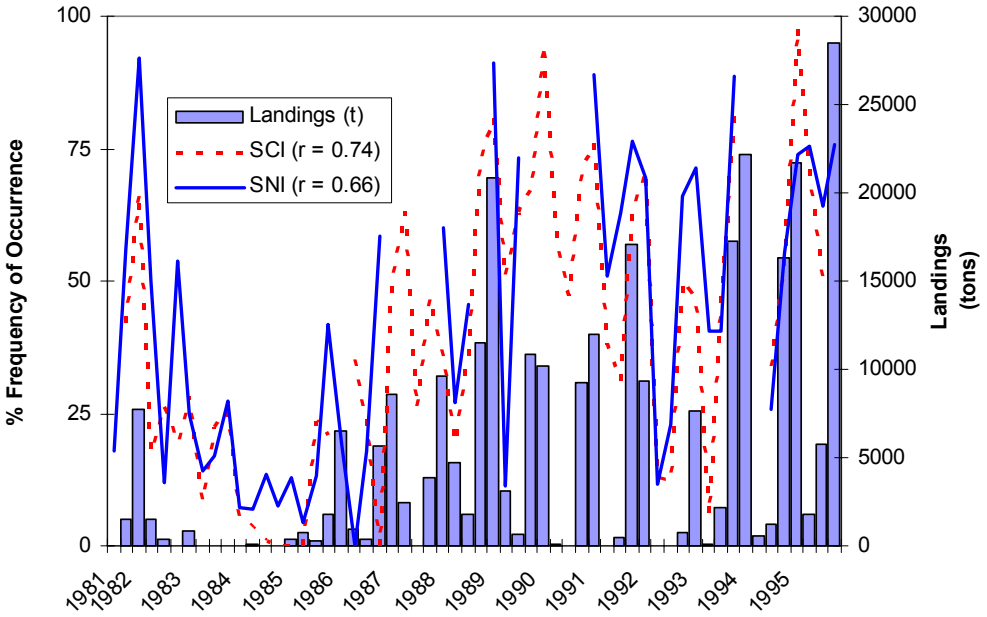


Figure 2-3. Seasonal Comparison of Sea Lion Scat Squid Frequency-of-Occurrence at San Clemente (SCI) and San Nicholas Islands (SNI) vs Squid landings in Southern California Ports (from Lowry and Carretta 1999).

Fishery independent data suggest that squid distribution is widespread, fishing does not occur in all areas of distribution, and not all spawning grounds are targeted. Historical evidence from research cruises along the west coast, as well as recent catch data, suggests that squid biomass may be very large at times and distributed widely along the entire west coast (Groundfish Triennial Bottom Trawl Survey, Midwater trawl surveys, Kenny Mais survey, etc., STAR Panel Working Paper #5), suggesting that a large portion of the squid biomass is available to other trophic levels (Figure 2-4).

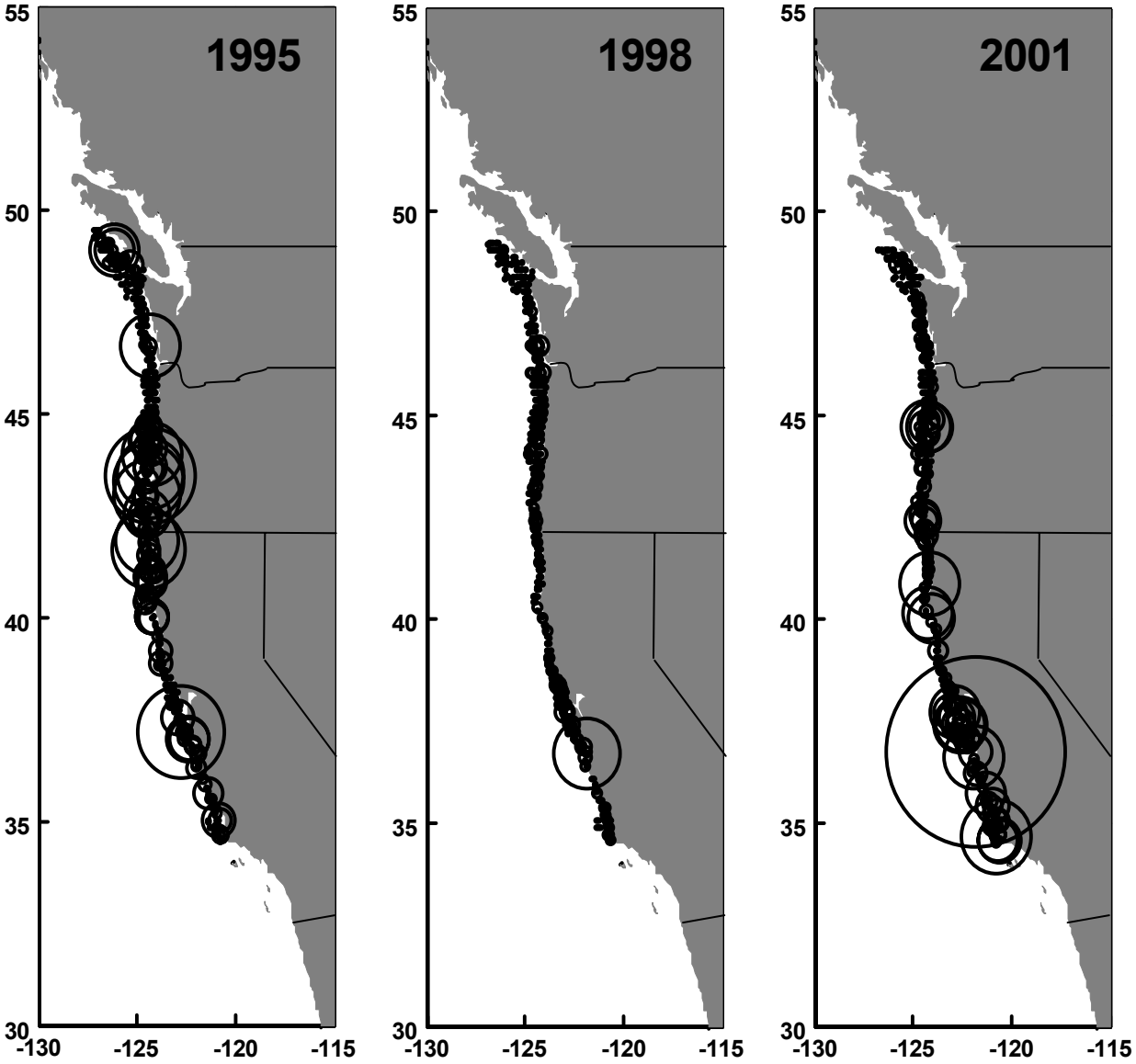


Figure 2-4. Expanding symbol plots of distribution and abundance of *Loligo opalescens* juveniles collected as part of the by-catch in the summer triennial groundfish survey conducted by NOAA Fisheries/NWFSC (from Reiss et al. in submission).

As briefly identified above, market squid, along with anchovy and sardine, are important as forage to predators at many trophic levels. Although it is not currently possible to estimate the total amount of squid used as forage in the California Current ecosystem or the size of squid populations necessary to sustain predator populations, the MSFMP contains the goal of providing adequate forage for dependent species. This goal is implemented through management measures that reserve a portion of the biomass as forage for all dependent species using such tools as fishery control rules and harvest replenishment areas.

Table 2-1. Known fish, bird, mammal and invertebrate predators of coastal pelagic species, including market squid. (Table 1.1.2-1 from Federal Coastal Pelagic Species FMP; Table 7A from CDFG Report to the Legislature).

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MARINE MAMMALS	MARINE BIRDS	MARINE FISH
Northern fur seal	Black-footed albatross	Northern anchovy
Guadalupe fur seal*	Fulmar	Pacific sardine
Steller sea lion	Sooty shearwater	Pacific whiting
California sea lion	Manx shearwater	Common thresher shark
Northern elephant seal	Short tailed shearwater	Bonito shark
Harbor seal	Pink footed shearwater	Soupfin shark
Common dolphin	Leach's Storm petrel	Blue shark
Harbor porpoise	Ashy Storm petrel*	Pacific electric ray
Dall's porpoise	Black Storm petrel	Silver (coho) salmon*
Pacific white-sided dolphin	Brown pelican*	King (Chinook) salmon*
Bottlenose dolphin	Double-crested cormorant	Steelhead*
Pilot whale	Brandt's cormorant	Rockfish (many species)
Blue whale*	Pelagic cormorant	Striped bass
Fin whale*	Glaucous-winged gull	Barred sand bass
Sei whale	Western gull	Kelp bass
Minke whale	Heerman's gull	Spotted sand bass
Pacific right whale*	Ring-billed gull	Ocean whitefish
Humpback whale*	California gull*	Jack mackerel
California gray whale	Black-legged kittiwake	Yellowtail
	Common murre	White seabass
	Pigeon guillemot	Queenfish
INVERTEBRATES	Marbled murrelet*	California corbina
Market squid	Craveri's murrelet	White croaker
Ocean squids	Xantus's murrelet*	Surfperches (many species)
	Ancient murrelet	California barracuda
	Cassin's auklet	Pacific (chub) mackerel
	Rhinoceros auklet*	Pacific bonito
	Horned puffin	Albacore
	Tufted puffin*	Bluefin tuna
	Bald eagle	Swordfish
	Osprey	Striped marlin
	Elegant tern*	Giant seabass
	Caspian tern	Lingcod
	Forster's tern	Scorpionfish
	Least tern*	Dogfish

* = endangered, threatened, or candidate species

2.1.7 Competition

Market squid feed with a variety of pelagic fish, namely anchovies, sardines, herring, and mackerel. They are often found together in commercial catch targeting these species; however, there is little information regarding the actual competition for

resources. Dense spawning aggregations of market squid may result in an increased incidence of cannibalism (Karpov and Cailliet 1978).

Trophic interactions between squid and higher-trophic-level fish are poorly understood. Among coastal pelagic finfish species (sardines, anchovies, and mackerel), it is not known if the value of market squid as a food source to adult predators outweighs the negative effects of predation by squid on larvae and juveniles of predator fish species plus competitive removal of phytoplankton, zooplankton and other fish.

2.1.8 Critical Habitat

The description and identification of Essential Fish Habitat for market squid is generalized because data are incomplete for this species. The CPS FMP describes the east-west geographic boundary to be all marine and estuarine waters from the shoreline along the California coast offshore to the limits of the exclusive economic zone (EEZ) and above the thermocline, where sea surface temperatures range between 50-79ºF, the upper tolerance of CPS finfish.

Market squid inhabit the inshore and offshore waters of the California Current from British Columbia to Baja California. The California Current is a region of transport, coastal jets, divergence, and upwelling. Changes in the Pacific Basin atmospheric pressure systems result in seasonal and interannual environmental variability within the California Current ecosystem. Variations are caused by local winds and Ekman transport, flows of the equatorward California Current, the poleward undercurrent, and the inshore countercurrent. Temporal variations associated with the California Current are on time scales of several years to decades [i.e., the El Niño Southern Oscillation (ENSO) and cold vs. warm water regimes]. ENSO and other temperature related events markedly alter flow and temperature of currents within the California Current system.

Refuges, preserves and marine sanctuaries (now termed marine protected areas and marine managed areas due to recent legislation) are areas that are legally defined and regulated by the state or federal government, with the primary intent of managing areas for their conservation, recreational, ecological, historical, research, educational, or aesthetic qualities. National marine sanctuaries specifically prohibit exploring for, developing, or producing oil, gas, or minerals within their boundaries. Two national marine sanctuaries, the Channel Islands National Marine Sanctuary and the Monterey Bay National Marine Sanctuary encompass the main fishing areas for market squid.

Non-spawning market squid are pelagic and believed to be associated with the deep scattering layer that migrates vertically to the upper levels of the water column at night. Spawning squid concentrate in dense schools near spawning grounds, but habitat requirements for spawning are not well understood. Spawning occurs over a wide depth range, but the extent and significance of spawning in deep water are unknown. Known market squid spawning grounds are characterized by a sandy substrate in shallow waters; major spawning grounds fished in California are located in Monterey Bay and near the Channel Islands. Egg cases are most often deposited at depths

between 18 and 55 m (CDFG-NOAA Fisheries unpublished data), but have been found at depths of 792 m. Adults and juveniles prefer oceanic salinities and are most abundant between temperatures of 50-60ºF (Roper and Sweeney 1984).

2.1.9 Status of the Stocks

Market squid population dynamics are poorly understood. Although some information exists on the coastwide distribution and abundance of market squid from fishery-independent midwater and bottom trawl surveys aimed at assessing other species, there is no good measure of annual recruitment success beyond information obtained from the fishery. Because fishing activity occurs only on shallow-water spawning aggregations, it is not apparent if landings reflect availability to the fishery, or overall stock size since squid have been documented at greater depths using other gear.

Historically, the squid resource was considered by some to be underutilized. Until improved estimates of abundance are available, the true status of the population will remain unknown. In 1998, a cooperative scientific research program between the Department and NOAA Fisheries was initiated and efforts to model the population began. This program may eventually give rise to a more thorough and detailed stock assessment similar to those for other coastal pelagic species.

2.1.10 Areas Involved

There are two major fishery areas in California. The northern fishery is centered in Monterey Bay, and squid are landed primarily at Monterey and Moss Landing. The northern fishery operates predominately within a half-mile of the Monterey Bay shoreline. The southern fishery targets a multitude of fishing spots including the Channel Islands and coastal areas from Point Conception south to La Jolla. Squid are landed chiefly at the ports of Ventura, Port Hueneme, San Pedro, and Terminal Island.

2.2 History of Exploitation

The commercial fishery has a long history in California, dating back to the mid-nineteenth century, although annual catches were usually less than 10,000 short tons (tons) until the 1960s (Table 2-2). During the 1980s, California's squid fishery grew rapidly in fleet size and landings when international demand for squid increased due to declining squid fisheries in other parts of the world (CDFG 2001c). In 1997, a permit was created for the squid fishery and the rapid growth of fleet size was halted by a moratorium on new permits. Although it is not known when recreational fisheries in California started to use market squid as bait, it is currently used as either live or dead bait for recreational fisheries throughout the state.

Table 2-2. Historical market squid landings in tons for California divided at Point Conception into northern and southern fisheries. The market squid season is from 1 April through 31 March of the following year. Source: CDFG Landing Receipts.

Season	Northern fishery	Southern fishery	Total landings

Table 2-2. Historical market squid landings in tons for California divided at Point Conception into northern and southern fisheries. The market squid season is from 1 April through 31 March of the following year. Source: CDFG Landing Receipts.

Season	Northern fishery	Southern fishery	Total landings
1927-1928	1567	4	1571
1928-1929	686	44	730
1929-1930	2,303	16	2,319
1930-1931	5,494	16	5,510
1931-1932	792	71	863
1932-1933	2,072	28	2,100
1933-1934	430	4	434
1934-1935	736	19	755
1935-1936	329	19	347
1936-1937	451	17	469
1937-1938	245	61	306
1938-1939	754	11	765
1939-1940	522	53	575
1940-1941	818	86	904
1941-1942	694	47	741
1942-1943	406	34	440
1943-1944	4,529	18	4,546
1944-1945	5,435	38	5,472
1945-1946	7,586	27	7,613
1946-1947	19,777	18	19,795
1947-1948	8,728	64	8,792
1948-1949	7,599	59	7,658
1949-1950	3,087	2	3,089
1950-1951	2,997	2	2,999
1951-1952	5,844	374	6,219
1952-1953	1,746	2,649	4,394
1953-1954	2,076	391	2,467
1954-1955	3,772	77	3,849
1955-1956	6,714	119	6,833
1956-1957	9,828	478	10,306
1957-1958	5,496	1,753	7,249
1958-1959	1,902	2,848	4,750
1959-1960	7,140	94	7,235
1960-1961	1,103	996	2,099
1961-1962	1,987	4,075	6,062
1962-1963	2,886	2,028	4,914
1963-1964	3,174	1,641	4,815
1964-1965	4,551	5,223	9,774
1965-1966	4,439	4,508	8,947
1966-1967	5,597	4,211	9,808
1967-1968	5,617	6,088	11,705
1968-1969	7,289	2,668	9,957

Table 2-2. Historical market squid landings in tons for California divided at Point Conception into northern and southern fisheries. The market squid season is from 1 April through 31 March of the following year. Source: CDFG Landing Receipts.

Season	Northern fishery	Southern fishery	Total landings
1969-1970	5,780	6,186	11,966
1970-1971	4,314	8,861	13,175
1971-1972	8,328	4,475	12,803
1972-1973	6,124	5,057	11,181
1973-1974	621	7,696	8,317
1974-1975	7,248	5,302	12,549
1975-1976	2,495	10,563	13,058
1976-1977	2,511	6,587	9,098
1977-1978	2,235	12,050	14,285
1978-1979	10,343	8,680	19,024
1979-1980	14,169	7,213	21,381
1980-1981	7,860	12,087	19,947
1981-1982	14,132	11,700	25,833
1982-1983	11,697	1,516	13,213
1983-1984	1,061	27	1,087
1984-1985	549	804	1,354
1985-1986	4,276	10,100	14,376
1986-1987	6,967	18,636	25,603
1987-1988	6,632	18,582	25,214
1988-1989	5,765	42,430	48,195
1989-1990	7,829	25,222	33,051
1990-1991	8,871	23,602	32,472
1991-1992	9,013	29,653	38,666
1992-1993	9,450	9,343	18,793
1993-1994	10,012	44,440	54,452
1994-1995	19,103	44,489	63,592
1995-1996	3,676	90,157	93,833
1996-1997	5,828	118,481	124,309
1997-1998	9,275	1,623	10,898
1998-1999	26	11,673	11,699
1999-2000	308	126,464	126,772
2000-2001	7,730	115,681	123,411
2001-2002	10,094	92,621	102,715
2002-2003	27,828	19,166	46,994

2.2.1 Description of User Groups

2.2.1.1 Commercial Fishery

California's market squid fishery began in 1863; Chinese immigrants harvested small quantities of squid from Monterey Bay (Dickerson and Leos 1992). Skiffs were used to encircle a net around another skiff that used a torch to attract the squid to the surface.

The product was dried and exported to China. In 1905, Italian immigrant fishermen introduced the more efficient lampara net. The lampara net (Table 2-3) was the only legal form of round haul gear in the southern bight of Monterey Bay until 1989. Once purse and drum seines were legalized for use in this district, the squid fleet switched gear types and the lampara became obsolete. In CDFG Districts 16 and 17 (Monterey and Santa Cruz Counties), attracting lights were prohibited between 1959 and 1988; in 1989 lights were again allowed in the northern fishery. Catch in the northern fishery had not expanded in terms of volume or location until the 2002-2003 season. Excluding El Niño events, the number of vessels participating in the northern fishery landing greater than two tons daily of market squid has remained relatively constant (Figure 2-5) while the number of vessels increased in the 1990s (Figure 2-6).

Table 2-3. Description of gear types.

Gear type	Description
Purse seine	A round haul net with a "purse" line to close the bottom of the net. One end is attached to a skiff and the deploying vessel encircles the squid. The other end of the net is brought to the deploying vessel and the purse line is drawn, closing the bottom of the net to prevent escaping squid.
Drum seine	Like a purse seine, but a large drum stores, deploys and retrieves the net.
Lampara	A round haul net with the sections of netting made and joined to create bagging. The net is pushed beneath squid to encircle it from each side. The "wings" of the net are pulled back to the boat and the squid end up in the bag portion of the net. This gear has no arrangement for pursing.
Brail	A large dip net sometimes used with the assistance of the vessel's hydraulics.

During the 1970s brail vessels were the major harvesters in the southern California market squid fishery, using a power-assisted brail or dip net in conjunction with attracting lights (Kato and Hardwick 1975). In 1977, the fleet shifted from using brail vessels to purse seine vessels (Vojkovich 1998). Vessels brailing for squid still land a small portion of the catch (less than 2.0% in 2000-2001 season). These vessels have the advantage of fishing in some areas that are closed to roundhaul gear and can land smaller volumes at a higher value. However, purse seine and drum seine vessels are more effective at landing large volumes of squid and by the early 1990s, the purse seine became the dominant gear on the entire coast, with the drum seine gaining popularity by the mid-1990s (Figure 2-7).

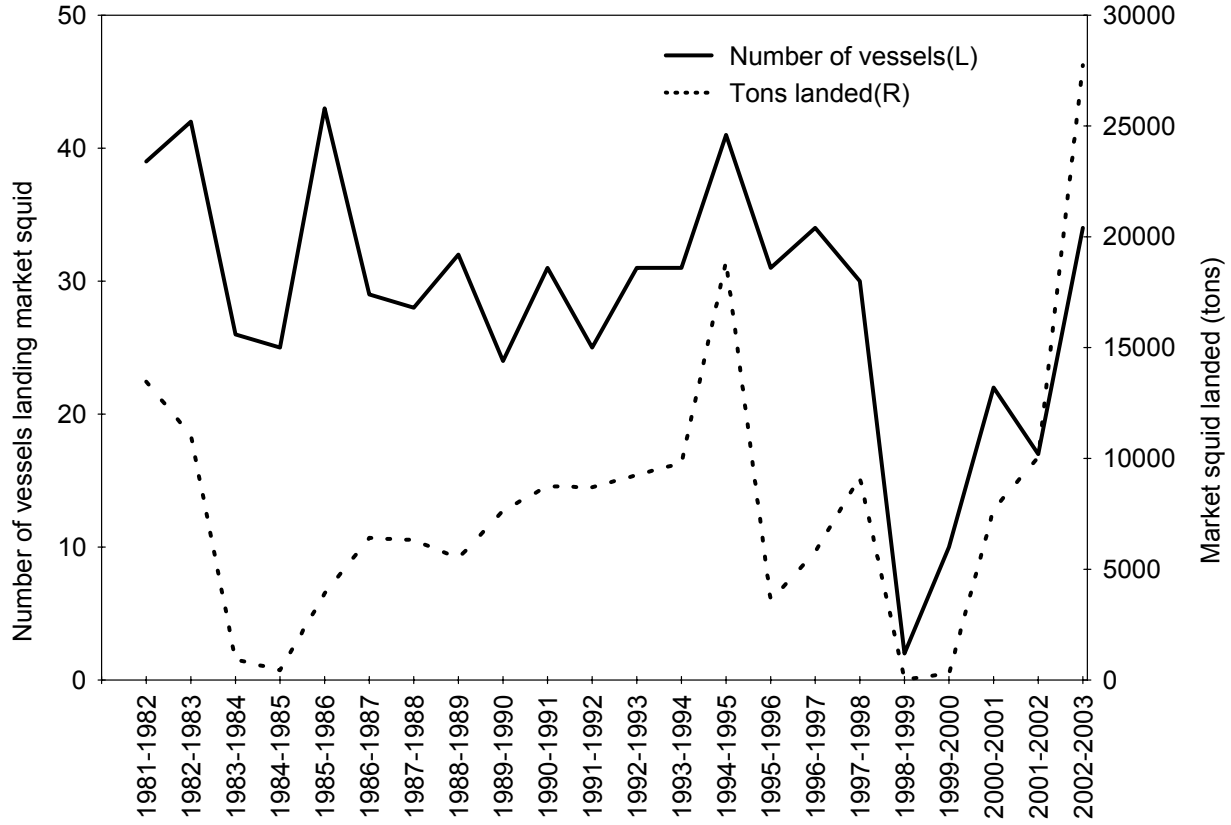

Figure 2-5. Number of vessels and market squid landings by season for Northern California. Source: CDFG Landing Receipts; note: data for 2002-2003 season is preliminary.

According to Department records, the average purse seine vessel length is 18.9 m (62 feet) and 81 gross tons. The average hold capacity is 84 tons. During the past three years, over two-thirds of the fleet (70%) used a purse seine, 23% used a drum seine and 4% used brail gear. Nearly all vessels use side-scan sonar and fathometers. The average vessel power is 428 HP and auxiliary power is148 HP. Most vessels (82%) use refrigerated seawater to keep their catch cold, while others (live bait vessels) use circulated seawater, brine or no cooling system at all. The average purse seine net is 381 m (1250 feet) long with a depth of 48 m (156 feet). The stretched mesh size is one inch.

In most cases, squid seiners work with light boats. A light boat is typically a smaller vessel with several high-powered lights located at various levels around the vessel. The purpose of the lights is to attract and aggregate spawning squid to surface waters. The light boat actively searches for squid. Once squid are located and aggregated, the light boat will signal the seiner to deploy its net, encircling the light boat, in order to catch the squid located under the lights.

According to logbook records, the average light boat is 11.8 m (39 feet) in length with a gross tonnage of 19 tons. Wattage for squid attracting lights averages approximately 22,500 watts (30,000 watts is the legal maximum). Nearly all light boats use side-scan sonar and fathometers. Light boat power and auxiliary power average 379 HP and 63 HP, respectively.

Squid fishing supplements the income of many seine vessels from southern California that also participate in the tuna and CPS fisheries. Many vessels in the southern fishery have homeports in the states of Alaska, Washington and Oregon and participate in salmon, herring and sardine fisheries in these other states. In recent years, some vessels from the squid fishery participated in a high value sardine fishery off the Columbia River at the border of Oregon and Washington. Many light boats also participate in other local fisheries that do not use attracting lights such as herring, hook-and-line and gillnet. Declines in other fisheries led to an influx of fishing vessels from other states in the 1990s. Some fishermen have complained about user conflict and territorial disputes between "local" and out-of-state fishermen. Non permitted vessels, including vessels in other fisheries (such as trawlers) that periodically catch small volumes of squid, are allowed to make landings of up to two tons daily (Table 2-4).

The number of businesses purchasing squid has remained constant since the early 1980s (mean = 54; range 41-86), however, since the 1994-1995 season, the majority (80% or more) of the squid purchased was bought by nine or fewer dealers. The majority (approximately 72%) of the dealers purchase less than 100 tons per year.

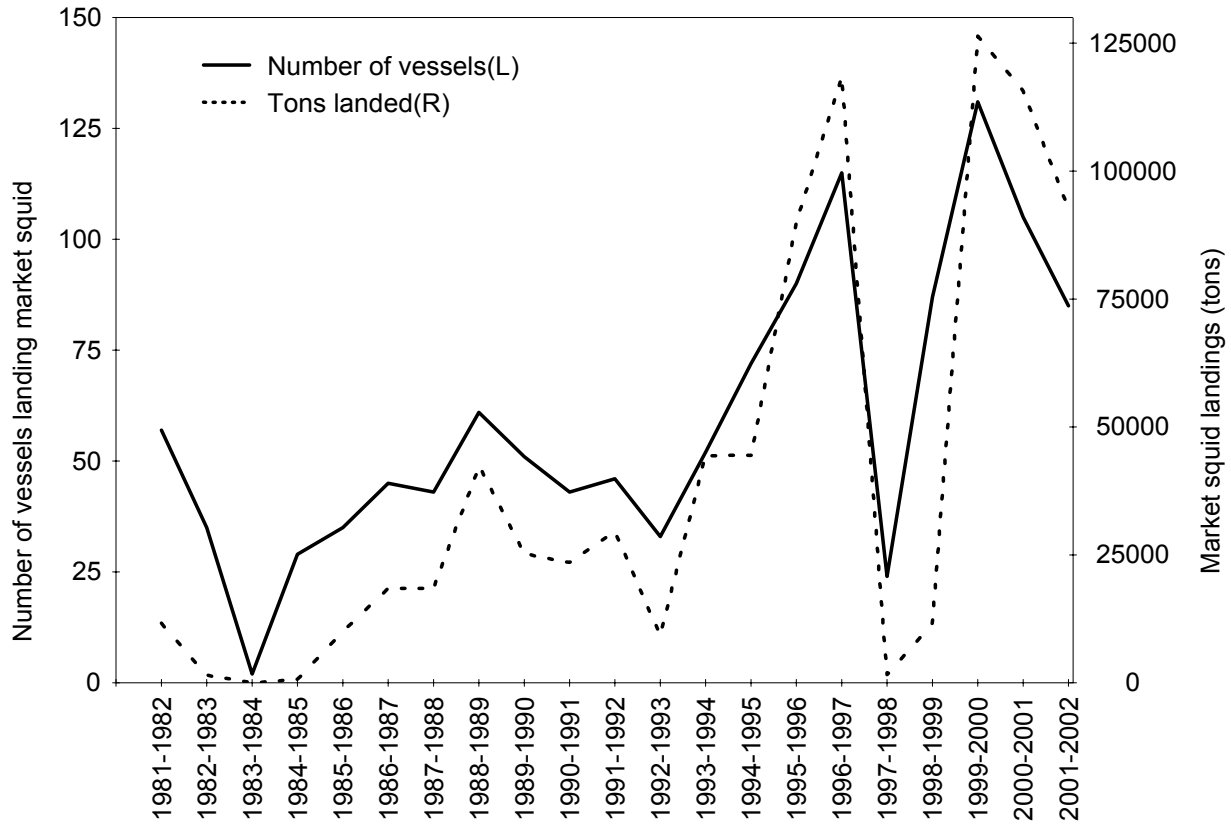

Figure 2-6. Number of vessels and market squid landings by season for Southern California. Source: CDFG Landing Receipts.

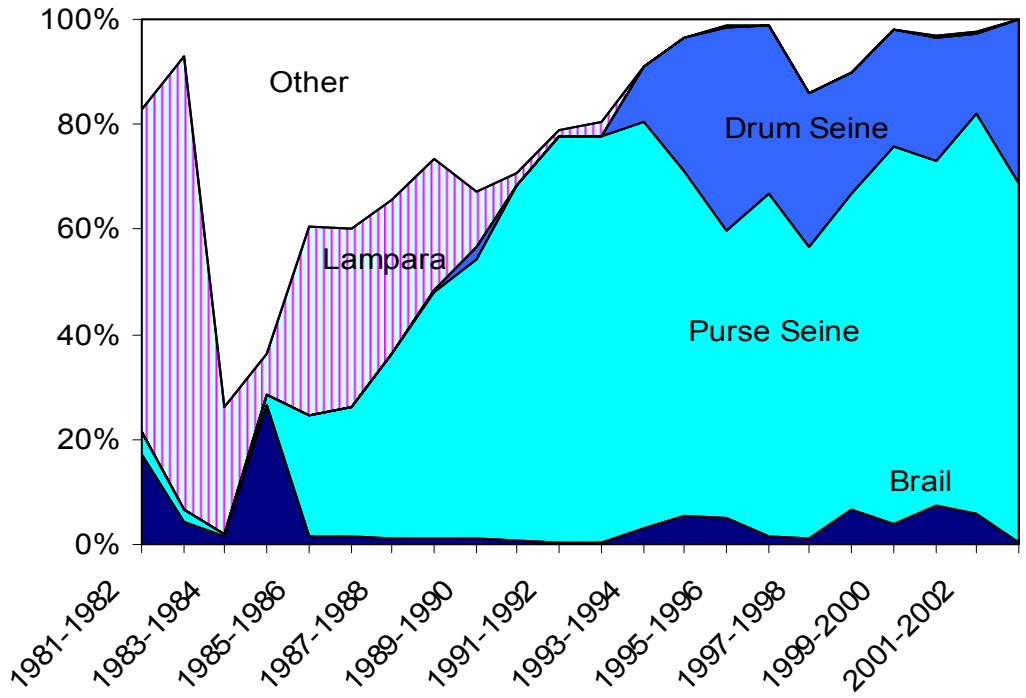

Figure 2-7. Percent of landings by season and gear type (note: "Other" includes, but is not limited to jig, hook and line, trawl nets, and other roundhaul nets). Source: CDFG Landing Receipts.

Table 2-4. Historical California landing receipt information for permitted and non-permitted vessels, 1981-1982 to 2002-2003. . Vessels fishing for squid were not required to have a squid fishing permit until the 1998-1999 season; this table shows the historical activity by the vessels currently permitted as of the 2002-2003 squid fishing season. Source: CDFG Landing Receipts.

Season	Landings (tons)	Landings (tons) by current permittees	Percent landings made by permittees	Number of vessels	Number of currently permitted vessels
1980-1981	5,768	1,459	25.3%	55	10
1981-1982	25,851	11,349	43.9%	152	31
1982-1983	13,213	7,049	53.3%	125	28
1983-1984	1,087	740	68.1%	81	17
1984-1985	1,354	476	35.1%	95	21
1985-1986	14,376	8,833	61.4%	126	34
1986-1987	25,603	14,184	55.4%	122	34
1987-1988	25,214	15,547	61.7%	117	37
1988-1989	48,195	31,371	65.1%	119	43
1989-1990	33,051	22,705	68.7%	100	39
1990-1991	32,472	24,764	76.3%	102	41
1991-1992	38,666	30,503	78.9%	85	40
1992-1993	18,793	16,176	86.1%	82	40
1993-1994	54,452	44,335	81.4%	92	45
1994-1995	63,592	51,006	80.2%	110	54
1995-1996	93,833	72,749	77.5%	128	65
1996-1997	124,315	95,082	76.5%	143	77

Table 2-4. Historical California landing receipt information for permitted and non-permitted vessels, 1981-1982 to 2002-2003. . Vessels fishing for squid were not required to have a squid fishing permit until the 1998-1999 season; this table shows the historical activity by the vessels currently permitted as of the 2002-2003 squid fishing season. Source: CDFG Landing Receipts.

Season	Landings (tons)	Landings (tons) by current permittees	Percent landings made by permittees	Number of vessels	Number of currently permitted vessels
1997-1998	10,898	9,917	91.0%	86	46
1998-1999	11,699	9,433	80.6%	117	67
1999-2000	127,248	107,934	84.8%	168	95
2000-2001	124,379	108,831	87.5%	152	85
2001-2002	102,667	96,757	94.2%	118	85
2002-2003	46,970	45,031	95.9%	105	78

2.2.1.2 Recreational Fishery

The other market squid user group is the recreational sector of the fishery. Market squid are primarily caught by bait haulers using seine, lampara or brail nets. This small volume of squid is a high value fishery, which supplies bait to recreational fisheries along the California coast, primarily in southern California (CDFG 2001b). Live bait is sold from the catcher vessel at sea or from one of the many harbor-based bait dealerships. Sport fishing vessels and privately owned skiffs catch their own squid bait by using attracting lights and brail nets and/or rod and reel. Live and dead squid are ideal bait for a variety of California sport fisheries, especially rockfish and white seabass.

2.2.2 Fishing Effort

2.2.2.1 Commercial Fishing Effort

In the 1990s, the market squid fishery ranked highest among the state's commercial fisheries: squid ranked number one in landings for six years and number one for dollars paid ex-vessel for three years (CDFG 2001c). Although quite successful, the commercial squid fishery is unpredictable due to environmental (e.g., El Niño) and market conditions.

During an El Niño event (i.e., 1997-1998), squid availability declines along with fishing effort and catch. In years when squid are readily available, fishing effort appears to be determined by market conditions. Vessel participation is at its greatest during the late fall and early winter for the southern fishery and during the summer for the northern fishery (Figure 2-8). When squid processors have full freezers or the demand for California squid is low, vessels are generally put on market-imposed limits, and ex-vessel prices may be lowered. As squid availability declines as the season progresses, many vessels leave for other fisheries. If ex-vessel prices drop too low, effort may also drop because of less economic incentive to fish.

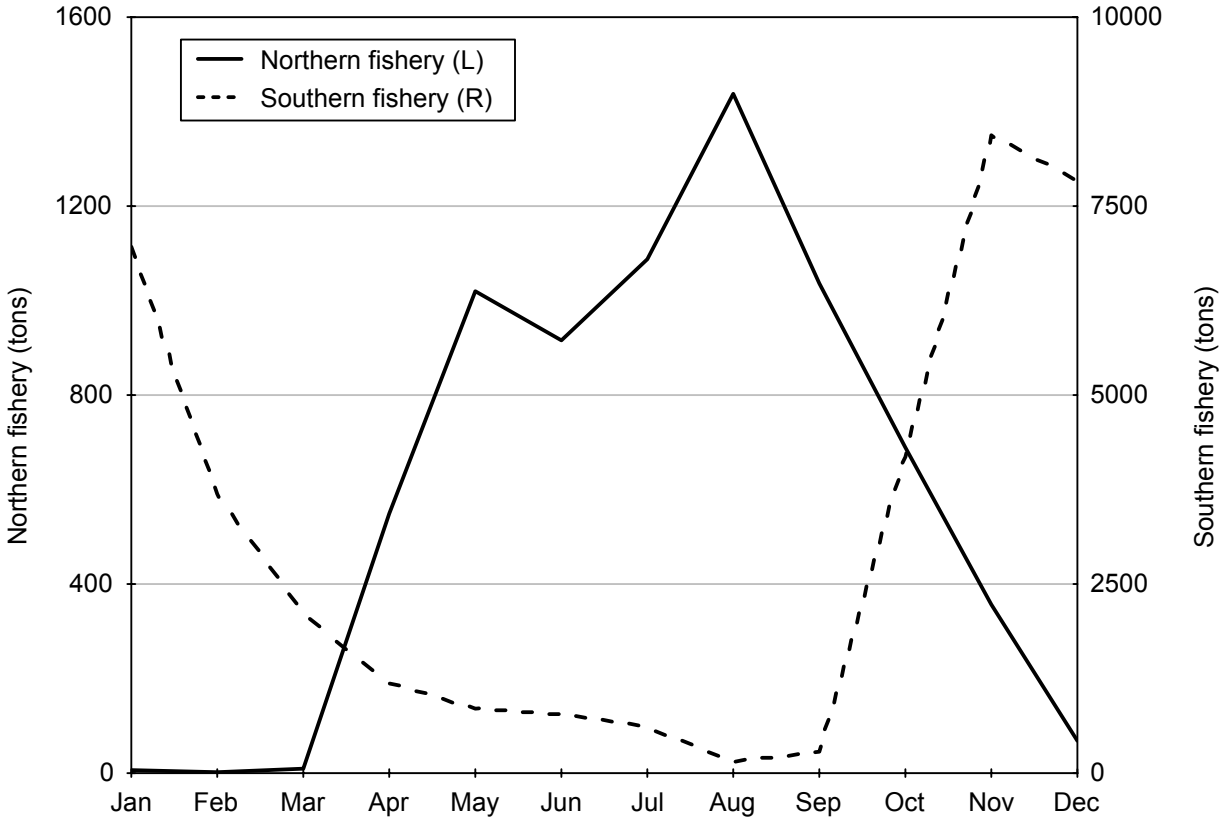

Figure 2-8. Average monthly landings in tons for the squid fishery divided at Point Conception into northern (left axis) and southern (right axis) fisheries for the period of 1981 through 2001. Source: CDFG Landing Receipts.

Although market squid may be available in commercial quantities from Baja California to Oregon, the fishery is centered in two areas of California: Monterey Bay and the Channel Islands off southern California. The earliest fishery, in Monterey Bay, caught less than 1,000 tons per year from 1916 (when the Department began keeping records) to 1923 (Dickerson and Leos 1992). From 1924 to 1932, landings averaged more than 2,000 tons per year. Most of this catch was dried and exported to China; some was used domestically as canned or frozen product. The Asian market closed in 1933 due to financial conditions and the domestic market supported the Monterey fishery for many years. Landings in California were minimal until 1942 when demand from international aid programs triggered a rise in the need for squid the following year. Landings peaked at close to 20,000 tons in the 1946-1947 season, then averaged 9,100 tons until the 1981-1982 season when greater than 25,000 tons were landed (Table 2-2). Before the 1960s, the majority of squid landings were in the Monterey Bay area. In 1961, the fishery in southern California experienced a dramatic increase in landings. The southern fishery centers around the northern Channel Islands, Santa Catalina Island, and southern coastal nearshore areas (Hill and Yaremko 1997).

Since the early 1980s, landings in southern California have exceeded those of the northern fishery (Figure 2-9; also see Table 2-2). Fishery landings reached a peak of

126,772 tons in the 1999-2000 season. The rapid fishery expansion of the last 25 years is a result of rising demand for squid in foreign markets, especially Europe and China.

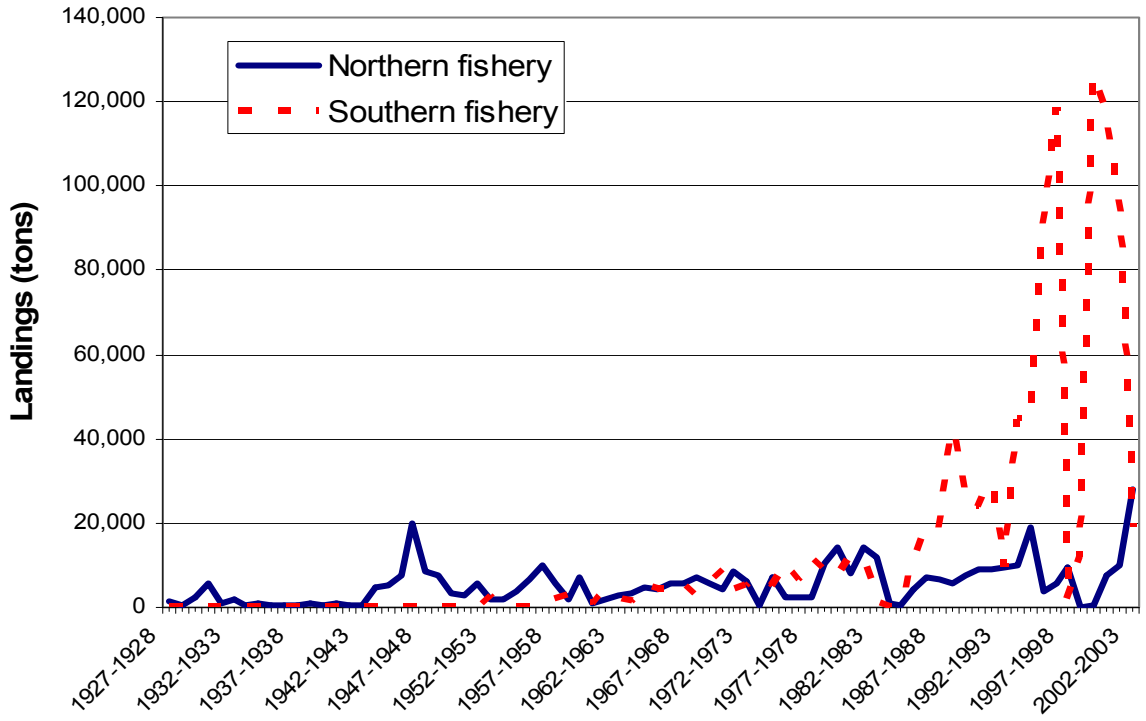

Figure 2-9. Market squid landings from 1927-1928 through 2002-2003 seasons showing the increase in landings for the fishery south of Point Conception. Source: CDFG Landing Receipts.

Because the squid fishery was primarily an open-access fishery before 1998 and due to recent increases in statewide landings, legislation was enacted to ensure the sustainability of the squid resource and the marine life that depends on squid. This legislation required the purchase of an annual permit to land more than two tons or to attract squid by using light for purposes of commercial squid harvest. Eligibility has been determined by the purchase of a permit in the initial 1998-1999 season and subsequently from the previous year (Table 2-5). In the 2002-2003 season, there were 185 vessel permits and 40 light boat owner permits issued. Since 1998, the number of vessel and light boat owner permits has declined.

Table 2-5. Vessel and light boat owner's permit issuances, 1998-99 to 2002-03 seasons. Source: CDFG Landing Receipts.

Season	Vessel Permits Issued	Vessel Attrition (%)	Light Boat Owner Permits Issued	Light Boat Attrition (%)
1998-1999	248	--	53	--
1999-2000	218	12.1	51	3.8
2000-2001	195	9.6	50	2.0
2001-2002	195	0.0	44	12.0
2002-2003	185	5.1	40	9.1

Not all permitted vessels were active in the fishery during the moratorium period. Despite the large number of permits issued, the current squid fleet consists of approximately 60 dedicated seiners. As with many fisheries, a select number of vessels made the majority of the catch. In the last four seasons, only 30, 34, 28, and 21 permitted vessels, respectively, made 75% of the catch.

2.2.2.2 Recreational Fishing Effort

There are insufficient data to describe recreational fishing effort for market squid. Live bait logs used by commercial vessels to voluntarily report catch (e.g., northern anchovy, Pacific sardine) do regularly report squid taken. Additionally, some light boat operators record scooping live squid for bait in their logbooks. Preliminary data for the 2001-2002 season recorded 49 tons of market squid taken as live bait, less than 0.05% of the total harvest. Again, these data are voluntary and should be considered as a minimum amount of squid harvested for bait.

2.2.3 Fishery Impacts

The adverse effects from fishing activities may include physical, chemical and biological alterations of the substrate, loss of and or injury to benthic organisms, prey species and their habitat, and other components of the ecosystem. FMPs must include management measures that minimize adverse effects on marine ecosystems from fishing, to the extent practicable, and to identify conservation and enhancement measures. In addition, they must contain an assessment of the potential adverse effects of all fishing activities and should consider the relative impacts of all fishing equipment used in varying habitats (Bargmann et. al. 1998).

Fishing for market squid could have important trophic implications and other ecological impacts. There is concern over the use of chains as a seine weight in the commercial fishery. Chains have the potential of digging deeper into the ocean floor than the suggested alternatives, such as small diameter cables (Hastings and MacWilliams 1999). Net bottoms may also scrape the ocean floor and do harm to squid eggs. A suggestion has been made for a maximum depth and length of net to avoid disturbance to egg cases or to require that the net shall be no deeper that the depth fished. Further, there is concern for squid caught which have not yet spawned by targeting schools of squid using sonar which are in transit to spawning grounds.

Bycatch is minimal in the commercial market squid fishery, although it cannot be avoided entirely. Through the Department's port sampling program, 886 of 2,402 samples (37%) collected between October 1998 and October 2003 contained incidentally caught fish and invertebrates (Table 2-6). Two or more species were observed as bycatch in 47% of landings with bycatch. Most of this bycatch was other coastal pelagic species, including Pacific sardine, Pacific mackerel, northern anchovy and jack mackerel. Approximately 3.2% of sampled landings contained squid egg cases. Previous drafts of this MSFMP reported that incidental catch of squid eggs was 2%. In addition, squid eggs occurred in 8.3% of the Monterey samples. This higher level of observed egg cases is most likely due to the shallower nature of the northern

fishery and is a source of concern. Under the proposed management strategy, the fishery is monitored by evaluating escapement of squid eggs from the fishery. If the fishery damages squid spawning beds, and this damage is a significant source of egg mortality, the monitoring program will be biased unless this additional source of mortality is accounted for.

Currently, the type of net used to fish for squid is unregulated, although purse seines used for squid typically do not hang as deep as purse seines used for other species, so contact with the bottom is reduced. Incidental catches of squid eggs and other species increase in the squid fishery when the nets are set in shallower water (less than 40 m), where bottom contact may occur (Lutz and Pendleton 2001). Damage to the substrate, and thus, mortality of squid eggs associated with purse seining for squid has not been quantified.

A research study to measure the effect of purse seine fishing on squid spawning grounds has been undertaken by NOAA Fisheries and the Department. So far, preliminary results of this study are unavailable. The study will use three approaches to measure the effect of purse seines on squid beds: 1) Direct observation of egg capsule bycatch in the net from an observation boat; 2) ROV surveys of the squid egg capsule distributions in fished and unfished habitats, and 3) Determination of the natural mortality of squid eggs in heavily fished areas versus unfished areas. If current fishing practices are shown to affect squid egg survival, changes in gear or fishing practices can be proposed to the squid fishing industry to find the most efficient way to reduce the risk of egg loss due to fishery gear interaction. Potential future management options may include altering the mesh size or depth of the net, or closing some of the shallow water habitats to fishing.

Less than 2 percent of the observed landings contained species that are prohibited from being landed using seine gear (e.g., barracuda, yellowtail). In terms of species of concern, there have been seven observations of Chinook (King) salmon representing 1.6% of observed landings in Monterey as well as one observation of salmon (species unknown). In addition, bocaccio was observed in 1.2% of the Monterey landings.

Table 2-6. Percent frequency-of-occurrence of observed market squid incidental catch by port area. A total of 2,402 port samples were taken between October 1998 and October 2003. Source: CDFG Port Sampling Data.

Common Name	Total All Ports	Monterey Moss Landing	Santa Barbara Ventura	San Pedro Terminal Is.
PACIFIC SARDINE	18.5	9.5	18.9	21.5
PACIFIC MACKEREL	6.9	2.3	6.0	9.7
NORTHERN ANCHOVY	5.0	3.9	4.0	6.2
JACK MACKEREL	4.0	6.7	0.1	6.6
MARKET SQUID EGGS	**3.2**	**8.3**	**1.7**	**2.3**
PACIFIC BUTTERFISH	2.0	4.4	1.8	1.0
BAT RAY	1.9	1.4	2.3	1.6
JACKSMELT	1.3	6.7	0.1	0.1
CALIFORNIA BARRACUDA	**0.9**		**1.0**	**1.1**
PACIFIC ELECTRIC RAY	0.9	4.9		

Table 2-6. Percent frequency-of-occurrence of observed market squid incidental catch by port area. A total of 2,402 port samples were taken between October 1998 and October 2003. Source: CDFG Port Sampling Data.

Common Name	Total All Ports	Monterey Moss Landing	Santa Barbara Ventura	San Pedro Terminal Is.
PELAGIC RED CRAB	0.9		2.0	0.1
DUNGENESS CRAB	0.7	3.9		
SANDDAB	0.6	2.1	0.4	0.2
SEA STAR	0.6	0.9	0.1	0.9
SCULPIN	0.6			1.4
HORN SHARK	0.4			0.9
TURBOT	0.4	1.9		
SOLE	0.4		0.6	0.3
CABEZON	0.3	0.2	0.1	0.6
ROCK CRAB	0.3		0.5	0.3
CHINOOK (KING) SALMON	**0.3**	**1.6**		
MEXICAN POMPANO	0.3		0.6	0.1
CALIFORNIA HALIBUT	0.3	0.5	0.1	0.4
RAY	0.3	0.2		0.6
MIDSHIPMAN	0.2	0.2		0.5
PACIFIC SANDDAB	0.2	0.7		0.3
BOCACCIO	**0.2**	**1.2**		
QUEENFISH	0.2		0.2	0.2
SMELT	0.2			0.4
WHITE CROAKER	0.2			0.4
PACIFIC SAURY	0.2	0.9		
FLYINGFISH	0.2		0.1	0.3
ROCKFISH	0.2	0.5	0.1	0.1
PACIFIC HERRING	0.2	0.9		
ENGLISH SOLE	0.2	0.7		0.1
MISCELLANEOUS FISH	0.2			0.4
CURLFIN TURBOT	0.1	0.5		0.1
MACKEREL UNCLASSIFIED	0.1	0.5	0.1	
OCTOPUS	0.1		0.2	0.1
SALEMA	0.1	0.7		
BLUE SHARK	0.1		0.2	
HORNYHEAD TURBOT	0.1			0.2
SPECKLED SANDDAB	0.1	0.2		0.1
SURFPERCH	0.1	0.5		
SEA URCHIN	0.1		0.2	
CALIFORNIA LIZARDFISH	0.1			0.2
SAND SOLE	0.1	0.5		
DIAMOND TURBOT	0.1			0.2
BARRED SAND BASS	0.1			0.2
BIGMOUTH SOLE	0.1			0.2
CALIFORNIA SPINY LOBSTER	0.0		0.1	
BLACKSMITH	0.0			0.1
GREENSPOTTED ROCKFISH	0.0		0.1	
BIG SKATE	0.0	0.2		
WAHOO	0.0			0.1

Table 2-6. Percent frequency-of-occurrence of observed market squid incidental catch by port area. A total of 2,402 port samples were taken between October 1998 and October 2003. Source: CDFG Port Sampling Data.

Common Name	Total All Ports	Monterey Moss Landing	Santa Barbara Ventura	San Pedro Terminal Is.
BLUE ROCKFISH	0.0	0.2		
YELLOWTAIL	**0.0**			**0.1**
SKATE	0.0		0.1	
SHRIMP UNCLASSIFIED	0.0			0.1
SHOVELNOSE GUITARFISH	0.0			0.1
SALMON	**0.0**	0.2		
Total Port Samples Taken	**2,402**	**415**	**988**	**999**

2.3 Social and Economic Characteristics of the Market Squid Fishery

California's fishing industry ranks among the top five seafood producing states in the nation (CSC 1997), and growth or decline in commercial fishing, including the market squid industry, affects production, trade and employment throughout the California economy. California market squid is the most valuable commercial fishery product to the state in terms of volume and revenue, generating more than $35 million ex-vessel revenue in recent years. Among California fishery exports, market squid ranked first by volume and value; further, market squid has ranked first in both volume and revenue several times during the 1990s (Table 2-7). The vast majority of squid is frozen for export to China, Japan and Europe where it is used mainly for human consumption. Minor amounts are sold fresh or canned.

Table 2-7. Market squid volume and value exported and respective rankings of California fishery exports from 1990 through 2000 (last year data available). Source: NOAA Fisheries.

Year	Squid exported (tons)	Export value*	Rank by volume	Rank by value	Percent catch exported
1989	5,267	$5,667,283	1	7	11.7
1990	4,571	$4,110,021	2	10	14.6
1991	2,619	$2,637,344	12	20	6.4
1992	4,187	$3,938,031	2	8	29.0
1993	4,569	$5,448,155	1	6	9.7
1994	15,801	$15,817,174	1	3	25.8
1995	24,107	$21,196,325	1	1	30.2
1996	36,377	$32,802,620	1	2	41.1
1997	49,745	$45,989,317	1	1	64.2
1998	1,554	$2,109,087	8	20	48.7
1999	37,411	$36,355,586	1	1	29.8
2000	92,701	$71,637,625	1	1	75.2

*Note: export value not adjusted for inflation.

The role of international buyers in the success of the California market squid fishery is substantial. After decades of generally low catches, volume increased during the 1990s because of new markets and higher prices. Landings and ex-vessel revenue declined during the 1997-1998 El Niño when squid became harder to catch. In 1999, overseas markets collapsed due to poor economic conditions in Asia. Since then, there has been some recovery of the Asian market, although demand is affected greatly by

performance of other worldwide fisheries, particularly the Falkland Islands *Loligo gahi* fishery.

There are three major port areas associated with California's commercial market squid fishing industry (Table 2-8): Northern California (Monterey County); Santa Barbara port area (Ventura and Santa Barbara Counties); and Los Angeles port area (Los Angeles and Orange Counties).

Table 2-8. Market squid landings (in tons) by port area (N-SFO = counties north of San Francisco; SFO = San Francisco County, M/SC = Monterey and Santa Cruz Counties; SLO = San Luis Obispo County; SB/VE = Santa Barbara and Ventura Counties; LA/OC = Los Angeles and Orange Counties; SD = San Diego County). Source: CDFG Landing Receipts.

Season	N-SFO	SFO	M/SC	SLO	SB/VE	LA/OC	SD	Total
1990-1991	1	142	8,728	<1	13,201	10,400	<1	32,472
1991-1992	2	1,622	7,389	<1	18,098	11,554	0	38,666
1992-1993	<1	2,698	6,751	1	7,297	2,028	18	18,793
1993-1994	<1	1,122	6,643	2,247	25,571	18,869	<1	54,452
1994-1995	77	2,464	15,021	1,540	32,685	11,802	2	63,592
1995-1996	2	823	2,700	151	67,824	22,331	2	93,833
1996-1997	0	367	5,235	226	90,039	28,441	1	124,309
1997-1998	4	226	9,045	<1	1,593	28	2	10,898
1998-1999				10	6,948	1,584		8,543
1999-2000	0	6	332	8	85,134	41,758	10	127,248
2000-2001	1	0	7,854	19	67,542	48,917	45	124,378
2001-2002	0	309	8,539	68	27,583	33,363		69,862
2002-2003	4	953	26,478	393	15,121	4,066		47,016

Since the 1993-1994 fishing season, the Santa Barbara and Los Angeles port areas have received the bulk of market squid revenues, with the highest revenues coming into the ports of San Pedro, Port Hueneme and Ventura (Table 2-9). Since the 1981-1982 season, these three areas account for an average of 98% of all squid landings except during El Niño periods (1982-1983 – 53% and 1992-1993 – 86%) when squid landings were minimal. Based on landings, other ports where squid are landed landing are of minor economic importance.

Table 2-9. Dollars paid ex-vessel for market squid by port area (N-SFO = counties north of San Francisco; SFO = San Francisco County, M/SC = Monterey and Santa Cruz Counties; SLO = San Luis Obispo County; SB/VE = Santa Barbara and Ventura Counties; LA/OC = Los Angeles and Orange Counties; SD = San Diego County). *Note: Dollars not adjusted for inflation. Source: CDFG Landing Receipts.

Season	N-SFO	SFO	M/SC	SLO	SB/VE	LA/OC	SD	Total
90-91	$144	$30,691	$1,299,765	$59	$1,223,192	$1,343,869	$643	$3,898,362
91-92	$1,452	$344,122	$873,987	$51	$830,200	$1,137,595	$0	$3,187,407
92-93	$40	$452,087	$652,164	$163	$764,033	$444,441	$3,612	$2,316,541
93-94	$6	$320,948	$1,012,803	$505,792	$2,612,486	$2,923,770	$0	$7,375,804
94-95	$17,477	$633,318	$2,807,522	$453,583	$8,149,029	$2,607,151	$306	$14,668,386

Table 2-9. Dollars paid ex-vessel for market squid by port area (N-SFO = counties north of San Francisco; SFO = San Francisco County, M/SC = Monterey and Santa Cruz Counties; SLO = San Luis Obispo County; SB/VE = Santa Barbara and Ventura Counties; LA/OC = Los Angeles and Orange Counties; SD = San Diego County). *Note: Dollars not adjusted for inflation. Source: CDFG Landing Receipts.

Season	N-SFO	SFO	M/SC	SLO	SB/VE	LA/OC	SD	Total
95-96	$463	$214,959	$432,174	$21,301	$13,432,243	$5,544,538	$50	$19,645,729
96-97	$0	$12,160	$521,737	$58,681	$14,810,588	$8,354,422	$262	$23,757,850
97-98	$2,180	$60,241	$2,136,685	$10	$429,861	$19,499	$525	$2,649,001
98-99				$621	$2,969,874	$749,300		$3,719,794
99-00	$6	$1,774	$79,518	$4,024	$24,883,285	$11,120,763	$7,000	$36,096,369
00-01	$16	$0	$1,881,726	$1,912	$11,609,928	$10,652,521	$12,683	$24,158,785
01-02	$0	$74,049	$1,773,494	$13,688	$4,774,247	$6,813,077		$13,448,556
02-03	$1,262	$214,582	$6,525,785	$76,546	$4,068,682	$1,171,035		$12,057,892

Generally, ex-vessel revenues have closely paralleled landings until the 2000-2001 season when dollars paid ex-vessel clearly dropped (Figure 2-10). Although the volume of squid produced by California markets is dependent on the international market, the price paid to fishermen can influence both effort and overall volume of catch. Additionally, price paid to fishermen depends on market demand as well as the availability of the resource. When volume of catch is low, the price paid per ton exceeds $500 per ton during the 1997-1998 and 2002-2003 El Niño events. When volume is high, the price may be as low as $100 per ton. Squid taken by brail and in small volumes tends to receive a better price. Often, the price of squid will start high at the beginning of the southern California fishery, and decline as the frozen product begins to accumulate in cold storage facilities. This may result in a reduced incentive for fishermen to fish later in the season. Therefore, declines in landings for springtime months may reflect a reduction in the availability of squid as well as reduced effort. Additionally, many vessels participating in other fisheries (e.g. salmon, CPS finfish) will return to other ports during spring months. California markets (processors) play a role in determining the composition of the squid fleet. Although there are many California vessels that have historically participated in the fishery that are still active, there is an increasing proportion of fishery participants from Alaska, Washington and Oregon, reflecting a willingness of the processors to employ these vessels.

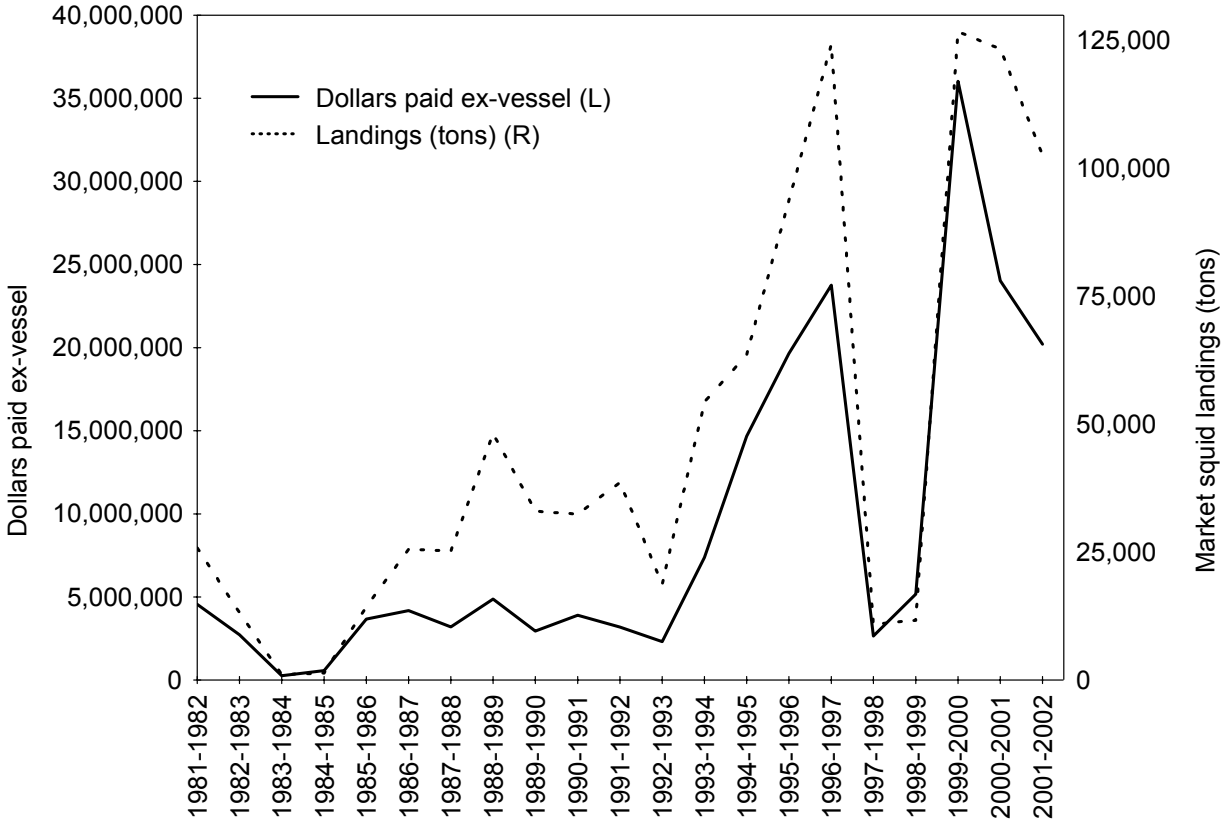

Figure 2-10. Dollars paid ex-vessel and landings in tons for the 1981-1982 through 2001-2002 seasons. Source: CDFG Landing Receipts.

Most of the revenue in the squid fishery is generated by purse seine fishermen (Table 2-10). Drum seine vessels have been increasing their revenues steadily since the 1994-1995 season (excluding El Niño periods). Revenue from squid fishing using lampara nets has declined 99% from 2.7 million dollars in 1981-1982 to very low values in recent years.

Table 2-10. Dollars paid ex-vessel by gear type for market squid fishery from 1981-1982 to 2002-2003 seasons. Note: dollars are not adjusted for inflation. Source: CDFG Landing Receipts.

Season	Brail	Purse seine	Drum seine	Lampara	Other	Total Value
1981-82	$784,085	$485,689		$2,736,398	$544,990	$4,551,162
1982-83	$220,933	$232,256		$2,256,622	$17,260	$2,727,070
1983-84	$9,884	$1,973		$88,548	$168,499	$268,905
1984-85	$313,559	$26,941		$37,497	$192,358	$570,355
1985-86	$22,772	$1,836,397		$755,088	$1,059,659	$3,673,915
1986-87	$46,771	$2,208,225		$819,332	$1,109,205	$4,183,532
1987-88	$30,728	$1,831,687		$473,646	$867,786	$3,203,847
1988-89	$25,106	$2,621,290	$10,924	$956,279	$1,262,613	$4,876,212
1989-90	$16,809	$1,792,182	$23,630	$168,002	$953,209	$2,953,832
1990-91	$12,810	$2,576,712		$109,038	$1,199,802	$3,898,362
1991-92	$5,218	$2,243,108	$2,118	$12,063	$924,899	$3,187,407
1992-93	$5,808	$2,080,155		$22,029	$208,549	$2,316,541
1993-94	$68,758	$6,611,752	$441,568	$1,811	$251,916	$7,375,804
1994-95	$280,832	$8,181,704	$5,857,551	$9,658	$338,642	$14,668,386
1995-96	$213,986	$12,327,482	$6,912,266	$45,053	$146,942	$19,645,729

Table 2-10. Dollars paid ex-vessel by gear type for market squid fishery from 1981-1982 to 2002-2003 seasons. Note: dollars are not adjusted for inflation. Source: CDFG Landing Receipts.

Season	Brail	Purse seine	Drum seine	Lampara	Other	Total Value
1996-97	$109,399	$16,506,397	$6,901,917	$28,358	$211,777	$23,757,850
1997-98	$17,566	$1,752,117	$870,181		$9,137	$2,649,001
1998-99	$97,272	$2,483,404	$1,138,391		$725	$3,719,794
1999-00	$260,915	$27,750,936	$8,009,106	$37,693	$26,235	$36,084,885
2000-01	$437,870	$18,146,102	$5,502,793	$17,042	$54,960	$24,158,768
2001-02	$146,345	$11,601,275	$1,691,986	$2,894	$6,040	$13,448,542
2002-03	$33,392.	$8,369,379	$3,651,143	$119	$3,233	$12,057,268

An average of 114 fishing vessels participate seasonally in the market squid fishery. For the entire squid fishery, the average crew size is 4.5 people (range 3-8, n = 33, Pomeroy et al. 2002). The average purse seine vessel in San Pedro has a crew size of 7.2 (range 4-10). Crew wages are typically 50% of ex-vessel revenue after operating costs. Light boats are paid 20% of the catch value after costs (Lutz and Pendleton 2001). Usually, there is a 1:1 ratio of light boats to seiners on the fishing grounds (A. Henry, pers. obs., O. Amoroso, pers. comm.).

Table 2-11. Percent of revenue received by port area complex from 1981-1982 through 2001-2002 fishing seasons. Note: dollars were not adjusted for inflation. Source: CDFG Landing Receipts.

Season	Monterey Area	Santa Barbara/Ventura	Los Angeles	Other Areas
1981-1982	71.8	4.5	23.7	0.0
1982-1983	84.1	0.1	15.8	0.0
1983-1984	62.7	3.2	3.3	30.8
1984-1985	32.1	21.5	43.9	2.6
1985-1986	42.9	22.3	34.8	0.0
1986-1987	30.5	21.2	46.0	2.2
1987-1988	31.1	34.2	34.2	0.4
1988-1989	23.5	7.3	67.6	1.6
1989-1990	38.9	6.4	54.6	0.1
1990-1991	33.3	31.4	34.5	0.8
1991-1992	27.4	26.0	35.7	10.8
1992-1993	28.2	33.0	19.2	19.7
1993-1994	13.7	35.4	39.6	11.2
1994-1995	19.1	55.6	17.8	7.5
1995-1996	2.2	68.4	28.2	1.2
1996-1997	2.2	62.3	35.2	0.3
1997-1998	80.7	16.2	0.7	2.4
1998-1999	0.0	83.1	16.6	0.3
1999-2000	0.2	68.9	30.8	0.0
2000-2001	7.7	48.1	44.1	0.1
2001-2002	13.2	35.5	50.7	0.7
2002-2003	54.1	33.7	9.7	2.4

From 1981-1982 through 2000-2001, an average of 54 dealers received market squid from fishing vessels each season. In the early 1980s, dealers in the Monterey port area received the majority of the squid business (Table 2-11). This trend has shifted south to the Santa Barbara/Ventura port area complex that has received, on average, 55% of market squid business in the last five years.

2.3.1 Demographic and Social Communities Associated with the Market Squid Fishery

The market squid fishery consists of two major geographical regions: the northern and southern fisheries (Figure 2-11). The northern fishery occurs along the central coast of California centered on Monterey Bay; the southern fishery extends from the Channel Islands southward along the coast to La Jolla. Monterey, Santa Barbara, Ventura and Los Angeles Counties are the principle counties where squid is offloaded. Three primary squid fleets are recognized as distinct groups operating out of these areas: 1) Monterey and Moss Landing (northern fishery); 2) Ventura and Port Hueneme (Ventura and Santa Barbara Counties); and 3) San Pedro and Terminal Island [Los Angeles County, (Pomeroy and FitzSimmons 2001)].

2.3.1.1 Northern Fishery

2.3.1.1.1 Monterey County

In 1997, the Monterey County population was approximately 365,000 with 33,000 people in the city. The city encompasses 8.62 square miles. Monterey County has three main economic focuses: agriculture, tourism, and the military. Agriculture takes place mainly in the Salinas Valley, the stronghold of the Monterey County economy. In 1995, 30% of the county's labor and proprietor income was from agriculture. Tourism activity is concentrated primarily along the coastal areas. The military has the Naval Postgraduate School and the Defense Language Institute, which are located in the city of Monterey. In 1993, military downsizing began with the relocation of 13,000 soldiers and their families from Fort Ord in Monterey County. Currently, the community is working to replace the military industrial sector with an education sector (PFMC 2002). Another valuable economic component of Monterey County began in 1930 with the onset of a thriving fishing industry at Cannery Row. Today, all that remains of this industry is a small commercial fleet and a few fish businesses that operate out of Monterey Bay marinas.

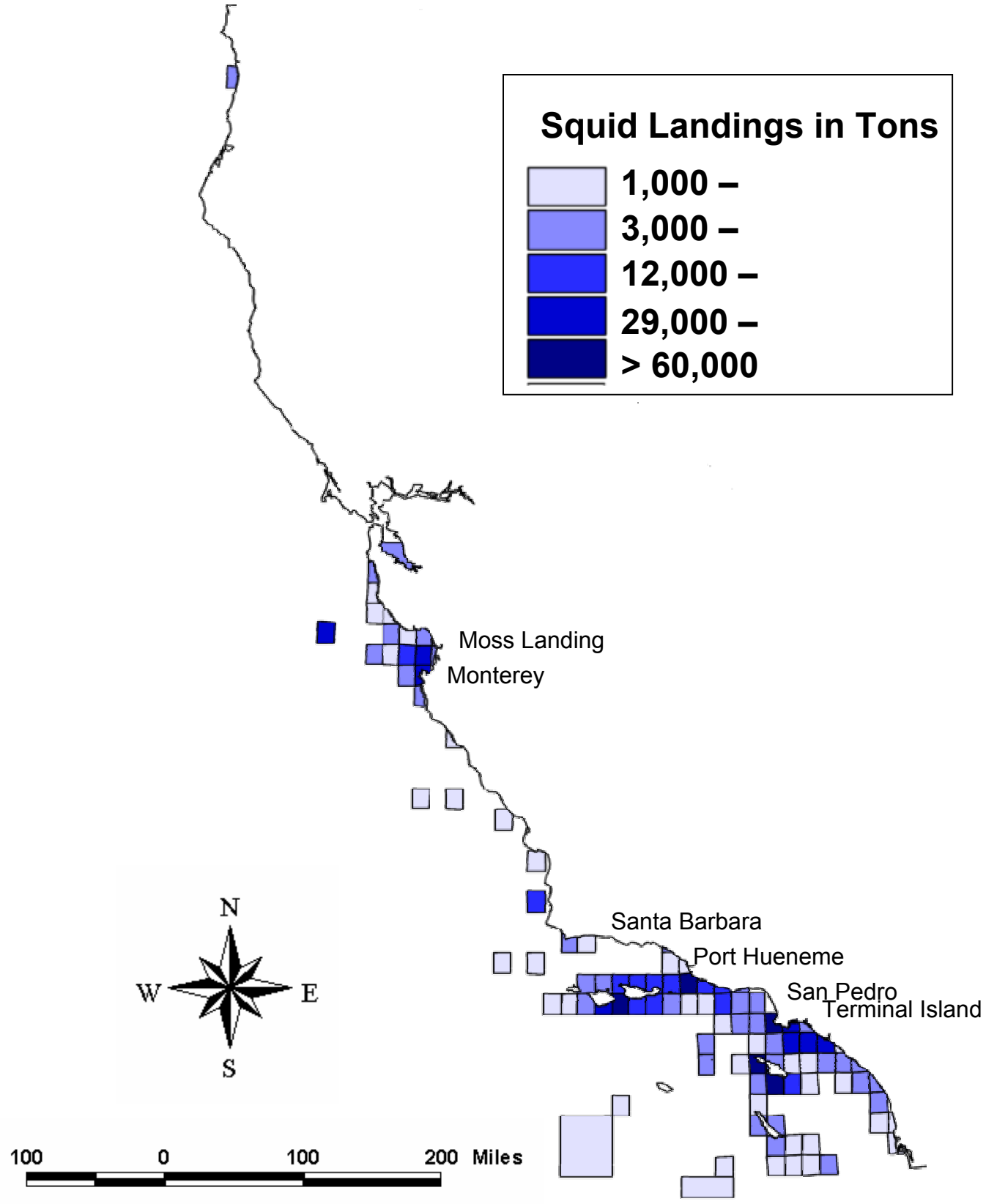

Figure 2-11. Geographic location of major fishing areas in California by CDFG blocks (10' x 10') from 1991 through 2000 based on Department landing receipts.

2.3.1.1.2 Monterey Area Squid Fishery

Monterey Harbor and Moss Landing are the two ports in Monterey Bay that receive market squid. Monterey Harbor has been involved in the squid industry since the late 1800s. Today, space for fish packing and storage facilities at this harbor are limited, so the commercial wharf is used primarily for offloading purposes and squid are transported to processing facilities outside the city. Moss Landing Harbor did not become an active offloading site until 1947. Since then, it has been the site of squid and CPS finfish offloading operations, marine research, recreational fishing and tourism. These industries must share harbor space and sometimes tension exists between the groups (Pomeroy et al. 2002).

Currently, four major processors operate in Monterey Bay and each has historical family links to fishing in the region (Pomeroy et al. 2002). In addition, many current fishermen are descendants of Italian fishermen who settled here long ago and initiated early fishing efforts (Pomeroy and FitzSimmons 2001). Over time, many different vessels have landed squid in Monterey Bay; but the majority of landings are made by a small group of local fishermen collectively known as the Monterey Bay wetfish fleet (wetfish: sardine, anchovy, mackerel, squid and bonito). This subgroup of skippers has extensive social and cultural ties to the wetfish industry and the local community. Historically, the Monterey fleet has fished for a combination of CPS finfish and squid. Many have shifted to other fisheries such as San Francisco Bay herring or Alaska salmon to supplement their income, especially when wetfish catches are low (Pomeroy et al. 2002).

Today, the Monterey Bay fleet consists mostly of modern vessels and drum seines that tend to be larger with steel hulls and often two holds (Lutz and Pendleton 2000). Market squid is one of the primary targets of the Monterey Bay wetfish industry. However, following the El Niño in late 1997, squid landings were slow to recover in this region (Pomeroy et al. 2002) until February 2002.

2.3.1.2 Southern Fishery - Ventura and Port Hueneme

2.3.1.2.1 Santa Barbara County

The population of Santa Barbara County increased from 369,608 in 1990 to 399,347 in 2000 (CTTCA 2000). Agriculture accounted for 11% of Santa Barbara's total income in 1997. In 1999, manufacturing overtook agriculture as the most important contributor to the economy of Santa Barbara County. Non-agricultural income from health care and social assistance, retail trade, professional, scientific and technical services, and construction followed manufacturing in terms of importance (PFMC 2002).

2.3.1.2.2 Ventura County

Similar to Santa Barbara, agriculture accounted for 9% of the county's labor and proprietor income, but was overtaken by manufacturing in 1999. Again, manufacturing

was followed by other sources of non-agricultural income: retail trade, wholesale trade, health care and social assistance, and finance and insurance sectors (PFMC 2002).

2.3.1.2.3 Ventura/ Port Hueneme Fishery

Four harbors play a role in the CPS industry: Santa Barbara, the Channel Islands Harbor, Ventura, and Port Hueneme. Santa Barbara's port is primarily geared towards coastal tourism and only minimal quantities of squid are landed here annually. Similarly, the Channel Islands Harbor is designed mainly to support recreation and does not support commercial fisheries. However, there are holding facilities containing live squid, anchovy, and sardine to provide bait for recreational and commercial fishermen in the area.

Ventura Harbor is of crucial importance for offloading squid. The harbor is used primarily for commercial fishing operations, although port space is shared with sport fishing and tourist operations. Ventura's commercial fishermen are largely composed of descendants of Slavic fishermen who arrived in the area long ago. The Ventura fleet targets squid as well as Alaska salmon and San Francisco herring, but CPS species are not often targeted (Pomeroy and FitzSimmons 2001). Concerns are now being raised about the future economic sustainability of the fishery since several areas of squid fishing at the Channel Islands have been designated as state marine reserves (Pomeroy et al. 2002).

Port Hueneme is located in Ventura County and was created to provide an ocean link from the California central coast agricultural community to global markets (PFMC 2002). Port Hueneme is the U.S. port of entry for the central coast area of California and the only deep-water harbor between Los Angeles and San Francisco harbors. It ranks among the top seaports in California for general cargo. Port Hueneme specializes in the import and export of automobiles, heavy agricultural equipment, industrial vehicles, fresh fruit and produce, forest products, and other cargo. Port Hueneme ranks as the top seaport in the United States for citrus export and it ranks among the top ten seaports for automobile and banana imports. Over $4 billion in cargo value moves through Port Hueneme annually. The port provides space for local sport and commercial fishing industries and related activities generate over $388 million for the local economy each year; 3,500 jobs in Ventura County are related to operations at Port Hueneme (PFMC 2002).

Since 1985, Port Hueneme has been the top squid receiving port in the state. The primary function of this deepwater port is cargo transportation. As a result, space allotted for commercial fishing operations is often cramped and crowded (Pomeroy et al. 2002). Historically, Port Hueneme has been an important receiving station for the wetfish industry. The number of processors fluctuates from year to year depending on the market; but, on average, there are eight processors working the region at a given time. In addition, the timing of the squid season complements the community's agricultural off-season providing ample labor, cold storage and transportation resources. There are two distinct groups of fishermen in this fleet. The first group is composed of local in-state fishermen who primarily target CPS finfish, squid, and occasionally tuna

and bonito. Many fishermen in this group are from Monterey and San Pedro/ Terminal Island areas and are drawn to the area in the winter for the squid fishery since revenues are declining in the Alaska salmon fishery and boats are being excluded from the San Francisco Bay herring fishery. The second group, over half of the fleet, are out of state fishermen attracted to the southern California market squid fishery after encountering problems in other fisheries (e.g., salmon, herring). The Ventura ports are utilized by many fishermen working the Channel Islands since they are closer and more convenient than Monterey or San Pedro ports (Pomeroy et al. 2002).

2.3.1.3 Southern Fishery - San Pedro/ Terminal Island

2.3.1.3.1 Los Angeles County

The ports of San Pedro and Terminal Island are located in the county of Los Angeles. The population of Los Angeles County increased from 8,863,000 to 9,519,000 between 1990 and 2000.

2.3.1.3.2 San Pedro

The population in San Pedro decreased from 85,987 in 1990 to 84,697 in 2001. In 1996, 51.6% of the community was Caucasian, 33.8% was Hispanic, 6.2% was African American, and 7.6% was Asian. The average per capita income in 1996 was $19,413 (Claritas 1996).

San Pedro is located in southwest Los Angeles on the southeastern slope of the Palos Verdes Peninsula. The community's roots developed over a century of participation in fishing and related industries and are described in the San Pedro Community Environmental Perspectives (1989). The community is relatively small with a hometown feeling and is enhanced by the fact that many residents are locally employed.

During the 1980s, the commercial fishing industry in Los Angeles declined, directly affecting the local economies of San Pedro and Wilmington. One reason for the decline was competition from foreign fisheries, which operated with lower labor costs and government subsidies. State and local taxes and high insurance costs were blamed as additional burdens on the struggling industry. By 1986, only one fish packing plant remained of the 14 that operated in 1960 (PFMC 1998). This plant has since closed.

2.3.1.3.3 San Pedro/Terminal Island Fishery

The San Pedro/Terminal Island fishery industry is not the primary focus of the ports in this region. The main priority at these ports is tourism and transportation of cargo, oil and gas. However, San Pedro has long been recognized as a major center for the California CPS industry's purse seine fleet. Much of the revenue generated by the fleet remains in the community through slip fees, boat maintenance, fuel purchases, live bait sales, and by supplying squid for processing (Lutz and Pendleton 2001). Many fishery participants have ancestors from Italy and the country formerly known as Yugoslavia that participated in the fishery generations past. Most of the San Pedro fleet relies

solely on market squid, coastal pelagic species (CPS) and coastal tuna for their income. As a result, the variability and uncertainty in the market affect fishermen, processors and receivers. Historically, participants in this fishery have survived by shifting their efforts between species (Pomeroy et al. 2002).

A survey of the San Pedro fleet initiated in 2000 revealed that most of the vessels were old with wooden hulls (Lutz and Pendleton 2000). The average age of the vessels in this fleet is 47 years and, thus, cost effective insurance is not available to over 1/3 of the fleet. Another problem is non-uniform fishing effort within the fleet. In 1999, four vessels landed 45.6% of the total fleet revenue because they were able to operate at higher production levels and thereby dominate the fleet (Lutz and Pendleton 2001). In the mid 1990s, San Pedro ports experienced an incursion of out of state vessels to participate in the market squid fishery. This resulted in a flooded market and caused squid prices to fall (Lutz and Pendleton 2001).

2.3.1.4 Summary of the Three Squid Fishery Areas

In all three regions, most skippers view commercial fishing as a family tradition. In fact, most have other family members involved in fishing, processing, or market activities. The relationship between fishermen and the markets plays a vital role in the survival and sustainability of a fishery. The California market squid fishery began as a small industry that supplied squid to local markets. In recent years, the fishery has shifted away from local markets. Currently, the California squid industry is now centered on global markets that have placed an increased demand upon California market squid. Additionally, squid fishing is driven by market orders. Vessels targeting squid usually have a relationship with one market from which they receive orders for specific amounts of squid. When demand or storage space is limited, boats are placed on limits regardless of squid availability (Pomeroy and FitzSimmons 2001).

2.4 History of Conservation and Management Measures

2.4.1 State Management

The regulatory history of the commercial market squid fishery by the State of California began with a ban on squid attracting lights in 1959 (Table 2-13). The addition of former FGC §8397 in 1957 prohibited the use of these lights in the Monterey Bay fishery. Processors believed that squid caught with the aid of attracting lights were of poorer quality and smaller in size than those caught without lights. The fishermen also felt that the lights disrupted the spawning. Further, banning attracting lights would prevent canneries from harvesting squid directly from their docks. This prohibition was lifted in 1987 for most of Monterey Bay (District 17); in 1988, attracting lights were once again allowed in the Pacific Grove area in Monterey Bay (District 16).

In 1983, the Commission adopted regulations that limited the days of the week and times of day that fishermen could engage in the take of market squid. CCR Title 14 §149 prohibited any vessel, using or possessing a roundhaul net in Monterey, from taking market squid between noon on Friday and midnight on Sunday, and between

noon and midnight on any day Monday through Thursday. In 1989, Senate Bill (SB) 1080 (Mello) allowed fishermen to utilize all types of roundhaul nets, including purse and half-purse seine nets, in the take of market squid in the Pacific Grove area (District 16). In 1990, the Commission amended its regulations (CCR Title 14 §149) to allow for the take of squid by roundhaul gear before midnight Monday through Thursday north of a line running 252º magnetic from the Moss Landing Harbor entrance.

In 1993, the market squid landing tax was increased to $0.0019 per pound (SB 1030, Thompson). The same year, Assembly Bill (AB) 14 (Hauser) restricted vessels from the use of squid attracting lights in District 10 (ocean waters of San Mateo, San Francisco, Marin and Sonoma Counties).

Before April 1998, the market squid fishery was largely an unregulated, open access fishery. Because of increasing market interest and rising squid landings, SB 364 (Sher), was passed in 1997. This legislation established a $2,500 permit for market squid vessels and light boats and a three-year moratorium on entry into the fishery; called for a three-year study of the fishery; and provided for the creation of a Squid Fishery Advisory Committee (SFAC) and a Squid Research Scientific Committee (SRSC) to advise the Department on research and interim measures. Senate Bill 364 also required that the Department present a report on the fishery to the Legislature, with recommendations for a conservation and management plan by April 2001.

In 1998, the MLMA was enacted. In 1999, the Legislature appropriated $5.2 million to implement this legislation. The MLMA removed from the Legislature the burden of micro-managing fisheries by transferring that oversight role to the Commission and directing several actions, including the:

- development of a master plan for implementing the MLMA;
- development of management plans for California state fisheries; and
- development of a plan for dealing with emerging fisheries as they become operational in California.

In 2000, SB 1544 (Sher) was enacted, reducing the market squid permit fee to $400 from $2,500 until April 2003 and extending the sunset date for FGC Article 9.7 to 1 January 2004. When Governor Davis signed this legislation, he did so to ensure uninterrupted protection and regulations for the squid fishery, but requested that the Legislature, squid fishermen and their representatives as well as other stakeholders "review the appropriateness of the squid permit fee."

In 2000, the Commission adopted interim measures for the market squid fishery under CCR Title 14 §149. The regulations prohibited the commercial take of market squid between noon on Friday and noon on Sunday from Pt. Conception south to the US-Mexico border and required commercial squid vessels and light boats to maintain logbooks detailing fishing/lighting activities. In response to potential negative effects on nesting seabirds of vessels lighting for squid on several of the Channel Islands, the regulations restricted attracting lights to a maximum of 30,000 watts and required that lights be shielded.

In 2001, SB 209 (Sher) was enacted, authorizing the Commission to manage the squid resource and to adopt a market squid fishery management plan. Other features of this bill included providing that specified provisions will become inoperative upon the adoption by the Commission of a market squid fishery management plan and the adoption of implementing regulations and will be repealed 6 months thereafter.

In 2001, the Commission established a harvest guideline of 125,000 tons for the market squid fishery, which was based on the highest seasonal catch level for the fishery; its purpose was to prevent volumetric growth of the fishery should market demand encourage such expansion.

Table 2-13 Summary of Market Squid Regulations from 1959 to the present.

Date	Bill # (Author)	Management Action
1959	§8397	It is unlawful to use any artificial light to lure or attract squid in Districts 16 and 17. This section applies to all artificial lights except those lights necessary for the usual operation of a vessel not used to lure or attract, or intended to lure or attract, squid.
1983	AB 513 (Farr)	Authorizes the Commission to adopt regulations specifying the days of the week and times of the day when squid may be taken north of Point Conception.
1984	CCR Title 14 §149	The Commission adds CCR Title 14 §149, to prohibit any vessel, using or possessing a roundhaul net in Districts 16 and 17, from taking market squid between noon Friday and midnight Sunday and between noon and midnight on any Monday through Thursday.
1987	AB 123 (Farr)	Allows the use of lights to attract squid in District 17.
1988	AB 4055 (Farr)	Allows the use of lights to attract squid in District 16.
1989	SB 1080 (Mello)	Allows the use of all roundhaul nets, including purse seine and half-purse seine nets, to take squid in all portions (including the southernmost portion) of District 16, subject to the same area and season restrictions previously in effect for lampara nets.
1993	AB 14 (Hauser)	Restricts the use of attracting lights in District 10.
1993	SB 1030 (Thompson)	A landing tax of $0.0019/lb is imposed.
1997	SB 364 (Sher)	Authorizes the take of market squid north of Pt. Conception between noon on Sunday and noon on Friday. Requires a permit for the take of squid with a dip, purse seine, or lampara net for commercial purposes. Requires a permit to attract squid by light from a vessel. Establishes a fee for a commercial squid light boat owner's permit. Allows for transfer of vessel or light boat owner's permits under certain conditions. A three-year moratorium on commercial squid vessel permits is established; the possession of a permit from the previous year is required in order to renew.
1998	AB 1928 (Morrow)	No permit is necessary, nor is a landing tax imposed, for the take of live bait. Drum seines and other roundhaul nets excepted from prohibition of rings along lead line and pursing of net bottoms.
1998	AB 1241 (Keeley)	Marine Life Management Act passes.
2000	CCR Title 14 §149	Amendment – Prohibits commercial take of market squid between noon on Friday and noon on Sunday from Pt. Conception south to the US-Mexico border. Requires commercial squid vessels and light boats to maintain logbooks detailing fishing/lighting activities.

Table 2-13 Summary of Market Squid Regulations from 1959 to the present.

Date	Bill # (Author)	Management Action
2000	CCR Title 14 §149	Amendment – Vessels fishing or lighting for squid are restricted to using no more than 30,000 watts of light. Each vessel fishing or lighting for squid must shield the entire filament of each light, directing the light downward, or the vessel must keep the illumination completely submerged underwater.
2000	SB 1544 (Sher)	Establishes a $400 fee for a commercial market squid vessel permit. Extends the sunset date for SB364 to 1 January 2004. Extends existing duties imposed on the Department and the Commission and makes an appropriation.
2001	SB 209 (Sher)	Requires the Commission to adopt the MSFMP by 31 Dec 2002, after consideration and public hearings. Requires the Commission to establish fees for commercial market squid vessel permits and commercial squid light boat owner's permits annually commencing April 1, 2003. Prohibits each person who is issued a commercial squid light boat owner's permit from selling, trading or transferring the permit to another person. Provides that specified provisions will become inoperative upon the adoption by the Commission of a MSFMP and the adoption of implementing regulations and will be repealed 6 months thereafter.
2001	CCR Title 14 §149	Proposed regulatory changes establish catch limits in order to protect the squid resource and manage the fishery sustainably; a harvest guideline of 125,000 tons was selected.

2.4.2 Federal Management: Coast Pelagic Species Fishery Management Plan (CPS FMP)

Amendment 8 of the CPS FMP placed Pacific mackerel (*Scomber japonicus*), Pacific sardine (*Sardinops sagax*), jack mackerel (*Trachurus symmetricus*), and market squid (*Loligo opalescens*) in a management unit with northern anchovy (*Engraulis mordax*). Managed species are divided into two categories: "Actively managed" and "monitored". Actively managed species are subject to annual harvest limits based on current biomass estimates. There are no mandatory harvest limits for monitored species; however, other management measures, such as area closures, could apply to monitored species. Initially, Pacific sardine and Pacific mackerel are designated as actively managed species, while jack mackerel, northern anchovy, and market squid are monitored species. However, the CPS FMP required that Maximum Sustainable Yield (MSY) be established for all species in the plan. Setting MSY for market squid is problematic because a biomass estimate has yet to be determined. A proxy for MSY, using egg escapement, has been approved for the market squid fishery. Details of this method are presented in section 3.2. Finally, the PFMC delegated management authority for market squid to the State.

Chapter 3. Management Measures for a Sustainable Market Squid Fishery

3.1 Project Objectives

The MLMA sets sustainability as an overall goal for the fishery management system (FGC §7056). Within the definition of sustainability, the MLMA includes not only the maintenance of the fishery populations, but also the fullest possible range of present and long-term benefits (including ecological benefits), and biological diversity (FGC §99.5). The MLMA calls for achieving its primary goal of sustainability by meeting several objectives:

- preventing overfishing;
- rebuilding depressed stocks;
- ensuring conservation;
- promoting habitat protection and restoration.

To this end, fishery management plans (FMPs) must identify measures that will be used for the conservation and management of the fishery (FGC §7082). Among other measures, the MLMA identifies area and time closures, size limits, gear restrictions, and restricted access. The Department plans to meet these requirements and the goals and objectives of the MSFMP using management based on four components: 1) fishery control rules, 2) a restricted access program, 3) ecological considerations, and 4) administrative items. The project will protect the market squid resource and the marine life that depends on squid by minimizing the risk of overfishing, adverse social and economic impacts on the fishing communities whenever possible, and ecological impacts that result from the commercial squid fishery; together this program forms an integral approach to meeting the MLMA guidelines. The final project and the implementing regulations adopted by the Commission at the 27 August 2004 and 3 December 2004 meetings are presented in Table 3-1.

This MSFMP establishes a fisheries management program for market squid and procedures by which the Commission will manage the market squid resource and various fishery components. In addition, it defines the scope of management authority for the Commission when acting under the MSFMP. Management measures implementing the MSFMP, which directly control fishing activities, must be consistent with the goals and objectives of the MLMA and other applicable laws. Also, they must be consistent with federal management requirements in the CPS FMP. These management actions are to be considered repeatedly within the streamlined process that provides for more timely Commission action under certain specific conditions. Procedures in this FMP do not affect the authority of the Director of the Department to take emergency regulatory action under FGC §7710.

3.1.1 Fishery Control Rules

Fishery control rules provide a protocol for managing sustainable levels of market squid fishing that is enforced through the adoption of specific regulatory tools such as seasonal catch limits, gear restrictions, weekend closures, and sustainable levels of egg escapement. The application of the MLMA concept of adaptive management is

particularly relevant to this fishery because information regarding the biology of market squid is limited and no reliable estimate of market squid abundance is available.

3.1.2 Restricted Access Program

The MSFMP bases its approach to restricted access upon the MLMA and the Commission's restricted access policy, and establishes a capacity goal (the optimum number of vessels in the fleet that will promote resource sustainability and economic viability of the fishery), initial issuance criteria, and transferability conditions for the commercial market squid fishery.

3.1.3 Ecological Considerations

The market squid fishery is part of a larger ecosystem that includes the effects of ecological interactions of the project on non-target species and habitat. In addition, the market squid resource is a significant forage component in the diets of seabirds, marine mammals and fish. Harvest replenishment and general habitat closure areas provide for specific areas where no squid fishing can occur. Harvest Replenishment Areas can provide areas of uninterrupted spawning. General habitat closures are intended to prevent squid fishery interactions in areas that have not been traditionally utilized for commercial squid fishing and where there is the potential for interactions with non-target species such as salmon, seabirds, and marine mammals. Seabird closure areas reduce the potential for interactions between the squid fishery and seabirds that are sensitive to disturbance from lights and noise.

3.1.4 Administrative Items

This category contains items that are administrative in nature to the MSFMP, namely the creation of a squid advisory committee.

Table 3-1. Summary of Management Measures as Identified in the Draft MSFMP Adopted by the Commission 27 August 2004 and 3 December 2004.

FISHERY CONTROL RULES	
Seasonal Statewide Catch Limitation	
	Establish a seasonal catch limitation based on recent average catch and the assumption that squid biomass is above average spawning biomass (currently set at 118,000 tons) to be reviewed in two years (Option A.2).
Weekend Closures	
	Continue closures from noon Friday to noon Sunday from the U.S.-Mexico border to the California-Oregon border (Option D.1)
Monitoring Program	
	Continue existing squid monitoring programs (port sampling and logbooks) (Option E.1).
Live Bait Fishery and Incidental Catch of Market Squid	
	Continue existing regulations that do not require a squid permit when fishing for live bait or incidental take two tons or less (Option F.1).
Gear Restrictions	
	Maintain existing gear options regarding wattage (30,000 watts) (Option G.1)

Table 3-1. Summary of Management Measures as Identified in the Draft MSFMP Adopted by the Commission 27 August 2004 and 3 December 2004.	
	Establish gear restrictions which state that each vessel fishing for squid and lighting for squid will utilize shielding that will reduce the light scatter of its fishing operations by shielding the entire filament of each light used to attract squid and orient the illumination directly downward so that the lower edge of the shield will be parallel to the deck of the vessel (Option G.4)
RESTRICTED ACCESS PROGRAM	
Market Squid Fleet Capacity Goal	
	Establish a capacity goal for market squid vessels that produces a moderately productive and specialized fleet (55 vessels, 18 brail vessels and 34 light boats, capacity goal for non-transferable permits is zero) (Option H.3)
Initial Issuance of Permits	
	Transferable Permits: Market Squid Vessel Permit: possession of a current market squid vessel permit (2004-2005) and a minimum of 50 landings in window period January 1, 2000 through March 31, 2003; Brail Permit: Possession of a current market squid vessel permit (2004-2005) and a minimum of 10 landings made with brail gear in window period January 1, 2000 through March 31, 2003; Light Boat Permit: Possession of a current market squid permit (either vessel or light for 2004-2005) and have submitted one light boat log by December 31, 2000. Non-Transferable Permits: Market Squid Vessel Permit: Possession of a current market squid vessel permit (2004-2005), possession of a California commercial fishing license for at least 20 years and a minimum of 33 landings prior to August 27, 2004. Only receipts that demonstrate catch aboard a vessel that does not already qualify for issuance of a transferable permit of any permit class are eligible. Brail Permit: Possession of a current market squid vessel permit (2004-2005), possessed a California commercial fishing license for at least 20 years and made a minimum of 10 landings with brail gear during one fishing season in a window period from January 1, 2000 through March 31, 2003. Only receipts that demonstrate catch aboard a vessel that does not already qualify for issuance of a transferable permit of any permit class are eligible. Light Boat Permit: There is not a non-transferable permit category (Option I.1).
Permit Fees	
	Annual permit fees: Market Squid Vessel Permit – Transferable = $2,000 Market Squid Vessel Permit – Non-Transferable = $1,000 Market Squid Brail Permit – Transferable = $2,000 Market Squid Brail Permit – Non-Transferable = $1,000 Market Squid Light Boat Permit - Transferable = $600 (Option J.2)
Market Squid Vessel Permit Transferability	
	Establish full transferability of market squid vessel permits based on comparable capacity (within 10%); establish transferability of market squid vessel permits to a vessel of larger capacity under a “2 for 1” permit retirement; individuals wishing to gain entry into the fishery must secure two permits (Option K.3)
Market Squid Brail Permit Transferability	
	Establish full transferability of market squid brail permits based on comparable capacity (Option L.3)
Market Squid Light Boat Owner’s Permit Transferability	
	Establish full transferability of light boat owner permits with a ‘1 for 1’ permit retirement (Option M.3)
	Upgrade ~~2~~ 1 light boat owner permit~~s~~ for one brail permit (Option M.4)(Revised by Commission 22 March 2005).
Transferability Fee	
	Establish a transfer fee of $500 (Option N.1). Establish a **Market Squid Brail Permit Upgrade Fee of $1,500.**
Experimental Market Squid Vessel Permits	
	Establish three non-transferable experimental fishery permits (Option O.2).

Table 3-1. Summary of Management Measures as Identified in the Draft MSFMP Adopted by the Commission 27 August 2004 and 3 December 2004.	
ECOLOGICAL CONSIDERATIONS	
Area and Time Closures to Address Seabird Issues	
	Establish areas closed to squid vessels using attracting lights in all waters of the Gulf of the Farallones National Marine Sanctuary (Option R.9).
ADMINISTRATIVE ITEMS	
Market Squid Advisory Committee	
	Establish one advisory committee for the squid fishery, which includes scientific, environmental and industry representatives (Option S.1).

3.2 Fishery Control Rules

3.2.1 Definition of Maximum Sustainable Yield and Optimum Yield

Fishery control rules are the primary mechanism for achieving sustainable use, preventing overfishing, preserving habitat, rebuilding depressed stocks, and recognizing the importance of non-consumptive uses. In addition, control rules must be based on objective, measurable criteria such as population size, productivity, density, or other inputs. Formulas are often used to calculate an allowable catch (fishing mortality); however, control rules do not have to be cast in terms of fishing mortality rates or biomass levels. In general, they help identify key management measures appropriate to the fishery.

The MLMA defines maximum sustainable yield (MSY) as "the highest average yield over time that does not result in a continuing reduction in stock abundance, taking into account fluctuations in abundance and environmental variability" (FGC §96.5).

The MSY model determines catch limits, which most often are expressed as a fixed fishing rate such that a constant fraction of the stock may be harvested each year. It is specific for each species or stock of fish and is calculated from knowledge of abundance, life history, and population dynamics. Environmental factors are also considered since they affect growth, reproduction, and mortality rates. In many cases, providing a range of estimates for MSY may be reasonable since there are different assumptions in the model. In addition, there may be situations where the scientific information is inadequate to directly calculate MSY for a particular species, and a proxy or substitute may be used. For example, recent average catch may be used as a proxy for MSY if a period is chosen when there is no evidence of long-term declining abundance.

The MLMA additionally defines Optimum Yield (OY) to give specific direction for resource managers:

> "Optimum yield, with regard to a marine fishery, means the amount of fish taken in a fishery that does all of the following: (a) provides the greatest benefit to the people of California, particularly with respect to food production and recreational opportunities, and takes into account the protection of marine ecosystems; (b) is the maximum sustainable yield of the fishery, reduced by relevant economic, social, or ecological factors; (c) in the case of an overfished fishery, provides for rebuilding to a level consistent with producing maximum sustainable yield in the fishery" (FGC §97).

It is not uncommon that the status of knowledge for a given stock is limited to the catch history and incomplete life history information. This fact is acknowledged by the Legislature in both the MLMA [see FGC §90.1, 7056(g), 7059, 7060, 7072(b), 7073(b) 7081] and in the squid statutes [see FGC §8420(b), 8426(c)]. A precautionary approach to calculating OY in data-moderate or data-poor situations is to multiply MSY, or its proxy, by a fraction. A tenet of this principle is that less aggressive (more restrictive) harvest policies are adopted as uncertainty increases concerning the status of stocks and their response to fishing pressure (Restrepo et al. 1998). And, as mentioned above, an alternative approach is to select a proxy when information needed to calculate MSY is lacking.

3.2.2 Proxy for MSY and Precautionary OY

There often is insufficient knowledge to calculate MSY. Restrepo et al. (1998) provide an alternative approach for federal fisheries management, and the State used a variant of the Restrepo approach in the interim regulations for the market squid fishery.

A proxy for MSY is calculated when MSY-related parameters cannot be estimated from available data or when estimated values are deemed unreliable for various reasons (e.g., extremely low precision, insufficient contrast in the data, or inadequate models). The proxy for MSY in data-poor and data-moderate situations in this approach is based on the historical average catch, selecting a period when there is no indication that abundance is declining. A proxy for OY is then determined by reducing the proxy MSY by a percentage that can vary depending on the amount of information available. As uncertainty decreases about the status of stocks and their response to fishing pressure, less precautionary management can be adopted. This approach to risk management reduces the chance of inadvertent overfishing when little is known about the status of a stock.

There are no definitions or standards for measuring the level of data richness for a fishery other than the general guidance provided in Restrepo, et al. (1998) although it is important to remember these guidelines were established for fish that are considered long-lived in comparison with the market squid, which only lives 6 months:

- Data-rich cases: Reliable estimates of MSY-related quantities and current stock size are available. Stock assessments may be sophisticated, and provide a reasonably complete accounting of uncertainty;
- Data-moderate cases: Reliable estimates of MSY-related quantities are either unavailable or of limited use due to peculiar life history, poor data contrast, or high recruitment variability, but reliable estimates of current stock size and all critical life history (e.g., growth) and fishery (e.g., selectivity) parameters are available. Stock assessments may range from simple to sophisticated and uncertainty can be reasonably characterized and quantified;
- Data-poor cases: Reliable estimates of MSY-related quantities are unavailable, as are reliable estimates of either current stock size or certain critical life history or fishery parameters. Stock assessments are minimal, and measurements of uncertainty may be qualitative rather than quantitative.

3.2.3 Seasonal Catch Limitation

3.2.3.1 A Proxy for MSY Based on Historical Landings

Due to the lack of adequate data to make a mathematical MSY determination, guidance was taken from NOAA Fisheries (Restrepo et al. 1998). These guidelines propose that in data-poor situations such as the market squid fishery, a proxy may be used for MSY, and that it is reasonable to use recent average catch from a period when there is no qualitative or quantitative evidence of declining abundance.

El Niño events are a recurring phenomenon of the California Current and thus, are a factor in landings when considering MSY. Historic market squid data indicate that low landing periods correspond with El Niño events when availability of squid to the fishery is greatly reduced. In addition, market conditions are volatile and influenced by the international demand and availability of supply from other fisheries. In the period between the last two El Niño events (1993-1994 and 1997-1998) there was a nearly unlimited demand for California market squid in the Republic of China, a situation that kindled rapid development of fishing and expansion of processing for export. The expansion ended with the onset of the1997-1998 El Niño event during which market squid availability dropped to very low levels and landings declined.

The first fishing season (1999-2000) following the 1997-1998 El Niño event resulted in the highest squid landings on record (Table 3-2). Nearly all of the landings were from the southern California fishery (99.7%); landings reported from the northern fishery were minimal (0.3%). This disparity could not have been predicted given the current understanding of market squid or by utilizing temperature inclusive models. Average landings for the last ten, five, and three years are presented in Table 3-2. These averages can be used as a proxy for MSY.

3.2.3.2 Establishment of a Seasonal Catch Limitation

The Commission has established a statewide seasonal catch limitation based on a multi-year recent average catch (see Table 3-2). This approach assumes that the stock is above the average spawning biomass (B_{MSY}) and uses a precautionary multiplier of 1.0. This limitation is currently set at 118,000 tons.

The ability of the market squid fishery to support landings of greater than 100,000 tons in the 1999-2000 season with repeat landings of the same magnitude in the following two seasons suggests that the stock is robust enough to withstand this level of landings. This is likely due to the semiannual lifespan and the presence of several (minimum seven) cohorts throughout the year. Therefore, a multiplier of 1.0 was chosen to be most appropriate for market squid as opposed to more precautionary OY multipliers since traditional assessment methods are normally used for much longer lived fish species.

Table 3.2. Market Squid Landings by Season 1991-1992 through 2002-2003 and Average Landings based on 10, 5, or 3 years using different seasons. Averages are rounded to the nearest thousand. .

Season	Total landings (short tons)	10-yr Ave. (93-94 to 02-03)	5-yr Ave. (98-99 to 02-03)	3-yr Ave. (00-01 to 02-03)	10-yr Ave. (92-93 to 01-02)	5-yr Ave. (97-98 to 01-02)	3-yr Ave. (99-00 to 01-02)
1991-1992	38,666						
1992-1993	18,793				18,793		
1993-1994	54,452	54,452			54,452		
1994-1995	63,592	63,592			63,592		
1995-1996	93,833	93,833			93,833		
1996-1997	124,309	124,309			124,309		
1997-1998	10,898	10,898			10,898	10,898	
1998-1999	11,699	11,699	11,699		11,699	11,699	
1999-2000	126,772	126,772	126,772		126,772	126,772	126,772
2000-2001	123,411	123,411	123,411	123,411	123,411	123,411	123,411
2001-2002	102,715	102,715	102,715	102,715	102,715	102,715	102,715
2002-2003	46,994	46,994	46,994	46,994			
Average (rounded)	**68,000**	**76,000**	**82,000**	**91,000**	**73,000**	**75,000**	**118,000**

Setting a seasonal catch limitation will serve to curtail growth of the fishery should market demand allow for such expansion. It is prudent not to allow landings to expand beyond present levels without better methods to assess the status of the resource. Given the number of squid vessels permitted during the moratorium and significant excess capacity in the fleet, dramatic increases in catch could occur in a short time frame unless a safeguard is in place. Catch trends indicate that the market squid resource appears to be quite robust and is able to sustain the recent catch levels.

3.2.3.3 The Use of Egg Escapement as a Proxy for MSY

As was mentioned above, because no biomass estimate exists for market squid, it is not possible to define an overfished condition for this species. It is important to recognize that setting an actual MSY for market squid is impractical for the squid fishery because fishery and biological data are inadequate and landings are strongly influenced by market demand rather than effort. However, if a minimum threshold for egg escapement is not realized, it can be considered that an overfished condition may exist, or that catches of squid exceed any specified allowable level. Overfishing is defined as harvests of squid are occurring at times when either the egg escapement threshold is not being met, or that catches are exceeding specified allowable levels and that these catches may not be sustainable.

Consequently, the egg escapement method will also be used as a proxy for MSY/OY. This method of assessing fishery impacts to the squid resource is identified in Amendment 10 of the Federal CPS FMP (PFMC 2002) and brings the state in compliance with federal regulations. The egg escapement method of regulating the fishery relies on the Department to monitor the squid fishery at an appropriate level in

order to collect adequate biological information. The egg escapement model, as a proxy for MSY, is only a temporary measure until an acceptable biomass estimate can be determined for market squid. If a biomass estimate cannot be determined for market squid, agencies will continue to improve and refine the egg escapement method. This process of re-evaluation of the egg escapement model is ongoing through the PFMC CPS Management team.

3.2.4 Weekend Closure for Commercial Market Squid Fishery

The Commission has decided to continue closures beginning noon Friday through noon Sunday from the U.S.-Mexico border to the California-Oregon border. This weekend closure allows for two days of uninterrupted spawning in areas where squid are being harvested. This provides protection to the resource by allowing spawning to occur and egg cases deposited without disturbance from the fishery. This also includes the use of attracting lights on weekends for commercial harvest. Unlike a seasonal quota or closure, this measure spreads the spawning escapement throughout the year, rather than concentrating it during one particular period.

Prohibiting fishing activity on weekends may also help alleviate conflict with other interest groups (e.g., divers, recreational fishermen, commercial passenger fishing vessels, etc.) operating in the same area. For example, the weekend closure has probably reduced the amount of interactions between the fishery and recreational divers wanting to observe squid spawning events.

3.2.5 Monitoring Programs

The Commission has decided to continue the existing squid monitoring programs, including fishery-dependent sampling efforts and ongoing monitoring of catch information, especially those focused on developing management models. The fishery-dependent sampling is essential for real-time monitoring of the market squid fishery through the egg escapement method. The adopted project also maintains the Department's logbook system for squid vessels and light boats. These records provide valuable catch information other than landing data, and are critical to model the market squid population.

These monitoring programs (port sampling and logbooks) are designed to learn more about the fishery and resource and are intended to aid in the development of population models to sustain harvests. This method of assessing fishery impacts to the squid resource is identified in Amendment 10 of the Federal CPS FMP (PFMC 2002) and brings the state in compliance with federal regulations.

3.2.6 Live Bait Fishery and Incidental Catch of Market Squid

The Commission has decided not to require a market squid vessel permit when fishing for live bait or when landing or taking market squid less than two tons in any calendar day. Market squid are an important source of live bait for the California recreational fishing industry. A relatively small volume is taken by the live bait industry using brail,

lampara, or drum seine gear. This fishery is a high value use of squid, supplying bait to recreational fisheries along the West Coast, primarily in southern California. Live bait catch, largely dependent on local availability, is sold by vessels either at sea or at live bait dealerships in several harbors statewide. Since the sale of live bait in California is not documented in a manner similar to that used for the market landings of squid, estimates of tonnage and value are not available.

FGC §8421(b) does not require vessels taking or landing market squid for commercial purposes to have a market squid permit if the catch does not exceed two tons in any calendar day. Because squid frequently school with CPS finfish, mixed landings of market squid and CPS finfish are common. With a seasonal catch limitation in place, once the catch limit is reached, an allowance for incidental catch of market squid from other commercial fisheries is needed. This would prevent the squid being discarded.

3.2.7 Gear Restrictions

The Commission chose to maintain existing lighting restrictions which state that each vessel fishing for squid or lighting for squid will utilize a total of no more than 30,000 watts of light to attract squid at any time. And, as part of those restrictions, each vessel fishing for squid or lighting for squid will reduce the light scatter of its fishing operations by shielding the entire filament of each light used to attract squid and orient the illumination directly downward, or provide for the illumination to be completely below the surface of the water.

In addition, the Commission chose to modify existing shielding regulations to require that the lower edges of the shield be parallel to the deck of the vessel in order to provide the maximum shielding possible to reduce impacts to seabird or coastal communities (Option G.4). Since light shields are currently required, there would not be any significant change in net economic benefits and fishery community economic activities while reducing impacts to seabirds and coastal communities.

3.3 Restricted Access Program (Limited Entry Program)

Restricted access programs are designed to match fishing effort with the sustainability of the resource and to address economic issues associated with excess harvest capacity in open access fisheries. In a fishery such as the market squid commercial fishery, the main objective of a restricted access program would be to assure the greatest economic viability from the harvest of market squid.

Prior to the 1998-1999 season, the squid fishery was an open access fishery. In 1996, new demand and markets for squid attracted many fishing vessels from other states. This influx of fishing vessels and increased competition has resulted in conflict and territorial disputes between “local” and out-of-state fishermen.

A restricted access program for the squid fishery should serve to balance the need to provide a viable economic harvest with the need to protect the squid resource. Access into the market squid fishery may be restricted by issuing only a certain number of

permits (limited entry). In the absence of a biomass estimate for market squid, a limited entry program, in conjunction with a seasonal catch limit, monitoring the fishery through the egg escapement method and weekend closures should collectively provide for a sustainable squid resource and fishery.

3.3.1 Summary of Commission Restricted Access Policy and the Market Squid Fishery

California's fisheries are to be protected, conserved, and managed for the public benefit, which may include food production, commerce and trade, subsistence, cultural values, recreational opportunities, maintenance of viable ecosystems, and scientific research. None of these purposes need be mutually exclusive and, ideally, as many of these purposes should be encouraged as possible, consistent with resource conservation.

If harvest and other human-caused factors affecting the sustainability of the squid fishery are not managed, fishery resources may be less than optimally productive or, in the worst case, may suffer serious declines. Restricting access to a fishery has become one of many standard fishery management tools used by public agencies in carrying out their conservation and management responsibilities for publicly held fishery resources. It is the policy of the Commission to design restricted access programs to enhance the State's ability to manage its commercial fishery resources. Restricted access programs should: 1) contribute to sustainable fisheries management by providing a means to match the level of effort in a fishery to the health of the fishery resource and by giving fishery participants a greater stake in maintaining sustainability; 2) provide a mechanism for funding fishery management, research, monitoring, and law enforcement activities; 3) provide long-term social and economic benefits to the State and fishery participants; and 4) broaden opportunities for the commercial fishing industry to share management responsibility with the Department.

More specifically, the Commission's purposes for restricting access or entry to a fishery are described as: 1) promote sustainable fisheries; 2) provide for an orderly fishery; 3) promote conservation among fishery participants; and 4) maintain the long-term economic viability of fisheries. Restricted access programs may be instituted in order to carry out one or more of these purposes in a given fishery.

Because a primary purpose of restricted access programs is to match the level of effort in a fishery to the health of the fishery resource, each restricted access program that is not based on individual transferable quotas shall identify a fishery capacity goal intended to promote resource sustainability and economic viability of the fishery. Fishery capacity goals can be expressed as some factor or combination of factors that fairly represents the fishing capacity of the fleet. These factors may include the number of permitted fishery participants, number of permitted boats, net tonnage of the permitted fleet, amount of gear used in the fishery, and cumulative hold capacity. Fishery capacity goals should be based on such biological and economic factors as what is known about the size and distribution of the target species, historic fleet size or harvest capacity, and distribution of harvest within the current fleet. Conflicts with other

fisheries or ocean interest groups and economic conditions (current and future) within the fishery may also be factored in to such determinations. Depending on the fishery, the fishery capacity goal may be expressed as a single number or as a range.

Rationale for Implementation of a Limited Entry Program for the Market Squid Fishery

Vessels currently participating in the market squid fishery are capable of harvesting more squid than is available under current or likely future biomass conditions. Fisheries characterized by excess harvesting capacity are described as overcapitalized in terms of the number of vessels and the amount of gear and equipment devoted to harvesting. As fisheries become overcapitalized, harvesting costs increase while catches remain the same. This situation represents an economically inefficient use of society's productive resources, and causes several problems for managers and the fishing industry when abundance and demand decline, and catches are reduced. As harvesting capacity in fisheries increases, problems arising from the need for more restrictive management measures and resolution of allocation issues become more acute. No relief from these problems will occur if harvesting capacity continues to rise. Taking action to reduce excess capacity before a resource reaches depleted status is a proactive management strategy that may thwart or alleviate potential problems with resource allocation in the future.

Scope of the Market Squid Limited Entry Program

Vessels landing less than two tons of squid on a per trip basis will not be required to possess a limited entry permit. Additionally, landing of squid beyond the jurisdiction of the state of California will not be affected by any limited entry requirements. Recreational fishing for squid will not require a limited entry permit, nor does fishing for squid for use as live bait.

3.3.2 Capacity Goal

Evaluating the capacity of the current market squid fishery can be used to provide a basis for establishing a restricted access program that matches the level of effort in a fishery to the health of the fishery resource. The goal of such a program is to maintain a sustainable squid resource and provide for a fishery that is diverse, stable, and profitable. With the establishment of the moratorium in 1998, many vessels applied for permits that were not previously active in the squid fishery. These purchases led to a situation where excessive and currently unutilized capacity has been present among permitted vessels of the fleet. During peak landing periods, the number of active vessels was still significantly below the number of currently permitted vessels.

The Commission has adopted a capacity goal for market squid vessels that produces a moderately productive and specialized fleet of 55 market squid vessel permits, 18 market squid brail permits, and 34 light boat permits. A capacity goal of 55 market squid vessels instead of the 52 originally proposed was adopted to include the addition of three experimental non-transferable fishery permits (Option O.2). The adopted program sets the capacity goal for light vessels at 52 light boats. The adopted project

supports a brail fleet capacity goal of 18 vessels as part of the total light boat capacity goal of 52 vessels.

3.3.3 Initial Issuance of Market Squid Fleet Permits

Establishing limited entry qualifying criteria is a first step in reducing fleet size from the 165 squid vessels and 40 light boats currently permitted to achieve the selected capacity goal. A capacity goal is a target value that may be disruptive if implemented immediately. Providing initial qualifying criteria, implementing provisions for permit transferability, and encouraging additional attrition are mechanisms to help reduce the number of vessels in order to achieve the capacity goal in a less disruptive manner. Senate Bill 364 (1997) served as an initial notice of intent that a restricted access program was to be considered for the market squid fishery. This legislation established a squid fishery permit system; the system issued vessel-owner permits, and permit renewal required possession of a permit the previous season (moratorium). This moratorium of squid permits further served to alert squid fishermen of the potential for a restricted access program.

The Commission's policy to determine qualification for an initial permit has three elements. First, the policy for all restricted access fisheries assumes that initiating a restricted access program will not increase the recent level of fishing effort. Second, initial issuance of permits will only be to the current owners of qualifying vessels. Third, in order to meet the needs of a particular fishery, it may be desirable to modify the approach of giving permits only to current owners of qualifying vessels.

FGC §8101 permits any licensed fisherman to participate during the initial year of a limited entry program regardless of the prescribed conditions for entry if the fisherman presents to the Department satisfactory evidence that he or she has been licensed as a California commercial fisherman for at least 20 years and has participated in the specific fishery. Further, the fisherman must demonstrate qualifying participation in the fishery through landings or other appropriate criteria determined by the Commission.

Developing light boat initial issuance criteria based on historical participation is particularly problematic given that light boat participation was not formally documented prior to the logbook program. When the permit program was initiated, light boats could possess either a market squid vessel permit or a squid light boat owner's permit to use attracting lights. A number of currently active light boats hold market squid vessel permits rather than light boat owner permit's based on the design of the permit structure during the 1998-2004 moratorium period. Beginning in 2000, the Department has operated a market squid logbook program, which documents light boat activity, and used these submitted logbooks as documented participation in the squid fishery.

The Commission adopted a limited entry program for the California market squid fishery following the Commission's own established guidelines and policies for restricted access commercial fisheries. Limited entry was widely supported by most members of the SRSC, the SFAC, and other squid fishing industry and conservation groups, with some processors and fishermen initially in opposition. During the adoption process, a

group of both fishermen and processors got together and decided which elements to support as a group, which the Commission adopted.

Five major permit categories were adopted for initial issuance criteria: 1) transferable market squid vessel owner permits, 2) non-transferable market squid vessel owner permits, 3) transferable market squid brail permits, 4) non-transferable market squid brail permits, and 5) market squid light boat owner permits. Initial issuance of these permits was set under the following criteria:

Transferable Permits:

- Market Squid Vessel Permit: possession of a current market squid vessel permit (2004-2005) and a minimum of 50 landings in window period 1 January 2000 through 31 March 2003;
- Brail Permit: Possession of a current market squid vessel permit (2004-2005) and a minimum of 10 landings made with brail gear in window period 1 January 2000 through 31 March 2003;
- Light Boat Permit: Possession of a current market squid permit (either vessel or light for 2004-2005) and have submitted one light boat log by 31 December 2000.

Non-Transferable Permits:

- Market Squid Vessel Permit: possession of a current market squid vessel permit (2004-2005), possessed a California commercial fishing license for at least 20 years and made a minimum of 33 squid landings at any time prior to August 27, 2004;
- Brail Permit: Possession of a current market squid vessel permit (2004-2005), possessed a California commercial fishing license for at least 20 years and made a minimum of 10 landings with brail gear during one fishing season in a window period from 1 January 2000 through 31 March 2003. Only receipts that demonstrate catch aboard a vessel that does not already qualify for issuance of a transferable permit of any permit class are eligible.

The adopted option (Option I.1) for initial issuance establishes a fleet, (Table 3-3), that is in proximity with the adopted capacity goal for the market squid fishery (Option H.3). Further, the adopted transferability options (Options K.3, L.3, and M.4) provide a mechanism to achieve the adopted capacity goal.

Table 3-3. Summary of adopted project initial issuance limited entry criteria. Source: CDFG Landing Receipts.

Permit Type	Initial issuance criteria	Anticipated number of qualifiers
Market squid vessel permit (transferable)	Possession of a valid 2004-2005 market squid permit; 50 market squid landings between 1 January 2000, and 31 March 2003.	68

Table 3-3. Summary of adopted project initial issuance limited entry criteria. Source: CDFG Landing Receipts.

Permit Type	Initial issuance criteria	Anticipated number of qualifiers
Market squid brail permit (transferable)	Possession of a valid 2004-2005 market squid vessel permit; a minimum of 10 landings made with brail gear in window period 1 January 2000 and 31 March 2003.	5 (11 qualify less 6 that also qualify for vessel permit)
Market squid light boat owner's permit (transferable)	Possession of a 2004-2005 market squid permit (either vessel or light); submission of one light boat log by 31 December 2000.	45 (57 qualify less 8 that qualify for a vessel permit and 11 that qualify for a brail permit)
Market squid vessel permit (non-transferable)	A 20-year CA commercial fishermen possessing a valid 2004-2005 market squid permit; a minimum of 33 landings prior to 27 August 2004	12-25
Market squid brail permit (non-transferable)	Possession of a 2004-2005 market squid vessel permit; possession of a California commercial fishing license for at least 20 years; made a minimum of 10 landings with brail gear during one fishing season in a window period from 1 January 2000 and 31 March 2003. Only receipts that demonstrate catch aboard a vessel that does not already qualify for issuance of a transferable permit of any permit class are eligible.	5

3.3.4 Permit Fees

The adopted project requires that an appropriate annual fee for market squid vessel, market squid brail, and light boat owner's permits be established to: 1) cover the cost of squid research and management programs, and 2) provide adequate monitoring and implementation of a limited entry program. Revenue is also generated from taxes levied on squid landings ($3.80 per ton) this source of funding is variable and dependent entirely on the success of the fishery year-to-year. Any permit fee established needs to be reevaluated periodically.

The Commission adopted the following annual permit fees:

Market Squid Vessel Permit – Transferable = $2,000
Market Squid Vessel Permit – Non-Transferable = $1,000
Market Squid Brail Permit – Transferable = $2,000
Market Squid Brail Permit – Non-Transferable = $1,000
Market Squid Light Boat Permit - Transferable = $600

Limited entry guidelines require an appropriate fee to implement a limited entry program, while also providing funds for management and research. The current baseline costs for maintaining existing Department programs that deal directly with

market squid research, monitoring, enforcement, and license sales exceeds $964,000 annually (see Section 1, Chapter 5). Under the Commission's adopted program for initial issue of permits, the number of permits issued would be 111 transferable (68 vessel, 13 brail, 38 light boat). Assuming a minimum of 17 20-year nontransferable permits issued, there would be 135 permits initially issued (Table 3-4).

The Commission has adopted the following transfer criteria:

- Establish full transferability of market squid vessel permits based on comparable capacity (within 10%).
- Establish transferability of market squid vessel permits to a vessel of larger capacity (greater than 10%) under a "2 for 1" permit retirement – this option will allow vessel owners to increase their vessel capacity by transferring their permit to a replacement boat and surrendering one additional permit. Permit holders wishing to increase their current capacity by more than 10% must acquire another market squid vessel permit and surrender it to the Department for retirement.
- Once the Capacity Goal has been achieved, individuals wishing to gain entry into the fishery must secure two permits: one permit must be surrendered to the Department for retirement and one permit would be issued to a vessel of comparable capacity. Market squid light boat owner permits cannot be used to secure a market squid vessel permit.

Table 3-4. Range of fees for transferable and non-transferable market squid vessel, brail and light boat owner permits. The current baseline costs for maintaining existing Department programs that deal directly with market squid research, monitoring, enforcement, and license sales exceeds $964,000 annually (see MSFMP Section 1, Chapter 5).

Permit type	Initial issuance	Permit Fee	Total
Market squid transferable permits			
Vessel	68	$2,000	$136,000
Brail	5	$2,000	$10,000
Light	45	$600	$27,000
Market squid non-transferable permits			
Vessel	12-25	$1,000	$12,000-25,000
Brail	5	$1,000	$5,000
Totals	135		$178,000
Program fees offset by fees (%):		Full Implementation ($964,000) Current Monitoring Only ($533,000)	18.5% 33.4%

For market squid vessel permits, the adopted project establishes transferability of these permits to a vessel of comparable capacity, within 10%. This gives the permit holder some flexibility when another vessel is required, because it is often difficult to find exact matches in capacity and provides fishermen who wish to retire the opportunity to sell their boat and/or permit to new participants. Additionally, the adopted project allows upgrades via transfer to vessels of larger capacity under specified conditions. Using a "2 for 1" permit retirement system, those in the fleet wishing to increase their catching capacity may do so while simultaneously generating a net loss in overall capacity of the fleet, which will aid in achieving the capacity goal.

3.3.6. Transferability of Market Squid Brail Permits

For market squid brail permits, the Commission adopted full transferability of these permits (Option L.3) based on comparable capacity (within 10%). Given they are a minor component of the fleet and the number of currently active brail vessels is less than the suggested capacity goal, there is little concern regarding overcapitalization at this time.

3.3.7 Transferability of Market Squid Light Boat Owner's Permits

The Commission has decided to establish full transferability of light boat owner's permits. This would be allowed only if the initial number of permits issued is equal to or less than the capacity goal.

On 22 March 2005, the Commission sent notice of a change in the original proposed language for upgrading a light boat owner's permit to a transferable brail permit. The original language stated that a light boat permit holder may exchange 2 light boat owner permits for one market squid brail permit. The change reflects the Fish and Game Commission's decision to allow the holder of a Transferable Market Squid Light Boat Permit to upgrade that Permit to a Transferable Market Squid Brail Permit, without the surrender of any additional permits (one-for-one upgrade).

3.3.8 Permit Transfer Fees

The Commission chose to set the permit transfer fee at $500. The adopted project establishes an appropriate fee to transfer market squid vessel, market squid brail, and light boat owner's permits to assist with transfer administrative costs. The permit upgrade fee from a transferable light boat permit to a transferable brail permit, with the surrender of the light boat permit, is $1500.

3.3.9 Experimental Market Squid Vessel Permits

The Commission has established 3 experimental market squid vessel non-transferable permits. This allows the Commission to issue 3 non-transferable market squid vessel permits to any individual for placement on any vessel for purposes of developing a squid fishery in areas previously not utilized for squid production. Individuals issued permits pursuant to this section would be required to adhere to all commercial squid fishing regulations in CCR Title 14 §149, and all terms and conditions for permits defined in CCR Title 14 §149.1, excepting initial issuance criteria defined in CCR Title 14 §149.1(c). These permits count towards the capacity goal.

3.4 Ecological Considerations

As part of the 1997 Legislation enacted to protect the market squid resource, the Department was directed to determine where there are areas, if any, that should be declared harvest replenishment areas for market squid where the taking of squid would not be permitted. Harvest replenishment areas for market squid would serve to:

- protect spawning habitat,
- function as forage reserves,
- offer protection against bycatch and fishery interactions, and
- provide areas of uninterrupted spawning for market squid.

In October 2002, the Commission designated 12 new MPAs at the northern Channel Islands (three of which replace existing reserves at Anacapa, Santa Barbara and San Miguel islands). These areas include known commercial squid fishing sites at Santa Barbara, Anacapa, Santa Cruz, and Santa Rosa islands. In addition to the closures at the Northern Channel Islands, commercial fishermen are not allowed to fish in state-

designated ecological reserves using roundhaul nets. Several existing reserves are known to be market squid spawning sites (e.g., Carmel Bay Ecological Reserve, Point Lobos Ecological Reserve, northeast side of Santa Catalina Island and Santa Monica Bay); all serve as harvest replenishment areas for market squid. Also, based on the large geographic range (Baja California north to Alaska) of market squid, there is an abundance of areas where squid are not fished. The MPAs and ecological reserves meet all of the goals of a harvest replenishment area. Marine protected areas have multiple uses, including 1) providing a buffer for species against the effects of environmental fluctuations and management uncertainties, 2) protecting specific areas or species from overexploitation, or 3) reducing user conflict.

The market squid resource is also important to the recreational fishery. Further, market squid is a significant component in the diets of numerous seabirds, marine mammals, and fish. The MPAs and ecological reserves will function as forage reserves for the many species that consume market squid.

Several seabird species are the focus of squid fishery interactions with seabirds, including: the federally and State-listed endangered and fully protected California brown pelican (*Pelecanus occidentalis californicus*), State-listed threatened Xantus's murrelet (*Synthliboramphus hypoleucus*), and Department species of special concern (SSC) ashy storm-petrel (*Oceanodroma homochroa*).

In total, there are 14 seabird species that breed on Santa Barbara, Anacapa and San Miguel islands (including one endangered species, one threatened species and five SSC) while 12 seabird species breed at the Farallon Islands (including four SSC) (Table 3-5). In addition to these nesting species, there are numerous other species associated with State waters that forage near these islands.

Table 3-5 Seabird species that breed (indicated by an X) in the Channel Islands and the Farallon Islands

	ANA	**SBI**	**SMI**	**SRI**	**SCR**	**CAT**	**SCL**	**SNI**	**Farallon Is.**
Diurnal Species									
California Brown Pelican*	X	X	R		R		R	R	
Double-Crested Cormorant**	X	X	X					X	X
Brandt's Cormorant	X	X	X	X	X		X	X	X
Pelagic Cormorant	X	X	X	X	X				X
Western Gull	X	X	X	X	X	X	X	X	X
Pigeon Guillemot	X	X	X	X	X				X
Tufted Puffin**			X						X
Western Snowy Plover ŧ,**			-----x	X					
Black Oystercatcher	X	X	X	X	X		X	X	X
Common Murre									X
Nocturnal Species									
Ashy Storm-Petrel**	P	X	X		X	X	X		X
Black Storm-Petrel**		X	X			X	X		
Leach's Storm-Petrel		X	X						X
Xantus's Murrelet**, ***	X	X	X		X	X	X		
Rhinoceros Auklet**			X						X
Cassin's Auklet	X	X	X		X				X

*Federally and State listed as endangered, ŧ Federally listed as threatened, ** Department Species of Special Concern (SSC), -----x = not seen since 1991

*** State listed as threatened
P= probable nesting, R= Roost site
ANA=Anacapa, SBI= Santa Barbara, SMI= San Miguel, SRI= Santa Rosa,
SCR= Santa Cruz, CAT= Santa Catalina, SCL= San Clemente, SNI= San Nicolas

3.4.1 Area and Time Closures to Address Seabird Issues

The Commission established an area closure to squid fishing with the use of attracting lights in the Gulf of the Farallones National Marine Sanctuary with boundaries defined as of 27 August 2004. This would protect not only the seabirds that breed and rear on the Farallon Islands, but also protect a large forage area (3,250 km^2) in the waters surrounding the islands from light disturbance and interactions with squid vessels. Under this option, noise associated with squid fishing activities has the potential to cause disturbances to seabirds.

3.5 Administrative Items

3.5.1 Advisory Committee for Squid Fishery

The Commission in its adoption of §53.02 to Title 14, CCR established that the Director may create an advisory committee to assist the Department with development and review of fishery assessments, management options and proposals, and Plan amendments. This squid fishery advisory committee shall be comprised of industry, science, and environmental community members. The committee will assist the Department by providing recommendations regarding the effectiveness of adopted squid management.

Chapter 4. Research to Support the Market Squid Fishery Management Plan

At the core of the Marine Life Management Act (MLMA) is the principle of basing decisions on best available scientific information as well as other information that the Department and Commission possess [FGC §7050(b)(6)]. With this in mind, the MLMA includes, as a broad objective, promotion of marine ecosystem research that will enable better management decisions [FGC §7050(b)(5)]. Within this general policy on science and living marine resources, the MLMA establishes specific policies for the management of marine fisheries. Generally, fishery management decisions are to be based on best available scientific or other relevant information readily available, including what the MLMA calls Essential Fishery Information (EFI).

The MLMA defines EFI, with regard to a marine fishery, as information about fish life history and habitat requirements, the status and trends of fish populations, fishing effort, and catch levels, fishery effects on fish age structure and on other living marine resources and users. The MLMA calls upon the Department to collect EFI for all marine fisheries managed by the State in cooperation with participants in the fishery [FGC §7060(a)(b)]. To foster improvements in the management of individual fisheries, the MLMA requires that fishery management plans include research protocols that identify critical information gaps and the steps that will be taken to close gaps [FGC §7081]. These protocols are to describe the following:

- Past and current monitoring of the fishery;
- EFI, such as age structure of a population and spawning season, and other relevant information; and
- Plans for additional monitoring and research needed to acquire EFI.

In these ways, the MLMA provides an opportunity for fishermen, scientists, fishery managers, conservationists, and others to develop a system for obtaining the information needed to manage our living marine resources.

Although much biological information has been gathered on market squid in the past 30 years, EFI is lacking in many areas for this species. Future research should be directed toward acquiring EFI and involving collaborative efforts of the fishing industry (both commercial and recreational) and qualified university or private fisheries research institutions. In accordance with MLMA, this chapter describes fishery research protocols designed to advance the MSFMP. Additionally, it identifies gaps in the current knowledge of market squid stocks and the fishery and the steps needed to obtain this information for implementation to be successful. This chapter describes a research plan that is designed to incorporate the goals of the MLMA with the objectives for the management of the California market squid fishery.

4.1 Grouping Essential Fishery Information

Besides requiring a description of current and past monitoring of the fishery, the MLMA also requires that research protocols in FMPs include a description of EFI for the fishery. All EFI categories are important or essential; however, resources required to obtain this information will always be finite. Essential fishery information has been categorized below to identify areas that are necessary to management. It is important to emphasize that these groups are not mutually exclusive since one group may include components that fall under another.

4.1.1 Age and Growth Characteristics

Age and growth studies typically measure how long a species lives, the age at which it reproduces, and how fast individuals grow. This information is very important to determine a population's ability to replenish itself, at what rate it might be harvested, and when individuals will reach a harvestable size. Changes in the age structure and growth rate of a population also serve as indicators of the population's health. This information is often essential for stock assessments and models that guide management strategies. Specific EFI includes length/weight ratios, longevity, age/length ratios, age at size at sexual maturity, and age at length at recruitment into the fishery.

4.1.2 Distribution of Stocks

A stock is a population unit that is selected for management purposes. It may be defined based on its ecology, genetics, and/or geographic separation. Discrete stocks of a given species may have very different growth rates, reproductive schedules and capacity, and ecological relationships. Stock distribution refers to where a stock is found and is important in addressing jurisdictional issues. Specific EFI includes the depth and geographic range of a species, the amount of gene flow and genetic structure of the stock, and helps to determine whether stocks are separate or continuous.

4.1.3 Ecological Interactions

This information identifies the interaction of fishes within the environment, habitat, and ecological community. The MLMA recognizes that fisheries are part of a larger system and calls for conserving the health and diversity of marine ecosystems and living marine resources (FGC §7050)]. Fisheries are embedded in a web of ecological relationships that include the effects of oceanographic regimes and human disturbances on physiological, energetic, or behavioral aspects of organisms, relationships with prey and predators, interrelationships among species due to relative density of different populations, and the distribution and quality of habitat that is key to reproduction and recruitment. Estimation of any ecological relationship demands a species-specific, within-habitat approach due to environment and organism cross correlations.

4.1.4 Estimates of Abundance

This information helps to determine how many individuals comprise the population and the number available to the fishery. This information is essential for all predictive modeling of marine resources. Estimates of stock size can be determined through direct (e.g., surveys) or indirect (e.g., examination of the exploitation history) means. Specific EFI includes relative densities of target species, habitat-specific absolute densities, length frequency distributions, relative density estimates of life stages (i.e., eggs, larvae, young-of-the-year, juveniles, or adults), recapture rates of tagged fish, and catch-per-unit-effort information.

4.1.5 Movement Patterns

This information identifies the spatial distribution of fish and their residence time in specific habitats. Many species may exhibit movement patterns that are associated with specific oceanographic conditions. Certain species may aggregate in specific areas for spawning, move in predictable patterns, or move to certain locales that make them especially vulnerable to harvest. Insights into the movement patterns of fish are important to the development of management strategies based on regional catch quotas or marine protected areas. Specific EFI includes the home range, homing ability, seasonal migrations, environmental cues, and spawning grounds of a species.

4.1.6 Recruitment

Recruitment refers to the number of a species that survive to a particular life stage. It is often used to predict the population size in the future. In this context, recruitment refers to both recruitment to the fishery and recruitment to the population. Many species depend on successful recruitment events for replenishment of the stock. Recruitment success can be highly variable because it depends on the proper combination of many factors. As a result, sustainable harvest of the fishery may depend on only a few strong cohorts (born the same year) to provide harvestable stocks until the next successful recruitment event. Resource managers must consider this variable recruitment success when setting harvest levels by allowing sufficient portions of stocks to “escape” harvest and providing spawning biomass for future recruitment successes. Specific EFI includes the duration and distribution of eggs and larvae, size and timing of recruitment events, and annual cohort success. In addition, information on habitat availability and levels of predators and prey items is also important.

4.1.7 Reproductive Characteristics

Understanding key reproductive characteristics allows managers to set appropriate open and closed seasons and protect valuable spawning habitats.
Specific EFI for a species includes the number of eggs released, size at maturity, fertilization and spawning period, geographic spawning area, multiple spawning periods,

and the nature of mating systems. These data describe the reproductive potential of a fish stock and its ability to replenish itself.

4.1.8 Total Mortality

Total mortality of market squid refers to all removals of squid from the biomass and is traditionally separated into natural as well as fishing mortality. Natural and fishing mortality rates comprise the sum of all individuals removed from a population over a fixed time. Fishing mortality is the number of animals that are removed from the population by fishing. Natural mortality refers to all other forms of removal of squid from the population such as predation, starvation, disease or age. Fishing mortality and natural mortality are estimated in setting the current threshold of egg escapement. Mortality figures are essential for stock assessments and models to determine the number or weight (biomass) that may be safely harvested from a population or stock. Specific EFI includes catch data location, amount and sizes of discarded catch, landings by gear type, and survivability of fish that are released.

4.1.9 Market Squid Fishery Social and Economic Factors

The economic stability of coastal communities and quality of life may be affected by changes in activities related to recreational fishing or commercial fishing and processing. These changes may be caused by indirect factors or regulatory changes that directly affect fishing activities. Indirect factors include triggers from consumer or financial markets, such as 1) changes in consumer demand due to the favorable pricing and supply of a substitute item for a fishery product(s), 2) inflation, and, 3) tax changes that affect business investments or activities. These effects may be manifested locally through resultant changes in business output, employment, population, and public service demand. Four factors regarding social and economic information for the market squid fishery (employment, expenditures, market demand and revenue) are discussed below.

4.1.9.1 Employment

Overall, impacts to local community earnings and employment can be gauged using input-output multipliers to project the changes to local personal income and the number of local jobs. This procedure takes the direct change in final demand for an industry product or service in revenue or sales dollars and multiplies this direct change by a total income coefficient to estimate total change in local personal income. Similarly, multiplying the direct change by an employment coefficient will yield an estimate of changes in the number of local jobs.

4.1.9.2 Expenditures

Regulatory changes that directly affect recreational or commercial fishing revenues in local economies have a downstream effect on other economic sectors, which receive and re-spend those revenues. Output multipliers are used to describe the turnover

effect (number of times a dollar is exchanged within a community) and interrelationships between the basic-sector and downstream business sectors in the local economy.

Additionally, changes that directly affect end-user demand for recreational fishing activities or commercial fisheries products may change end-user spending patterns. Depending on the nature of end-user demand for a given service or product, end-users may spend less if the quantity or quality of the service or product is decreased. Conversely, we would expect end-users to spend more if the quantity or quality was improved. These changes in spending patterns may also affect purchases of related or ancillary goods or services provided in the local economy.

Lastly, the costs (usually expenditures) of production of a good, a service, or an activity provide a means to compare the relationship between resources used to benefits derived. Often, this is expressed as the benefits-to-cost comparison. In the case of commercial fishing activities, by monitoring costs of production at various levels of output, we can define production where we have maximum economic benefit (or "profits"). This is important in creating harvest guidelines which foster optimum economic yield and economic efficiency in the fishing fleet. Economic efficiency equates to cost and waste minimizing practices.

4.1.9.3 Market Demand

Changes in the quantity or quality of available fishery-related goods or services affect the individual end-user's demand for those goods or services. How much this demand may be affected depends on individual income, tastes, preferences, and the accessibility to substitute goods or services. The aggregate demand, based on the combined responses of individuals to changes in a good or service, yields an overall demand function for a good or service. This demand function is used to predict the reactions of end-users to changes in the quantity or quality of goods or services, and to estimate the relative value and benefits end-users derive from a good. Consequently, the effects of in-season adjustments to harvest limits can be projected in terms of the anticipated response of the target group of end-users, as well as changes in the corresponding revenue streams.

4.1.9.4 Revenue

This category includes revenue from the sale of local goods or services within the community and those goods or services which are exported out of the community. Revenue information allows resource managers to assess how changes in resources or regulations may affect industry-sector revenues and ultimately, the local community's economic output and vitality. Revenue generated by fishery-dependent activities (e.g., by commercial landings, recreational direct expenditures, or end-user consumption of commercial products) provides basic information for calculating contributions to local economies and a means to compare relative values of goods and services derived from the fishery.

4.2 Past and Ongoing Monitoring of the Commercial Fishery

4.2.1 Sustainable Fishery Control Rules

Fishery control rules determine levels for take and upper limits on take. Information on biomass, reproductive potential and productivity, and age composition, as well as other biological, social, and economic parameters, is necessary to directly and accurately calculate allowable fishing mortality. In some areas, market squid are in a data-rich situation while other areas are data-poor. The result is that some basic EFI is not generally available. These gaps need to be a priority in research.

Although the PFMC adopted the egg escapement method to monitor the market squid fishery setting the egg escapement threshold level at 30%, there are several areas that require further research or refinement including:

- Verify that the current threshold level of egg escapement promotes sustainability of the fishery;
- Information is needed regarding duration of spawning, egg-laying rate, rate of maturation and natural mortality on spawning grounds;
- Fishery-dependent sources of mortality of eggs spawned such as destruction of egg beds by fishing gear should be investigated as they are not quantified in the egg escapement threshold; and
- Egg escapement methodologies need spatial and temporal evaluation of northern and southern fisheries.

4.2.2 Fishery-Dependent Monitoring

4.2.2.1 Past Fishery-Dependent Monitoring

Fishery-dependent data for the commercial market squid fishery have been collected since 1927. Commercial data in the form of landing receipts, which are filled out when the catch is sold to fish businesses or by fishermen selling directly to the public, are the primary source of information on the amount landed, landing location, gear used and value of the catch. Landing receipts to date have provided a general knowledge of when and where fishing activity occurs and amount of squid landed. Logbooks are another useful tool for tracking fishing activity that supplements data gathered from landing receipts. In the case of market squid, logbook information is gathered from fishing vessels and light boats. These records provide a measure of fishing effort and may prove helpful for population modeling.

Additionally, the Department has actively collected fishery-dependent biological data on market squid through a dockside sampling program since October 1998. The typical data collected are species identification, size, weight, sex, age from statoliths, maturity through gonad and mantle tissue collection, and fecundity.

4.2.2.2 Problems with Past and Ongoing Fishery-Dependent Monitoring

Currently, some fishery-dependent data are of limited use. Fishery-dependent monitoring, using landing receipts, does not provide adequate information about fishing location. Fishing blocks used by the Department are 10 nautical miles (nm) by 10 nm representing an area of 100 square nautical miles. The size of the blocks is too large to identify specific fishing locations. Logbooks, which have been in operation since May 2000, will provide a more spatially explicit understanding of fishing activity, which is important for proper fishery management.

Generally, finfish stock fishery-dependent data have performed poorly in predicting stock decline when used alone (National Research Council 2001). However, because squid are pelagic and fishery-independent data are limited, the use of fishery-dependent data are the only source of stock information. Further, squid are short-lived (six-nine months) invertebrates, rather than longer-lived finfish, therefore, using fishery-dependent data presents additional challenges to an already problematic method of predicting abundance.

4.2.3 Fishery-Independent Research

4.2.3.1 Past Fishery-Independent Research`

There have been few fishery-independent studies on market squid. The Department sponsored several research projects beginning in 1998. These studies have provided necessary information on paralarval and market squid distribution when not on the spawning grounds, characterization of spawning habitat, and reproductive potential. Fishery-independent data can: 1) provide measures of the relative abundance, trends, and estimates of the size and age structure of fish stocks which are not affected by fishing practices or management regulations; 2) calibrate trends in fishery-dependent estimates and tune assessment models; and 3) encompass a broad suite of information on the biological community, the physical environment and the ecosystem as a whole, which cannot be obtained directly via fishery-dependent measures.

4.2.3.2 Problems with Past and Ongoing Fishery-Independent Research

Fishery-independent research has, and continues to be, conducted by a few organizations through a diverse set of funding sources. Unfortunately, the bulk of the research suffers from:

- Limited spatial coverage;
- Non-standardized research that prevents comparison with other data sets; and
- High costs.

However, the Department market squid research program was funded primarily through substantial permit fees and has been coordinated for comparability throughout California. Further, the Department has collaborated with agencies, squid fishermen, and universities to conduct the research. This collaborative research approach is effective and should be advanced. A reduction in permit fees to $400 by the Legislature in the 2001-2002 season coincided with a reduction in Department sponsored research.

4.3 Current Knowledge of Essential Fishery Information

Currently, EFI for market squid is limited for management purposes. Additional data would be desirable to assess the biomass of the stock, life history, ecological interactions, and socioeconomics. A description of the data currently available on market squid is outlined below.

4.3.1 Age and Growth Characteristics

The lifespan of market squid has been calculated based on recent research. Preliminary results indicate that market squid harvested are between four and ten months in age with new cohorts entering the fishery at least seven times a year. Length-at-age and length-weight relationships have been calculated, but need to be verified by further age and growth studies. In addition, daily ring deposition on statoliths needs to be validated throughout the lifespan of market squid.

4.3.2 Distribution of Stocks

The distribution of the market squid population is from the southern tip of Baja California, Mexico to southeastern Alaska. It is not known whether the population is made up of one or more stocks.

4.3.3 Ecological Interactions

No statewide coordination exists for studies of ecological interactions of market squid. Consequently, little is known about the region-specific effects of oceanographic regimes and human effects on the physiological, energetic, and behavioral characteristics of market squid, or the species that they interact with as prey, predators, or competitors.

4.3.4 Estimates of Abundance

No defensible estimates of abundance exist for market squid.

4.3.5 Movement Patterns

Paralarval research (Zeidberg and Hamner 2002) provides preliminary information of movement of paralarval squid, including movement offshore within currents and vertical migration.

4.3.6 Recruitment

Paralarval studies (Zeidberg and Hamner 2002) may provide information to predict recruitment into the fishery and identify spawning areas not targeted by the fishery.

4.3.7 Reproductive Characteristics

Some reproductive characteristics of market squid have been identified (Macewicz et al. 2001b). The potential fecundity has been characterized and is utilized in the egg escapement method. While monitoring continues, preliminary data indicate that the rate of eggs spawned prior to harvest varies between seasons. The temperature range for spawning squid has been identified using a remotely operated vehicle (ROV) and is most often in the range of 50 to 57º F. These current fishery-independent data collection methods need to be continued.

4.3.8 Total Mortality

The current rate of natural and fishing mortality for market squid, on either a daily or a monthly basis, is largely unknown. Ageing studies have started to produce better estimates and need to be continued on spatial (throughout its range) and temporal (within and between seasonal) scales.

4.3.9 Social and Economic

Adequate information on employment, expenditures, and revenues for certain basic-sector industries are readily available or can be derived from existing sources. Such sources include the periodic surveys and reports prepared by the Bureau of the Census, the Bureau of Labor and Statistics, the Bureau of Economic Analyses, the USFWS, the Department, and local institutions and academic affiliates. Combined information from these sources allows analyses of impacts or contributions to local economies by commercial fishing activities. However, these sources do not provide adequate information relevant for a thorough analysis of the California market squid fishery.

4.4 Research to Obtain Essential Fishery Information

The Department is currently monitoring the market squid fishery through fishery-dependent programs and fishery-independent research. The fishery-dependent port sampling program allows the Department to determine the characteristics of harvested squid and shifts in the fishery, as well as estimate egg escapement. Another fishery-dependent program is the logbook program, which allows an estimate of fishery effort and provides exact locations of fishing activity. The egg escapement method is based on female squid collected independent of the fishery. Current fishery-independent research is focused on increasing the sample size of female squid to refine the egg escapement model as well as the characterization and location of squid spawning beds.

The following research needs are necessary to fill market squid EFI gaps identified above. The overall goal is to expand our knowledge of market squid. Data-poor management using a MSY proxy should be considered a temporary solution while an accurate method to assess market squid biomass is pursued.

4.4.1 Fishery-Dependent Data Research

Current efforts to collect fishery-dependent data rely heavily on port sampling, landing receipts, and logbook data. Landing receipts and logbooks record fishing effort and allow managers to track fishing trends. Port samples provide valuable environmental and biological information on squid taken in the fishery. When using the egg escapement method (as a proxy for MSY), it is important to be aware of shifts in the fishery that may make this method less effective. These data can be used to detect changes in the fishery including potential shifts (such as a shift to pre-spawning adults), which may have detrimental effects on the population.

4.4.2 Fishery-Independent Data Research

The most important fishery-independent research need is to develop a model to estimate market squid biomass. Since direct population counts cannot be made, it is necessary to develop models or proxies to estimate population parameters (e.g., mortality, fishing pressure).

Currently, market squid fecundity estimates, based on the egg escapement model, are used as a proxy for MSY. However, it is important to improve and enhance these estimates by increasing the sample size of female market squid used in the histological studies upon which the egg escapement model is based. In addition, mantle condition, especially the rate of mantle thinning, will provide insight into the health of squid caught in the fishery. Further, it is necessary to obtain a more complete understanding of squid spawning including the number of times spawning occurs in a lifetime, spawning rate, and the duration of time spent on spawning grounds.

Like other cephalopod species, the age of market squid can be determined by counting growth rings on the statoliths; however, this technique needs to be verified and validated for all stages of market squid development. In addition, current research is aimed at identifying possible differences of growth and/or fecundity rates between squid caught in the northern and southern California fisheries.

A common problem in most fisheries is bycatch. The potential take of both commercially and recreationally important fish species, such as salmon, should be further evaluated. The current port sampling program only monitors the frequency of incidental catch observed at the squid processing facilities. The use of at sea observers should be evaluated to determine if bycatch is an important issue to this fishery by documenting any impacts to commercial and recreationally important fish species such as salmon and rockfish, in addition to marine mammals and seabirds. In addition, squid egg cases can be disturbed during fishing operations. Therefore, it is important to monitor bycatch to determine how squid eggs are being impacted. ROV and visual surveys may provide information on fishery impact to squid egg cases. These data may be applicable to future population models.

Larval squid abundance from California Cooperative Ocean Fisheries Investigations (CalCOFI) cruises from 1978-1998 needs to be analyzed and if possible used as an index of abundance for modeling purposes. Studies on natural mortality rates, dietary requirements, and spawning behavior could also fill in life history gaps. Other identified studies involve examining the distribution and migration of squid, including the determination of squid stock structure using genetic analyses.

Future research also needs to include explorations of spawning areas other than the traditional locations and an examination of egg densities and egg dynamics. Studies on the effects of sound and light disturbance on seabird populations should be continued. The possible interaction of predators (i.e., sea lions) and squid attracted to night-lighting also should be addressed. Furthermore, it is recommended that monies and efforts be invested into archiving data and samples, expanding socioeconomic data collection, and maintaining a database on spawning areas.

4.4.3 Market Squid Fishery Sponsored Research

Collaboration between government researchers and various fishing industries has been promoted in recent years to defray increasing costs of management as well as to increase awareness of the targeted resource. As recognized by the market squid legislation, information on this resource is limited, and the FMP addresses this with a research and monitoring component. As knowledge increases or additional management needs become apparent, the FMP allows for adaptive management to occur. The Department supports and encourages efforts by the squid fishing industry to become involved and address appropriate research questions.

A preliminary meeting in April 2004 between an industry sponsored group of fishermen and processors and Department, NOAA Fisheries and university researchers was held with the goal to identify and prioritize research needs and design a plan for cooperative field research. Some of the proposed projects that industry could participate included:

- Identifying potential spawning areas from anecdotal and existing fishery data;
- Collecting representative samples of the missing age class of virgin female squid;
- Testing the effectiveness of squid light boats at estimating squid abundance using lights for set periods of time (a catch per unit of effort concept); and,
- Testing the effectiveness of light boats and fishing vessels to perform bongo net tows which would augment CalCOFI data with nearshore and additional stations between and outside the CalCOFI stations.

4.4.4 Steps to Monitor the Fishery and Obtain Essential Fishery Information

The Department will need more resources than are currently available in order to begin some of the research needed to address EFI issues. The research objectives should be based on data necessary to model the market squid biomass. The Department is encouraging collaboration with other state and federal agencies, academia, and the user groups to conduct EFI research and address squid management needs. Some of these needs include:

- Further analysis and evaluation of particular components of the egg escapement method for the market squid population off the coast of California. This modeling work should focus on developing a better understanding of squid biology and population-level responses to exploitation strategies;
- Developing an infra-structure to facilitate communication, logistical support, standardization of data collection methods, preliminary analysis, and reporting;
- Addressing the effects of fishing gear (nets, bottom lines and shackles) on squid egg beds;
- Assess relevance of previously collected data, publish for peer review, and use in management decisions;
- Addressing the effects of squid lighting gear on nesting seabird rookeries;
- Assessing the effectiveness of enforcement and adjust as necessary to better manage the resource (i.e., increasing penalties and/or enforcement);
- Obtaining recommendations from advisory committees of the best data collection activities and models for market squid stock assessment; and,
- Initiating educational outreach programs.

4.4.5 Social and Economic Dimensions of the Fishery

The relationship between fishermen and the markets plays a vital role in the survival and sustainability of a fishery (Pomeroy and FitzSimmons 2001). Many squid fishermen have close social and economic ties to local fishing communities. As a result, the economic stability of coastal communities can be greatly impacted by local fisheries. Therefore, comprehensive analyses of the socioeconomic dimensions of the squid fishery should be considered. Due to the instability of the market squid fishery, the socioeconomic components can change frequently; thus, it is important to continually re-examine these conditions.

These recommendations work toward providing needed EFI and bringing the Department closer to an ecosystem-based approach to the management of market squid.

Chapter 5. Implementation and Costs

The estimated costs for implementation of the MSFMP are grouped into two main categories: 1) enforcement and 2) ongoing management and research. These costs estimates were produced by projecting the time to perform certain tasks such as the enforcement of regulations, collection and analysis of data, and review of documents. Generally, these cost projections are underestimated because there is no way to determine how difficult some issues may be. Nevertheless, estimates are useful for projecting costs and for comparing different options. These cost estimates include expenditures that are incurred regardless of whether or not the MSFMP is partially or fully adopted. These expenses are termed "sunk" costs and equate to the costs of enforcement, data collection, research and monitoring that the Department must perform as part of its resource stewardship charge.

5.1 Enforcement

Enforcement activities within the Department are coded to programs, such as the Marine Life Management Act (MLMA) and Marine Life Protection Act (MLPA) rather than a specific species or fishery. This makes it difficult to determine the accurately estimate enforcement costs in any individual fishery.

Although no enforcement officers are strictly assigned to the squid fishery, it is estimated that 8% of an officer's time is spent on squid enforcement (J. Gross pers. comm.). The majority of the enforcement takes place at the peak times of the fishery. Within the major squid landing ports (Moss Landing, Monterey Bay, Port Hueneme, Ventura, San Pedro, and Terminal Island) there are nine lieutenants and 20 wardens. Enforcement takes place on land, at the point of landing and at squid processors, and at sea using the Department's five patrol boats and nine patrol skiffs.

The 8% estimate is further supported by landings data. In 2001 and 2002, the number of squid landings, as compared to all landings, was 8.3% for the major squid ports (identified above). This is assumed to equal an estimated 8% of enforcement time spent on squid (squid landings: 6,100; total commercial landings: 73,200 commercial landings for the major squid landing ports).

Using this value (8%), the estimated annual costs for enforcement in the squid fishery was determined as follows:

Staffing summary: 9 lieutenants, 20 wardens	
Annual enforcement costs (including operating expenses):	$2,500,000
Percent estimate of squid enforcement	x 8%

Total annual enforcement cost:	$ 200,000

5.2 Ongoing Management and Research

In 1998, fishery managers, researchers, and statisticians from the Department and NOAA Fisheries met to develop both fishery-dependent and fishery-independent sampling and monitoring programs for market squid. During this meeting, goals were identified and a series of sampling protocols were developed to attain data necessary to expand existing knowledge of basic market squid biology, life history, and commercial fishing activity (CDFG 2001c).

To acquire better information on squid taken in the California fishery, the Department developed a monitoring system to track variations over the season in squid length, weight, sex and maturity, and to accurately profile the State's commercial market squid fishery by tabulating catch data on a daily basis. Additional efforts to improve identification of the vessels participating in the fishery, characterize the use of gear to take squid, and determine the number of vessels using each gear type, fishing and landing patterns, market value, and product distribution, were undertaken as well.

Efforts to achieve these goals and to better manage the market squid fishery required the implementation of different programs. As part of the development of the monitoring system, a port sampling program was established in 1998 to collect fishery and biological data. Research cruises conducted by the Department and by outside contractors since 1998 have provided vital information about spawning habitats and egg production. In 1999, a logbook program designed to collect information on effort in the fishery was developed and implemented, where both roundhaul and light vessels provide information on their catch and effort during each day of fishing activity. The purpose of this program was to increase the amount and accuracy of data collected and to supplement the landing receipt program already in place. The estimated costs of these programs are separated into fishery-dependent monitoring and fishery-independent research.

Additional management tasks include the Department's responsibility to communicate fishery information to stakeholders on a timely basis. This may require preparation and mailing of newsletters or letters and the creation and maintenance

of internet web pages. Also, the Department needs to communicate with an advisory committee (if formed), the Commission, and the general public.

5.2.1 Fishery-Dependent Monitoring

Collection of fishery-dependent biological data is authorized under FGC §8010. Written fishing records (logbooks) are required under FGC §8026, and CCR Title 14 §140 and §149. The use of landing receipts is required under FGC §8043. The costs of fishery-dependent monitoring can be broken down into two parts: 1) the port sampling program and 2) the logbook and the landing receipt program.

- Fishery-dependent samples are taken from squid landings at the three major port areas (Monterey/Moss Landing, Santa Barbara/Ventura/Port Hueneme, and San Pedro/Terminal Island). There is a monthly goal of 25 samples from each southern port and 20 samples from Monterey. One sample is taken every day each week, and an additional sample is required on two randomly chosen days of the week. A sample consists of 30 squid randomly selected from one vessel. Samplers observe at least half of the load and collect squid throughout the observation time. Samplers also interview the captain to learn where the vessel fished, how many sets were made, if a light boat was used, size of the catch, and any anecdotal information. Samples are not collected when there are no landings.

  The samples are processed in the lab to collect information on length, weight, sex, and gonadal condition. Statoliths and a sample of mantle tissue are taken from the first male and first five females of every sample. Gonads are preserved from the first five females of every sample. The estimated annual costs for these activities are as follows:

  Staffing Summary: 2 Personnel Year (PY) Laboratory Assistants, 3.5 PY Temporary Help

Staff:	$160,000
Annual operating expenditures:	69,000
Total annual costs:	$229,000

- The Department's statistical database and landing receipt and logbook programs provide vital information about the squid fishery. The estimated annual costs associated with the collection and maintenance of this information are as follows:

  Staffing Summary: 1 PY Marine Biologist, 1 PY Temporary Help

Staff:	$ 85,000

Annual operating expenditures:	$19,000
Total annual costs:	$104,000

5.2.2 Fishery-Independent Research

As part of the legislatively directed initial three year study (April 1998-2001, SB 364), approximately $240,000 annually was directed toward scientific research efforts outside the Department via contracts with the University of California. The objectives of these projects were to develop and evaluate applications of escapement and depletion modeling strategies to the California market squid fishery, obtain better information on squid life history, explore the stock structure of the squid population, and improve understanding of the relationships between age, growth, maturity, and fecundity. Some of the contract efforts required fishery-independent sampling aboard fishery research vessels, which provided a valuable basis for future science-based management strategies that may be used in lieu of proposed regulatory measures developed from catch information alone.

Within the Department, research cruises focused on collecting fishery-independent data have been undertaken. Annual trawl cruises from 1998 to 2001 have been used in development of egg escapement models, specifically to capture female squid to increase the robustness of the current model. Other research cruises have utilized a remotely operated vehicle (ROV) to characterize market squid spawning habitat, including the depth and temperature where egg cases are deposited as well as to develop an index of egg case abundance. The ROV cruises have been conducted twice a year to coincide with peak squid fishing activity. The estimated annual costs for continuing the Department fishery-independent research are as follows:

Staffing Summary: 1 Personnel Year (PY) Associate Biologist, 2 PY Marine Biologists, 0.25 PY Senior Biologist

Staff:	$219,000
Annual operating expenditures:	215,000
Total annual costs:	$434,000

5.3 Summary of Estimated Annual Costs of Implementation

Managing the fishery and developing an estimation of optimum yield will require continued monitoring and collection of fishery-dependent and fishery-independent data. Fishery-dependent biological data and fishery-independent biological data are necessary to estimate population size and reproductive success. Edited logbook and landing receipt data can be used to monitor trends in the fishery and estimate fishery effort.

The estimated annual cost of market squid enforcement is $200,000. Additional regulations for the squid fishery presented through this management plan are expected to require additional enforcement effort and cost that has not been estimated. Presently, there is no funding specified to offset these costs. Monies should be designated to properly fund the enforcement of the market squid fishery management plan. The estimated annual cost for ongoing and future research in the market squid project, including statistical data, fishery-dependent, and fishery-independent sampling is approximately $964,000. Current levels of funding are estimated at $533,000, which excludes all research that the Department was previously conducting. The funding for these operations is from the Fish and Game Preservation Fund.

The following is a summary of the estimated annual costs of full and partial implementation:

Description	Full Program	Partial Program
Enforcement	$200,000	$200,000
Fishery-dependent monitoring:		
Port sampling	$229,000	$229,000
Logbooks/landing receipts	$101,000	$104,000
Ongoing management and research		
Research surveys	$ 434,000	-
Total Implementation Expenses	$964,000	$533,000

Literature Cited

Ainley, D.G., L.B. Spear, S.G. Allen, and C.A. Ribic. 1996. Temporal and spatial patterns in the diet of the common murre in California waters. The Condor. 98:691-705.

Baltz K. and J. Morejohn. 1977. Food habits and niche overlap of seabirds wintering on Monterey Bay, California. Auk. 94: 526-543.

Bargmann, G., D. Hanan, S.F. Herrick, K. Hill, L. Jacobson, J. Morgan, R. Parrish, J. Spratt, and J. Walker. 1998. Amendment 8 to the northern anchovy fishery management plan incorporating a name change to: The coastal pelagic species fishery management plan. December 1998, p. D-9.

Benjamins, S. (2000). Cephalopod predators. *The Cephalopod Page*. http://www.nhm.ac.uk/hosted_sites/tcp/pred4.html (28 Nov. 2001)

Bettencourt, B., L. Coelho, J.P. Andrade, and A. Guerra. 1996. Age and growth of the squid *Loligo vulgaris* off the south coast of Portugal, using statolith analysis. J. Moll. Stud. 62: 359-366.

Bower, J. 2000. The dark side of light. Audubon. 102(2):92-97.

Butler, J., J. Wagner, and A. Henry. 2001. Age and growth of *Loligo opalescens*. Pacific Fisheries Management Council Squid Stock Assessment Review. 13 pp.

CDFG: California Department of Fish and Game. 2001b. Draft, Constituent involvement plan for the nearshore fishery management plan (08 January 2001). Resources Agency, Department of Fish and Game. 11 pp.

CDFG: California Department of Fish and Game. 2001c. Status of the market squid fishery with recommendations for a conservation and management plan. Calif. Dept. of Fish and Game Marine Region Report to the Legislature. 73 pp.

Carretta, J.V., M.M. Muto, J. Barlow, and J. Baker. 2002. U.S. Pacific Marine Mammal Stock Assessments: 2002.U.S. Department of Commerce, NOAA Technical Memorandum NOAA Fisheries -SWFSC-346. 286p.

Carter, H.R., G.J. McChesney, D.L. Jaques, G.S. Strong, M.W. Parker, J.E. Takekawa, D.L. Jory, and D.L. Whitworth. 1992. Breeding populations of seabirds in California, 1989-1991. Volume 1 - populations estimates, and Volume 2 - colony maps and appendices. Unpublished draft final report, U.S. Fish and Wildlife Service, Northern Prairie Wildlife Research Center, Dixon, California.

Carter, H.R., A. L. Sowls, M.S. Rodway, U.W. Wilson, R.W. Lowe, G.J. McChesney, F. Gress, and D.W. Anderson. 1995. Population size, trends, and conservation problems of the double-crested cormorant on the pacific coast of North America. Colonial Waterbirds. 18(Special Publication 1): 189-215.

Carter, H.R., D.L. Whitworth, J.Y. Takekawa, T.W. Keeney, and P.R. Kelly. 2000. At-sea threats to Xantus' murrelets (*Synthliboramphus hypoleucus*) in the Southern California Bight. *In* D.R. Browne, K.K. Mitchell, and H.W. Chaney (Eds.), Proceedings of the fifth California Islands symposium, 29 March to 1 April 1999, U.S. Minerals Management Service, Camarillo, California, pp. 435-447.

Carter, H.R., D. S. Gilmer, J. E. Takekawa, R. W. Lowe and U. W. Wilson. 2001a. Breeding Seabirds in California, Oregon, and Washington. Found at: http://biology.usgs.gov/s+t/noframe/b022.htm

Carter, H.R., U.W. Wilson, R.W. Lowe, M.S. Rodway, D.A. Manuwal, J.E. Takekawa, and J.L. Yee. 2001b. Population trends of the common murre (Uria aalge californica). I*n* D. A. Manuwal, H.R. Carter, T.S. Zimmerman, and D.L. Orthmeyer (Eds.), Biology and conservation of the common murre in California, Oregon, Washington, and British Columbia. Volume 1: Natural history and population trends. U.S. Geological Survey, Biological Resources Division, Information and Technology Report USDS/BRD/ITR2000-0012, Washington, D.C., pp. 33 – 128.

Claritas. 1996. 1996 Proprietary Estimates for all Census Tracts, Counties, and Minor Civil Divisions in the US. Claritas Data Services.

CTTCA: California Technology Trade and Commerce Agency. 2000. Labor force and occupations. http://www.commerce.ca.gov/california/economy/es202. (02/01).

Dailey, M.D. 1969. A survey of Helminth parasites in the squid *Loligo opalescens*, Smelt, *Osmerus mordax*, Jack Mackerel, *Trachurus symmetricus*, and Pacific Mackerel, *Scomber japonicus*. California Fish and Game, 55(3): 221-226.

Dayton, P.K., S. Thrush, and F.C. Coleman. 2002. *Ecological Effects of Fishing in Marine Ecosystems of the United States*. Pew Oceans Commission. Arlington, Virginia. 44pp.

Dick, M.H. and W. Donaldson. 1978. Fishing vessel endangered by crested auklet landings. Condor. 80: 235-236.

Dickerson, T. and R. Leos. 1992. California market squid. *In* California's living marine resources and their utilization, CA Sea Grant, pp. 36-39.

Dohl, T. P., K. S. Norris, R. C. Guess, J. D. Bryant, and M. W. Honig. 1980. Summary of marine mammal and seabird surveys of the Southern California Bight area, 1975-1978. Part II. Cetacea of the Southern California Bight. Final Report to the Bureau of Land Management, NTIS Rep. No. PB81248189. 414p.

Fields, W.G. 1965. The structure, development, food relations, reproduction, and life history of the squid *Loligo opalescens* Berry. California Department of Fish and Game Fish Bulletin 131: 1-108.

Forsythe, J., N Kangas, and R. Hanlon. 2004. Does the California market squid *(Loligo opalescens)* spawn naturally during the day or night? A note on the successful use of ROVs to obtain basic fisheries biology data. Fish. Bull. 102:389-392.

Furness, R.W. and M.L. Tasker. 2000. Seabird-fishery interactions: quantifying the sensitivity of seabirds to reductions in sandeel abundance, and the identification of key areas for sensitive birds in the north sea. Mar. Ecol. Prog. Ser. 202:253-264.

Gilly, W.M. 2003. Population analysis of the California Market Squid, Loligo opalescens using DNA microsatellite analysis. Final report to the California Department of Fish and Game. Contract Number FG7334MR.

Gilly, W., M. Fountain, and A. Novakovic. 2001. Population analysis of the California market squid, *Loligo opalescens*, using DNA microsatellite analysis. *In* Status of the market squid fishery with recommendations for a conservation and management plan. Calif. Dept. Fish Game Marine Region Report to the Legislature. Appendix D.

Groot, C. and L Margolis. 1991. Pacific salmon life histories. UBC Press, Vancouver, Canada. 500p.

Hacker, S.E. 1992. Stomach contents of four short-finned pilot whales (*Globicephala macrorhynchus*) from the Southern California Bight. Marine Mammal Science 8(1): 76-81.

Hanlon, R.T., N. Kangas, and J.W. Forsythe. 2004. Egg-capsule deposition and how behavioral interactions influence spawning rate in the squid *Loligo opalescens* in Monterey Bay, CA. Marine Biology 145:923-930.

Hastings, S., and S. MacWilliams. 1999. Multi-species and multi-interest management: an ecosystem approach to market squid (*Loligo opalescens*) harvest in California. Marine Sanctuaries Conservation Series MSD-99-1. U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration, Marine Sanctuaries Division, Silver Spring, MD. 24 pp.

Henry, A. E., 1997. Prey Dynamics of Pacific Harbor Seals and California Sea Lion foraging near San Nicolas Island. MS Thesis, San Diego State University, San Diego, California. pp. 115.

Hill, K.T. and M.L. Yaremko. 1997. Spatial and temporal distributions of market squid (*Loligo opalescens*) off California based on commercial landings and aerial observation data. Abstract in California Cooperative Fisheries Investigations Program, 28-30 October 1997 at Lake Arrowhead, California.

Hunter, J.R., and N.C.H. Lo. 1997. The daily egg production method of biomass estimation: some problems and potential improvements. Ozeanografika 2: 41-67.

Hurley, A.C. 1977. Mating behavior of the squid *Loligo opalescens*. Marine Behavior and Physiology 4(3): 195-203.

Hurley G.V., Odense P., O'Dor R.K. & E.G. Dawe, 1985. Strondium labelling for verifying daily growth increments in the statoliths of the short-finned squid (*Illex illecebrosus*). Can.J. Fish. Aquat. Sci., 42: 380-383.

Isaac, G., H. Neumeister, and W.F. Gilly. 2001. The effects of temperature on early life stages of California squid (*Loligo opalescens*). Pacific Fisheries Management Council Squid Stock Assessment Review. 15 pp.

Jackson, G. D. 1990a. The use of tetracycline staining techniques to determine statolith growth ring periodicity in the tropical loliginid squids, *Loliolus noctiluca* and *Loligo chinensis*. Veliger 33: 389-393.

Jackson, G. D. 1990b. Age and growth of the tropical nearshore loliginid squid *Sepioteuthis lessoniana* determined from statolith growth-ring analysis. Fishery Bulletin 88: 113-118.

Jackson, G. D. 1994. Statolith age estimates of the loligonid squid *Loligo opalescens* (Mollusca: Cephalopoda) corroboration with culture data. Bull. Mar. Sci. 54: 554-557.

Jackson, G. D. 1998. Research into the life history of *Loligo opalescens*: where to from here? Calif. Coop. Oceanic Fish. Invest. Rep. 39:101-107.

Jackson, G.D. and M.L. Domeier. 2003. The effects of an extraordinary El Niño / La Niña event on the size and growth of the squid *Loligo opalescens* off southern California. Marine Biology 142:925-935.

Karpov, K.A. and G.M. Cailliet. 1978. Feeding dynamics of *Loligo opalescens*. Calif. Dept. Fish Game, Fish Bulletin 169: 45-65.

Karpov, K.A. and G.M. Cailliet. 1979. Prey composition of the market squid, *Loligo opalescens* Berry, in relation to depth and location of capture, size of squid, and sex of spawning squid. CalCOFI Rep. 20: 51-57.

Kato, S. and J.E. Hardwick. 1975. The California squid fishery. FAO Fish. Rep. 170: 107-116.

Kudroshoff, T. C., A. E. Henry, and M. L. Yaremko. 2000. Frequency and distribution of market squid egg cases off California. Abstract. Fifty-first California Cooperative Fisheries Investigations Conference. Lake Arrowhead, CA. October 2000.

Lipinski, M. 1986. Methods for the validation of squid age from statoliths. J. Mar. Biol. Assoc. U.K. 66: 506-526.

Lowry, M.S. and J.V. Carretta. 1999. Market squid (*Loligo opalescens*) in the diet of California sea lions (*Salophus californianus*) in southern California (1981-1995). CalCOFI Rep. 40: 196-202.

Lowry, M.S., C.W. Oliver, C. Macky, and J.B. Wexler. 1990. Food habits of California sea lions *Zalophus californianus* at San Clemente Island, California, 1981-86. Fishery Bulletin, U.S. 88: 509-521.

Lutz, S. and L. Pendleton. 2000. An assessment of the market squid and other major commercial wetfish fisheries of southern California. USC- Southern California Fisheries Project.
http://www.usc.edu/dept/economics/usclace/uscfish/USCFISHWetfishAssessment(WorkingDocSept2000).pdf

Lutz, S. and L. Pendleton. 2001. Socio-economic study of the San Pedro historic purse seine fleet. USCFISH.
http://www.usc.edu/dept/economics/usclace/uscfish/USCFISHSocioEcoStudy(June2001).pdf

Macewicz, B.J., J.R. Hunter, and N.C.H. Lo. 2001a. Validation and monitoring of the escapement fecundity of market squid. Project report to Calif. Dept. of Fish and Game. Document #2, Pacific Fisheries Management Council Squid stock assessment review. 8 pp.

Macewicz, B.J., J.R. Hunter, N.C.H. Lo, and E.L. LaCasella. 2001b. Lifetime fecundity of the market squid, *Loligo opalescens*. Document #1, Pacific Fisheries Management Council Squid stock assessment review. 19 pp.

Macewicz, B.J., J.R. Hunter, N.C.H. Lo, and E.L. LaCasella. 2003. Fecundity, egg deposition, and mortality of market squid (*Loligo opalescens)*. Fishery Bulletin 102(2):306-327.

MacGinite, G.E. and N. MacGinite. 1949. Natural History of Marine Mammals. New York: McGraw Hill. P. 473.

Maxwell, M. R. 2001. Stock assessment models for the market squid, *Loligo opalescens.* Document #7, Pacific Fisheries Management Council Squid stock assessment review. 53 pp.

May, R.M., J.R. Beddington, C.W. Clark, S.J. Holt, and R.W. Laws. 1979. Management of multi-species fisheries. Science. 205:267-277.

McGowan, J.A. 1954. Observations on the sexual behavior and spawning of the squid, *Loligo opalescens*, at La Jolla, California. Calif. Fish Game Fish Bulletin 40(1): 47-55.

Miller D.J., M.J. Herder, and J.P. Scholl. 1983. California marine mammal/fishery interaction study, 1979 to 1981. NOAA Fisheries - SWFSC Admin. Rep. LJ8313C. 234pp.

Morejohn, G.V., J.T. Harvey, and L.T. Krasnow. 1978. The importance of *Loligo opalescens* in the food web of marine vertebrates in Monterey Bay, California. Calif. Dept. Fish Game, Fish Bulletin 169: 67-98.

Morris, R.H., D.P. Abbott, and E.C. Haderlie. 1980. Intertidal Invertebrates of California. Stanford: Stanford University Press. p. 690.

NMFS:National Marine Fisheries Service (NOAA Fisheries). 2001b. Alaska groundfish fisheries, draft programmatic environmental impact statement. United States Department of Commerce, National Oceanic and Atmospheric Administration, Alaska Region.

NMFS/NOAA 2001. National Oceanic and Atmospheric Administration, National Marine Fisheries Service List of Fisheries. http://www.nmfs.noaa.gov/prot_res/PR2/Fisheries_Interactions/2000_LOF.pdf.

NMFS/NOAA/OPR (2001) Commercial Fishery Interactions. http://www.nmfs.noaa.gov/prot_res/PR2/Fisheries_Interactions/fisheriesinteractions.html.

NOAA /NCCOS. 2003. A Biogeographic Assessment off North/Central California: To Support the Joint Management Plan Review for Cordell Bank, Gulf of the Farallones, and Monterey Bay National Marine Sanctuaries: Phase I - Marine Fishes, Birds and Mammals. National Centers for Coastal Ocean Science. Silver Spring, MD 145 pp.

NOAA/NOS 2003a. Socioeconomic Impact Analysis of Marine Reserve Alternatives for the Channel Islands National Marine Sanctuary. April 8, 2003. Dr. Vernon R. Leeworthy and Peter C. Wiley. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service.

NOAA/NOS. 2003b. Gulf of the Farallones National Marine Sanctuary State of the Sanctuary Report. National Ocean Service. Silver Springs, MD. 32pp.

NOAA/NMFS (2003). Commercial fisheries dependent data. http://www.st.nmfs.gov/st1/econ/data.html.

National Research Council. 2001. Marine protected areas; Tools for sustaining ocean ecosystems. Nat. Acad. Press. Washington DC. 272 pp.

O'Dor, R.K. and D.M. Webber 1986. The constraints on cephalopods: why squid aren't fish. Can. J. Zool. 64:1591-1605.

Okutani, T. and J. McGowan. 1969. Systematics, distribution, and abundance of the epiplanktonic squid (Cephalopoda, Decapoda) larvae of the California Current April 1954 - March 1957. Bull. Scripps Inst. of Oceanogr. Univ. Calif. 14: 1-90.

Oliphant, M.S. 1971. Pacific bonito food habits. Calif. Dept. Fish Game, Fish Bulletin 152: 64-82.

PFMC: Pacific Fishery Management Council. 1998. The coastal pelagic species fishery management plan draft amendment eight. Pp. A78-A90.

PFMC: Pacific Fisheries Management Council. 2002. Status of the Pacific Coast Coastal Pelagic Species Fishery and Recommended Acceptable Biological Catches. 48 pp.

PFMC: Pacific Fishery Management Council. 1998. The coastal pelagic species fishery management plan draft amendment eight. Pp. A78-A90.

PFMC Pacific Fishery Management Council Strategic Plan Development Committee. 2000. Groundfish Fishery Strategic Plan "Transition to Sustainability". Pacific Fishery Management Council. 65 pp.

PFMC. 2002. Limited entry fleet capacity and market squid maximum sustainable yield control rule. Amendment 10 to the Coastal Pelagic Species Fishery Management Plan. Pacific Fishery Management Council. July 2002. 224 pp.

PFMC. 2003. Status of the Pacific Coast coastal pelagic species fishery and recommended acceptable biological catches. Stock assessment and fishery evaluation - 2003. Pacific Fishery Management Council. June 2003. 120pp.

Pomeroy, C., and M. Hunter. 2001. The Channel Islands Squid Fishery. Summary prepared for the March 21,2001 Channel Islands Marine Reserves Working Group Meeting.

Pomeroy, C., M. Hunter, and M. Los Huertos. 2002. Socioeconomic profile of the California wetfish industry. *In* D. Pleschner-Steele (ed.) California's wetfish industry: It's importance past, present and future. Santa Barbara, CA: California Seafood Council (CD-ROM).

Preuss, T. and W.F. Gilly. 2000. Role of prey-capture experience in the development of the escape response in the squid *Loligo opalescens*: A physiological correlate in an identified neuron. Journal of Experimental Biology 203 (3): 559-565.

Reichow, D. and M.J. Smith. 1999. Highly variable microsatellites in the California market squid, *Loligo opalescens*. Marine Biotechnology. 1(4) 403-406.

Reichow, D. and M.J. Smith. 2001. Microsatellites reveal high levels of gene flow among populations of California squid, *Loligo opalescens*. Molecular Ecology. 10(5) 1101-1109.

Reiss, C.S. M. Maxwell, J.R. Hunter, and A. Henry. In Submission. Environmental effects on population dynamics of *Loligo opalescens* in the southern California Bight. Submitted to California Cooperative Oceanic Fisheries Investigations Reports. 25pp.

Restrepo, V.R., W.L. Gabriel, L.L. Low, A.D. MacCall, P.M. Mace, R.D. Methot, J.E. Powers, B.L. Taylor, G.G. Thompson, P.R. Wade, and J.F. Witzig. 1998. Technical guidance on the use of precautionary approaches to implementing National Standard 1 of the Magnuson-Stevens Fishery Conservation and Management Act. U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration Technical Memorandum. 54 pp.

Riser, N.W. 1949. Studies on the Tetraphyllidea. Unpublished PhD. Thesis, Department of Biology, Stanford University.

Roper, C.F.E. and M.J. Sweeney. 1984. Cephalopods of the world: An annotated and illustrated catalogue of species of interest to fisheries. FAO Fish. Synop. 125(3): 277 pp.

Spratt, J.D. 1978. Age and growth of the market squid, *Loligo opalescens* Berry, in Monterey Bay. Calif. Dep. Fish Game, Fish Bulletin 169: 35-44.

Telfer, T. C., J. L. Sincock, G. V. Byrd, and J. R. Reed. 1987. Attraction of Hawaiian seabirds to lights: conservation efforts and effects of moon phase. Wildlife Society Bulletin. 15: 406-413.

Tricas, Timothy C. 1979. Relationships of the blue shark, *Prionace glauca*, and its prey species near Santa Catalina Island, California. Fishery Bulletin 77 (1): 175-182.

United States Dept. of Comm. 1999. Trends in United States coastal regions 1970-1998. www.state-of-coast.noaa.gov/natdialog/index.html (12/11/00).

U.S. Bureau of Labor Statistics. 2003. Bureau of Labor Statistics Data. http://www.bls.gov/data/home.htm.

U.S. Department of Commerce.1997.RIMS II Regional Input-Output Modeling System multipliers. Regional Economic Analysis Division, Bureau of Economic Analysis, Washington, DC.

U.S. Fish and Wildlife Service. 1983. The California Brown Pelican Recovery Plan. Prepared by the USFWS under contract to Franklin Gress and Daniel W. Anderson (University of California, Davis). Published by USFWS, Portland, Oregon, pp. 50-52.

Vojkovich, M. 1998. The California fishery for market squid (*Loligo opalescens*). *In* Symposium of the CalCOFI conference. California Cooperative Oceanic Fisheries Investigations Reports. Pp. 55-60.

Weber, M.L. and B. Heneman. 2000. Guide to California's Marine Life Management Act. Bolinas, California: Common Knowledge Press. 133 pp.

Zeidberg, L. D. and W. M. Hamner. 2002. Distribution of squid paralarvae, /Loligo opalescens/ (Cephalopoda: Myopsida), in the Southern California Bight in the three years following the 1997-1998 El Niño. Marine Biology 141: 111-122.

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Appendix A Glossary

Appendix A. Glossary of Terms and Abbreviations

A

Absolute Abundance - The total number of individuals in a population. This is rarely known, but usually estimated from relative abundance, although other methods may be used.

Abundance - See **Relative Abundance** or **Absolute Abundance**

Adaptive Management - In regard to a marine fishery, adaptive management is a scientific policy that seeks to improve management of biological resources, particularly in areas of scientific uncertainty, by viewing program actions as tools for learning. Actions are designed so that even if they fail, they will provide useful information for future actions. Monitoring and evaluation shall be emphasized so that the interaction of different elements within the system can be better understood.

Age Class - A group of individual organisms of the same age in a population. "Year-Class" or "cohort" are terms generally synonymous with age class, but are identified by the actual year in which the cohort was produced (e.g., 1991 year-class or sardines resulted from the 1991 spawning season).

Age Composition - Identifies the proportions of a population of fishes by age or age group.

Allocation - The opportunity to fish is distributed among user groups or individuals. The share that a user group receives is sometimes based on historic harvest amounts.

Altricial - A term used to describe the developmental pattern in birds in which newly hatched young are relatively immobile, have closed eyes, lack down, and must be cared for by the adults. Altricial young are born helpless and stay in the nest for a comparatively long time.

Allowable Biological Catch (ABC) - A term used that refers to the range of allowable catch for a species or species group. It is set each year by a scientific group created by the management agency. The agency then takes the ABC estimate and sets the annual Total Allowable Catch (TAC).

Assessment - A judgment made by a scientist or scientific body on the state of a resource (e.g., size, health, pollution impacts) usually for passing advice to management authority.

Availability - In a general sense, used to describe periods of poor (low availability) or good (high availability) catches, regardless of the size or health of a fish population. In a strict sense, it refers to the fraction of a population which is susceptible to fishing during a given fishing season.

B

Biomass - The total weight or numbers of a stock or population of fish at a given point in time. The **spawning biomass** is that portion of total biomass that is mature and spawning.

Brail net - A large dip net, sometimes used with the assistance of the vessel's hydraulics.

Bycatch - Fish or other marine life that are taken in a fishery but which are not the target of the fishery, including discards.

C

CalCOFI - California Cooperative Oceanic Fisheries Investigations.

Candidate Species - Officially noticed by the Commission as being under review by the Department of Fish and Game for addition to the rare, threatened, or endangered species lists.

Capacity Goal - The primary purpose of restricted access programs is to match the level of effort in a fishery to the health of the fishery resource, each restricted access program that is not based on individual transferable quotas shall identify a fishery capacity goal intended to promote resource sustainability and economic viability of the fishery.

Catch - Refers sometimes to the total amount (numbers or weight) caught, and sometimes only to the amount landed or kept. Catches that are not landed are called discards.

Catchability - A value that modifies a unit of fishing effort in the calculation of fishing mortality which usually will depend on the habits of the fish, its abundance, and the type and deployment of fishing gear.

Catch Per Unit Effort (CPUE) - The catch obtained by a vessel, gear or fisherman per unit of fishing effort (e.g., number of fish caught per hour of trawling).

CCR - California Code of Regulations.

CDFG - California Department of Fish and Game.

CEQA - California Environmental Quality Act.

Cohort - A group of fish spawned during a given period, usually within a year. See also: **age class**.

Commission - California Department of Fish and Game Commission.

Compensatory Mechanism - A process by which the effect of one factor on a population tends to be compensated for by a change in another factor. For example, a reduction in the egg production (spawning) may be compensated for by an increase in the survival rate of eggs.

Competition - Active demand between organisms for a common resource that is in limited supply (e.g., food, space).

CPFV - Commercial Passenger Fishing Vessel.

CPS - Coastal pelagic species (northern anchovy, jack mackerel, Pacific mackerel, Pacific sardine, and market squid).

D

Density Dependence - When the density of a population of organisms directly affects other processes, which can then affect the abundance of that population. For example, a reduction in the numbers of a population might lead to increased growth per individual (because of earlier maturity).

Department - California Department of Fish and Game.

Depletion Methods - These methods are based on the principle that a decrease in CPUE over time and for finite periods of time (usually years or seasons) bears a direct relationship to the extent of the decrease of the population. If this assumption is true, and a substantial proportion of the population is being removed over time, then this method can be used to estimate the population present at the beginning of that time.

Depressed - With regard to a marine fishery, the condition of a fishery for which best available scientific and other relevant information indicates a declining population trend has occurred over a period of time appropriate to that fishery. With regard to fisheries for which management is based on maximum sustainable yield,

or in which a natural mortality rate is available, "depressed" means the condition of a fishery that exhibits declining fish population abundance levels below those consistent with maximum sustainable yield.

Direct Enumeration - The counting of individuals in a population through direct visual observations, or through the use of such aids as sonar or video. Typically involves estimating species density along sampling transects, and applying the result to an entire survey area in order to estimate abundance. These methods have only limited value for the marine resource manager. Their usefulness has generally been limited to enclosed (freshwater) or anadromous (e.g., salmon) resources, where direct observations and subsequent counts can result in estimates of abundance.

Discards - Fish that are taken in a fishery but are not retained because they are of an undesirable species, size, sex, or quality, or because they are required by law to be released.

Drum seine - Like a purse seine, but a large drum stores, deploys, and retrieves the net.

E

Ecosystem - The relationships between the sum total biological and non-biological factors present in the area.

EEZ - Exclusive economic zone; consists of ocean waters from the edge of State waters three miles (5 km) to 200 miles (322 km) offshore.

Effort - The amount of time and fishing power used to harvest fish. Fishing power includes gear size, boat size, and horsepower.

Egg and Larval Surveys - Involves the collection of larvae, usually with a tow net, within a predefined geographic area. These surveys are typically carried out in conjunction with other studies in order to determine fishery information such as abundance and recruitment. They can also be used to define the geographic extent and peak time of spawning activity.

Egg Production Method - While this method is very expensive, it can provide a real-time, fishery-independent estimate of spawning biomass, that is directly calculated from population reproductive values that are measured by extensive at-sea sampling of eggs and adults on the spawning grounds.

EIR - Environmental Impact Report.

El Niño - An El Niño event occurs when the sea surface temperatures in the eastern equatorial Pacific region along the coasts of Peru and Ecuador increase significantly above the average temperature for three or more months. A La Niña is characterized by unusually cold ocean temperatures in the equatorial Pacific. Currently, El Niños have a return period of four to five years. An El Niño Southern Oscillation (ENSO) describes the full range of the Southern Oscillation that includes both warming and cooling of sea surface temperatures when compared to a long-term average. The ENSO has two parts: the El Niño is the oceanic component and the Southern Oscillation is the atmospheric component of the phenomenon.

Endangered Species - A native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant which is in serious danger of becoming extinct throughout all, or a significant portion, of its range due to one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, or disease.

ENSO - El Niño Southern Oscillation. See El Niño.

Equilibrium Yield - The yield in weight taken from a fish stock when it is in equilibrium with fishing at a given intensity and its abundance is not changing from year to year. Also called **sustainable yield**.

Escapement - That part of the stock which survives at the end of a fishing period (e.g., season, year).

Essential Fishery Information - Information about fish life history and habitat requirements; the status and trends of fish populations, fishing effort, and catch levels; fishery effects on fish age structure and on other living marine resources and users; and any other information related to the biology of a fish species or to taking in the fishery that is necessary to permit fisheries to be managed according to the requirements of §7060 FGC.

Ex-vessel - Refers to activities that occur when a commercial fishing boat lands or unloads a catch. For example, the price received by a captain for the catch is an ex-vessel price.

F

Fecundity - The production of eggs per individual or per unit weight of an individual.

FGC - Fish and Game Code.

Fishery- Both of the following:

(a) One or more populations of marine fish or marine plants that may be treated as a unit for purposes of conservation and management and that are identified on the

basis of geographical, scientific, technical, recreational, and economic characteristics.
(b) Fishing for, harvesting, or catching the populations described in (a).

Fishing Effort - The amount of effort expended by a gear or person which is usually standardized (e.g., number of net hauls per unit of time per size of net) and summed before being used as an index of total effort. Also see **Effort**.

Fishing Mortality (F) - A measurement of the rate of removal of fish from a population by fishing. Fishing mortality can be reported as either annual or instantaneous. Annual mortality is the percentage of fish dying in one year. Instantaneous is that percentage of fish dying at any one time. The acceptable rates of fishing mortality may vary from species to species.

Fledgling - A young bird that has recently left the nest and become capable of flight, but is usually still under the care of an adult bird.

FMP - Fishery Management Plan.

G

Growth Overfishing – A reduction in the proportion of fish caught that is not compensated for by a corresponding increase in their average size. This is more likely to occur when a fishery is taking too many younger individuals.

Growth Rate - Usually refers to the average growth of individuals, in length or weight by successive ages over the life span of the particular species.

H

Habitat - The physical, chemical, and biological features of the environment where an organism lives.

Habitat Enhancement – The improvement of habitat, typically for the benefit of a select number of species which depend on that habitat. Wetlands restoration, artificial reefs, and kelp reforestation are examples of habitat enhancement.

Hook and Line - Includes trolling, jigging, and longline gear types.

I

Incidental Catch - See **Bycatch**

Incidentally-Taken Species - See **Bycatch**

Indices of Abundance - These measures usually do not translate to an estimate of actual biomass of a population, and are usually collected over time (years) to reflect trends in a population. The indices can be compiled from a number of sources, usually reported annually (e.g., CPUE, aerial spotter, and acoustic, egg, larval, or adult research survey data). Indices of abundance, because of their simplicity, are seriously evaluated regarding the assumptions in their calculation. When they can be closely matched to more direct and precise of estimates of abundance, they can be cost-effective tools of tracking the trends of a population.

J
K
L

Lampara net – A round haul net with the sections of netting made and joined to create bagging. The net is pushed beneath squid to encircle it from each side. The "wings" of the net are pulled back to the boat and the squid end up in the bag portion of the net. This gear has no arrangement for pursing.

La Niña - A La Niña is characterized by unusually cold ocean temperatures in the equatorial Pacific. See El Niño.

Landings - The number or weights of fish unloaded at a dock by commercial fishermen or brought to shore by recreational fishermen for personal use. Landings are reported at the points at which fish are brought to shore. Note that landings, catch, and harvest define different things.

Limited Entry - Restriction of the right to participate in a fishery, by the use of permits or other means.

Living Marine Resources - Includes all wild mammals, birds, reptiles, fish, and plants that normally occur in or are associated with salt water, and the marine habitats upon which these animals and plants depend for their continued viability.

M

Marine Mammals - Animals that live in marine waters and breathe air directly. Females give live birth and can produce milk. Includes porpoises, whales, and seals.

Maximum Sustainable Yield - In a marine fishery, it means the highest average yield over time that does not result in a continuing reduction in stock abundance, taking into account fluctuations in abundance and environmental variability.

Mesh Size - The size of openings in a fishing net. Minimum mesh sizes are often prescribed in an attempt to avoid the capture of young fish before they reach their optimal size for capture.

MLMA - Marine Life Management Act.

Mortality (Total) - The sum total of individual deaths within a population. Usually it is stated as an annual rate and calculated as the sum of deaths due to natural causes (e.g., predation, disease), fishing mortality (deaths due to fishing and natural mortality), and nonfishing, artificial causes (e.g., pollution, seismic surveys).

MSFMP – Market Squid Fisheries Management Plan.

N

NOP - Notice of Preparation.

NMFS - National Marine Fisheries Service or NOAA Fisheries.

O

Optimal Sustainable Yield - A sustainable yield that takes into account biological, social, and political values, and the effect of harvesting on dependent or associated species, in an attempt to produce the maximum benefit to society from a stock of fish.

Optimum Yield - With regard to a marine fishery, means the amount of fish taken in a fishery that does all of the following:

(a) Provides the greatest overall benefit to the people of California, particularly with respect to food production and recreational opportunities, and takes into account the protection of marine ecosystems.

(b) Is the maximum sustainable yield of the fishery, as reduced by relevant economic, social, or ecological factors.

(c) In the case of an overfished fishery, provides for rebuilding to a level consistent with producing maximum sustainable yield in the fishery.

Overfished - With regard to a marine fishery, means both of the following:

(a) A depressed fishery.

(b) A reduction of take in the fishery is the principal means for rebuilding the population.

Overfishing - A rate or level of taking that the best available scientific information, and other relevant information that the Commission or Department possesses or

receives, indicates is not sustainable or that jeopardizes the capacity of a marine fishery to produce the maximum sustainable yield on a continuing basis.

P

Paralarvae – Life stage of market squid at the time of hatching (hatchlings).

Participants - The sport fishing, commercial fishing, and fish receiving and processing sectors of the fishery.

Pelagic - Pertaining to the water column, or referring to organisms living in the water column.

Performance Standard - A qualitative and/or quantitative standard used to judge whether the performance of a particular individual, tool, or process is functioning properly. The standard used must be objective and readily detectable. In fisheries biology, a performance standard used to gauge a specific management process could be the long-term recruitment success of a particular species as measured through a standard biological survey method.

PFMC - Pacific Fishery Management Council.

Population (see **Stock**) - A species, subspecies, geographical grouping, or other category of fish capable of management as a unit.

Predator - A species that feeds on other species. The species being eaten is the prey.

Prey - A species being fed upon by other species. The species eating the other is the predator.

Productivity - Generally used to refer to the capacity of a stock to provide a yield.

PSMFC - Pacific States Marine Fisheries Commission.

Purse Seine - A net used to encircle aggregations of fish by closing the bottom of the net. The net is continuous, with corks along the top and leads along the bottom. Purse seines have a drawstring running the length of the lead line, which is pulled tight after the set.

Q

Quota - A limit on the amount of fish which may be landed in any one fishing season or year. May apply to the total fishery or to an individual share.

R

Recreational Fishery - Harvesting fish for personal use, fun, and challenge. Recreational fishing does not permit sale of catch. Refers to and includes the fishery resources, fishermen, and businesses providing needed goods and services.

Recruit - A relatively young fish entering the exploitable stage of its life cycle.

Recruitment - Either the rate of entry of recruits into the fishery or the process by which such recruits are generated. Usually associated with attainment of a particular age or size, but can also be dependent on such factors as the fishes' appearance on a particular fishing ground, or how they grow to a size large enough to be captured by a certain mesh gear.

Relative Abundance - An estimate of biomass usually measured by indices that track trends in population biomass over time. This method is neither a direct nor usually precise estimate.

Restricted Access - A fishery in which the number of persons who may participate, the number of vessels that may be used in taking a specified species of fish, or the catch allocated to each fishery participant is limited by statute or regulation.

S

Selectivity - Refers to the selective nature of fishing gear in that almost all kinds of gear catch fish of some sizes more readily than other sizes.

SFAC - Squid Fishery Advisory Committee.

Spawning Biomass - See **Biomass**

Spermatophore - A capsule or compact mass of spermatozoa extruded by the males of certain invertebrates and directly transferred to the reproductive parts of the female.

SRSC - Squid Research and Scientific Committee.

Stock - A species, subspecies, geographical grouping, or other category of fish capable of management as a unit.

Survival Rate - Number of fish alive after a specified time interval (usually a year) divided by the initial number.

Sustainable, Sustainable Use, and Sustainability - with regard to a marine fishery, both of the following:

(a) Continuous replacement of resources, taking into account fluctuations in abundance and environmental variability.
(b) Securing the fullest possible range of present and long term economic, social, and ecological benefits; maintaining biological diversity; and, in the case of fishery management based on maximum sustainable yield, taking in a fishery that does not exceed optimum yield.

T

Threatened Species - a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant that, although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of the special protection and management efforts.

Total Allowable Catch (TAC) - The annual recommended catch for a species or species group. The regional council sets the TAC from the range of the Allowable Biological Catch (ABC).

Total Length - The straight-line distance from the most forward tip of the snout to the end of the tail fin, when the mouth is closed and the lobes of the tail fin are squeezed together.

Trawl - A large bag net that is tapered and forms a flattened cone. The mouth of the net is kept open while it is towed or dragged over the sea bottom.

Trophic Level - Position in the food chain, determined by the number of energy-transfer steps to that level.

U

USC - United States Code.

V

Y

Year Class - see Age Class.

Yield - Sometimes this term is synonymous with catch, but it more often implies a degree of sustainability over a number of years.

Yield-Per-Recruit - The expected lifetime yield per fish of a specific age. The yield is usually expressed in weight for each recruit. For a given species with a specific growth curve, and constant natural mortality, the yield-per-recruit will vary as a function of age at first capture and fishing mortality.

Yield-Per-Recruit Model - This model can be used to predict the yield from any given level of recruitment if just the natural mortality, present fishing mortality, and growth rates can be estimated. Furthermore, this model can be manipulated to estimate yields for any combination of natural mortality, fishing mortality, and age-at-first-capture. This information could then allow management to adjust mesh sizes, and thus age-at-first-capture, to provide for maximum or optimal yield-per-recruit regardless of population size.

Appendix B Existing Regulations Prior to Adoption of the MSFMP (FGC and CCR Title 14)

Appendix B. Existing Regulations Prior to Adoption of the MSFMP

FISH AND GAME CODE

Article 9. Salt-water and Anadromous Fish Generally

§8399. Squid - restrictions.

North of Point Conception, squid may be taken the year around; however, the commission may adopt regulations specifying the days of the week and the times of the day when squid may be taken.

§8399.1. Squid taking restricted; seine skiff.

(a) In District 10, it is unlawful to engage in the following activities:
(1) Attract squid by a light displayed from any vessel, except a vessel deploying nets for the take, possession, and landing of squid or from the seine skiff of the vessel deploying nets for the take, possession, and landing of squid.
(2) Attract squid by a light displayed from any vessel whose primary purpose is not the deployment, or assisting in the deployment, of nets for the take, possession, and landing of squid.
(3) To encircle any vessel, other than by the seine skiff of a vessel deploying nets for the take, possession, and landing of squid, while that vessel is engaged in the taking of squid.
(b) For purposes of this section, “seine skiff” means a vessel that is not licensed by the federal government or registered by the Department of Motor Vehicles, that is used to assist a larger federally-licensed or state-registered fishing vessel by assisting in the deployment and retrieval of nets and the landing of fish, and that travels with that larger fishing vessel at all times, that is used solely at the direction of the operator of the larger fishing vessel, and that is owned by the owner of the larger fishing vessel.

Article 9.7. Market Squid

§8420. Legislative findings

The Legislature finds and declares that the fishery for market squid (*Loligo opalescens*) is the State’s largest fishery by volume, generating millions of dollars of income to the state annually from domestic and foreign sales. In addition to supporting an important commercial fishery, the market squid resource is important to the recreational fishery and is forage for other fish taken for commercial and recreational purposes. The growing international market for squid and declining squid production from other parts of the world has resulted in an increased demand

for California market squid, which, in turn has led to newer, larger, and more efficient vessels entering the fishery and increased processing capacity. The legislature finds that the lack of research on market squid and the lack of annual at-sea surveys to determine the squid could result in over fishing of the resource, damaging the resource, and financially harming those persons engaged in the taking, landing, processing, and sale of market squid. The Legislature further finds that many individuals, vessels, and processing plants engaged in the market squid fishery have no other viable alternative fisheries available to them and that a decline or a loss of the market squid resource would cause economic devastation to the individuals or corporations engaged in the market squid fishery. The Legislature declares that to prevent excessive fishing effort in the market squid fishery and to develop a plan for the sustainable harvest of market squid, it is necessary to limit the number of days of the week market squid may be taken and to develop a plan for a sustainable California market squid fishery.

§8420.5. Commercial taking of market squid.

North of a line extending due west magnetic from Point Conception, market squid may be taken for commercial purposes only between noon on Sunday and noon on Friday of each week.

§8421. Commercial market squid vessel permit.

(a) On or after April 1, 1998, no person shall use a vessel to take or land market squid with dip nets (commonly referred to as scoop nets), purse seine nets, or lampara nets for commercial purposes unless the owner of that vessel has been issued a commercial market squid vessel permit by the department that has not been suspended or revoked.
(b) A commercial market squid vessel permit shall be issued only for vessels employing dip, purse seine, or lampara nets for the taking of market squid for commercial purposes. No permit is required for any vessel taking or landing market squid for commercial purposes if the amount taken by the vessel does not exceed two tons landed in a calendar day or if the squid taken is used for live bait only. No other nets shall be used for the taking of market squid from a vessel for commercial purposes. Furthermore, it is unlawful to possess in excess of two tons of incidentally taken squid per trip.
(c) A commercial market squid vessel permit shall be issued to a person only if that person is the owner of record of the commercial fishing vessel for which the permit is issued and the vessel is registered with the department pursuant to Section 7881.
(d) A commercial market squid vessel permit shall be issued only to the person who owns the vessel at the time of application for that permit. For purposes of this subdivision, an owner includes any person who has a lease-purchase agreement for the purchase of a vessel.
(e) No person who is issued a commercial market squid vessel permit shall sell, trade, or transfer the permit to another person.

(f) A commercial market squid vessel permit shall be issued annually, commencing with permit for the 1998-99 permit year.
(g) A violation of the section does not constitute a misdemeanor; however, pursuant to Section 7857, the commission may revoke or suspend the commercial market squid vessel permit or commercial fishing license held by any person who violates this section.
(h) Squid landed in excess of the limit specified in subdivision (b) of Section 8421 without a permit shall be forfeited to the department by the signing of an official release of property form. The squid shall be sold or disposed of in a manner to be determined by the department. The proceeds from all sales shall be paid into the Fish and Game Preservation Fund.

§8421.5. Permit holder of partnership or corporation.

If a commercial market squid vessel permit is issued for a vessel that is owned by a bonafide partnership or corporation, that partnership or corporation shall designate the individual who is the operator and shall provide that information to the department annually at the time of issuing the permit. If there is a dissolution of the partnership or the corporation, the partnership or corporation shall notify the department of the name of the partner or shareholder who is the successor permit holder and the department shall reissue the permit to that partner or shareholder.

§8422. Fees for permit; renewal.

(a) The fee for a commercial market squid vessel permit shall be four hundred dollars ($400).
(b) All applications for a commercial market squid vessel permit for the 1998-99 permit year shall be received by the department on or before April 30, 1998, or, if mailed, shall be postmarked by April 30, 1998. In order to renew a permit, an applicant shall have been issued a commercial market squid vessel permit in the immediately preceding year. Applications for renewal of the permit shall be received by the department on or before April 30 of each year, or, if mailed, shall be postmarked by April 30 of each year.
(c) Notwithstanding Section 7852.2, a penalty of two hundred fifty dollars ($250) shall be paid in addition to the fee required under subdivision (a) for applications that do not meet the deadline specified in subdivision (b) but that are received by the department on or before May 31 of any year.
(d) The department shall deny all applications received after May 31 of each year, and the application shall be returned to the applicant who may appeal the denial to the commission. If the commission issues a permit following an appeal, it shall assess the late penalty prescribed by subdivision (c).

§8423. Commercial squid light boat owner's permit.

(a) No person shall operate a squid light boat unless the owner of the boat has been issued a commercial squid light boat owner's permit by the department and a permit number is affixed to the boat in the manner prescribed by the department.
(b) The department shall issue a commercial squid light boat owner's permit to a person who submits an application, pays the permit fee, and meets the other requirements of this section.
(c) The department may regulate the use of squid light boats consistent with the regulations established for commercial squid vessels.
(d) The fee for a commercial squid light boat owner's permit shall be four hundred dollars ($400).
(e) It is unlawful for a person to engage in the following activities, unless the vessel used for the activity has been issued a commercial market squid vessel permit or the person holds a commercial squid light boat owner's permit:
(1) Attracting squid by light displayed from a vessel, except from a vessel deploying nets for the take, possession, and landing of squid or except from the seine skiff of the vessel deploying nets for the take, possession, and landing of squid.
(2) Attracting squid by light displayed from a vessel whose primary purpose is other than deployment, or assistance in the deployment, of nets for the take, possession, and landing of squid.
(f) A commercial squid light boat owner's permit shall be issued to a person who is the owner of record of a vessel that is registered with the department pursuant to Section 7881. For purposes of this subdivision, an owner includes any person who has a lease-purchase agreement for the purchase of a vessel.

§8423.5 Fees for permit; renewal.

(a) All applications for a commercial squid light boat owner's permit for the 1998 permit year shall be received by the department on or before April 30, 1998, or, if mailed, shall be postmarked by April 30, 1998. In order to renew a permit, an applicant shall have been issued a commercial squid light boat owner's permit in the immediately preceding year. Applications for renewal of the permit shall be received by the department on or before April 30 of each year, or, if mailed shall be postmarked by April 30 of each year.
(b) Notwithstanding Section 7852.2, a penalty of two hundred fifty dollars ($250) shall be paid in addition to the fee required under subdivision (a) for applications that do not meet the deadline specified in subdivision (b) but that are received by the department on or before May 31 of any year.
(c) The department shall deny all applications received after May 31 of each year, and the application shall be returned to the applicant who may appeal the denial to the commission. If the commission issues a license following an appeal, it shall assess the late penalty prescribed by subdivision (b).

§8424. Purchase of squid from vessel.

(a) No person shall purchase squid from a vessel or vessels unless that person holds a license issued pursuant to Section 8032 or 8033, employs a certified weigh master, and the facilities operated by the person are located on a permanent, fixed location.
(b) Notwithstanding any other provision of law, this section shall not apply to the transfer at sea of squid for live bait in an amount less than 200 pounds in a calendar day.

§8425. Annual squid management regulations.

On or after April 1, 1998, and annually thereafter, the commission, upon the recommendation of the director, after a public hearing at which findings are adopted, shall adopt regulations to protect the squid resource and mange the squid fishery at a sustainable level, taking into account the level of fishing effort and ecological factors, including but not limited to, the species' role in the marine ecosystem and oceanic conditions.

§8426. Fishery status report; recommendations for market squid conservation and management plan.

(a) The director shall be responsible for the development of research protocols and the development of recommendations for the management of the squid fishery as set forth in subdivision (c) and for the conduct of public hearings to receive information on the resource and the fishery. The director may establish a Squid Research Scientific Committee consisting of persons with scientific knowledge or expertise on the squid resource or fishery, who may be employed by academic institutions, public or private research institutions, or the private sector. The committee, if established, shall assist in the development of research protocols and the preparation and review of the market squid conservation and management plan as described in subdivision (c). The department shall pay, from revenues derived pursuant to this article, the necessary costs of the committee, including a per diem to all members, as determined by the department.
(b) The director may establish a Squid Fishery Advisory Committee consisting of members representing licensed squid fishermen, squid processor, the recreational fishing industry, squid light boat owners, marine conservation organizations, and the Sea Grant Marine Advisory Program.
(c) The director shall hold public hearings to take testimony on interim measures, squid research needs, and the development of the management recommendations to be included in the report to the Legislature. Notwithstanding Section 7550.5 of the Government Code, on or before April 1, 2001, in consultation with the Squid Fishery Advisory Committee, if established, and following public hearings, the director shall submit to the Legislature a report on the status of the market squid fishery with

recommendations for a market squid conservation and management plan, including, but not limited to, the following information:
(1) Whether a limited access plan to manage the amount of fishing effort in the market squid fishery is necessary and, if so, what criteria should be used to determine who may participate in the fishery, what the optimum number of vessels should be in the fishery, and the overall fleet capacity.
(2) Whether it is necessary or advisable to reduce the number of days of the week that market squid may be taken for commercial purposes in specified areas of the state to protect the squid resource.
(3) Whether there are areas, if any, that should be declared harvest replenishment areas for squid where the taking of squid would not be permitted.
(4) A research and monitoring program of the market squid resource as may be needed to assist in the management of the market squid fishery to assure sustainable harvest on an annual basis and funding for that program.
(5) The regulation of squid light boats.
(6) Coordination that may be necessary with a federal coastal pelagic species management plan, should one be adopted.
(7) Whether it is necessary or advisable to modify the method of take or the use of fishing gear.

§8427. Transfer of permit to replacement vessel.

(a) A commercial market squid vessel permit issued pursuant to Section 8422 or a commercial squid light boat owner's permit issued pursuant to Section 8423 may be transferred to another vessel owned by the permit holder, if the vessel is of comparable capacity as determined by United States Coast Guard documentation papers, and only if the permitted vessel was lost, stolen, destroyed, or suffered a major mechanical breakdown.
(b) The department shall not issue a permit for a replacement vessel if the permitted vessel was reported as lost, stolen, destroyed, or damaged for fraudulent purposes.
(c) Only the permit holder at the time of the loss, theft, destruction, or mechanical breakdown of the vessel may apply for the transfer of the vessel permit. Proof that a vessel is lost, stolen, or destroyed shall be in the form of a copy of the report filed with the United States Coast Guard or any other law enforcement agency or fire department investigating the loss.
(d) The vessel owner shall submit an application for the transfer to the department on a form provided by the department and shall pay a non-refundable transfer fee of two hundred fifty dollars ($250) for each transfer of a market squid vessel permit or a commercial squid light boat owner's permit.
(e) The permit for the permitted vessel shall be current, and the owner of the permitted vessel shall make assurances in the transfer application that any renewal of the permit which becomes due during the application processing period will be made.

(f) The owner of the permitted vessel shall submit evidence with the transfer application sufficient to establish that he or she is the owner of the permitted vessel and the owner of the replacement vessel at the time of the application for transfer.
(g) The vessel owner shall sign the transfer application under penalty of perjury and shall certify that the information included in the application is true to the best of his or her knowledge and belief.

§8428. Use of funds.

An amount not to exceed the sum collected annually from permit fees paid pursuant to Sections 8422 and 8423 may be used for the purposes of this article, including any research that may be necessary for the development of recommendations from the Legislature.

§8429. Material false statements-penalties.

Any statement made to the department, orally or in writing, relating to a permit issued under this article, shall be made under penalty of perjury. The commission shall revoke the commercial fishing license, the commercial boat registration of any vessel, and, if applicable, any licenses issued pursuant to Section 8032, 8033, or 8034 that are held by any person submitting material false statements, as determined by the commission, for the purpose of obtaining a commercial market squid vessel permit.

§8429.5. Authority of director and commission.

Notwithstanding any other provision of law, nothing in this article shall prohibit or otherwise limit the authority of the director or the commission under any other law.

§8429.7. Repeal of article

Sections 8420.5 to 8423.5, inclusive, and Sections 8426 and 8427 shall become inoperative upon the adoption by the commission of a market squid fishery management plan and the adoption of implementing regulations pursuant to Section 8425, and are repealed six months thereafter.

CALIFORNIA CODE OF REGULATIONS

149. Commercial Taking of Market Squid.

(a) Fishing days. North of a westerly extension of the United States --Republic of Mexico boundary line, market squid may not be taken for commercial purposes between 1200 hours (noon) on Friday and 1200 hours (noon) on Sunday of each week. This regulation applies to vessels catching squid or attracting squid with lights

for the purpose of catching. This regulation does not apply to vessels pursuing squid for live bait purposes only.

(b) Records. Pursuant to Section 190 of these regulations, any person who possesses a valid market squid vessel permit or squid light boat owners permit shall complete and submit an accurate record of his/her squid fishing/lighting activities on a form [Market Squid Vessel Logbook - DFG 149a (4/99), or Market Squid Light Boat Logbook - DFG 149b (4/99), which are incorporated by reference herein] provided by the department, as appropriate to the type of fishing activity.

(c) Maximum Wattage. Each vessel fishing for squid or lighting for squid will utilize a total of no more than 30,000 watts of lights to attract squid at any time.

(d) Light Shields. Each vessel fishing for squid or lighting for squid will reduce the light scatter of its fishing operations by shielding the entire filament of each light used to attract squid and orienting the illumination directly downward, or providing for the illumination to be completely below the surface of the water.

(e) Seasonal Harvest Guideline. For the period from April 1 through March 31 of the following year, a total of not more than 125,000 short tons of market squid may be taken by vessels permitted under Section 8421 of the Fish and Game Code, with the fishery closure implemented as follows:

(1) The department shall estimate, from the current trend in landings, when the market squid harvest guideline will be reached, and will publicly announce the effective date of closure of the directed fishery on VHF/channel 16 between the hours of 10:00 p.m. and 12:00 a.m. (midnight). It shall be the responsibility of all operators of permitted market squid vessels to monitor VHF/channel 16 to determine when the harvest guideline is expected to be reached and the fishery closed. Any announcement issued or made by the department on VHF/channel 16 shall constitute official notice.

(2) Whenever the market squid harvest guideline has been reached, market squid may be taken for commercial purposes until April 1 only pursuant to Section 8421(b) of the Fish and Game Code.

Section 2:

Final Market Squid Fishery Management Plan

Environmental Document

Final Market Squid Fishery Management Plan Environmental Document

At its 27 August 2004 meeting in Morro Bay, the Fish and Game Commission (Commission) certified the Market Squid Fishery Management Plan's Environmental Document (ED) for consistency with the provisions of the California Environmental Quality Act and adopted the MSFMP.

In the draft ED, the proposed project description comprised the management options recommended by the Department. However, the Commission had the opportunity to select from a range of options within the 19 option categories based on what they deemed reasonable. When the final MSFMP was adopted in August, some of the Commission's selected options did not reflect the Department's initial recommendations. However, these changes were insignificant in that the selected options did not result in any new potentially significant impacts. Therefore, the text of this section has not been altered.

Executive Summary

In terms of volume and revenue, market squid (*Loligo opalescens*) is one of the most important commercial fisheries in the State of California, generating millions of dollars of income annually from domestic and foreign sales. Market squid is important to the recreational fishery and is forage for marine mammals, seabirds, sea turtles, and fish, including fish taken for commercial and recreational purposes. The growing international market for squid and the declining squid production in other parts of the world has resulted in an increased demand for California market squid, which has led to more efficient vessels entering the fishery and increased processing capacity.

In 1997, the Legislature approved Senate Bill (SB) 364 to establish a moratorium on California's commercial market squid fishery. The initial 3-year moratorium placed a cap on the number of vessels in the squid fishery, established a $2,500 permit fee to fund a California Department of Fish and Game (Department) study of the fishery, and provided the Fish and Game Commission (Commission) with interim regulatory authority over the fishery for the duration of the moratorium. This interim fishery management program generated approximately two million dollars, which was directed into squid fishery research, management, enforcement, and related activities. As part of this process, a Squid Fishery Advisory Committee (SFAC), made up of resource stakeholders, and a Squid Research Scientific Committee (SRSC), consisting of many of the world's leading squid fishery scientists, were established to advise the Director on recommendations for squid conservation and management and to provide input on the development of research protocols.

In 2001, the Legislature approved SB 209 which provided for the management of the market squid fishery by the Commission. The bill required the Commission to manage the squid fishery under the Marine Life Management Act (MLMA) on and after 1 January 2002 and required the Commission to adopt a market squid fishery management plan under the MLMA by 31 December 2002. It also authorized the Commission to set the fees for commercial market squid vessel and light boat owner's permits, and recommended limiting entry for the fishery, establishing catch limits, and maintaining a research and monitoring program to assess the health of the fishery. In April 2002, the Department provided the preliminary draft Market Squid Fishery Management Plan (MSFMP) for review and comment by the public. The Commission will consider adoption of the management plan in the summer of 2004, with implementation in the 2005/2006 fishing season.

The goals of the MSFMP are to ensure sustainability of the resource and the marine life that depends on it, reduce the potential for overfishing, and maintain an appropriate sized squid fishery. The MSFMP establishes a fisheries management program for California's market squid fishery and procedures by which the Commission will manage the market squid resource. Management measures implementing the MSFMP, which directly control fishing activities, must be consistent with the goals and objectives of the MSFMP, MLMA, and other applicable laws. These management actions are to be considered regularly with an exception that provides for more timely Commission action

under certain specific conditions. Procedures in the MSFMP do not affect the authority of the Director to take emergency regulatory action under Fish and Game Code (FGC) §7710. Since squid is included in the Federal Coastal Pelagic Species Fishery Management Plan (CPS FMP) as a monitored species, the MSFMP framework structure is consistent with the federal management by the Pacific Fishery Management Council outlined in the CPS FMP.

While the draft MSFMP describes several management components, the Department recommends continuing existing market squid regulations while adding new restrictions to the fishery. The proposed restrictions include a moderate restricted access program, area and time closures around Santa Barbara and Anacapa islands to protect several species of nesting seabirds from light disturbances, an area closure for squid fishing in all waters north of Pillar Point to protect marine species from direct and indirect squid fishery interactions, permit fees to support a monitoring program, and the establishment of a single advisory committee.

The MSFMP, Section 1, describes 19 option categories for management of the market squid fishery based on four management components; fishery control rules, restricted access, ecological concerns, and administration. The proposed project and alternative options are grouped around the four components of the proposed project.

Fishery Control Rules

- Seasonal statewide catch limitation
- Egg escapement method to monitor the squid fishery
- Daily trip limits
- Weekend closures
- Monitoring program (e.g. port sampling, logbook analysis)
- Live bait fishery and incidental catch
- Gear restrictions

Restricted Access

- Limited entry and capacity goals
- Initial issuance of market squid fleet permits
- Annual permit fees
- Transferability of permits for market squid vessels
- Transferability of permits for brail boats
- Transferability of permits for light boats
- Permit transfer fees
- Experimental market squid vessel permits
- Market squid fishery regional control date

Ecological Concerns

- Squid harvest replenishment/general habitat closure areas
- Area closures for seabird protection

Administration

- Advisory committee

Some of the management option categories, e.g., permit fees, monitoring the fishery (using egg escapement), port sampling and logbook analyses, and establishment of one consolidated advisory committee, are not further discussed in this Environmental Document for the following reasons:

- Permit fees are a funding mechanism for fishery management that already exists as part of the status quo environment. The incremental difference between the current statutory fee of $400 and the proposed regulatory fee of $400 to $5000 is an aspect of the restricted access program, whose physical impacts to the environment are discussed at length in Chapters 4 and 5. No adverse environmental impacts are anticipated by the imposition of a higher fee.

- Monitoring the fishery, port sampling, and logbook analysis are information gathering activities that also already exist as part of the pre-project status quo environment. Monitoring the fishery is accomplished through port sampling and is undertaken according protocols developed cooperatively between the Department and the National Oceanic and Atmospheric Administration's Fisheries Service. Port sampling occurs after the vessel docks and while the catch is landed; thus, no adverse environmental impacts are reasonably expected from this activity. Similarly, logbook analysis occurs in the Department offices, after the logbooks have been submitted by the fishermen; again, no adverse environmental impacts have been identified from this activity.

- Finally, the SRSC and the SFAC already exist pursuant to FGC §8426(a) as part of the status quo environment. The proposed consolidation of these two bodies into one represents a strictly administrative or organizational change. As the name indicates, the role of the committee is advisory, and it possesses no authority to make decisions that translate into an environmental effect. Accordingly, no adverse environmental impacts have been identified from this activity.

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Chapter 1. Purpose and Need for the Proposed Action

1.1 Introduction

The Pacific Ocean and its rich marine living resources are of great environmental, economic, aesthetic, recreational, educational, scientific, nutritional, social and historic importance to the people of California. Market squid (*Loligo opalescens*) is the state's largest commercial fishery by tonnage. In addition, the market squid resource is important to the recreational fishery and is forage for fish, birds, marine mammals and other marine life. The growing international market for squid and declining squid production from other parts of the world has resulted in an increased demand for California market squid, which, in turn, has led to newer, larger, and more efficient vessels entering the fishery and increased processing capacity. The recent expansion in the fishery, combined with record harvests of market squid, has the potential to overfish the market squid resource. Should this occur, it could impact the resource and financially affect those engaged in the taking, landing, processing, and sale of market squid. To prevent excessive fishing effort in the market squid fishery, and to develop a plan for the sustainable harvest of market squid, it is proposed to adopt and implement a fishery management plan for the California market squid fishery that sustains both the squid population and the marine life that depends on squid.

The 1998 Marine Life Management Act (MLMA) enacted Fish and Game Code (FGC) §7050-7090 and became effective in January 1999. The MLMA created state policies, goals, and objectives to govern the conservation, sustainable use and restoration of California's marine living resources. The MLMA also provides guidance for the development of Fishery Management Plans (FMPs) which will form the primary basis for the management and development of regulations for the State's sport and commercial marine fisheries.

The Market Squid Fishery Management Plan (MSFMP) fulfills the requirements of the MLMA that the California Department of Fish and Game (Department), on behalf of the Fish and Game Commission (Commission), develop an FMP for the market squid fishery. The specific goals and objectives of the MSFMP are listed below:

Goals:

- To manage the market squid resource to ensure long term resource conservation and sustainability ;
- To develop a framework for management that will be responsive to environmental and socioeconomic changes.

Objectives:

- Provide for the sustainable use of the market squid resource by commercial and recreational fisheries for the optimum long-term benefits of present and future generations;
- Maintain an adequate forage reserve for marine mammals, fish and seabirds;
- Use adaptive management to provide for necessary changes and modifications of management measures in a timely and efficient manner;

- Ensure proper utilization and the avoidance of bycatch in the market squid fishery as well as wastage of market squid in other fisheries;
- Support and promote increased understanding of market squid natural history, population dynamics, and its ecosystem's role to improve management;
- Ensure effective monitoring of the market squid population and its fisheries;
- Ensure enforcement of regulations;
- Identify, protect, and restore critical market squid habitat;
- Minimize the adverse impacts of management on small-scale fisheries, coastal communities, and local economies.

This Environmental Document (ED) is intended to fulfill the Commission's obligation to comply with the California Environmental Quality Act (CEQA) [Public Resources Code (PRC) §21000 et seq.] in considering and adopting an FMP, and associated implementing regulations. In general, public agencies in California must comply with CEQA whenever they propose to approve or carry out a discretionary project that may have a potentially significant adverse impact on the environment. Where approval of such a project may result in such an impact, CEQA generally requires the lead public agency to prepare an Environmental Impact Report (EIR). In contrast, where no potentially significant impacts could result with project approval, a lead agency may prepare what is commonly known as a negative declaration. Where an EIR is required, however, the document must identify all reasonably foreseeable, potentially significant, adverse environmental impacts that may result from approval of the proposed project, as well as potentially feasible mitigation measures and alternatives to reduce or avoid such impacts. Because the lead agency must also subject the EIR to public review and comment, and because the agency must respond in writing to any public comments raising significant environmental issues, compliance with CEQA serves to protect the environment and to foster informed public decision-making.

CEQA also provides an alternative to preparation of an EIR or negative declaration in limited circumstances. Under CEQA, the Secretary of Resources is authorized to certify that a state regulatory program meeting certain environmental standards provides a functionally equivalent environmental review to that required by CEQA [PRC §21080.5; see also CEQA Guidelines, California Code of Regulations (CCR) Title 14 §15250-15253;]. As noted by the California Supreme Court, "[c]ertain state agencies, operating under their own regulatory programs, generate a plan or other environmental review document that serves as the functional equivalent of an EIR. Because the plan or document is generally narrower in scope than an EIR, environmental review can be completed more expeditiously. To qualify, the agency's regulatory program must be certified by the Secretary of the Resources Agency. An agency operating pursuant to a certified regulatory program must comply with all of CEQA's other requirements" [Mountain Lion Foundation v. Fish and Game Comm. (1997) 16 Cal.4th 105, 113-114 (internal citations omitted)].

The Commission's CEQA compliance with respect to the MSFMP and associated regulations is governed by a certified regulatory program [CEQA Guidelines, CCR Title 14 §15251, subd. (b)]. The specific requirements of the program are set forth in CCR

Title 14 in the section governing the Commission's adoption of new or amended regulations, as recommended by the Department (CCR Title 14 §781.5). Pursuant to CCR Title 14 §781.5, this ED contains and addresses the proposed MSFMP and associated implementing regulations, and reasonable alternatives to the proposed MSFMP. In so doing, the ED is intended to serve as the functional equivalent of an EIR under CEQA. As noted above, however, preparation of the ED is not a "blanket exemption" from all of CEQA's requirements [Environmental Protection Information Center v. Johnson (1985) 170 Cal.App.3d 604, 616-618; see also Wildlife Alive v. Chickering (1976) 18 Cal.3d 190]. Instead, the Commission must adhere to and comply with the requirements of its certified program, as well as "those provisions of CEQA from which it has not been specifically exempted by the Legislature" [Sierra Club v. State Board of Forestry (1994) 7 Cal.4th 1215, 1228].

1.2 Location and General Characteristics of the Project Area

The shoreline of California is one of the longest in the nation. There are approximately 1,072 miles of wave washed shoreline along the mainland coast, and 300 miles around the offshore islands. The harvest of market squid is proposed statewide, in all areas defined as ocean waters (CCR Title 14 §27.00), except where prohibited or restricted, as specified, in state refuges, reserves or national parks, and as regulated by provision of this proposed MSFMP. There are two major fishery areas in California (Figure 1). The northern fishery is centered in Monterey Bay and utilizes the ports of Monterey and Moss Landing. The southern fishery is centered in Santa Barbara, Ventura and Los Angeles counties and utilizes the ports of Ventura and Port Hueneme as well as San Pedro and Terminal Island ports within Los Angeles Harbor. While the northern fishery operates predominately within a half-mile of the Monterey Bay shoreline, the southern fishery targets a multitude of fishing spots including the Channel Islands and the coastal areas from Point Conception south to La Jolla (San Diego County).

Market squid have a wide distribution throughout the California Current System from the southern tip of Baja California, Mexico (23° N Latitude) to southeastern Alaska (55° N Latitude, Dickerson and Leos 1992). Although the major fisheries are in central and southern California, short-term fisheries have developed along the coast from central California to British Columbia and southeast Alaska (CDFG 2001). Market squid are pelagic invertebrates and have been found at depths to 2,600 feet. Squid are commercially harvested during spawning at depths of 50 to 150 feet. Commercial fishermen target spawning aggregations of squid; spawning grounds are typically nearshore areas over sandy bottom habitat where egg cases are deposited. An in-depth description of the habitat preferences and life history characteristics of market squid is found in Section 1, Chapter 2 of the MSFMP.

1.3 Scope of the Environmental Document

1.3.1 Proposed Action

For purposes of CEQA and this ED, the proposed action consists of the adoption of the MSFMP and its associated implementing regulations that govern market squid fishing activities in California. The proposed action is intended to be consistent with the Coastal Pelagic Species Fishery Management Plan (CPS FMP) prepared by the Pacific Fishery Management Council (PFMC). In order to prevent excessive fishing effort in the market squid fishery and to develop a plan for the sustainable harvest of market squid, it is necessary to adopt and implement a fishery management plan for the California market squid fishery that sustains both the squid population and the marine life that depends on squid. The various management tools and alternatives available will be described including the stated policies, goals, and objectives of FMPs under the MLMA. The MSFMP will continue to be managed through ongoing oversight and management of the fishery by the Commission.

1.3.2 California Environmental Quality Act (CEQA)

The Legislature enacted CEQA in 1970 to serve primarily as a means to require public agency decision makers to document and consider the environmental implications of their actions. In so doing, CEQA encompasses a number of Legislative findings and declarations, including a finding that it is "necessary to provide a high quality environment that at all times is healthful and pleasing to the senses and intellect of man" [PRC §21000 (b)]. CEQA also codifies state policy to, among other things, "prevent the elimination of fish or wildlife species due to man's activities, insure that fish and wildlife populations do not drop below self perpetuating levels, and preserve for future generations representations of all plant and animal communities and examples of the major periods of California history" [PRC §21001 (c)]. A similar provision in the FGC also declares: "It is hereby declared to be the policy of the State to encourage the conservation, maintenance, and utilization of the living resources of the ocean and other waters under the jurisdiction and influence of the State for the benefit of all the citizens of the State and to promote the development of local fisheries and distant-water fisheries based in California in harmony with international law respecting fishing and the conservation of the living resources of the oceans and other waters under the jurisdiction and influence of the State" (FGC §1700).

CEQA applies to all "governmental agencies at all levels" in California, including "state agencies, boards, and commissions" [PRC §21000 (g), 21001 (f) (g)]. Public agencies, in turn, must comply with CEQA whenever they propose to approve or carry out a discretionary project that may have a significant effect on the environment (PRC §21080). For purposes of CEQA, a project includes "an activity which may cause either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment," that is, like the proposed project, "directly undertaken by any public agency" [PRC §21065 (a)]. Moreover, as mandated by the Legislature, "it is the policy of the State that projects to be carried out by public agencies be subject to the same level of review and consideration under [CEQA] as that of projects required to be approved by public agencies" (PRC §21001.1).

Unlike its "procedural" federal counterpart, the National Environmental Policy Act (42 United States Code [USC] §4321), CEQA contains a "substantive mandate" that public agencies refrain from approving projects with significant environmental effects if there are feasible mitigation measures or alternatives that can substantially lessen or avoid those effects (Mountain Lion Foundation, supra, 16 Cal.4th at p. 134; PRC Section 21002). CEQA, as a result, "compels government first to identify the [significant] environmental effects of projects, and then to mitigate those adverse effects through the imposition of feasible mitigation measures or through the selection of feasible alternatives" [Sierra Club v. State Board of Forestry (1994) 7 Cal.4th 1215, 1233; see also Sierra Club v. Gilroy City Council (1990) 222 Cal.App.3d 30, 41]. Public agencies fulfill CEQA's mandate through required consultation with other interested public agencies and the public; preparation of EIRs, functional equivalent documents, or other appropriate CEQA analysis; subjecting their environmental analyses to public review and comment, and preparing responses to public comments concerning the environmental impacts associated with their proposed projects; and ultimately adopting findings detailing compliance with CEQA's substantive mandate. In this respect, the CEQA process "protects not only the environment but also informed self-government" [Citizens of Goleta Valley v. Board of Supervisors (1990) 52 Cal.3d 553, 564 (internal quotation marks deleted)]. Indeed, as recently underscored by the California Supreme Court, compliance with these requirements, even in the context of a certified regulatory program, "ensures that members of the [governmental decision making body] will fully consider the information necessary to render decisions that intelligently take into account the environmental consequences. It also promotes the policy of citizen input underlying CEQA" [Mountain Lion Foundation, supra, 16 Cal.4th at p. 133 (internal citations omitted)].

1.3.3 Scoping Process

The MLMA calls for meaningful constituent involvement in the development of each FMP, and requires the Department to develop a process to involve interested parties in that process. In addition, CEQA requires public consultation during lead agency review of all proposed projects subject to a certified regulatory program [See PRC §21080.5 (d)(2); see also CCR Title 14 §781.5). The adoption of the MSFMP and its associated implementing regulations is such a project under CEQA. In addition to the requirements of the MLMA, CEQA requires public consultation on all environmental projects. The Department accomplishes this through a public comment period, scoping sessions within the communities involved, or at least two Commission meetings. The Department conducted two public meetings to present options for management of the market squid fishery on 26 January 2001, in Port Hueneme and on 27 January 2001, in Monterey. The proposed project for management of the market squid fishery was developed through these venues.

In 1998, pursuant to FGC §8426**,** the Squid Fishery Advisory Committee (SFAC) and the Squid Research and Scientific Committee (SRSC) were formed to examine the market squid fishery. The SFAC is composed of fishery participants and environmentalists. The SFAC made suggestions to the Department on proposed

management strategies for the fishery. The SRSC is composed of domestic and international university, agency, and private industry scientists. The SRSC made recommendations on squid research protocols and methods as well as management. These two committees met from 1998 through 2000 and both have played a large advisory role in interim management of the fishery.

In December 2001, the Department prepared and filed a Notice of Preparation with the State Clearinghouse for distribution to appropriate responsible and trustee agencies for their input and comments. Further, the notice was provided to individuals and organizations that had expressed prior interest in regulatory actions regarding market squid.

1.3.4 Public Review and Certification of the Environmental Document

The Commission's certified regulatory program and CEQA itself require that the Draft ED be made available for public review and comment (CCR Title 14 §781.5(f); PRC §21091). Consistent with these requirements the Draft ED was released, as part of the Preliminary Draft MSFMP, for public review and comment on 15 May 2002. The Preliminary Draft MSFMP was sent to interested parties and was also posted on the Department's web site for public review. The Department accepted all written comments regarding the Preliminary Draft MSFMP that were received before 8 February 2003.

The Department submitted the Draft MSFMP to the Commission on July 7, 2003. This document was the result of revisions to a preliminary draft which was released for nearly a year of public review in 2002. It also went through an extensive scientific peer review process. Based on those reviews, substantial improvements were incorporated into the 2003 draft MSFMP and it was completely reorganized into four sections and streamlined for clarity and content. Public testimony on the Draft MSFMP was taken at the 1 August 2003 and 5 December 2003 Commission meetings. The Draft ED will once again be made available for public review and comment for no less than 45 days. During this review period, the public is encouraged to provide written comments regarding the Draft ED to the Department at the following address:

Department of Fish and Game
8604 La Jolla Shores Drive
La Jolla, CA 92037
Attention: Dale Sweetnam, Senior Marine Biologist, Supervisor

The Commission will consider the proposed draft MSFMP and ED at a public hearing scheduled to be held in the late spring/early summer of 2004, and additional public comment is expected at that time. Adoption is expected late August 2004. Public notice of the Commission meeting will be provided as required by CEQA and the FGC. The Department is required by law to prepare written responses to all comments on the Draft ED and proposed MSFMP received during the public review period that raise significant environmental issues. (CCR Title 14 §781.5(h); see also PRC §21092.5.). In

some instances, written responses to comments may require or take the form of revisions to the Draft ED or the proposed MSFMP, or both. Any such revisions, along with the Department's written responses to comments raising significant environmental issues shall constitute the Final ED. Notice of any final decision by the Commission regarding the Final ED and MSFMP will be provided to the extent required by law.

1.4 Consultation and Coordination

Because of concern about interactions between the squid fishery and nesting seabirds, including the California brown pelican, a federally and state listed species, the Department coordinated efforts to meet with the other agencies. Agencies involved in the meetings regarding the squid fishery and seabirds included the U.S. Fish and Wildlife Service (USFWS), Channel Islands National Park Service (CINPS), Channel Islands National Marine Sanctuary (CINMS), and National Oceanic and Atmospheric Administration's Fisheries Service (NOAA Fisheries) personnel. A meeting was held prior to the 4 February 2000 Commission meeting when shielding and wattage regulations were adopted for the squid fishery. An additional meeting took place on 11 October 2000. Since that time the Department has received written comments on the seabird issue as well as comments on other aspects of the MSFMP from various agencies (see Section 4 of the MSFMP, Responses to Public Comment).

1.5 Laws and Regulations

The California constitution gives authority to the State Legislature which may, by statute, provide for the seasons and conditions under which different species of fish may be taken. California law consists of 29 codes including the FGC. Laws in the FGC consist of statutes (chaptered bills that have passed through both houses of the Legislature and ultimately signed by the Governor and recorded by the Secretary of State) and propositions passed by the voters of the State. The FGC is administered and enforced through regulations. The Commission was created by the State constitution. The rulemaking powers of the Commission are delegated to it by the Legislature.

The authority and responsibility of the Commission and the Department to make and enforce regulations governing recreational and commercial fishing is provided by the Legislature and, thereby, the Department is the State agency charged with carrying out policies adopted by the Legislature and Commission. The Department enforces statutes and regulations governing recreational and commercial fishing activities, conducts biological research, monitors fisheries, and collects fishery statistics necessary to protect, conserve, and manage the living marine resources of California. General policies for the conduct of the Department are formulated by the Commission.

Recreational fishing regulations are adopted by the Commission following procedures listed in the FGC. General provisions applying to the taking and possession of fish by recreational fishermen are provided in FGC §7100-7400. Specific sportfishing regulations are found in CCR Title 14, Chapter 4.

Commercial fishing regulations are created by the Legislature and the Commission. Provisions relating to the taking and possession of fish for commercial purposes is provided in FGC §7600-9101 and CCR Title 14, Chapter 6. With the passage of the MLMA, the Commission has been granted additional broad authority to regulate commercial fisheries.

1.5.1 Marine Life Management Act

It is the policy of the State of California to ensure the conservation, sustainable use, and, where feasible, restoration of California's marine living nearshore resources for the benefit of all the citizens of the State. Programs for the conservation and management of marine fisheries resources shall be established and administered to rebuild depressed stocks, to ensure conservation, to facilitate long-term protection, and, where feasible, restore marine fishery habitats. In addition, whenever feasible and practicable, it is the policy of the State to ensure sustainable commercial and recreational nearshore fisheries, to protect recreational opportunities, and to ensure long-term employment in commercial and recreational fisheries.

The MLMA was signed into law and incorporated into the FGC (§7050-7090) in January 1998. The Act created State policies, goals, and objectives to govern the conservation, sustainable use and restoration of California's marine living resources. The MLMA provides guidance to management of the State's living marine resources, in general, and of its fisheries. The general policy on all marine resources is to ensure conservation, sustainable use, and restoration of those resources. Sustainability is to be achieved by allowing only activities and uses that are themselves sustainable. The policy on fisheries management for both recreational and commercial fisheries is meant to maintain the long-term economic, recreational, cultural, and social values of the fisheries and their habitats.

1.5.2 Federal Laws

In addition, marine resources also are managed by federal laws governing the take of seabirds, marine mammals, fish, and shellfish. The federal government manages the marine resources and fishing activities of the United States through the Magnuson-Stevens Fishery Conservation and Management Act of 1976 and the Sustainable Fisheries Act of 1996 (now called the Magnuson-Stevens Fishery Conservation and Management Act [MSFCMA]). The purpose of the MSFCMA is to provide conservation and management of US fishery resources, develop domestic fisheries, and phase out foreign fishing activity within the Exclusive Economic Zone (EEZ) consisting of ocean waters from the edge of state waters (3 miles) to 200 miles offshore.

Eight Regional Fishery Management Councils implement the goals of the MSFCMA through regulations adopted by NOAA Fisheries. The PFMC manages the federal fisheries resources off Washington, Oregon, and California by developing fishery management plans for the EEZ. The PFMC manages five coastal pelagic species

(CPS) species including market squid, northern anchovy, Pacific sardine, jack mackerel and Pacific mackerel under the CPS FMP. The State of California sits on the PFMC. When NOAA Fisheries adopts regulations for CPS included in the CPS FMP, conforming regulations need to be adopted by the Commission to avoid federal preemption under the MSFCMA (16 USC Section 856(b)), to facilitate coordination and execution of resource management activities, to increase the efficiency and effectiveness of state law enforcement, and to remain consist with the Legislature's intent that federal-state fisheries management conformity is desirable (FGC §7652.]

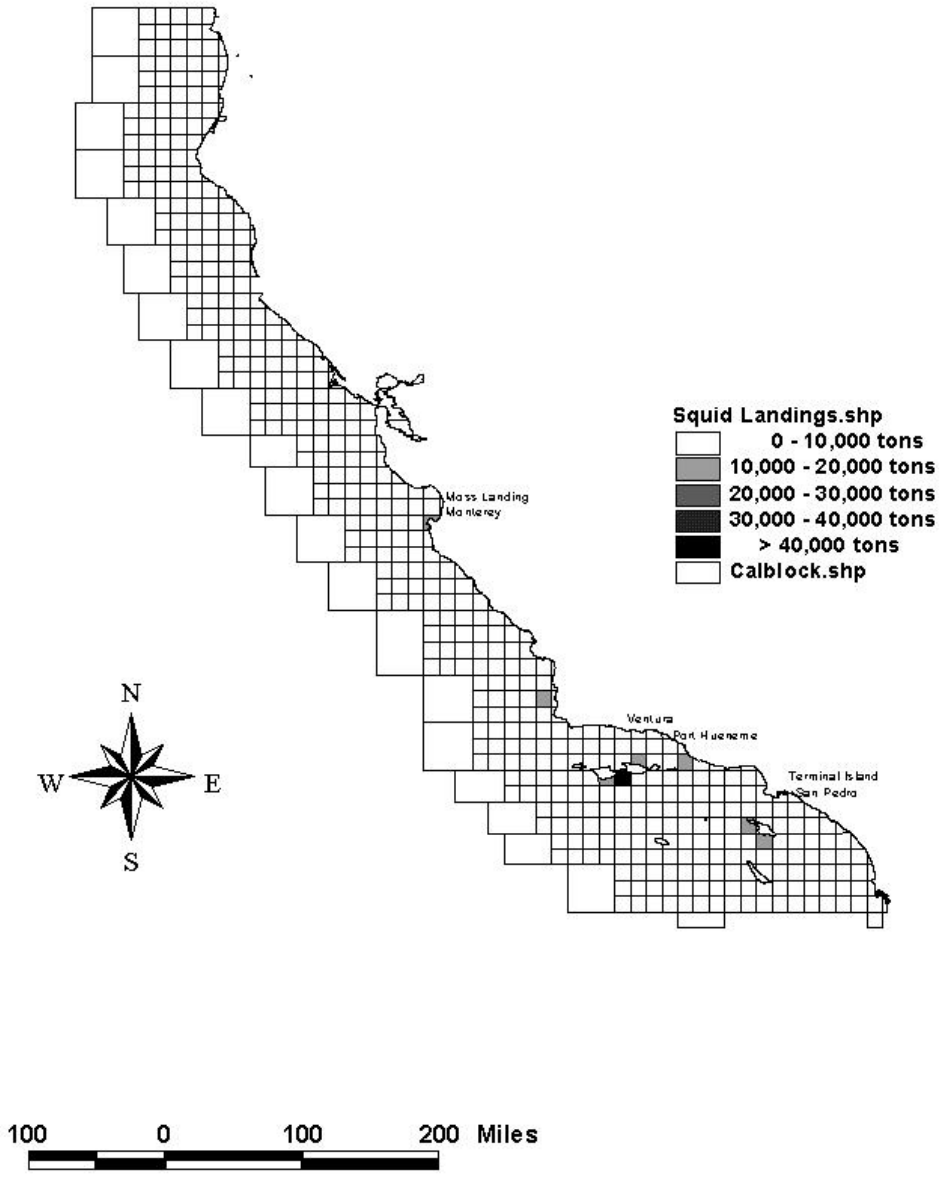

Figure 1-1. Location of Landings in the Market Squid Fishery

Chapter 2. Project Description and Alternatives

Project Options Analyzed in the Environmental Document

This chapter describes the proposed project options, status quo options, and a range of alternative project options. The discussion of alternatives focuses on alternatives to the project which are capable of avoiding or substantially lessening any significant effects of the project, even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly. Of those alternatives, this document examines in detail only the ones that could feasibly attain most of the basic objectives of the project. An ED need not consider every conceivable alternative to a project. Rather it must consider a reasonable range of potentially feasible alternatives that will foster informed decision making and public participation. It is not required to consider alternatives which are infeasible. This document does not consider alternatives whose effect cannot be reasonably ascertained and whose implementation is remote and speculative. The proposed project options and the range of alternatives were developed from various sources including the two advisory groups and input from public meetings. Chapter 1 Section 1 describes the development of the options and alternatives in detail.

Section 1 of the MSFMP describes 19 option categories for management of the market squid fishery based on four components; fishery control rules, restricted access, ecological concerns, and administration. Some of the management option categories, such as the permit fees, monitoring the fishery using egg escapement, port sampling and logbook analyses, and establishment of an advisory committee, do not have any adverse environmental impacts, thus, they are not discussed any further. This chapter describes the 14 remaining option categories associated with the proposed project, the no project alternative (status-quo), and other project alternatives that have a potential to affect the environment (Table 2-1). The 14 option categories have two to eleven options which, when combined with other options categories, will comprise either the proposed project, the no project alternative (status-quo), or other project alternatives. These different options are available to the Commission to manage the market squid fishery. Whether implementation of the MSFMP will result in potentially significant impacts under CEQA is a function of whether implementation of the selected options would cause such impacts. Option designations (letter and number) have been retained in this chapter to reference Section 1 of the MSFMP. A detailed description of the components and the rationale for the different options can be found in Section 1, Chapter 3 of the MSFMP.

In Section 1 of the MSFMP, some status quo options also are the proposed project options (e.g. C.2, D.1, E.1, F.1, G.1). Some of these options are currently regulations, and were put in place until a FMP for market squid could be developed and implementing regulations adopted, at which time certain code sections relating to the squid fishery also become inoperative. Because the Department recommends continuing these existing market squid regulations while adding new restrictions to the fishery, they are part of the MSFMPs proposed or preferred project. However, for

purposes of this analysis, the proposed project only consists of the preferred options that are not status quo. For CEQA analyses, the status quo alternative is considered the "no project" alternative since it represents the "pre-project" baseline or existing environmental conditions. The purpose of analyzing the no project alternative is to allow a comparison of the impacts of approving the proposed project versus the impacts of not approving the proposed project (CCR Title 14§15126.6). CEQA Guidelines (CCR Title 14 §15126) require that this document provide an accurate description of the current environmental conditions (affected environment) and identify any impacts that currently exist with the no project alternative. Furthermore, this document must describe the type of impacts, level of impact, as well as potentially feasible mitigation measures to reduce or avoid such impacts that would occur with the proposed project. It must also include a range of reasonable project alternatives. Tables 2-2 to 2-4 summarize the components and options discussed in this document under the proposed project, the no project alternative and other project alternative options.

TABLE 2-1 COMPONENTS AND OPTIONS ANALYZED IN THE ED

Component	Letter	Option Category
Fishery Control Rules	A	Seasonal statewide catch limitation
	C	Daily trip limits
	D	Weekend closures
	F	Live bait fishery and incidental catch
	G	Gear Restrictions
Restricted Access	H	Limited entry and capacity goals
	I	Initial issuance of market squid fleet permits
	K L M	Transferability of permits for market squid vessels Transferability of permits for market squid brail vessels Transferability of permits for market light boats
	O	Experimental market squid vessel permits
	P	Market squid fishery regional control date
Ecological Concerns	Q	Squid harvest replenishment/general habitat closure areas
	R	Area and time closures to address seabird issues

TABLE 2-2 PROPOSED PROJECT OPTIONS

	Fishery Control Rules
A.2	Statewide seasonal catch of 118,000 tons
	Restricted Access
H.3	Capacity goal for vessels & light boats at 52 permits each, 18 brail permits would be light boats
I.1	Meet specifications for issuance of squid fleet permits (squid vessel, squid brail, squid light boat)
K.3	Transfer vessel permits based on comparable capacity under a "2 for 1" retirement and secure 2 permits to enter the fishery
L.3	Establish full permit transferability of market squid brail permits based on comparable capacity
M.3	Establish full permit transferability for light boats with a "2 for 1" retirement
M.4	Trade "4 for 1" light boat permits for a brail permit
	Ecological Concerns
Q.3	Establish areas closed to squid fishing in all waters north of Pillar Point at any time**
R.4	Establish areas closed to squid vessels using attracting lights; 1 nm closure at Anacapa and Santa Barbara islands from 1 February to 30 September

TABLE 2-3 NO PROJECT ALTERNATIVE (STATUS QUO) OPTIONS	
	Fishery Control Rules
A.5	Statewide seasonal catch of 125,000 tons
C.2	No daily trip limits
D.1	Weekend closures from noon Friday to noon Sunday
F.1	No squid permit for live bait or landing 2 tons/day
G.1	Gear options; maintain shields and/or light wattage regulations
	Restricted Access
H.5	No capacity goal (no limited entry program)
I.2	184 market squid vessel and 41 light boat owners permits, no additional brail permits
K.1	No permit transfers for squid vessels except in major breakdown or loss of vessel
L.1	No permit transfers for brail vessels except in major breakdown or loss of vessel
M.1	No permit transfers for light boats except in major breakdown or loss of vessel
O.3	No experimental market squid vessel permit
P.2	No regional restricted access control date
	Ecological Concerns
Q.1	No specific areas set aside as squid harvest replenishment/general habitat closure areas
R.5	No seabird time and area closures

TABLE 2-4 ALTERNATIVE OPTIONS	
	Fishery Control Rules
A.1	Statewide seasonal catch limit of 80,000 tons
A.3	Regional seasonal catch limit based on multi-year averages
A.4	Statewide seasonal catch limit based on environmental conditions
A.6	No seasonal catch limitation*
A.7	Establish a seasonal catch limitation of between 24,000 -125,000 tons
C.1	Establish daily trip limit between 30-137.8 tons for vessels and 15 tons for brails
D.2	Do not continue weekend closures*
D.3	Maintain statewide weekend closures except in areas of the northern Channel Islands*,**
D.4	Maintain statewide weekend closures and extend range of options north of Point Conception**
F.2	Establish a permit for the taking of squid for live bait
G.2	Remove existing gear options regarding shields and/or light wattage*
G.3	Establish light wattage set between 15,000 and 30,000 watts**
G.4	Modify shields to improve effectiveness**
	Restricted Access
H.1	Capacity goal for vessels and light boats at 10 permits each and 18 brail permits
H.2	Capacity goal for vessels and light boats at 52 permits each and 18 brail permits
H.4	Capacity goal for vessels and light boats at 104 permits each and 18 brail permits
I.3	Issue purchase by any permit-holder in first year of moratorium
I.4	Meet specifications for issuance of squid fleet permits (version 2)
1.5	Do not have a permit program*
K.2	Establish full permit transferability of market squid vessels
L.2	Full transferability of brail permits assuming 15-ton daily trip limit (C1)is adopted
M.2	Establish full permit transferability of market squid light boat permits
O.1	Establish 1-5 experimental market squid vessel transferable permits**
O.2	Establish 1-5 experimental market squid vessel non-transferable permits**
P.1	Establish a market squid fishery regional control date for a future program**

TABLE 2-4 ALTERNATIVE OPTIONS continued	
	Ecological Concerns
Q.2	Close all waters within depths of 100 fathoms around San Nicholas Island
Q.4	Establish areas closed to squid fishing in any waters of the Gulf of Farallons NMS**
Q.5	Establish areas closed to squid fishing 1 nm around the Farallon Islands**
Q.6	Prohibit the take of squid for commercial purposes in District 10**
R.1	Establish areas closed to squid fishing; 1 nm closure at San Miguel, Anacapa, and Santa Barbara islands, from 1 February to 30 September
R.2	Establish areas closed to squid fishing; 1 nm closure at Anacapa and Santa Barbara islands from 1 February to 30 September
R.3	Establish areas closed to squid vessels using attracting lights; 1 nm closure at San Miguel, Anacapa, and Santa Barbara islands, from 1 February to 30 September
R.6	Establish areas closed to squid fishing; 1 nm closure at Farallon Islands from 1 February to 30 September**
R.7	Establish areas closed to squid fishing in all waters of the Gulf of the Farallones NMS from 1 February to 30 September**
R.8	Establish areas closed to squid vessels using attracting lights; 1 nm closure at the Farallon Islands, from 1 February to 30 September**
R.9	Establish areas closed to squid vessels using attracting lights in all waters of the Gulf of the Farallones NMS, from 1 February to 30 September**
R.10	Establish areas that are closed to squid fishing around San Miguel, Anacapa and Santa Barbara islands from 1 February through 30 November**
R.11	Establish areas that are closed to squid fishing around Anacapa and Santa Barbara islands from 1 February through 30 November**

* Not discussed in detail in the ED, refer to Section 5.2
** Options added at the request of the Commission and/or via public comment

2.1 Fishery Control Rules

The fishery control rules provides a protocol for determining sustainable levels of market squid fishing that is enforced through the adoption of specific management tools such as seasonal catch limits, daily trip limits, area closures, time closures, and sustainable levels of egg escapement. These tools are primarily designed to address economic problems associated with excess harvest capacity in open access fisheries. Information regarding the biology of market squid is limited and no reliable estimate of market squid abundance is available. As knowledge increases, management can become less precautionary. The management alternatives proposed by the Department have considered the conditions specific to each region (north and south of Point Conception). Fishery control rule option categories discussed in this document include seasonal catch limitations, daily trip limits, weekend closures, permits for the live bait fishery and incidental catch of market squid, and gear restrictions.

2.1.1 Seasonal Catch Limitation

A seasonal catch limitation does not allow the catch to expand beyond a maximum volume and may provide some stock protection. The maximum sustainable yield (MSY) in a marine fishery is the highest average yield over time that does not result in a continuing reduction in stock abundance, taking into account fluctuations in abundance and environmental variability. However, there is a lack of data adequate to make a mathematical MSY determination for the market squid fishery, making it a data-poor situation. In such cases, NOAA Fisheries guidelines (Restrepo et al. 1998) dictate that a proxy may be used for MSY, and that it is reasonable to use recent average catch from a period when there is no qualitative or quantitative evidence of declining abundance.

El Niño events are an intrinsic part of the California Current and thus, should not be excluded from landings when considering MSY. Historic market squid data indicate that low landing periods correspond with El Niño events when availability of squid to the fishery is greatly reduced. The first fishing season (1999-2000) following the 1997-1998 El Niño event resulted in the highest squid landings on record. Nearly all of the landings were from the southern California fishery (99.7 percent); landings reported from the northern fishery were minimal (0.3 percent). This disparity could not have been predicted given the current understanding of market squid or by utilizing temperature inclusive models.

The ability of the California market squid fishery to support landings of 124,309 short tons (tons) in 1996-1997, followed by a strong El Niño (1997-1998) and then repeat landings of the same magnitude in 1999-2000 and 2000-2001 suggests that the stock is robust enough to withstand these levels of landings. This is likely due to the semiannual lifespan and the presence of several (minimum seven) cohorts throughout the year.

Options for Establishing a Seasonal Catch Limitation

Option A.1: Establish a statewide seasonal catch limitation of 80,000 tons. This seasonal catch limitation is based on the seasonal catch limitation using the 3-year recent average catch from the 1999-2000 to 2001-2002 seasons with the assumption that the stock is below B_{MSY} (average spawning biomass) and above MSST (minimum stock size threshold). This approach uses a multiplier of 0.67. Under this option, a maximum statewide seasonal catch limitation of 80,000 tons would be implemented.

Option A.2 (*proposed action*): Establish a statewide seasonal catch limitation of 118,000 tons. This seasonal catch limitation is based on the recent average catch and the assumption that the stock is above the $B_{MSY.}$ This approach uses a multiplier of 1.0. Under Option A.2, a maximum seasonal catch limitation of 118,000 would be implemented.

Option A.3: Establish regional seasonal catch limitations based on either a multi-year recent average catch for each region with the assumption that the stock is above B_{MSY}. The regions would be north and south of Point Conception.

Option A.4: Establish a statewide seasonal catch limitation based on environmental conditions as recommended by the SRSC: a seasonal harvest of 115,000 tons in a non-El Niño period and a landings cap of 11,000 tons during an El Niño period.

Option A.5 (*status quo*): Establish a statewide seasonal catch limitation of 125,000 tons, a value in close proximity to the highest catch on record.

Option A.6: Do not set a seasonal catch limitation. The SFAC did not support any landings limit. Most fishers and processors opposed the landings limit. There was speculation that the likelihood of repeating a catch of 125,000 tons in a season is unlikely given the implementation of weekend closures. Landings for the 2001-2002 season were 123,411, which was 98.7 percent of the limit.

Option A.7: Establish a seasonal catch limitation of between 24,000 to 125,000 tons (as directed by the Commission, 1 August 2003). The maximum value (125,000 tons) represents the current interim regulation, while the minimum value represents a 6 year average of seasonal landings from the 1997-1998 to 2002-2003 seasons and the assumption that the stock is below the MSST. The primary purpose of this option is to give the Commission greater flexibility in determining a seasonal catch limitation with a level of protection they are comfortable with.

2.1.2 Daily Trip Limits for Vessels Landing Squid

The purpose for implementing daily trip limits for market squid vessels and brail vessels is to prevent change in the general size composition of individual vessels once permits become transferable. There has been a steady increase in daily trip limits for market squid from 1981 to the present time. Establishing daily trip limits for squid fishing

vessels would prevent current vessels from increasing catch volume on a per-trip basis, should market-imposed trip limits be dissolved or technological developments allow for increased efficiency. Daily trip limits will protect the resource through distribution of harvest throughout the season, which may be of extreme importance since the fishery targets spawning squid. When combined with a restricted access program (see below) daily trip limits would serve to disseminate the fishery resulting in reduced fishing effort on specific spawning aggregations and locations.

The current fishery is controlled by market orders. Although there are vessels in the current fleet capable of delivering loads well in excess of 60 tons, there is rarely the opportunity to deliver a vessel's full capacity tons because market-imposed trip limits of 30 tons are routine, although a vessel may deliver to more than one processor daily. Processors set the limit at 30 tons because of limited processing and freezing capacity. Market squid are included as part of the CPS FMP as a monitored-only species. The CPS FMP federal guidelines limit CPS finfish harvest to a approximately 137.8 tons daily trip limit, but the majority of the vessels are well under this volume.

Options for Establishing Daily Trip Limits

Option C.1: Establish a daily trip limit between 30-137.8 tons daily for market squid vessels and 15 tons for brail vessels.

Option C.2 *(status quo/proposed action)*: Do not establish daily trip limits for the market squid fishery.

2.1.3 Weekend Closure

Interim regulations (CCR Title 14 §149), implemented in 2000, prohibit the take of market squid for commercial purposes each week between noon Friday and noon Sunday from Point Conception south to the U.S.-Mexico border. The closure extends an existing squid fishery closure for the same time period north from Point Conception to the California-Oregon border (FGC §8420.5). The weekend closure north of Point Conception has been in effect since 1983 and was put in place to reduce conflict with coastal communities. The regulations affect vessels catching squid and vessels using lights to attract squid, and do not apply to those pursuing squid for live-bait purposes. This precautionary measure was adopted to provide spawning squid at least two consecutive nights each week respite from fishing pressure and to address complaints from coastal communities concerning bright attracting lights used by market squid vessels. Unlike a seasonal quota or closure, this measure spreads the escapement throughout the year, rather than concentrating it during one particular period. Prohibiting fishing activity on weekends also helps alleviate conflict with other interest groups operating in the same areas.

Options for Weekend Closures

Option D.1 (*status quo/proposed action*): Continue closures from noon Friday to noon Sunday from the U.S.-Mexico border to the California-Oregon border.

Option D.2: Do not continue weekend closures.

Option D.3: Maintain existing statewide weekend closures but provide for an exemption in the areas of the northern Channel Islands to allow fishing to continue 7 days per week. (Project alternative added at the request of the Commission and/or as a result of public comment).

Option D.4: Maintain statewide weekend closures and extend the range of closure to include additional days and/or times for areas north of Point Conception. (Project alternative added at the request of the Commission and/or as a result of public comment).

2.1.4 Live Bait Fishery and Incidental Catch of Market Squid

Market squid are an important source of live bait for the California recreational fishing industry. A small volume also is taken by the commercial live bait industry using brail, lampara, or drum seine gear. This fishery is a high value use of squid, supplying bait to valuable recreational fisheries along the West Coast, primarily in southern California. Live bait catch is largely dependent on local availability, and is sold by vessels either at sea or at live bait dealerships in several harbors statewide. Since the sale of live bait in California is not documented in a manner similar to that used for the commercial sale of squid, estimates of tonnage and value are not available. Present market squid regulations do not require a squid permit when fishing for live bait. It is assumed the take of live bait is minor, but because the actual amount of squid taken as live bait is unknown, bait logs would provide information about the impact of this industry on the resource and it is recommended that the current voluntary live bait logs be modified to include market squid.

Current regulations [FGC § 8421(b)] do not require vessels taking or landing market squid for commercial purposes to have a market squid permit if the incidental catch of market squid does not exceed 2 tons in any calendar day. The volume of squid taken in this manner is small and landings of market squid less than or equal to 2 tons has been decreasing since the 1980s.

Options for Live Bait Fishery and Incidental Catch of Market Squid

Option F.1 (*status quo/proposed action*): Continue existing regulations that do not require a squid permit when fishing for live bait. Continue existing regulations that do not require a market squid permit for vessels landing or taking market squid not to exceed 2 tons in a calendar day.

Option F.2: Establish a permit for the taking of market squid as live bait. Continue existing regulations that do not require a market squid permit for vessels landing or taking squid not to exceed 2 tons in a calendar day.

2.1.5 Gear Restrictions

More than 90 percent of the vessels (seiners) that currently participate in the market squid fishery use roundhaul gear (purse seine, drum seine) to catch squid, and light boats are used in tandem with the seiners. A light boat is typically a smaller vessel with several high-powered lights located at various levels around the vessel. The purpose of the lights is to attract and aggregate spawning squid to surface waters. Spawning squid do not appear to have regular spawning locations that they seek out. It is not known what prompts squid to deposit their eggs at certain locations. Furthermore, it is not known if squid show site fidelity, returning to the same spawning site where they hatched. These factors, combined with environmental changes affect where the squid fishery operates at any given time. Some seasons, fishing is concentrated along the coastline while other times it is further offshore at islands.

By the summer of 1999, seabird researchers, the American Trader Trustee Council and the CINPS became concerned about potential effects of attracting lights used by the squid fleet on nesting seabirds at nearby islands. Specifically, their concerns centered on disturbance to the island breeding colonies from high wattage lights and noise from market squid fishing vessels and they requested that the Department take action to prevent potential new impacts on the nesting birds.

It was thought that shielding the high powered lights should block any light that is emitted upward or in a horizontal direction from the bulb. Thus, the Department evaluated the light emitted from one shielded squid fishing vessel with light emissions from one unshielded vessel. Several light measurements were taken from four different distances for the shielded and unshielded fishing vessels and were repeated at different elevations [sea level, 150 ft above sea level (ASL), and 300 ft ASL]. The results indicated that the shielded vessel emitted less light at approximately 1/2 mile offshore compared with an unshielded vessel 1 mile from shore for elevations up to 300 ft ASL. However, seabirds may nest at elevations higher than 300 ft. For example, 85 percent of California brown pelicans nesting at West Anacapa Island nest at elevations greater than 300 ft. Illumination increases with elevation due to reflection and may be a result of the shape of the shield allowing more reflection at higher elevations. Thus, the effectiveness of a shielded boat decreases with elevation. Additionally, there is the issue of multiple boats in one area and the additive effects of lights. Two boats with 30,000 watts are twice as bright as a single boat with 30,000 watts; 10 boats would be 10 times as bright. Thus, several shielded boats within 1/2 mile could be brighter than fewer boats at 1 mile. Squid boats fish closer to shoreline than the minimum distance measured by the Department. The CINPS reported 12 light boats at one time with an average distance of 75 to 450 feet, or less than 1/8 mile from the shoreline. Finally, there is the issue of increased illumination when boats rock.

Because of the inference that lights from the squid fishery interfere with the California brown pelican recovery and population levels of the Xantus's murrelet and ashy storm-petrel, the Department recommended and the Commission adopted a maximum allowable light wattage and specific requirements for orientation and shielding of lights for vessels fishing or lighting for squid. The management measures are: 1) entail the reduction of wattage from any individual vessel to a maximum of 30,000 kilowatts, and 2) require the use of shielding for all vessels commercially fishing or landing squid. These interim regulations went into effect 30 May 2000. At the time the light restrictions were adopted, the Commission asked the Department to report as to effectiveness of the interim measures in a year. Although the Department has attempted to measure the effectiveness of these gear restrictions, a threshold value for light intensity that negatively impacts the breeding success of seabirds has not been determined.

In addition to the potential effects of lights on nesting seabird colonies, the growth of the southern California fishery coincided with complaints from coastal communities about the intensity of the squid vessel lights. Some seasons, fishing is concentrated along the coastline while other times it is farther offshore at islands. The lack of consistency among squid spawning sites from year to year further complicates the issue because many years squid fishing pressure is reduced along the southern California coastline.

However, the shielding and wattage regulations serve to reduce the total amount of light transmitted to coastal communities, specifically the cities of Monterey and Malibu (Los Angeles County). Shielding and wattage restrictions were put in place (May 2000). No complaints from southern California coastal communities about lights from the squid vessels were documented in 2000 and 2001. But in January 2002, the Laguna Beach police received about 40 calls from residents regarding squid fishing in waters less than half a mile offshore. In 2002, fishing activity in Monterey Bay tripled compared with the average for the area. Yet, enforcement received only general complaints from the community about the squid fishing lights at night; enforcement personnel took action against operators with shielding violations (T. Olivas, pers. comm.)

Options for Gear Restrictions

Option G.1: (*status quo/proposed action*): Maintain existing gear restrictions which states that each vessel fishing for squid and lighting for squid will utilize a total of no more than 30,000 watts of light to attract squid at any time and that each vessel fishing for squid or lighting for squid will reduce the light scatter of its fishing operations by shielding the entire filament of each light used to attract squid and orient the illumination directly downward, or provide for the illumination to be completely below the surface of the water.

Option G.2: Remove existing gear options regarding shields and/or wattage.

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Option G.3: Establish gear restrictions that each vessel fishing for squid and lighting for squid will utilize a wattage limitation set at a value between 15,000 to 30,000 watts of

light to attract squid at any time. (Project alternative added at the request of the Commission and/or as a result of public comment).

Option G.4: Establish gear restrictions which states that each vessel fishing for squid and lighting for squid will utilize shielding that will reduce the light scatter of its fishing operations by shielding the entire filament of each light used to attract squid and orient the illumination directly downward, or provide for the illumination to be completely below the surface of the water. (Project alternative added at the request of the Commission and/or as a result of public comment).

2.2 Restricted Access

Restricting access to a fishery has become one of many standard fishery management tools used by public agencies in carrying out their conservation and management responsibilities for publicly held fishery resources. It is the policy of the Department and Commission to design restricted access programs to enhance the State's ability to manage its commercial fishery resources. Restricted access programs should: 1) contribute to sustainable fisheries management by providing a means to match the level of effort in a fishery to the health of the fishery resource and by giving fishery participants a greater stake in maintaining sustainability; 2) provide a mechanism for funding fishery management, research, monitoring, and law enforcement activities; 3) provide long term social and economic benefits to the State and fishery participants; and 4) broaden opportunities for the commercial fishing industry to share management responsibility with the Department. More specifically, the Commission's purposes for restricting access or entry to a fishery are described as: 1) promote sustainable fisheries; 2) provide for an orderly fishery; 3) promote conservation among fishery participants; and 4) maintain the long term economic viability of fisheries. Restricted access programs may be instituted in order to carry out one or more of these purposes in a given fishery. Each option under Restricted Access provides different permitting strategies and results in a different number of vessels anticipated to qualify.

2.2.1 Limited Entry/Capacity Goals

Limiting the number of vessels may be one method of reducing take in order to protect the market squid resource. Even when fishery management specifies catch limits, season length, and gear allowed, fishermen still compete to catch as much as possible in the shortest period of time. Limited entry would reduce the number of vessels but not necessarily the effort as the remaining vessels would compensate for the market demand. Fewer boats in the fleet will result in the fleet becoming more specialized, and these vessels will presumably need to be more productive for squid, resulting in a fleet with minimal excess or latent capacity.

Prior to the 1998-1999 season, the squid fishery was an open access fishery. In 1996, new demand and markets for squid attracted many fishing vessels from other states. This influx of fishing vessels increased competition. Vessels currently participating in the market squid fishery are capable of harvesting more squid than is available under

current or likely future biomass conditions. Available information indicates that market squid vessels permitted in the 2000-2001 season could harvest in excess of 15,000 tons a day operating at maximum efficiency, an amount in excess of the volume of squid likely to be available under the most optimum of conditions.

Establishing limited entry qualifying criteria is a first step in reducing fleet size from the 184 market squid vessels and 41 light boats currently permitted to achieve the selected capacity goal, provided the current number of vessels is in excess of the selected goal.

The brail fleet produces only a small fraction of the overall take of market squid, but it is in the best interest of the fishery to curtail growth of this sector until more information is available by preventing an open-access situation. Market squid brail permits would allow light boats to land squid (> two tons) while lighting for seiners. Additionally, at any time these vessels could develop more efficient methods of operation which could change the overall catch contribution made by this component of the fishery.

Options for Market Squid Fleet Capacity Goal

Option H.1: Establish a capacity goal for market squid vessel permits that produces a highly productive and more specialized fleet. This option assumes that the maximum catch that would ever be possible for each boat is caught on every trip. If the vessel fished a maximum of 130 days per season, 10 vessels operating in this manner could land the maximum seasonal catch. This option would then set the capacity goal for both market squid vessel permits and light boat owner permits at 10 permits each. The capacity goal for market squid brail permits would be 18 permits. The capacity goal for non-transferable market squid vessel permits and market squid brail permits is zero.

Option H.2: Establish a capacity goal for market squid vessel permits that produces a moderately productive and specialized fleet. This option assumes that the maximum catch that each boat made is caught on every trip. If the vessel fished the highest average number of day per season (45), 52 vessels operating in this manner would land the maximum seasonal catch. This option would then set the capacity goal for both market squid vessel permits and light boat owner permits at 52. The capacity goal for market squid brail permits would be 18 permits. The capacity goal for non-transferable market squid vessel permits and non-transferable market squid brail permits is zero.

Option H.3 (*proposed action*): Establish a capacity goal for market squid vessel permits that produces a moderately productive and specialized fleet. This option assumes that the maximum catch that each boat made is caught on every trip. If the vessel fished the highest average number of days per season (45), 52 vessels operating in this manner would land the maximum seasonal catch. This option would then set the capacity goal for both market squid vessel permits and market squid light boat permits at 52 each. Because brail vessels function largely as light boats and the goal of the plan is to match the number of light boats to the number of market squid vessel permits, market squid brail permits would be part of the total light boat capacity goal of 52 vessels. The capacity goal for market squid brail permits as a division of light boat permits would be set at 18 permits. The capacity goal for vessels with light boat owner permits would be

34. The capacity goal for non-transferable market squid vessel permits and non-transferable market squid brail permits is zero.

Option H.4: Establish a capacity goal for market squid vessels that produces a less productive and less specialized fleet, producing a more diverse fleet. This option assumes that the average catch for each boat continues. If the vessel fished a maximum of 45 days per season, 104 vessels operating in this manner would land the maximum seasonal catch. This option would then set the capacity goal for both market squid vessel permits and light boat owner permits at 104 permits. The capacity goal for market squid brail permits would be 18 permits. The capacity goal for non-transferable market squid vessel permits and market squid brail permits is zero.

Option H.5 (*status quo*): Do not establish a capacity goal (no limited entry program). Currently there are 184 market squid vessel permits and 41 squid light boat owner's permits, and no market squid brail permits exist.

2.2.2 Initial Issuance of Market Squid Fleet Permits

California has had a practice of giving preference to vessels of fishermen with past participation when issuing restricted access permits. Among fishermen or vessels with past participation in the squid fishery, preference for permits may be based on factors such as years of participation in the fishery or level of participation (landings). The Commission's policy to determine qualification for an initial permit has three elements. First, the policy for all restricted access fisheries assumes that initiating a restricted access program will not increase the recent level of fishing effort. Second, initial issuance of permits will only be to the current owners of qualifying vessels. Third, in order to meet the needs of a particular fishery, it may be desirable to modify the approach of giving permits only to current owners of qualifying vessels. Currently, the status quo condition has 184 market squid vessel permits and 41 squid light boats owner's permits and no market squid brail permits exist.

Options for Initial Issuance of Market Squid Fleet Permits

Option I.1 (*proposed action*):

- Market squid vessel permit (transferable): a) possession of a current market squid vessel permit and b) a minimum number of landings (50-150 landings) during a specific window period.
- Market squid vessel permit (non-transferable): a) have possessed a California commercial fishing license for at least 20 years, and b) have made at least 33-50 landings of market squid in any one licensed season.
- Market squid brail permit (transferable): a) possession of a current market squid vessel permit and b) a minimum number of landings (5-25 landings) during a specific window period.
- Market squid brail permit (non-transferable): a) have possessed a California commercial fishing license for at least 20 years, and b) have made a minimum of landings (5-25).

- Squid light boat owner's permit (transferable): a) possession of either a current market squid vessel permit or a current market squid light boat permit and b) have submitted one light boat log during a specific window.
- No provisions for non-transferable squid light boat owner's permits are proposed.

Option I.2 (*status quo*): Continue with existing moratorium program (184 market squid vessel permits and 41 squid light boat owner's permits). There would be no issuance of market squid brail permits because that permit does not exist at this time.

Option I.3: Allow permit purchase by any permitholder who held a permit in the first year of the moratorium (301 permits were purchased: 239 market squid vessel permits and 62 squid light boat owner's permits). There would be no market squid brail permits because that permit does not exist at this time.

Option I.4:
- Market squid vessel permit (transferable): a) possession of a current market squid vessel permit and b) a minimal number of market squid landings during a specific window period, OR c) possession of a current market squid vessel permit, and d) have possessed a California commercial fishing license for at least 20 years, and e) have made a minimum number of landings (33-50) in one licensed season (approximately 18 additional vessels qualify).
- There are no provisions for non-transferable market squid vessel permits.
- Market squid brail permit (transferable): a) possession of a current market squid vessel permit and b) a minimal number of landings (5-25) during a specific window period, OR c) have possessed a California commercial fishing license for at least 20 years, and d) have made at least 10 landings of market squid with brail gear in any one licensed season (approximately 15 additional vessels qualify).
- There are no provisions for non-transferable market squid brail permits.
- Squid light boat owner's permit (transferable): a) possession of either a current market squid vessel permit or a current squid light boat owner's permit and b) have submitted one light boat log by 31 December 2000 (64 vessels qualify)
- There are no provisions for non-transferable squid light boat owner's permits.

Option I.5: Do not have a permit program.

2.2.3 Transferability of Market Squid Permits (options K, L, M)

Limited entry permits are affixed to the owner (or corporation) of record of the vessel that qualifies. If there are more permits in the fishery than the capacity goal, transferability provisions can help meet the capacity goal over time while preventing disruption to the fishery. Under the moratorium established for the fishery in 1998, transferability was disallowed except in cases of the permitted vessel being lost, stolen, destroyed or suffering a major mechanical breakdown. Following the Commission's restricted access guidelines transferability of limited entry permits should be allowed provided the provisions assist in attaining the capacity goal. The further away the initial

number of permits are from the capacity goal, the more restrictive the provisions for transferability will need to be to achieve the capacity goal over time. As with initial issuance criteria, options associated with K, L, and M are intended to represent the scope of options available.

Market Squid Vessel Permit Transfer Options

Option K.1 (*status quo*): Do not allow permit transfers except in cases of major mechanical breakdown or loss of the vessel.

Option K.2: Establish full transferability of market squid vessel permits.

Option K.3 (*proposed* action):

- Establish full transferability of market squid vessel permits based on comparable capacity (within 10 percent).
- Establish transferability of market squid vessel permits to a vessel of larger capacity under a "2 for 1" permit retirement – this option will allow vessel owners to increase their vessel capacity by transferring their permit to a replacement boat and surrendering one or two additional permits. Permit holders wishing to increase their current capacity more than 10 percent must acquire another market squid vessel permit and surrender it to the Department for retirement.
- Individuals wishing to gain entry into the fishery must secure two permits: one permit must be surrendered the Department for retirement and one permit for issuance to a vessel that will not increase the fishing capacity (not to exceed a maximum of 10 percent increase). This will allow a reduction in the number of permits. Market squid light boat permits cannot be used to secure a vessel permit.

2.2.4 Market Squid Brail Permit Transfer Options

Option L.1:(*status quo*): Do not allow permit transfers except in cases of major mechanical breakdown or loss of the vessel – this option will allow for more rapid attrition of the fleet, however, it likely will not meet the practical needs of working vessels and can have implications for vessel safety.

Option L.2: Establish full transferability of market squid brail permits – provided a 15-ton daily trip limit for these vessels is implemented, there is no specific reason to restrict transfer of market squid brail permits as they are a minor component of the fleet and do not significantly contribute to the fleet capacity.

Option L.3 (*proposed action*): Establish full transferability of market squid brail permits based on comparable capacity (within 10 percent) – should no daily trip limit be adopted for brail boats, this would be a viable option. This helps to meet the needs of the fleet without significantly increasing capacity as no permits currently exist.

2.2.5 Market Squid Light Boat Permit Transfer Options

Option M.1 (*status quo*): Do not allow permit transfers except in cases of major mechanical breakdown or loss of the vessel – this option will allow for more rapid attrition of the fleet, however, it likely will not meet the practical needs of working vessels and can have implications for vessel safety.

Option M.2: Establish full transferability of squid light boat owner's permits – this would be allowed only if the initial number of permits issued is equal to or less than the capacity goal.

Option M.3 (*proposed action*): Establish full transferability of squid light boat owner's permits with a "2 for 1" permit retirement – this would help to meet the fleets' needs and help to achieve the capacity goal for squid light boat owner's permits.

Option M.4 (*proposed action*): Trade either, two, three, or four squid light boat owner's permits for one market squid brail permit – a light boat may acquire and surrender additional squid light boat owner's permits in exchange for a market squid brail permit.

2.2.6 Experimental Market Squid Vessel Permits

This option would allow the Commission to issue one to five transferable or non-transferable Market Squid Vessel Permits to any individual for placement on any vessel for purposes of developing a squid fishery in areas previously not utilized for squid production. Individuals issued permits pursuant to this Section would be required to adhere to all commercial squid fishing regulations in CCR Title 14 §149, and all terms and conditions for permits defined in CCR Title 14§149.1, excepting initial issuance criteria defined in CCR Title 14 §149.1(c). These permits would count towards the capacity goal. (These alternatives were added at the request of the Commission and/or as a result of public comment).

Option O.1: Establish 1 to 5 experimental market squid vessel transferable permits.

Option O.2: Establish 1 to 5 experimental market squid non-transferable permits.

Option O.3 (*status quo/proposed action*): Do not establish experimental market squid vessel permits.

2.3 Ecological Concerns

The market squid fishery is part of a larger ecosystem that includes the effects of ecological interactions of the project on non-target species and habitat. Harvest replenishment and general habitat closure areas provide for specific areas where no squid fishing can occur. Harvest replenishment areas provide areas of uninterrupted spawning. General habitat closures are intended to prevent squid fishery interactions in areas that have not been traditionally utilized for commercial squid fishing and where there is the potential for interactions with non-target species such as marine mammals, seabirds, sea turtles and fish. In addition, the market squid resource is a significant

forage component in the diets of marine mammals, seabirds, sea turtles, and fish, and these areas will act as forage reserves for many of these species.

2.3.1 Squid Harvest Replenishment/General Habitat Closure Areas

As part of the 1997 Legislation enacted to protect the market squid resource, the Department was directed to determine where there were areas, if any, that should be declared harvest replenishment areas for market squid where the taking of squid would not be permitted. Harvest replenishment areas provide areas of uninterrupted spawning and are similar to Marine Protected Areas (MPA), a tool used to manage and conserve marine resources. Both are sections of the ocean set aside to protect and restore habitats and ecosystems, conserve biological diversity and provide a refuge for sea life. These areas have multiple uses, including providing a buffer for species against the effects of environmental fluctuations and management uncertainties, protecting specific areas or species from overexploitation, or reducing user conflict. Harvest replenishment areas differ from MPAs in that they would only be managed for the commercial market squid fishery.

In October 2002, the Commission designated 12 new MPAs at the northern Channel Islands (three of which replaced existing reserves at Anacapa, Santa Barbara and San Miguel islands). These new MPAs include known commercial squid fishing sites at Santa Barbara, Anacapa, Santa Cruz, and Santa Rosa islands. In addition to the closures at the northern Channel Islands, commercial fishermen are not allowed to fish in state designated ecological reserves using roundhaul nets. Several existing reserves are known to be market squid spawning sites (e.g., Carmel Bay Ecological Reserve, Point Lobos Ecological Reserve, northeast side of Santa Catalina Island and Santa Monica Bay); all serve as harvest replenishment areas for market squid. Additionally, based on the large geographic range (Baja California north to Alaska) of market squid, there is an abundance of areas that are unfished for squid.

General habitat closures are intended to prevent squid fishery interactions in areas that have not been traditionally utilized for commercial squid fishing and where there is the potential for interactions with non-target species such as marine mammals, seabirds, sea turtles, and fish. In addition, the market squid resource is a significant forage component in the diets of marine mammals, seabirds, sea turtles, and fish and these areas will act as forage reserves for many of these species. The MPAs also act as general habitat area closures for they offer protection against bycatch and fishery interactions and function as forage reserves.

In 2003, squid vessels harvested more squid north of the traditional Monterey fishing grounds, in the area between Pigeon Point and Point Reyes, than the prior 12-year average (1990-2002) (see Figure 3-7a-b in Section 1). This disturbed some biologists and other users of the area. The removal of squid biomass in this area was of particular concern because squid are an important prey item for the many marine mammals, seabirds, sea turtles, and fish that utilize this area (which includes the Gulf of the

Farallones National Marine Sanctuary, part of Monterey Bay National Marine Sanctuary, Cordell Bank National Marine Sanctuary, and the Farallon Islands, a National Wildlife Refuge). The Farallon Islands are home to one of the largest and most diverse seabird colonies in the continental U.S., providing nesting habitat for 12 species of marine and coastal birds including the SSC ashy storm-petrel, double-crested cormorant, tufted puffin and rhinoceros auklet. They also provide breeding, pupping and/or haul-out habitat for five species of pinnipeds, including northern elephant seal, northern fur seal, Steller sea lion (which is federally listed as threatened) California sea lion and Pacific harbor seal. The waters in the Gulf of the Farallones are highly productive and are a designated feeding area for the federally endangered humpback and blue whales (NOAA/NOS 2003). The creation of additional harvest replenishment areas and/or general habitat closure areas in waters north of Pillar Point would create forage reserves for fish, seabirds, sea turtles, marine mammals, and other marine species that consume squid. These areas might serve to increase the amount of market squid available as prey to other species although these areas were typically not fished for market squid, not at least prior to 2003. Any possible fish bycatch or seabird, sea turtle, or marine mammal interaction with the fishery would not occur if the areas were closed areas. However, exclusion of squid fishing in closed areas could shift fishing effort to other areas with populations of marine mammals, seabirds, sea turtles, and fish.

Options for Squid Harvest Replenishment /General Habitat Closure Areas

Option Q.1 (*status quo*): Do not set aside specific areas as squid harvest replenishment areas for market squid or general habitat closures.

Option Q.2: Close all waters within depths of 100 fathoms around San Nicholas Island.

Option Q.3 (*proposed action*): Establish areas that are closed to squid fishing in all waters north of Pillar Point at any time. Pillar Point is located approximately 25 miles south of San Francisco, just north of Half Moon Bay. It represents the last major landmark before heading into the mouth of San Francisco Bay. This option would include part of the Monterey Bay National Marine Sanctuary, the Gulf of the Farallones National Marine Sanctuary, Cordell Bank National Marine Sanctuary, and the Farallon Islands, a National Wildlife Refuge. Under this option marine species would be protected from direct and indirect squid fishery interactions in areas that have not been traditionally utilized for commercial squid fishing, general habitat protection. Essentially, this option would make half the state a squid harvest replenishment area (Project alternative added at the request of the Commission and/or as a result of public comment and selected as a preferred option by the Department).

Option Q.4: Establish areas that are closed to squid fishing in any waters of the Gulf of the Farallones National Marine Sanctuary. (Project alternative added at the request of the Commission and/or as a result of public comment).

Option Q.5: Establish areas that are closed to squid fishing in waters extending offshore 1 nautical mile from the mean high water mark of Southeast Farallon Island,

Middle Farallon Island, North Farallon Island and Noon Day Rock. (Project alternative added at the request of the Commission and/or as a result of public comment).

Option Q.6: Prohibit the take of squid for commercial purposes in District 10. (Project alternative added at the request of the Commission and/or as a result of public comment).

2.3.2 Area and Time Closures to Address Seabird Disturbance

The squid fishery has the potential to impact seabirds by the use of bright lights and increased noise which can disrupt nesting and other behaviors. At the Channel Islands, the squid fishery can interact with 14 species of breeding seabirds including the California brown pelican, Xantus's murrelet and the ashy storm-petrel. Brown pelicans are federally and State-listed as endangered and fully protected under FGC §3511. The Xantus's murrelet is in the process of being designated as a threatened species under the CESA. Ashy storm-petrels are classified by the Department and the USFWS as a species of special concern or SSC. The double-crested cormorant, tufted puffin, black storm-petrel, and rhinoceros auklet are also designated as Department SSC (see section 3.9.2 for a definition of SSC). At the Farallon Islands, one of the largest and most diverse seabird colonies in the continental U.S., the squid fishery may interact with 12 species of marine and coastal birds including four SSC, the ashy storm-petrel, double-crested cormorant, tufted puffin and rhinoceros auklet.

Concerns about potential disturbance effects on nesting seabirds on islands adjacent to waters fished by the squid fishery were first raised by seabird researchers, the American Trader Trustee Council, and the CINPS in the spring of 1999. Specifically, their concerns centered on disturbance to the island breeding colonies from high wattage lights and noise from market squid fishing vessels and they requested that the Department take action to prevent potential new impacts on the nesting birds. Three species were the focus of the squid fishery interaction with seabirds: the California brown pelican, ashy storm-petrel, and Xantus's murrelet. Options R.1 through R.4 and R.10 and R.11 address seabird issues associated with the southern market squid fishery.

More recently, concerns about potential disturbance effects on nesting seabirds at the Farallon Islands and adjacent waters were raised by biologists and other users of the area. In 2003, squid vessels harvested more squid north of the traditional Monterey fishing grounds than the prior 12-year average (1990-2002). The ashy storm-petrel was a species of major concern because they have experienced a long-term and sustained decline on the Farallon Islands. Options R.6 through R.9 specifically address seabird issues associated with the northern market squid fishery. [Note: these options were added at the request of the Commission and/or as a result of public comment. The Department's preferred option Q.3, which is a more comprehensive option, also addresses seabird impacts associated with the northern fishery and provides a greater level of protection as Options R.6 through R.9 only include the timeframe from 1 February to 30 September.

Options for Area and Time Closures to Address Seabird Issue

Option R.1: Establish areas that are closed to squid fishing around San Miguel, Anacapa and Santa Barbara islands from 1 February through 30 September. The area closure should be 1 nautical mile from the high water mark for these islands and would exclude the Channel Island MPAs, implemented in April 2003, because no commercial squid fishing is allowed in these areas. The closure would protect 14 seabird species (including one endangered, one candidate/threatened, and five other SSC) during their breeding seasons.

Option R.2: Establish areas that are closed to squid fishing around Anacapa and Santa Barbara islands from 1 February through 30 September. The area closure should be 1 nautical mile from the high water mark for these islands and would exclude the Channel Island MPAs, implemented in April 2003, because no commercial squid fishing is presently allowed in these areas. The closure would protect 12 seabird species (including one endangered, one candidate/threatened, and three other SSC) during their breeding seasons.

Option R.3: Establish areas that are closed to squid fishing using attracting lights around San Miguel, Anacapa and Santa Barbara islands from 1 February through 30 September. The area closure should be 1 nautical mile from the high water mark for these islands and would exclude the Channel Island MPAs, implemented in April 2003, because no commercial squid fishing is presently allowed in these areas. The closure is designed to offset the potential negative impacts of light pollution at seabird rookeries for 14 seabird species (including one endangered, one candidate/threatened, and five other SSC) during their breeding seasons.

Option R.4 *(proposed action):* Establish area and time closure areas for fishing for squid using attracting lights around Anacapa and Santa Barbara islands from 1 February through 30 September. The area closure should be 1 nautical mile from the high water mark for these islands and would exclude the Channel Island MPAs established in 2002 because no commercial squid fishing is presently allowed in these areas. The closure should offset the potential negative impacts of light pollution at seabird rookeries for 12 seabird species (including one endangered, one candidate/threatened, and three other SSC) during their breeding seasons.

Option R.5 (*status quo*): Do not establish area and time closure sites for seabird rookeries protection.

Option R.6: Establish areas that are closed to squid fishing around the Farallon Islands from 1 February through 30 September. The area closure should be 1 nautical mile from the high water mark for these islands. (Project alternative added at the request of the Commission and/or as a result of public comment).

Option R.7: Establish areas that are closed to squid fishing in all waters of the Gulf of the Farallones National Marine Sanctuary from 1 February through 30 September. (Project alternative added at the request of the Commission and/or as a result of public comment).

Option R.8*:* Establish area and time closure areas for fishing for squid using attracting lights around the Farallon Islands from 1 February through 30 September. The area closure should be 1 nautical mile from the high water mark for these islands. (Project alternative added at the request of the Commission and/or as a result of public comment).

Option R.9*:* Establish areas and time closure areas for fishing for squid using attracting lights in all waters of the Gulf of the Farallones National Marine Sanctuary from 1 February through 30 September. (Project alternative added at the request of the Commission and/or as a result of public comment).

Option R.10: Establish areas that are closed to squid fishing around San Miguel, Anacapa and Santa Barbara islands from 1 February through 30 November. The area closure should be 1 nautical mile from the high water mark for these islands and would exclude the Channel Island MPAs, implemented in April 2003, because no commercial squid fishing is allowed in these areas. (Project alternative added at the request of the Commission and/or as a result of public comment).

Option R.11: Establish areas that are closed to squid fishing around Anacapa and Santa Barbara islands from 1 February through 30 November. The area closure should be 1 nautical mile from the high water mark for these islands and would exclude the Channel Island MPAs, implemented in April 2003, because no commercial squid fishing is presently allowed in these areas. (Project alternative added at the request of the Commission and/or as a result of public comment).

Chapter 3. Affected Environment

Physical Environment

3.1 Air Quality

California's concern about air quality is second only to its concern about water quality. The State has adopted air quality standards that are as stringent as federal standards. The impacts to air quality are of greater concern in highly urbanized areas due to the existence of long-term land-based impacts. Air quality also is affected by local climatic and meteorological conditions. Therefore, in an area like the Los Angeles basin where there are persistent temperature inversions, predominant onshore winds, long periods of sunlight, and topography that traps wind currents, the effects of pollutants are more severe than along the central California coast where these components are less influential.

Off the northern and central California coasts, the prevailing winds are northwesterly with average wind speeds between 6 and 7 meters per second (m/s). The highest measured wind speed is approximately 22.5 m/s with peak gusts of about 29.0 m/s. Off the southern California coast, the prevailing wind direction is westerly with an average speed of about 3.5 m/s [Minerals Management Service (MMS) 2001].

In general, sea surface temperatures off California are slightly higher than air temperatures. This tends to result in slightly unstable atmospheres over the water. Atmospheric stability provides a measure of the amount of vertical mixing of air pollutants. Dispersion of pollutants is favored when the atmosphere is unstable. However, off northern California, the sea surface temperature in the summer season is somewhat lower than the air temperature, which tends to result in stable atmospheric conditions. Stable atmospheric conditions tend to limit mixing and dispersion of air-borne pollutants. Furthermore, in coastal valleys, and particularly in the Los Angeles Basin, atmospheric transport and dispersion is inhibited by topography and re-circulating due to land/sea breeze effects. As a result, these areas experience poor air quality when they contain significant population centers.

Air quality at a given location can be described by the concentration of various pollutants in the atmosphere. Units of concentration are generally expressed in parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). The significance of a pollutant concentration is determined by comparing the measured concentration to an appropriate federal and/or state ambient air quality standard. The standards represent the allowable atmospheric concentrations at which the public health and welfare are protected and include a reasonable margin of safety to protect the more sensitive individuals in the population. The degree of air quality degradation is compared to the health-based standards including the California Ambient Air Quality Standards (CAAQS) and the National Ambient Air Quality Standards (NAAQS) established by the federal Environmental Protection Agency (EPA). The NAAQS represent maximum acceptable

concentrations that may not be exceeded more than once per year, except the annual standards, which may never be exceeded. The CAAQS represent the maximum acceptable pollutant concentrations that are not to be equaled or exceeded and are established by the California Air Resources Board (CARB).

The EPA has designated all areas of the United States as having air quality better than (attainment) or worse than (non-attainment) the NAAQS. A non-attainment designation means that a primary NAAQS has been exceeded more that three discontinuous times in 3 years in a given area. An area is in non-attainment if a CAAQS has been exceeded more than once in 3 years.

Criteria air pollutants are defined as those for which a state or federal ambient air quality standard has been established to protect public health (Table 3-1). They include nitrogen oxides (NO_x), sulfur dioxide (SO_2), carbon monoxide (CO), ozone (O_3), volatile organic compounds (VOCs), and particulate matter less than 10 microns in diameter (PM_{10}). Emission offsets for new sources are required when those sources exceed set emission levels. Fuel oil combustion emits nitrogen dioxide (NO_2) and particulates. Nitrogen oxides and VOCs interact in the presence of sunlight to form ozone.

Table 3-1 Ambient air quality standards

Pollutant	Averaging Time	California Standards	Federal Standards	
			Primary	Secondary
Ozone (O_3)	1 hour 8 hour	0.09 ppm ---	0.12 ppm 0.08 ppm	same as primary same as primary
Carbon Monoxide	1 hour 8 hour	20.0 ppm 9.0 ppm	35.0 ppm 9.0 ppm	
Nitrogen Dioxide	1 hour annual average	0.25 ppm ---	--- 0.053 ppm	same as primary same as primary
Sulfur Dioxide	1 hour 3 hour 24 hour annual average	0.25 ppm --- 0.04 ppm ---	--- --- 0.14 ppm 0.03 ppm	--- 0.5 ppm --- ---
Lead	30 day average Calendar qtr	1.5 µg/m^3 ---	--- 1.5 µg/m^3	--- same as primary
Respirable Particulate Matter (PM_{10})	24 hour annual average	50 µg/m^3 ---	150 µg/m^3 50 µg/m^3	same as primary same as primary
Fine Particulate Matter ($PM_{2.5}$)	24 hour annual average	No separate Standard	65 µg/m^3 15 µg/m^3	same as primary same as primary
Sulfates	24 hour	25 µg/m^3	No Federal Standards	
Hydrogen Sulfide	1 hour	0.03 ppm	No Federal Standards	

The region of influence for inert pollutants (pollutants other than O_3 and its precursors) is generally limited to a few miles downwind from a source. Ozone is a secondary pollutant formed in the atmosphere by photochemical reactions of previously emitted pollutants or precursors. Ozone precursors are mainly the reactive portion of

volatile organic compounds and NO_x. In the presence of solar radiation, the maximum effect of these pollutants on O_3 levels can occur many miles from the source. Ozone concentrations are highest during the warmer months of the year. Inert pollutant concentrations tend to be the greatest during the winter months (California State Lands Commission [CSLC] 1999).

The San Francisco Bay area is a nonattainment area for ozone (MMS 2001) at the federal level and nonattainment for O_3 and PM_{10} at the state level (CSLC 1999). In 1995 through 2000, the highest measured 1-hour average ozone concentration in the area was 0.16 ppm. The federal ozone standard is 0.12 ppm for the 1-hour average and the state standard is 0.09 ppm. The South Coast Air Basin, which includes Los Angeles, is classified nonattainment for O_3, PM_{10}, NO_2, and CO. The ozone nonattainment classification is in the extreme category. The highest measured 1-hour ozone concentration in Los Angeles County for 1995 to 2000 was 0.22 ppm. San Diego County is a nonattainment area for ozone and is classified serious. During this period, the highest measured 1-hour average O_3 concentration was approximately 0.16 ppm.

Air quality is determined by measuring ambient concentrations of pollutants that are known to have deleterious effects. The degree of air quality degradation is then compared to health-based standards such as the CAAQS and the NAAQS.

Air quality can be affected by emissions from gas and diesel engines in commercial vessels engaged in the take of market squid. The calculation of emissions from commercial fishing vessels can be determined using the following emission factors for diesel fuel and gasoline:

Diesel
- Carbon Monoxide (CO) = 110 lb/1000 gal fuel
- Hydrocarbons (HC) = 50 lb/1000 gal fuel
- Nitrogen Oxides (NO_x) = 270 lb/1000 gal fuel
- Sulfur Oxides (SO_x) = 27 lb/1000 gal fuel

Gasoline
- Carbon Monoxide (CO) = 1,822 lb/1000 gal fuel
- Hydrocarbons (HC) = 11 lb/1000 gal fuel
- Nitrogen Oxides (NO_x) = 96 lb/1000 gal fuel
- Sulfur Oxides (SO_x) = 6 lb/1000 gal fuel

Pollution emissions released when vessels are underway are influenced by a variety of factors including power source, engine size, fuel use, operating speed, and load. Emission factors can only provide a rough approximation of daily emission rates. Most commercial vessels engaged in the take of market squid have diesel engines. Currently, two-cycle diesel engines are most common, but four-cycle engines, which are more efficient, are becoming more popular. Overall, fishing operations are responsible for less than 1 percent of the daily emissions from all sources (mobile and non-mobile) in California (CARB 1991, 1994), and do not have a significant effect on air quality in the

nearshore environment (Table 3-2). However, they do add to the cumulative exposure effects on marine organisms.

Table 3-2 South Coast vessel emissions (tons per day) - 2001.

Pollutant	CPFV's	All fishing vessels	All marine vessels
CO	0	0.9	4.8
HC	0.1	0.3	3.3
NO_x	0.6	6.3	44.2
SO_x	0.1	1.1	26.7
PM_{10}	0	0.1	3.2

The CARB has delegated responsibility of regulating stationary emission sources to local air agencies. These agencies have developed State Implementation Plans that detail how the State will attain the standards and describe thresholds to determine if the emissions are significant. The significant criteria are generally described as increased emissions levels in either pounds per day or tons per calendar quarter. Most of the Plans have factored in construction emissions into the significance criteria and therefore do not consider construction emissions to be significant for the purpose of CEQA. Emissions from fishing activities are not considered to exceed those produced by construction activities.

3.2 Water Quality

The quality of the water affects all fish species either directly or indirectly through the food chain, and the health of the ecosystem is largely determined by the constituents in the water, sediment, and air. The quantity and type of constituents entering the water column determine if the ecosystem is degraded by these inputs. Pollutants enter the nearshore marine ecosystem from many land sources, activities occurring on the water, and underwater geologic changes. The most familiar transport mechanisms include: ocean outfalls from sewage treatment plants, storm water discharges containing trash and chemicals, river inputs of sediments with nutrients and/or pesticides, thermal discharges from power plants, spills from vessel traffic, dredge material disposal, wind transport of air-borne contaminants, and construction activities. Some of the chemicals break down into harmless components in days or weeks, while others last for many decades. Some of the pollutants affect the fish immediately (such as a sewage spill depleting oxygen in the water column), while others remain in the fish for years, eventually affecting reproduction capability, feeding ability, growth potential, or physiological functions. The tissues of aquatic organisms may accumulate environmental pollutants more than one million times the concentrations in the water column.

Environmental concentrations of some pollutants have decreased over the past

20 years as a result of better water quality management practices. However, environmental concentrations of heavy metals, pesticides, and toxic organic compounds have increased due to intensifying urbanization, industrial development, and the use of new agricultural chemicals. Health advisories have been issued in California for white croaker, black croaker, California corbina, surfperch, queenfish, California scorpionfish, rockfish, kelp bass, and striped bass.

Coastal and marine water quality off the central California coast is good with minor exceptions. Portions of Monterey Bay have degraded water quality as a result of sewage effluent and riverine input from several local rivers. Coastal and marine water quality off southern California is good, but, as with the central coast, localized areas of water quality degradation exist due to high volume point sources (municipal wastewater outfalls in Los Angeles, Orange County, San Diego) coupled with the combined effects of discharges from numerous small sources. Natural petroleum seeps are recognized as significant sources of hydrocarbons in the Santa Barbara Channel area.

The National Oceanic and Atmospheric Administration (NOAA) created the National Status and Trends (NS&T) Program to monitor trends of chemical contamination in space and time and to determine biological responses to that contamination. Based on 6 years of results from the NS&T program, on a national scale, biologically significant concentrations of contaminants are limited primarily to urbanized estuaries (e.g., San Diego, Los Angeles, Seattle, and portions of San Francisco Bay) (NOAA 1991). All of the trace metals and groups of organic compounds can be acutely or chronically toxic to marine life and even to people under some conditions. Biological effects can sometimes be expressed as tumors, particularly in the liver of fish. Fish in Bodega Bay (Sonoma County) have been found with liver tumors, although this area is generally considered uncontaminated. This implies that fish exposed to harmful levels of contaminants in one area may be taken by a fishery in another area. In addition, the NS&T program found that older fish generally had a higher frequency of tumors than younger fish.

Toxic contaminant inputs from industrial, agricultural, and commercial activities are high-priority concerns in the changing bay ecosystems. For example, San Francisco Bay receives effluents from 46 publicly owned wastewater-treatment plants, 65 large industrial discharges, and as much as 40,000 tons of at least 65 contaminants each year. Many of these contaminants are toxic to plants or animals or pose threats to human health. A comprehensive study of toxic trace metals by the United States Geological Survey (USGS) has shown that contamination levels in San Francisco Bay accelerated during the 1950s. Some Bay locations are among the most highly polluted coastal sites in the United States. Contamination by silver, cadmium, lead, and selenium is especially high. These metals are of particular concern because they can impair the growth or reproduction of fish, birds, and mammals. In 1990, the USGS began a series of special investigations to describe the origins and effects of toxic contaminants in San Francisco Bay. Early results have shown that pesticides (such as diazinon) applied in the Central Valley of California are carried by rivers into the Bay at levels exceeding national guidelines. Biological tests have shown river waters to

contain high levels of pesticides soon after they are applied to fields. Public concern about the effects of toxic contaminants on coastal organisms is justified. Trace metals and pesticides are periodically found in San Francisco Bay at levels that can cause toxicity or impairment of ecosystem health.

Historically, sewage treatment plants served only as a way to gather sewage from a specific geographic location and then move it into the ocean. Now, most plants remove a significant amount of solids prior to discharging into the nearshore environment. While the coastal population has significantly increased since the 1950s, the mass of wastewater pollutants discharged (subject to regulatory controls) has been somewhat reduced while the volume has continued to increase. Storm drain-associated runoff is now the largest source of unregulated pollution to the waterways and coastal areas of the United States.

Discharged contaminants do not stay in the water column indefinitely but are transported to the sediments, and even directly to the aquatic organisms through absorption across body membranes or through ingestion of contaminated prey. Pollutants most frequently associated with sewage discharges include: sediment, nutrients, bacteria, petroleum products, heavy metals, pesticides, and other potentially toxic compounds. Chemicals released to surface waters from industrial and municipal discharges continue to accumulate to harmful levels in the sediments. Discharge limits for municipal and industrial point sources are based on either technology-based limits or state-adopted standards for the protection of the water column, not necessarily for downstream protection of sediment quality.

The EPA estimates that approximately 10 percent of the sediment underlying our nation's surface water is sufficiently contaminated with toxic pollutants to pose potential risks to fish, humans, and wildlife who consume fish. This represents about 1.2 billion cubic yards of contaminated sediment out of the approximately 12 billion cubic yards of total surface sediment where many bottom-dwelling organisms live, and the primary exchange between the sediment and overlying surface water occurs.

Approximately 300 million cubic yards of sediment are dredged annually from harbors and shipping channels nationwide to maintain commerce, while 3 to 12 million cubic yards of those are sufficiently contaminated to require special handling and disposal (EPA 1997). The dredging of sediments in Humboldt Bay, San Francisco Bay, Santa Monica Bay, Los Angeles and Long Beach Harbors, Newport Bay, and San Diego Bay has the potential to redistribute high levels of contaminants into the coastal environment. The majority of dredging operations along the coast occur within California's port and harbor facilities. Fish are exposed to contaminants from dredge material through the disturbance and redistribution of bottom sediment at both the dredge site and the disposal site. Many pollutants in the sediments have the potential to accumulate in increasing concentrations up the food chain and, therefore, affect more than just the organisms directly exposed to the contaminant. Adverse effects to organisms living in or near the bottom can occur even when contaminant levels in the overlying water are low. Marine organisms may accumulate pollutants through direct

ingestion of sediment, transport of pollutants across body membranes, uptake of dissolved contaminants present in the interstitial (pore) water, ingestion of benthic organisms, or ingestion of first-order carnivores. Contaminated sediments can affect the food chain base by eliminating food sources, and in some cases altering natural competition, which can affect the population dynamics of higher trophic levels.

Resuspension of bottom sediments occurs naturally in areas of the continental shelf when turbulence associated with currents or effects of surface waves exceed the threshold required for initiating motion of seabed materials and/or mass movement of bottom sediments occurs in response to seismic events, turbidity currents, or excess loading. Suspended sediments also occur in surface waters following storm events that produce discharges from coastal rivers. Currents may transport these river-derived sediments substantial distances alongshore or offshore from their origin. Conditions necessary to cause resuspension of bottom sediments or inputs of river-derived sediments occur episodically and at different frequencies along the coast. The potential and frequency of sediment suspension events also diminish with greater bottom depths due to the progressively weaker influence from turbulence associated with the passage of surface waves.

In general, turbulence sufficient to cause resuspension of bottom sediments occurs more frequently along the coast north of Point Conception. In addition, the frequency and intensity of river discharge events in the northern portion of the coast generally are expected to be greater than those in the southern portion of the coast due to latitudinal differences in typical rainfall amounts. Fishing activities associated with the MSFMP plan would not affect most water quality parameters including: temperature, salinity, dissolved oxygen, nutrients, or clarity/light transmittance. Descriptions of these parameters for coastal water off California are presented in Lynn et al. 1982 and Thomas and Siebert 1974.

Harbors and marinas are another source of pollutants that enter the coastal environment. Boat repair yard services typically include the repair and maintenance of mechanical systems, structural components, upholstery, electrical systems, and finished surfaces. Typical wastes generated from these operations include oil, coolants, lubricants, cleaning agents, paints, and dusts from sanding, sand blasting, polishing, and refinishing operations. All these contaminants have been documented to have detrimental effects on marine organisms. Water within the ports provides critical shelter habitat for a wide variety of ocean and coastal species during the larval and early adult stages. However, these resources are affected by port maintenance and development activities due to dredge and fill operations, discharge of storm water containing pollutants, release of contaminants from boat bottom paint, and discharges of petroleum products from fueling docks and bilge pumps.

According to EPA, spills during boat fueling are a major contributor to pollution of the nearshore waters. Fuel is spilled onto surface waters from fuel tank air vents while fueling the vessels and discharged during bilge pumping. These are individually small, but cumulatively large amounts, and contain petroleum hydrocarbons that persist in the

aquatic environment both in the water column, sediments, and body tissues of marine organisms. It also has been demonstrated that emissions produced by two-stroke engines contain substances that negatively affect fish, most severely in the early life stages. Fish and shellfish larvae are extremely sensitive to small amounts of these products.

The egg, early embryonic, and larval-to-juvenile stages of fish are the most sensitive to oil exposure (Malins and Hodgins 1981). Embryos and larvae lack the organs found in adults that can detoxify hydrocarbons, and most are not mobile enough to avoid or escape spilled oil. In addition, the egg and larval stages of many species are concentrated in the surface layers of the water, where they are more likely to be exposed to the most toxic components of an oil slick (MMS 2000). Petroleum hydrocarbons can severely impact communities of large bottom-dwelling organisms, as well as intertidal communities that provide food and cover for fishes. Fish can accumulate hydrocarbons from contaminated food and water. Fish have the capability to metabolize some hydrocarbons and excrete both metabolites and parent hydrocarbons from the gills and the liver. Nevertheless, oil effects to fish occur in many ways: histological damage, physiological and metabolic perturbations, and altered reproductive potential (National Research Council 1985).

Natural seeps occur through southern California, but most are found off the Santa Barbara coastline. The bioclastic, organic-rich Monterey Formation has been identified since the early 1900s as a prolific source rock for petroleum generation. Natural oil, tar, and gas seepage in the nearshore and offshore areas were known to the Indian inhabitants of coastal southern California in prehistoric times. Early European explorers noted the occurrence of hydrocarbon seeps, particularly along the northern coastline of the Santa Barbara Channel. Seepage oil was an important commodity to both the Indians and the early European settlers of the region (MMS 2001). Most of the offshore seepage occurs in areas where the Monterey or Sisquoc formations are exposed at or near the seafloor, and where active faulting or growing folds are observed. Between 40 and 670 barrels of oil per day naturally seep into the Santa Barbara Channel (MMS 2001). At one location, near Platform Holly, two submarine tents have been used since 1982 to trap gas and oil seepage emanating from the ocean floor. Since installation, the seep containment structures have captured in excess of 6 billion cubic feet of gas from an area of 20,000 square feet.

As a result of the natural release of oil, tar balls are found washed on beaches and offshore islands. Tar balls were expected and found on the north-facing shorelines of the Channel Islands during a recent survey by USGS, however, residues also were common on the south-facing shorelines adjacent to the Santa Barbara Channel where natural oil seeps and oil-production platforms are prolific. Preliminary geochemical analyses indicate several sources for the tar residues, most of which appear to be from natural oil seeps. In collaboration with the MMS, the USGS has initiated a field study to assess the interrelations among oil seeps, tarballs, and produced crude oils in a coastal region of southern California from Point Arguello to Point Conception. Photograph quadrats were established at rocky intertidal areas at the Boathouse (Vandenberg Air

Force Base) and Jalama Beach for repeated sampling of tarballs at 3-month intervals during the next 3 years. On the sandy beaches at the Boathouse and Jalama, transects were run parallel and perpendicular to the shoreline; 108 tarballs were recovered from these transects. Casmalia Beach was very clean; only seven tarballs were observed.

In addition, the possibility of oil spills associated with commercial oil production is a potential threat to the nearshore environment. The largest oil spill in the Pacific Outer Continental Shelf (OCS) region occurred in 1969, when a blowout occurred on Platform A off Santa Barbara and spilled an estimated 80,000 barrels into the Channel (Van Horn et al.1988). No spill of this magnitude has since occurred anywhere on the OCS as a number of preventive measures have been implemented (MMS 2000).

Offshore oil and gas facilities have been operating in California since the late 1800s. Concerns regarding the cumulative effects of offshore development, combined with a number of major marine oil spills throughout the world, have led to a moratorium in California on new offshore leasing in State waters (California Coastal Commission 1997). Effects to marine organisms from oil and gas exploration and development occur due to navigation risks, drilling mud and cuttings disposal, air quality, oil spills, and other ecosystem degradation. A number of undeveloped leases exist along the California coast in federal waters within the northern Santa Maria Basin, San Luis Obispo and Santa Barbara counties.

There are 79 existing federal OCS offshore leases in California. Forty-three of the leases are developed and 36 are undeveloped. A total of 38 fields have been discovered in the California OCS, including 14 fields in the offshore Santa Maria Basin, 22 fields in the Santa Barbara Channel, and two fields in the offshore Los Angeles Basin. As of 1 January 2000, daily production from the 43 developed federal OCS leases offshore California was 95,000 barrels of oil and 222 million cubic feet of gas. This production is attributed to 13 fields. These reserves will last approximately 10 years for oil and 16 years for gas (MMS 2001). The first California tideland oil well was drilled in 1896 in Santa Barbara County. Within 10 years, about 400 wells could be seen on the beach and just offshore. The State now administers more than 100 sites on which oil companies have developed some 1,000 wells that take oil and gas from state lands. In addition, over 1,000 wells produce oil from granted tidelands in the City of Long Beach.

Currently, there are 23 production platforms, one processing platform, and six artificial oil and gas production islands located in the waters offshore California. Four of the platforms and six man-made production islands are located in state waters lying offshore of Santa Barbara and Orange counties. A principal waste from oil production is produced water. Pollutants found in produced water include: oil and grease, metals, ammonia, phenols, cyanides, naphthalenes, and BTEX (benzene, toluene, ethylbenzene, and xylene) (MMS 2000). Research has demonstrated that hydrocarbons and other constituents of petroleum spills can, in sufficient concentrations, cause adverse impacts to fish (National Research Council 1985, Group

of Experts on the Scientific Aspects of Marine Pollution 1993). The effects can range from mortality to sublethal effects that inhibit growth, longevity, and reproduction.

The withdrawal of ocean water by offshore water-intake structures occurs commonly in southern California and less frequently along the rest of the coast. Water may be withdrawn for providing a source of cooling water for coastal power generating stations or as a source of potential drinking water in the case of desalinization plants. Large amounts of water (often billions of gallons per day) are withdrawn from coastal waters for the non-contact cooling of power generating plants. It is well known that millions of larval marine organisms are killed by their entrained passage through the power plants.

3.3 Geology

The Cenozoic geologic history (past 67 million years) of the Pacific coastal margin has been dominated by the interaction of oceanic and continental tectonic plates. Along the central and southern coast of California, north-northwest movement of the Pacific Plate relative to the North American Plate has resulted in the formation of the San Andreas and subsidiary fault systems. Tectonic activity along these faults has dominated this region during the middle to late Cenozoic period. North of Cape Mendocino, the Gorda Plate is moving eastward beneath the continental North American Plate while the Pacific Plate is moving northwest. The Gorda, North American, and Pacific Coastal plates form the Mendocino triple junction approximately 35 miles south-southwest of the Humboldt Bay area. These plates are bounded by the San Andreas Fault, the Mendocino Fault zone, and the Gorda Ridge. It is the subducting Gorda Plate that gives rise to the deep seismic zone which generates much of the earthquake activity in this region.

The geology along the California coast is characterized by three major stratigraphic sequences: 1) Cretaceous to lower Miocene (67 to 20 million years before present) clastic strata deposited as marine sequences in the shelf or slope environment, 2) middle to upper Miocene siliceous and calcareous (15 to 5 million years before present) strata deposited in deep-ocean environments, and 3) upper Miocene and younger (5 million years ago to present) clastic strata deposited primarily in shelf environments.

The regional geology for northern California is divided into two basins, the Eel River Basin (Cape Mendocino to Cape Blanco, Oregon) and Point Arena Basin (Point Arena to Cape Mendocino). The regional geology for central and southern California is divided into five different provinces: Central California (Eureka to Point Conception; it overlaps portions of the previous two Basins), Santa Barbara Basin, Los Angeles Basin, Inner Borderlands (Channel Islands vicinity), and Outer Borderlands (Channel Islands to Mexico). Each of these provinces contain numerous faults, some which extend onshore (e.g., San Andreas Fault and San Gregorio Fault).

The main divisions of the seafloor are the shore, continental shelf, continental slope and rise, and deep-sea bottom. The continental shelf extends seaward from the shore to

approximately 200 meters depth. Because of the variability of the coastline and offshore topography, the distance that the shelf extends from shore varies from approximately 1 nautical mile to 25 nautical miles. The continental slope extends from approximately 200 meter depth to an average depth of a few thousand meters. The continental slope can be further divided into upper, middle, and lower slope areas. The upper slope areas are from 200-500 meter depth, middle slope between 500-1,200 meter depth, and the lower slope between 1,200 and approximately 3,200 meter depth.

Much of the area along the continental slope between Point Arena and Point Reyes is subject to recent slumping (McCulloch 1980). The existence of mass transport deposits indicates locations of past slope failure and zones of possible seafloor instability. Mass transport of sediments is common on the continental shelf and slope of northern California and the submarine canyons that incise the central California shelf. Mass transport is the gravity-induced down slope movement of consolidated to semi consolidated sediments and consists of slides, slumps, and sediment creep.

The continental shelf of the greater Monterey Bay area between Point Año Nuevo and Point Sur exposes complex patterns of Mesozoic and Cenozoic rock outcrops, and coarse Quaternary sand bodies that occur in distinct depressions on the inner and mid-shelves. Exposures of familiar geologic formations from onshore central California, such as the Santa Cruz Mudstone and the Purisima and Monterey Formations, are present in the offshore. The tectonic structure mapped between Point Sal and Point Arena, offshore central California, found the main structural elements in the Monterey area include the San Andreas Fault Zone, San Gregorio Fault Zone, and the boundary of the Pacific and North American tectonic plates. A geologic map (Vedder et al. 1986) shows that bedrock in the area of Anacapa Island is either undifferentiated sedimentary rocks of Miocene age, or volcanic rocks of Miocene age. The layering of the rocks in the data identifies them as sedimentary rocks, probably of the Monterey Formation of Pliocene and Miocene age (Dibblee and Ehrenspeck, 1998).

The sea floor has representations of all major types of sediment: sand, mud, silt, hard rock outcroppings including pinnacles, cobbles and gravel, and clays. Low-relief rock outcrops (2 to 3 meter relief) provide unique habitat for a variety of fish and invertebrates. The canyons found throughout the coastal zone provide a channelized corridor for land-transported soils. The steep sides (up to 30 degrees for drops of several hundred meters along some canyons) are most likely cut into hard rock, probably the greywackes and metamorphic rocks of the Franciscan formation. Slump deposits are common in the submarine canyons off California and result from the undercutting of terrace and levee deposits by currents or by sediment transport in the canyons. The intermittent channel fill in the canyons is highly mobile and unstable.

Sediment grain size generally decreases with increasing depth off the coast, from predominantly sand-sized sediments on the continental shelf to fine-grained muds on the continental slope. The sand-to-sandy mud transition occurs at depths of 600 to 800 meters. Above this depth, waves and the California undercurrent can scour the bottom, preferentially removing the finer-grained sediments. At depths below this range, the

scouring effects are attenuated and fine-grained sediments have longer residence times on the bottom (Vercoutere et al. 1987). Within the depth range of 600 to 800 meters, where the slope flattens from 8 to 4 percent, the mud (silt and clay) content of the sediment increase from 12 to 55 percent. This is called the “mud line” or the mud transition that generally separates non-depositional or erosional bottoms above this depth range from more depositional regimes below this depth range.

The entire coast of California has received speculation about the presence of oil and gas reservoirs. Currently, southern California is the only area with active leases producing petroleum hydrocarbons. Test wells drilled off central and northern California resulted in positive indications of oil. The primary source of oil and reservoir rocks of porous sandstones, are in the Monterey Formation of Middle and Late Miocene age. Additional potential hydrocarbon sources and reservoirs exist in the shales and sandstones of the younger and older rocks present. Tests drilled off Bodega Bay and Año Nuevo into the Monterey Formation to 3,000 feet deep resulted in drill cuttings coated with free tarry oil (MMS 1987). Hydrocarbon seeps in northern and central California occur exclusively on the continental shelf and upper slope in water depths of less than 700 feet (Richmond et al. 1981).

3.4 Physical Oceanography

The hydrographic conditions along the California coast are influenced by the California Current system, precipitation, and river runoff. The North Pacific region is dominated by the Transitional Domain, but also is influenced by the Coastal Domain. The Transitional Domain is an east/west band of overlap between colder, lower salinity subarctic water to the north and warmer, more saline central Pacific water to the south. In this domain, water temperature in the upper layer is usually 7 degrees Centigrade (°C) or greater in the winter and 15°C or more in the summer. The Coastal Domain is characterized by marked localized variability in temperature and salinity. This variability is caused by local river runoff, upwelling, and mesoscale circulation features. Very nearshore tides influence the distribution of temperature and salinity through mixing. The boundary of the Coastal Domain is defined by the 32.4 parts per thousand (ppt) isohaline at 10 meter depth (MMS 1987).

The dominant oceanographic feature of the waters along the west coast of the United States and Baja California is the California Current. The California Current originates about 300 miles off the Oregon and Washington coasts between 45° and 50° North latitude and is described as a diffuse band (up to 620 miles wide), 328 to 1,640 feet deep, with a slow-moving (10 cm/sec) current which flows southward between late spring and early fall and northward during the winter and early spring (United States Fish and Wildlife Service 1986). Within in the California Current are two poleward flows, the Coastal Countercurrent and the California Undercurrent (Neshyba et al. 1989). The northward flowing Coastal Countercurrent occurs over the continental shelf, inshore from the California Current, and typically is only 10 to 20 kilometers wide with velocities less than 0.3 m/sec. It is broader and stronger in the winter when it occasionally covers the entire continental shelf and is referred to as the Davidson Current. The California

Undercurrent is a strong current which flows poleward through out the year over the slope (bottom depths of 200 to 5,000 meters). However, when viewed at any given time, the California Current is made up of numerous eddies and jet like filaments which result in a chaotic velocity field. For example, in the area between Point Arena and Bodega Bay, currents of 50 cm/sec are observed lasting for several days.

Coastal currents in a given location are strongly influenced by winds, large-scale currents occurring over a much larger area, bottom topography and the shape of the coastline, and changes in density due to heating/cooling and the input of freshwater from rivers. Winds are particularly important in influencing circulation along the California coast because they often produce intense upwelling and the energetic mesoscale circulation features associated with it. Satellite imagery frequently shows the presence of a large cyclonic counterclockwise eddy off Cape Mendocino during the summer. This eddy transports cold upwelled water originating near shore north of the cape seaward, while bringing warmer water ashore south of Cape Mendocino.

Upwelling along the west coast results from the interaction of the California Current and the winds generated by the North Pacific High. Due to the Coriolis effect, these northwesterly along-shore winds entrain surface water to the right, or away from the coast, a process known as Ekman transport. The transported water is replaced by cold, nutrient-rich subsurface water. Upwelling generally begins during the late spring (April to May) and ends in late summer early fall. This disruption of the stability of the water column is due to the transport of the deeper colder, more saline, and nutrient-rich water to the surface. The offshore extent of the primary upwelling zone appears to be 6 to 12 miles along the entire coast, although continental shelf topography may cause a seaward expansion of upwelling effects. There are generally four flow states that occur during the spring to fall time period: Upwelling, Cyclonic, Relaxation, and a quiescent period. The Upwelling regime is characteristic of cold, deep waters along the coast during early spring (35 percent of the year) when equatorward winds overwhelm any poleward along-shelf pressure gradient. Cyclonic flow occurs most frequently in the late spring through the summer (31 percent of the year) when upwelling favorable winds and a strong poleward along-shelf pressure gradient exist. Relaxation flow occurs most prominently in the early fall to early winter (27 percent of the year) when winds “relax” from their usual equatorward direction (MMS 2001).

In the southern California Bight there are three dominant sources of water types: 1) cold, low salinity, highly oxygenated sub-arctic water brought by the California Current and ultimately the Coastal Countercurrent, 2) the moderate, saline, central north Pacific water advecting into the Bight from the west, and 3) warm, highly saline, low oxygen content (Equatorial) water entering the Bight from the south, principally through the California Undercurrent. The distribution of these waters in the Bight is such that the top 200 meters is typically low in salinity and high in oxygen content, which identifies the water mass as principally sub-arctic even though temperatures range between 9° and 18°C. The lower mass (below 300 meters) is consistently high in salinity and low in dissolved oxygen identifying it as equatorial Pacific with temperatures between 9° and 5° C.

The circulation of the Bight is dominated by the Eastern Boundary Current of the North Pacific Gyre system, specifically the California Current, rather than by local wind forcing. The California Current carries sub-arctic water equatorward throughout the year, extends offshore a distance of about 400 kilometers and to a depth of 300 meters. The average speed is approximately 0.25 m/sec and occurs primarily during spring and summer. Nearer to the coast and within 150 kilometers, the surface current periodically reverses to a poleward direction and is then called the Coastal Countercurrent. This current is strongest during the fall and winter with its poleward flow reaching maximum speed typically within 50 kilometers offshore of the coast.

Below 200 meter depth, the poleward California Undercurrent exists throughout the year and is generally confined to within 100 kilometers of the coast along the continental slope. This current originates in the eastern equatorial Pacific and brings this warm, saline, low-dissolved-oxygen water poleward into the Bight. Within the Bight are submarine valleys and mountains, the peaks of which form the various offshore islands that influence the movement of water masses within the Bight. A complete overturning of water masses in the Bight occurs every 1 to 3 months. El Niño events represent an important interannual mode of variability in the oceanographic conditions along the west coast of the Pacific Ocean. These events occur at irregular intervals but usually at least once and often twice in a decade. The extent to which they alter circulation has not been fully documented but they are associated with anomalously warm water temperatures and the associated warm water biota which are transported northward with the advection of large volumes of water from the equatorial zone. The warm Pacific Current spawned an unusual series of storms from 5 January through 26 January 1995, that caused heavy, prolonged, and, in some cases, unprecedented precipitation across California. This series of storms resulted in widespread minor to record-breaking floods from Santa Barbara to the Oregon border. Several stream-gauging stations used to measure the water levels in streams and rivers recorded the largest peaks in the history of their operation. El Niño events that result in high river runoff have been documented to spread riverine sediment plumes from the Ventura/Santa Clara rivers south past Point Conception and to the vicinity of San Miguel Island (MMS 2001).

Both El Niño and regime changes are common, repetitive events readily observed in paleo-sediment analyses that extend back several thousand years. They also are clearly evident in time series analyses of physical factors (e.g., ocean temperatures) and indices of biological productivity (e.g., zooplankton densities). These longer-term events appear to be primarily dependent upon physical processes that are centered elsewhere in the Pacific and their effects include alterations in the physical, nutrient, and biological content of the waters entering the California Current system. Both processes also result in alterations in regional physical processes such as currents and upwelling that control local inputs of nutrients, productivity of kelp forests, and zooplankton populations that support populations of fishes and shellfishes harvested by California's commercial and recreational fisheries.

The effects of El Niño events in California include reduced input of cold, nutrient-rich waters from the north, and increased advection of warm, nutrient-poor water of subtropical origin into the southern California area. There may or may not be a reduction in winds that promote upwelling; however, nutrient input to the surface waters from upwelling is decreased due to reduced nutrients in the subsurface waters and a depressed thermocline. Thus, during El Niños, the California Current becomes less productive and more sub-tropical, and organisms enter the system from the south in greater numbers. For example, California spiny lobster and California sheephead, both have their centers of distribution off Baja California and recruit heavily to southern California (and sheephead as far north as Monterey) during strong El Niño events. During La Niñas, the environment is colder, zooplankton densities are higher, and subarctic organisms are favored. La Niña events with enhanced transport from the north result in increased recruitment of cool water fish in southern California.

Biological Environment

3.5 Coastal Habitat

Coastal areas contain the most variety of habitats in California: tidepools, estuaries, bays, rocky headlands, sandy beaches, mudflats, eelgrass, surfgrass, high and low-relief rocky features, and kelp forests. These habitats also are the most highly impacted by human disturbances including: dredging and filling, draining of wetlands, pollution from point and non-point sources (including oil spills), withdrawal of water flows from streams and rivers, clearing of vegetation, damming or stoppage of water courses, diverting water channels, placement of bank stabilization structures, modifying habitat from one type to another (e.g., removing wetlands for marina construction), and withdrawal of water for power plant cooling purposes (often killing all life entrained).

Approximately one-half of the shoreline from Point Conception north along the coastline of California is rocky, forming either broad benches or cliffs. Boulder and cobble beaches are patchily distributed within this same area. Along the central coast, rocky shorelines form high cliffs and steep rocky benches. North of Point Conception, where strong and constant wave action prevails, sandy beaches are found in the lee of each point due to depositional patterns. South of Point Conception, over three-fourths of the shoreline is sandy (excluding offshore islands which are mostly rocky).

Intertidal habitats are of two principal types - rocky or sandy. Gradations, such as unstable boulders and human constructed bulkheads, wharfs, breakwaters, etc., occur but most of the coast is either sandy or rocky (including offshore stacks and islands). Biological and physical factors influence the distribution, abundance, and species composition in intertidal habitats. The more important physical factors include: exposure and impact of waves, substrate composition, texture and slope of the substrate, desiccation, water temperature, and light. The more important biological factors include competition and predation.

The rocky shore intertidal substrate form a stable platform to which macro algae and invertebrates attach and obtain a firm hold against the force of waves. Rocky intertidal organisms are characterized by interesting physiological processes which offer methods of attachment, means of surviving wave shock and coping with an alternate exposure to air and water. Adaptations are in the form of tough skins, heavy shells, strong tube feet, and horny threads by which mussels attach to the rocks. Among the cover and protection given by the larger attached plant and animals live a myriad of usually smaller invertebrates. Some attach to the larger basal organisms, while others move among the community grazing on vegetation and other filter planktonic species. Marine plants are primarily red, brown, and green algae. The sessile invertebrates include: barnacles in the upper zone, mussels in the middle zone, and anemones in the lower zone. Mobile grazers and predators include: crabs, amphipods, snails, urchins, limpets, and sea stars. During low tide, shore birds feed among the tidepools, while during high tide, fish feed on the productive intertidal community. Tidepool fish typically found include: striped surfperch, tidepool sculpin, tidepool snailfish, and cabezon. Another rocky intertidal community is dominated by surfgrass. This community occurs in the lower intertidal to subtidal areas and supports a major nursery habitat for a wide variety of fish and invertebrates.

Since the mid-1980s, the black abalone population in southern California and mid-1990s in central California has undergone major declines in abundance due to the fatal disease referred to as withering foot syndrome. Withering foot syndrome is caused by a bacterial infection which thrives in warm ocean waters. The disease caused the abalone's foot to shrink in size to a point where it is no longer able to hold onto the rocks. The disease was first documented in the Channel Islands and at Diablo Cove where the nuclear power plant discharges warm water. The El Niño conditions of the 1990s accelerated the northward and coastward spreading of the disease. Populations are less than five percent of their original level in some areas (MMS 2001).

Rocky features on the ocean floor, when compared to sandy bottom acreage are uncommon offshore California. Several hundred small rocky platforms and submerged islands can be found in the nearshore coastline off California, with the incidence of nearshore rocky areas increasing as you move north of Point Conception. Rocky features, or natural reefs, are important biologically because they support stable, long-lived, biologically diverse communities as well as provide a food source for fish and other organisms. Reefs can be as large as the offshore feature off Point Sal measuring 7 miles at its widest point to small isolated pinnacles and outcrops. Subtidal rocky habitats are generally classified into two types, low- and high-relief. Low-relief is classified as rocky ledges and outcroppings less than 1 meter in height while high-relief are taller than 1 meter in height. Low-relief features contain less diverse, shorter-lived communities due to the constant or periodic disturbance by sedimentation. Most of the shallow water species prefer low-relief habitats where sediment flux is almost twice as high as on the deep reefs (MMS 2001). Communities associated with high-relief are rarer. Long-lived, highly diverse biological communities found on high-relief features are characterized by the presence of a variety of long-lived organisms such as sponges, corals, and feather stars.

The environment of the exposed sandy intertidal is considerably less stable than that of the rocky intertidal. Every wave on the sandy beach moves large amounts of sand and, depending upon the season, may remove most of the sand overlying a hard substrate. Organisms on the surf-swept beach bury themselves for protection from being swept out to sea by waves. Most of the animals living on sandy beaches have pelagic larval stages, so the young must be set adrift and may settle in another part of the world than their parents. Food also is uncertain as little is produced in the sand itself. Sandy beaches have comparatively fewer organisms and species than the rocky habitats and population level fluctuations are far greater than found on the more stable substrate. The only marine algae that may be present are benthic diatoms. Polychaete worms, molluscs (snails and clams), crustaceans (sand crab, shrimps, and mole crab), and echinoderms (sand dollars) are the predominant invertebrates found. California grunion utilize sandy beaches for spawning.

Wetlands and estuaries throughout California have been severely impacted through physical alteration by commercial and residential development, upland practices in the watersheds increasing sediment load, and discharges of pollutants into the watersheds through agricultural practices and surface runoff. Coastal wetlands have lost approximately 75 percent of their original acreage in California (NOAA 1992). Estuaries are bodies of water, ranging in size from streams to large bays, which communicate with the sea through relatively narrow openings. The openings of many estuaries are closed to the sea for certain periods of time. Wetlands are the saturated lowland areas associated with the estuary, such as salt marsh or mudflat. These habitats provide areas where numerous threatened and endangered plant and animal species reside or migrate through.

Wetland, estuarine, and slough habitats consist of salt marshes, eelgrass beds, fresh and brackish water marshes, and mudflats. Wetland habitats may only occupy narrow bands along the shore, or they may cover larger expanses at the mouths of bays, rivers, or coastal streams. Wetlands and estuaries are characterized by high organic productivity, high detritus production, and extensive nutrient recycling. Portions of the wetland that are submerged during high tide provide valuable food resources and predator protection for the many larval stages that rear in estuaries. Plant species commonly associated with salt marshes include cordgrass and pickleweed.

Estuaries contain a greater diversity of both plant and animal life forms per unit surface area than any other habitat in the marine environment. Estuaries are highly productive because they constitute an area where freshwater, marine, and terrestrial habitats meet and intermingle. High levels of nutrient input from terrestrial sources, high levels of freshwater input from streams, levels of marine-origin nutrient input caused by tidal flushing, shallow depths, and high heat retention are factors supporting the greater productivity of estuaries. Because of their extremely high rate of biological productivity, estuaries are frequented by numerous species. They provide critical resting and feeding habitats for migratory shore birds and waterfowl. The inhabitants of estuaries are characteristically euryhaline as they can adapt themselves to changes in the salinity

of the water. More marine organisms are capable of adjusting to lower salinities than fresh or brackish water species to increased levels of salinity. Estuaries are important habitats for both resident and transitory species, provide spawning and nursery habitats, foraging areas for numerous species such as invertebrates, fishes, reptiles, birds, and mammals. Some species spawn in estuaries and their young reside there before returning to the sea, while the young of other species spawned in the ocean use estuaries for nursery habitats. On a daily or tidal-cycle, many species enter estuaries to feed.

Estuarine zone fisheries are of great economic importance across the Nation. Three-fourths of the fish species caught in the United States are supported by estuarine habitats. Clams, crabs, oysters, mussels, scallops, and estuarine and nearshore small commercial fishes contributed an average dockside revenue of $389 million nationally from 1990 to 1992 (PFMC 1998). Seventy-five percent of all commercial fish and shellfish landings are of estuarine-dependent species. At least 31 groundfish species inhabit estuaries and nearshore kelp forests for part, or all, of their life cycle.

Forage fish are small, schooling fish which serve as an important source of food for other fish species, birds, and marine mammals. Examples of forage fish species are herring, smelt, anchovies, and sardine. Many species of fish feed on forage fish. In addition, marine mammals consuming forage fish include: harbor seals, California sea lions, Steller sea lions, harbor porpoises, Dall's porpoise, and minke whales. Forage fish are most commonly found in nearshore waters and within bays and estuaries, although some do spend some of their lives in the open ocean.

Many threatened and endangered specie's habitat are saltmarsh and estuaries. The California coastal areas contain more listed species (plants, fish, birds, mammals) than the rest of the west coast. The food provided is more abundant than the open ocean or provided in freshwater ecosystems. Many open-ocean species spawn in estuaries such as the great jellyfish larval polyps that rear in the sheltered waters of Elkhorn Slough (Hedgepeth 1968). Species that are found in estuaries include: oysters, sea cucumbers, octopus, midshipman, bat rays, leopard sharks, shrimps, sea pansies, sand dollars, clams, snails, crabs, sea otters, harbor seals, great egrets, great blue herons, terns, gulls, rails, pelicans, and cormorants.

Eelgrass is a perennial flowering sea plant that reproduces vegetatively and by seeds. Large mats of eelgrass provide essential habitat for many larval stages of commercial fish and crabs. Eelgrass supports a rather characteristic group of animals which live on its blades, about its base, and among its roots in the sediment. Eelgrass beds are found in estuaries from Alaska to Baja California. Many species are specialized to living on a portion of the eelgrass including snails, fixed jellyfish, and nudibranchs which live on the blades, sponges and shrimps in and around the roots, and scallops attached to clusters of eelgrass or swimming among the plants. Decaying eelgrass provides essential nutrients released into the water column and sediments to support planktonic filter feeders and benthic detrital feeders.

Almost all marine and intertidal waters, wetlands, swamps, and marshes are critical to fish. For example, seagrass beds protect young fish from predators, provide habitat for fish and wildlife, improve water quality, and control sediments. In addition, seagrass beds are critical to nearshore food web dynamics. Studies have shown seagrass beds to be among the areas of highest primary productivity in the world (PFMC 1998). This primary production, combined with other nutrients, provide high rates of secondary production in the form of fish.

Kelp forests off California are dominated by two species, the giant kelp and the bull kelp. Giant kelp can grow up to 100 feet and prefers the calmer portions of the coast south of Point Conception. Large kelp beds have been identified in waters up to 1 mile offshore in the area from Point Conception to Gaviota and at San Miguel, Santa Rosa, and Anacapa islands. Giant kelp is one of the most productive plants on earth able to grow 18 inches a day in full sunlight. While the giant kelp may live several years, the life of each frond is typically 6 months or less. It is to the kelp's advantage to replace old fronds with new and buoyant fronds.

Bull kelp is more resistant to the rougher waters outside protective bays and inlets. Some areas contain both species but, where colder waters dominate through out the year, bull kelp forms a monoculture forest. Bull kelp is an annual plant dying off each fall season while giant kelp is a perennial and may live 7 to 8 years. Kelp usually attach to rock outcrops or cobbles to stay in place, but in the Santa Barbara Channel, waters are so calm that kelp plants can become established in sandy subtidal regions by attaching themselves to worm tubes (MMS 2001). Hundred of species of animals and 400 types of sea plants have been cataloged in the kelp forests of Monterey Bay (NOAA 1997). Kelp forests provide vertical water column habitat for many types of adult and juvenile fish, marine mammals such as the sea otter, and other marine animals. Kelp forests provide critical habitat for encrusting animals such as sponges, bryozoans, and tunicates, as well as for juvenile fish, molluscs such as abalone, algae, and for other invertebrates. Fish associated with kelp forests include: greenling, lingcod, yellowtail, sheephead, opaleye, and many species of surfperch and rockfish. Gray whales have been reported to feed near kelp forests and to seek refuge from predatory killer whales. Kelp also provides a food resource for fish, and for grazing and detritus-feeding invertebrates such as isopods and sea urchins. Predators, such as sea stars and sea otters, are active there also.

As natural predators, the red and purple urchin have a dramatic effect on determining the health of a given kelp forest. In many areas, such as Diablo Cove, purple urchins have become overabundant preventing reestablishment of kelp. Areas dominated by urchins are called "urchin barrens" due to the imbalance between urchins and kelp or other algae. During warm water years, or in areas influenced by warm power plant discharges, both kelp and urchins die off, but the urchins are able to tolerate higher temperatures and eventually graze the rocky areas bare of kelp and algae. Commercial taking of red urchins only exacerbates the problem by reducing the competition between red and purple urchins and eliminating the natural urchin predators such as the sheephead due to lack of prey items.

Kelp detached and transported during storms provides a source of food for other local habitats. Sandy beach fauna, from invertebrates to shore birds, utilize the kelp washed up on the beach. Kelp wrack can provide critical food resources for wintering shore birds. Kelp that sinks provides food for deep water benthic organisms which are dependent on drifting food. Kelp that detaches and forms floating rafts provides habitat for juvenile rockfish and other pelagic species.

3.6 Benthic Habitat

All bottom types are represented off California and are discussed in the Geology section. Rocky shelves, pinnacles, and boulders give way to sandy and mud bottoms as depths increase. The benthic zone includes soft-bottom habitat, hard-bottom habitat, and low- and high-relief features. Organisms associated with the different types of benthic habitat are more specialized in their adaptations than those found in the changing coastal zone. Benthic infaunal species are those that primarily live all or a major part of their life cycle living within the sediments. Demersal epifaunal species are those that live on or near the bottom.

Fish demersal species are differentiated by depth or depth-related factors. The shelf community is from depths of at least 30 to approximately 200 meters and is characterized by sanddabs, English sole, rex sole, rockfish, lingcod, pink surfperch, plainfin midshipman, skates, rays, halibut, and white croakers. Most are of commercial and recreational value. Flatfish are dominant on the shelf and upper slope at depths between 100 to 500 meters in sandy and muddy bottoms. Upper and middle slope fish species are characterized by rockfish, flatfish, sablefish, hake, slickheads, and eelpouts. They range in depths from 200 to 1,200 meters deep with thorny heads, hake, slickheads, and rattails inhibiting the middle slope (500 to 1,200 meters). The lower slope (1,200 to 3,200 meters) taxa include rattails, thornyheads, finescale codling and eelpouts. At depths lower than 1,500 meters, the numbers of fish species, densities, and biomass are expected to be extremely low (Advanced Research Projects Agency 1994) compared to those found on the upper and middle slope.

Shelf habitats off California are very rich in the number of species and abundances of infauna. This trend is influenced by upwelling and high productivity. Continental shelf communities (less than 200 meters) are dominated by polychaetes of several families and other common taxa such as amphipods, gastropod snails, decapods, mysids, ostracods, brittle stars, and phoronids. Continental slope communities also are very rich, with even higher numbers of species at some depth than noted for the continental shelf areas. Key features of the slope communities include the following: 1) a marked decrease in infauna densities between approximately 800 to 1,000 meter depth, corresponding to the oxygen minimum zone, followed by 2) sharp density increases to approximately 1,800 meter depth, and finally 3) a gradual decrease with further increases in depth. Most of the species tend to be either deposit-feeding or detrital-feeding primarily depending on food falling of from the photic zone. Large woody debris also plays a significant role in benthic ocean ecology, where deep-sea wood borers

convert the wood to fecal matter providing terrestrial based carbon to the ocean food chain (PFMC 1998). Epifaunal communities include representatives from the following taxa: sponges, brittle stars, sea stars, sea pens, sea cucumbers, octopus, sea anemones, vase sponges, cup and branching corals, Tanner crabs, clams, and snails.

3.7 Pelagic Habitat

The continental shelf is relatively narrow off northern California. The east-west trending Mendocino Escarpment is a major submarine topographic feature off the west coast of the United States. Several submarine canyons are located offshore California with the Eel River Canyon prominent in northern California, Monterey Bay Canyon in central California, and Redondo Canyon in southern California. The pelagic habitat can be subdivided into three zones, epipelagic zone (surface to 200 meters), mesopelagic (200 to 1,000 meters), and bathypelagic zone (1,000 meters to bottom). The epipelagic zone waters are typically well lit, well mixed, and capable of supporting actively photosynthesizing algae. The mesopelagic zone is characterized by decreased light, temperature, and dissolved oxygen concentrations while pressure increases. The bathypelagic zone is characterized by complete darkness, lower temperatures and oxygen levels, and greater pressures as depth increases. Each of these zones is distinguished by characteristic fish assemblages.

Pelagic species spend most of their life in the open ocean but some, like herring and salmon, utilize estuaries for a portion of their life cycle. Other commercial and recreational pelagic fish species include: market squid, northern anchovy, Pacific sardine, salmon, mackerel, and albacore tuna. Coastal pelagic species are schooling fish, not associated with the ocean bottom, that migrate in coastal waters. Several species are managed by the PFMC CPSFMP. Pacific sardine inhabit coastal subtropical and temperate waters and, at times, has been the most abundant fish species in the California Current. During times of high abundance, Pacific sardine range from the tip of Baja California to southeastern Alaska. When abundance is low, Pacific sardine do not occur in large quantities north of Point Conception, California. The central subpopulation of northern anchovy ranges from San Francisco, California to Punta Baja, Mexico. Market squid inhabit the inshore and offshore waters of the Pacific Ocean from British Columbia down to Baja California, specifically within the California Current.

Epipelagic fish can be distinguished based on two ecological types. Oceanic forms are those that spend all or part of their life in the open ocean away from the continental shelf, while nearshore forms spend all or part of their life in water above the continental shelf. Typical epipelagic fish include fast-moving species such as tunas, mackerels, swordfish, blue sharks, thresher sharks, great white sharks, and salmon, as well as schooling baitfish such as Pacific herring, northern anchovy, and juvenile rockfish. The largest schools of anchovy occur within 25 miles of the coast over deep water, often over escarpments and submarine canyons. During daylight hours of summer and fall months, large compact schools may be found at depths of 360 to 600 feet. Most mesopelagic species undergo vertical migrations often moving into the epipelagic zone

at night to prey on plankton and other fish. Typical mesopelagic species include: deepsea smelt, lanternfish, and viperfish. In addition to various mesopelagic invertebrates such as krill and copepods, the major mesopelagic fish species forming the deep scattering layer include lanternfish and bristlemouths which migrate vertically. In contrast to mesopelagic fish, bathypelagic species are largely adapted for a sedentary existence in a habitat with low levels of food and no light. Some of the species occupying the bathypelagic zone also cross into the mesopelagic zone during vertical migrations. Many of these fish have light producing organs which attract prey and potential mates. Blackdragons, dragonfish, laternfish, and tubeshoulders can be found at these depths.

Pelagic invertebrates include those species capable of movement throughout the water column and/or just above the bottom. Examples include: euphausiids, pteropods, heteropods, cephalopods, and octopuses. Many of these species are either of commercial importance or are prey items for fish, sea turtles, seabirds, and marine mammals. Gelatinous invertebrates, such as jellyfish, salps, and tunicates, are the important prey items of some sea turtles and blue rockfish. Many pelagic invertebrates are components of the deep scattering layer. The deep scattering layer is described as a layer of living organisms, ranging from almost microscopic zooplankton to copepods, shrimp, and squid. This layer is present at different depth ranges during the day (200 to 800 meters) and night (generally near the surface).

Phytoplankton is generally limited in distribution from the sea surface to approximately 100 meters depth corresponding to the effective range of light penetration for photosynthesis. The predominant members of the phytoplankton community are diatoms, silicoflagellates, coccolithophore, and dinoflagellates. Population increases generally occur during the summer and fall months in response to upwelling events. The upwelling bloom events are dominated by diatoms, and during nonupwelling events, dinoflagellates are dominant.

Zooplankton species are not limited to the photic zone and can occur from surface waters to depths of over 400 meters. Many zooplankton species are able to vertically migrate up to several hundred meters. Copepods and euphausiids dominate the zooplankton community in terms of numbers and biomass. They are critical food sources for many species including juvenile fish and mysticete whales. Commercial important crustacean larval and larval fish are members of the zooplankton community for several weeks to months.

3.8 Areas of Special Concern

3.8.1 Essential Fish Habitat (EFH)

The PFMC manages 90 species of fish under three Fishery Management Plans: 1) Coastal Pelagic Species Fishery Management Plan, 2) Pacific Salmon Fishery Management Plan, and 3) Pacific Groundfish Fishery Management Plan. The Magnuson-Stevenson Act defines EFH as “those waters and substrate necessary to fish

for spawning, breeding, feeding, or growth to maturity." NOAA Fisheries guidelines state that "adverse effects from fishing may include physical, chemical, or biological alterations of the substrate, and loss of, or injury to, benthic organisms, prey species and their habitat, and other components of the ecosystem." The EFH has been established for five species of coastal pelagics: Pacific sardine, Pacific mackerel, northern anchovy, jack mackerel, and market squid which is from the coast out to the edge of the EEZ between the U.S. to Canada and U.S. to Mexico borders.

The EFH also has been established for 83 species of groundfish. EFH for Pacific Coast groundfish is defined as the aquatic habitat necessary to allow for groundfish production to support long-term sustainable fisheries for groundfish and for groundfish contributions to a healthy ecosystem (PFMC 2001). Descriptions of groundfish fishery EFH for each of the 83 species and their life stages result in over 400 EFH identifications. When these EFHs are taken together, the groundfish fishery EFH includes all waters from the mean higher high water line and the upriver extent of saltwater intrusion in river mouths, along the coast of Washington, Oregon, and California seaward to the boundary of the EEZ. The seven "composite" EFH identifications are as follows: estuarine, rocky shelf, non-rocky shelf, canyon, continental slope/basin, neritic zone (33 feet and shallower), and the oceanic zone (66 feet and deeper). Life history and habitat needs for the 82 species managed under the groundfish FMP are described in the EFH appendix to Amendment 11, which is available online at http://www.ner.noaa.gov/1sustfsh/efhappendix/page1.html and is incorporated by reference.

The EFH has been established for five species of salmon: chinook, coho, chum, pink, and sockeye. The EFH for these salmon include those waters and substrate necessary for salmon production to support a long-term sustainable salmon fishery. The EFH includes all streams, lakes, ponds, wetlands, and other currently viable water bodies and most of the habitat historically accessible to salmon. In the estuarine and marine areas, salmon EFH extends from the nearshore and tidal submerged environments within State territorial waters out to the full extent of the EEZ.

Habitat Areas of Particular Concern (HAPC) are described in the regulations as subsets of EFH which are rare, particularly susceptible to human-induced degradation, especially ecologically important, or located in an environmentally stressed area. Currently, only Amendment 14 to the Pacific Coast Salmon Plan has addressed HAPC for chinook, coho, and pink salmon.

3.8.2 State Marine Managed Areas

California's State Marine Managed Areas (MMAs), such as refuges, reserves, preserves, areas of biological significance, and parks, are one of many tools for state resource managers to use for protecting, conserving, and managing the State's valuable marine resources. The mission of the State MMAs is to ensure the long-term ecological viability and biological productivity of marine ecosystems and to preserve cultural resources in the coastal areas in recognition of their intrinsic value and for the

benefit of current and future generations. MMAs can offer many benefits, including protecting habitats, species, cultural resources, and water quality; enhancing recreational opportunities; and contributing to the economy through such things as increased tourism and property values. MMAs also may benefit fisheries management by protecting representative habitats and reducing extractive uses.

Several State refuges, parks, and reserves are located throughout the nearshore areas. The purpose of refuges and reserves is to reduce the abuse and waste of the State's tidepool resources by restricting general collecting of all animals living in tidepools and other areas between the high tide line and 1,000 feet below the low tide line (MMS 1987). This is achieved by prohibiting the general collection of animals and plants within the designated boundaries of the preserved. The Department enforces regulations in both refuges and reserves. Ecological reserves extend this level of protection to include rare or endangered wildlife and aquatic organisms, as well as specialized habitat types, both terrestrial and aquatic. Designation of individual or a network of reserves is intended to protect marine habitats, ecosystems, and living marine resources. Such reserves are created to satisfy one or more of the following purposes: natural heritage, ecosystem biodiversity, education/research, and/or fisheries management (FGC 2001 Addenda). Thus, entire ecosystems are maintained in a natural condition for the benefit of both the general public and scientific communities. The California Sea Otter Game Refuge is the largest covering 216 kilometers of coastline between the Carmel River, Monterey County and Santa Rosa Creek, San Luis Obispo County and was established to protect the sea otter population throughout its range in California.

Areas of Special Biological Significance (ASBS) have been designated by the California State Water Quality Control Board in 1974 and 1975, and are designed to protect intertidal and shallow subtidal areas. They are areas containing biological communities of such extraordinary, even though unquantifiable value that no acceptable risk of change in their environments as a result of man's activities can be entertained (MMS 1987). ASBSs deserve special protection through the preservation and maintenance of natural water quality conditions by prohibiting the discharge of wastes into, or within the vicinity of, these special biological communities. Many of the 34 total ASBSs in the State overlap geographically with established marine life refuges and reserves. Refer to Table 3-3 for a list of all areas of special concern. Under the Marine Managed Areas Improvement Act (MMAIA) all ASBSs are now State Marine Water Quality Protection Areas.

California's current MMAs are the result of more than 50 years of designations on a case-by-case basis through legislative, administrative, and statewide ballot initiative actions which has led to 18 different classifications and subclassifications (PRC§ 36601). Many MMAs evolved without conforming to any plan ensuring the most representative or unique areas of the ocean and coastal habitat were included. Additionally, many MMAs do not encompass an organized system, as the individual sites are not designated, classified, or managed in a systematic manner and many designations lack a clearly defined purpose, effective management measures, and

enforcement. Agencies are unable to meet management objectives, such as maintaining biodiversity, providing education and outreach, and protecting marine resources. To resolve these issues MMAIA, chaptered in 2000, formed an interagency committee to review all the existing MMA's and set criteria for considering and including additional areas into the MMA system. It also established a new classification system for designating managed areas in the marine and estuarine environment. The new classifications are; State Marine Reserve (no take), State Marine Park (limited recreational take), State Marine Conservation Area (limited commercial and/or recreational take), State Marine Water Quality Protection Areas (includes ASBSs), State Cultural Preservation Areas (e.g., shipwrecks), and State Recreational Management Areas.

The Marine Life Protection Act (MLPA), chaptered in October 1999, was designed to improve the array of Marine Protected Areas (MPAs), a subset of MMAs, existing in California waters through the adoption of a Marine Life Protection Program and a comprehensive master plan. MPAs provide for whole ecosystem protection, rather than focusing on single species or species groups. This ecosystem approach takes into consideration the interaction between different species and the importance of habitat. By using an ecosystem approach, biological diversity, reproductive potential, and resource sustainability are all increased. The Department is the lead agency charged with implementing the provisions of the MLPA. The MLPA requires that the Department develop a plan for establishing networks of MPAs in California waters to protect habitats and preserve ecosystem integrity, among other things. The MLPA states that "marine life reserves" (defined as no-take areas) are essential elements of an MPA system because they "protect habitat and ecosystems, conserve biological diversity, provide a sanctuary for fish and other sea life, enhance recreational and educational opportunities, provide a reference point against which scientists can measure changes elsewhere in the marine environment, and may help rebuild depleted fisheries." The MLPA further states that "it is necessary to modify the existing collection of MPAs to ensure that they are designed and managed according to clear, conservation-based goals and guidelines that take full advantage of the multiple benefits that can be derived from the establishment of marine life reserves. The Department will include MPAs with the classification of State Marine Reserve, State Marine Park, and State Marine Conservation Area in the recommended networks of MPAs. The final MLPA plan is due in December 2005.

In a process independent from the MLPA, the Department proposed MPAs within the Channel Islands National Marine Sanctuary. The Fish and Game Commission voted to adopt the Department's MPA plan and implementation occurred in April 2003. The Department's plan represents 19 percent of State waters within the Sanctuary and includes 132 square nautical miles in 10 no-take State Marine Reserves and 10 square nautical miles in 2 limited-take State Marine Conservation Areas.

3.8.3 National Marine Sanctuaries

Marine sanctuaries are areas that are legally defined and regulated by the federal government, with the primary intent of protecting marine resources for their inherent biological or ecological value. Four national marine sanctuaries, out of 11 nationwide, are found in California, Cordell Banks (designated 1989), Gulf of the Farallones (designated 1981), Monterey Bay (designated 1992), and Channel Islands (designated 1980). Marine sanctuaries were created with the passage of the Marine Protection, Research, and Sanctuaries Act of 1972. The mission of the national marine sanctuary program is "to identify, designate and manage areas of the marine environment of special national significance due to their conservation, recreational, ecological, historical, research, educational, or esthetic qualities (15 CFR Part 922)." The objectives of the sanctuary program are to: 1) preserve and protect valuable marine resources, 2) promote scientific research, 3) enhance public awareness, and 4) facilitate, to the extent compatible with the primary goal of resource protection, multiple use of these marine areas.

Table 3-3 State Marine Managed Areas in or adjacent to the marine environment and the new designations for MPAs (where applicable).

AREAS OF SPECIAL BIOLOGICAL SIGNIFICANCE (STATE MARINE WATER QUALITY PROTECTION AREAS)
Redwoods National Park Head State Marine Water Quality Protection Area
Kelp Beds at Trinidad Head State Marine Water Quality Protection Area
Kings Range National Conservation Area State Marine Water Quality Protection Area
Pygmy Forest Ecological Staircase State Marine Water Quality Protection Area
Kelp Beds at Saunders Reef State Marine Water Quality Protection Area
Del Mar Landing Ecological Reserve State Marine Water Quality Protection Area
Gerstle Cove State Marine Water Quality Protection Area
Bodega Marine Life Refuge State Marine Water Quality Protection Area
Bird Rock State Marine Water Quality Protection Area
Pt. Reyes Headlands Reserve and Extension State Marine Water Quality Protection Area
Double Point State Marine Water Quality Protection Area
Duxbury Reef Reserve and Extension State Marine Water Quality Protection Area
Farallon Island State Marine Water Quality Protection Area
James V. Fitzgerald Marine Reserve State Marine Water Quality Protection Area
Ano Nuevo Point and Island State Marine Water Quality Protection Area
Pacific Grove Marine Gardens Fish Refuge State Marine Water Quality Protection Area
Hopkins Marine Life Refuge State Marine Water Quality Protection Area
Carmel Bay State Marine Water Quality Protection Area
Point Lobos Ecological Reserve State Marine Water Quality Protection Area
Julia Pfeiffer Burns Underwater Park State Marine Water Quality Protection Area
Ocean Area Surrounding the Mouth of Salmon Creek State Marine Water Quality Protection Area
San Miguel, Santa Rosa, Santa Cruz Islands State Marine Water Quality Protection Area
Santa Barbara and Anacapa Island State Marine Water Quality Protection Area
San Nicolas Island and Begg Rock State Marine Water Quality Protection Area
Mugu Lagoon to Latigo Point State Marine Water Quality Protection Area
Santa Catalina Island (4 subareas) State Marine Water Quality Protection Area
San Clemente Island State Marine Water Quality Protection Area
Newport Beach Marine Life Refuge State Marine Water Quality Protection Area
Irvine Coast Marine Life Refuge State Marine Water Quality Protection Area
Heisler Park Ecological Reserve State Marine Water Quality Protection Area
San Diego Marine Life Refuge State Marine Water Quality Protection Areas
San Diego-La Jolla Ecological Reserve State Marine Water Quality Protection Area

NATURAL PRESERVES
Existing Name
Big Lagoon (3 sub units)
Brush Creek/Lagoon Lake Wetland
Carmel River Lagoon and Wetland
Morro Estuary
Morro Rock
Pajaro River Mouth
Pescadero Marsh
Point Dume
Salinas River Mouth
Santa Clara Estuary

ECOLOGICAL RESERVES	
Existing Name	**New Designation Without Regulation Changes**
Tomales Bay Ecological Reserve	Tomales Bay State Marine Park
Fagan Marsh Ecological Reserve	Fagan Marsh State Marine Park
Peytonia Slough Ecological Reserve	Peytonia Slough State Marine Park
Bair Island Ecological Reserve	Bair Island State Marine Park
Albany Mudflats Ecological Reserve	Albany Mudflats State Marine Park
Del Mar Landing Ecological Reserve	Del Mar Landing State Marine Park
Corte Madera Marsh Ecological Reserve	Corte Madera State Marine Park
Marin Islands Ecological Reserve	Marin Islands State Marine Park
Redwood Shores Ecological Reserve	Redwood Shores State Marine Park
Point Lobos Ecological Reserve	Point Lobos State Marine Reserve
Elkhorn Slough Ecological Reserve	Elkhorn Slough State Marine Reserve
Farallon Islands Ecological Reserve	n/a
Moro Cojo Ecological Reserve	n/a
Watsonville Slough Ecological Reserve	n/a
Carmel Bay Ecological Reserve	Carmel Bay State Marine Conservation Area
Morro Rock Ecological Reserve	Morro Rock Ecological Reserve
San Miguel Island Ecological Reserve	San Miguel Island State Marine Conservation Area
Anacapa Island Ecological Reserve	Anacapa Island State Marine Conservation Area
Anacapa Island Ecological Reserve Natural Area	Anacapa Island State Marine Reserve
Santa Barbara Island Ecological Reserve	Santa Barbara Island State Marine Conservation Area
Goleta Slough Ecological Reserve	Goleta Slough State Marine Park
Abalone Cove Ecological Reserve	Abalone Cove State Marine Park
Farnsworth Bank Ecological Reserve	Farnsworth Bank State Marine Conservation Area
Bolsa Chica Ecological Reserve	Bolsa Chica State Marine Park
Upper Newport Bay Ecological Reserve	Upper Newport Bay State Marine Park
Heisler Park Ecological Reserve	Heisler Park State Marine Reserve
Buena Vista Lagoon Ecological Reserve	Buena Vista Lagoon State Marine Park
Batiquitos Lagoon Ecological Reserve	Batiquitos Lagoon State Marine park
San Dieguito Lagoon Ecological Reserve	San Dieguito Lagoon State Marine Park
San Elijo Lagoon Ecological Reserve	San Elijo Lagoon State Marine Park
San Diego-La Jolla Ecological Reserve	San Diego-La Jolla State Marine Conservation Area
Offshore Rocks and Pinnacles Ecological Reserve	n/a

MARINE RESOURCE PROTECTION ACT ECOLOGICAL RESERVES (MRPAER)	
Existing Name	**New Designation Without Regulation Changes**
King Range MRPAER	King Range State Marine Reserve
Big Creek MPRAER	Big Creek State Marine Reserve
Vandenberg MRPAER	Vandenberg State Marine Reserve
Big Sycamore Canyon MRPAER	Big Sycamore State Marine Reserve

CLAM REFUGES (PISMO CLAM PRESERVES)	
Existing Name	**New Designation Without Regulation Changes**
Pismo-Oceano Beach Clam Preserve	Pismo-Oceano State Marine Conservation Area
Atascadero Beach Pismo Clam Preserve	Atascadero Beach State Marine Conservation Area
Morro Beach Clam Preserve	Morro Beach State Marine Conservation Area

REFUGES	
Existing Name	**New Designation Without Regulation Changes**
Bodega Marine Life Refuge	Bodega State Marine Reserve
Farallon Islands Game Refuge	n/a
California Sea Otter Game Refuge	n/a
Pacific Grove Marine Gardens Fish Refuge	Pacific Grove State Marine Conservation Area
James V. Fitzgerald Marine Life Refuge	James V. Fitzgerald State Marine Conservation Area
Hopkins Marine Life Refuge	Hopkins State Marine Reserve
Point Fermin Marine Life Refuge	Point Fermin State Marine Conservation Area
Catalina Marine Science Center Marine Life Refuge	Catalina Marine Science Center State Marine Reserve
Newport Beach Marine Life Refuge	Newport Beach State Marine Conservation Area
Irvine Coast Marine Life Refuge	Irvine Coast State Marine Conservation Area
Laguna Beach Marine Life Refuge	Laguna Beach State Marine Conservation Area
Niguel Marine Life Refuge	Niguel State Marine Conservation Area
Doheny Beach Marine Life Refuge	Doheny Beach State Marine Conservation Area
Dana Point Marine Life Refuge	Dana Point State Marine Conservation Area
South Laguna Beach Marine Life Refuge	South Laguna Beach State Marine Conservation Area
City of Encinitas Marine Life Refuge	City of Encinitas State Marine Conservation Area
San Diego Marine Life Refuge	San Diego State Marine Conservation Area

RESERVES	
Existing MPA Name	**New Designation Without Regulation Changes**
Duxbury Reef Reserve	Duxbury Reef State Marine Conservation Area
Gerstle Cove Reserve	Gerstle Cove State Marine Conservation Area
Point Reyes Headlands Reserve	Point Reyes Headlands State Marine Conservation Area
Estero de Limantour Reserve	Estero de Limantour State Marine Reserve
Ano Nuevo Reserve	n/a
Point Lobos Reserve	n/a
Pismo Invertebrate Reserve	Pismo State Marine Conservation Area
Robert W. Crown Reserve	Robert W. Crown State Marine Conservation Area
Coal Oil Point Reserve	n/a
Carpinteria Salt Marsh Reserve	n/a
Santa Cruz Island Reserve	n/a
Lover's Cove Reserve	Lovers Cove State Marine Conservation Area
Point Cabrillo Reserve	Point Cabrillo State Marine Conservation Area
Point Loma Reserve	Point Loma State Marine Conservation Area
Scripps Coastal Reserve	n/a

STATE ESTUARIES
Morro Bay State Estuary
San Diego Bay State Estuary

STATE PARKS AND BEACHES	
Existing MPA Name	**New Designation Without Regulation Changes**
MacKerricher State Park	MacKerricher State Marine Conservation Area
Russian Gulch State Park	Russian Gulch State Marine Conservation Area
Van Damme State Park	Van Damme State Marine Conservation Area
Manchester State Park	Manchester State Marine Conservation Area
Arena Rock Marine Natural Preserve (in Manchester State Park)	Arena Rock State Marine Conservation Area
Salt Point State Park	Salt Point State Marine Conservation Area
Fort Ross State Historic Park	Fort Ross State Marine Conservation Area
Sonoma Coast State Beach	Sonoma Coast State Marine Conservation Area
Julia Pfeiffer Burns State Park	Julia Pfeiffer Burns State Marine Conservation Area
Refugio State Beach	Refugio State Marine Conservation Area
Crystal Cove State Park	Crystal Cove State Marine Conservation Area
Cardiff and San Elijo State Beaches	Cardiff and San Elijo State Marine Conservation Area

MARINE PROTECTED AREAS
Anacapa Island State Marine Reserve
Santa Barbara Island State Marine Reserve
Harris Pt. State Marine Reserve
Judith Rock State Marine Reserve
Richardson Rock State Marine Reserve
Scorpion (Santa Cruz Island) State Marine Reserve
Gull Island (Santa Cruz Island) State Marine Reserve
Carrington Pt. (Santa Rosa Island) State Marine Reserve
Skunk Pt. (Santa Rosa Island) State Marine Reserve
South Point (Santa Rosa Island) State Marine Reserve
Anacapa Island State Marine Conservation Area
Painted Cave (Santa Cruz Island) State Marine Conservation Area

3.9 Threatened and Endangered Species

The USFWS and the NOAA Fisheries grant at-risk species and stocks protection under the federal Endangered Species Act of 1973 (ESA) with endangered, threatened, and depleted status designations. The ESA was passed to provide measures to conserve and recover listed species, thereby returning them to sustainable numbers no longer requiring the protection of ESA. The ESA contains a number of tools that are used by government agencies, local jurisdictions, user groups, and landowners to ensure that human activities are done in a way that avoids or minimizes the harmful effects of these activities. The designation of ESA species is based on the biological health of that species.

Under ESA, an endangered species is defined in the law as "any species which is in danger of extinction throughout all or a significant portion of its range." A threatened species is "any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." A candidate species is "any species being considered by the Secretary for listing as an endangered

or threatened species, but not yet the subject of a proposed rule." When a species is listed, the critical habitat of that species also must be designated. Critical habitats are those specific areas that are essential to the conservation of a listed species.

NOAA Fisheries is charged with the implementation of the ESA for marine and anadromous species, while the USFWS implements programs and regulations for terrestrial and freshwater species. Section 7 of the ESA requires that federal agencies insure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of the critical habitat of such species. The ESA requires NOAA Fisheries and the USFWS to develop recovery plans for species added to the list of Threatened and Endangered (T&E) species. The plans describe necessary conservation measures to ensure recovery of the species so that it becomes appropriate to remove the species from the T&E list.

The State also provides for the conservation of threatened and endangered species (FGC §2062, 2067, 2068) under the CESA. Like the ESA, CESA policy is to conserve, protect, restore, and enhance any endangered or threatened species and its habitat. Additionally, the FGC designates several marine mammal (§4700) and bird species (§3511) as “fully protected” meaning there is no issuance of permits under FGC §2081 to take such species.

3.9.1 Protected or Listed Marine Mammals in California Waters

The coast of California supports a rich assemblage of marine mammals with 27 species from the order Cetacea, six species from the sub-order Pinnipedia, and one species from the order Carnivora. Six whale species occurring in California waters are listed as endangered under ESA, while the central coast harbor porpoise is listed as a strategic stock by NOAA Fisheries. The Steller sea lion (eastern stock), Guadalupe fur seal, and the southern sea otter are listed as threatened under ESA. There are no candidate ESA marine mammal species found in California waters. The Guadalupe fur seal is listed under CESA as threatened. The southern sea otter, Guadalupe fur seal and northern elephant seal are also fully protected under FGC §4700. In addition to those species listed under the ESA, all marine mammals are protected under the Marine Mammal Protection Act of 1972, amended 1994, (MMPA) administered by the NOAA Fisheries and the USFWS.

3.9.1.1 Marine Mammal Protection Act and Current Fishery Categories

In addition to the ESA, the federal MMPA also provides designations for at-risk marine mammal stocks. A species or a stock of a species is designated as depleted when it falls below its Optimum Sustainable Population (OSP). Additionally, the MMPA lists a stock as strategic if: 1) it is listed as a T&E species under ESA; or 2) the stock is declining and likely to be listed as threatened under the ESA; or 3) the stock is listed as depleted under the MMPA; or 4) the stock has direct human-caused mortality which exceeds that stock's Potential Biological Removals (PBR) level. The term PBR is

defined as "the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its OSP" (Barlow et al. 1995). As mandated in the 1994 amendments to the MMPA, NOAA Fisheries develops estimates of PBR's for each marine mammal stock in U.S. waters.

Under section 118 of the MMPA, NOAA Fisheries classifies all U.S. commercial fisheries into one of three categories (I, II, III) based on the level of incidental serious injury and mortality of marine mammals that occurs in each fishery (NMFS,NOAA,OPR. 2003). The classifications are listed in the List of Fisheries (LOF) which is updated and published annually in the Federal Register. The categorization of a fishery determines whether fishery participants will be required to comply with certain provisions of the MMPA, such as registration, observer coverage, and take reduction plan requirements. Fisheries are listed as Category I if the annual mortality and serious injury of a marine mammal stock in a given fishery is greater than or equal to 50 percent of the PBR. Fisheries are listed as Category II if the annual mortality and serious injury of a marine mammal stock is greater than 1 percent and less than 50 percent of the PBR level, while Category III's annual mortality and serious injury of a marine mammal stock in a given fishery is less than or equal to 1 percent of the PBR level. Category III fisheries have a remote likelihood of marine mammal interaction or no known serious injuries or mortalities with marine mammals. Only participants in Category I or II are required to be registered under the MMPA (NMFS,NOAA,OPR 2003).

NOAA Fisheries issues permits through the Marine Mammal Authorization Program to provide an exception for commercial fishers from the general taking prohibitions of the MMPA. The owner of a vessel or non-vessel gear participating in a Category I or II fishery must obtain authorization from NOAA Fisheries in order to lawfully incidentally take a marine mammal in a commercial fishery, while those participating in Category III fisheries may incidentally take marine mammals without registering for or receiving an authorization (NMFS,NOAA,OPR 2003). NOAA Fisheries may also issue permits for the incidental, but not intentional, taking of marine mammals listed as T&E under ESA, (those species under NOAA Fisheries jurisdiction), if NOAA Fisheries determines that incidental mortality and serious injury due to commercial fishing will have a negligible impact on the affected species or stock, a recovery plan for has been or is being developed, a monitoring program has been established (where required), vessels are registered, and a take reduction plan has been developed or is being developed (NMFS/NOAA/OPR 2003). With the 1994 amendments to the MMPA, intentional takes of marine mammals are now illegal except when imminently necessary in self-defense or to save the life of another person.

In California, the thresher shark/swordfish drift gill-net and the large mesh (>3.5inches) set gill-net fishery are classified as Category I fisheries, while the California anchovy, mackerel and tuna purse seine, squid purse seine, and the California long-line are classified as Category II California fisheries. Class III California fisheries include: small mesh (<3.5 inches) set and drift gill-net; herring purse seine; sardine purse seine; squid dip net; salmon troll; shark/ bonito long-line/set line; groundfish, bottomfish long-line/set

line; groundfish trawl; shrimp trawl, lobster, prawn, shrimp, rock crab and fish pot; hagfish pot; crab pot; sablefish pot; swordfish harpoon; bait pens; abalone, sea urchin; kelp; sea urchin, clam, octopus, oyster, sea cucumber, scallop, ghost shrimp hand dive or mechanical collection; Commercial Passenger Fishing Vessel; and finfish and shellfish live-trap/hook-and-line (NMFS/NOAA/OPR 2002 LOF). There is no Category classification for recreational angling. Proposed changes for 2003 concerning California fisheries include reclassifying the California/Oregon thresher shark/swordfish drift gill-net fishery from Category I to Category II, adding the California angel shark/halibut set gill-net fishery (mesh size>3.5 inches and < 14 inches) as a Category I fishery and adding the California yellowtail, barracuda, white seabass and tuna drift gill-net fishery (mesh size>3.5 inches and < 14 inches) as a Category II fishery to the LOF.

Table 3-4 lists marine mammal species and their current listing/designation status and PBR (Forney et al. 2000, Carretta et al. 2001) level (note the “stock” designations for harbor porpoise, bottlenose dolphin, Steller sea lion, and northern fur seal). Following are brief descriptions of listed and state fully protected marine mammal species. Non-listed marine mammals with documented or suspected fishery interactions are further discussed in Section 3.10.1.

Table 3-4 Marine mammal species found in California waters (from Forney et al. 2000 and Carretta et al. 2001)

Species	Status	PBR
Humpback whale (*Megaptera novaeangliae*)	FE, SS, DEP	1.9
Northern right whale (*Eubalaena glacialis*)	FE, SS, DEP	N/D
Sperm whale (*Physeter macrocephalus*)	FE, SS, DEP	2.1
Sei whale (*Balaenoptera borealis*)	FE, SS, DEP	N/D
Fin whale (*Balaenoptera physalus*)	FE, SS, DEP	3.2
Blue whale (*Balaenoptera musculus*)	FE, SS, DEP	1.7
Gray whale (*Eschrichtius robustus*)		575
Harbor porpoise (*Phocoena phocoena*) (Central CA Stock)	SS	56
Bryde's whale (*Balaenoptera edeni*)		N/D
Minke whale (*Balaenoptera acutorostrata*)		4.4
Killer whale (*Orcinus orca*)		2.1
Pygmy sperm whale (*Kogia breviceps*)		28
Cuvier's beaked whale (*Ziphius cavirostris*)		43
Baird's beaked whale (*Berardius bairii*)		3.1
Short-finned pilot whale (*Globicephala macrorhynchus*)		5.7
Northern right whale dolphin (*Lissodelphis borealis*)		97
Long-beaked common dolphin (*Delphinus capensis*)		250
Short-beaked common dolphin (*Delphinus delphis*)		3,188
Bottlenose dolphin (*Tursiops truncatus*) (Offshore Stock)		8.5
Bottlenose dolphin (*Tursiops truncatus*) (Coastal Stock)		1.9
Striped dolphin (*Stenella coeruleoalba*)		180
Pacific white-sided dolphin (*Lagenorhynchus obliquidens*)		157
Risso's dolphin (*Grampus griseus*)		105
Dall's porpoise (*Phocoenoides dalli*)		737
Steller sea lion (*Eumetopias jubatus*) (Eastern Stock)	FT, SS, DEP	1,368
Northern fur seal (*Callorhinus ursinus*)		100
Guadalupe fur seal (*Arctocephalus townsendi*)	FT, ST, SS, PRO	104
Northern elephant seal (*Mirounga angustirostris*)	PRO	2,142
Pacific harbor seal (*Phoca vitulina richardsi*) (CA Stock)		1,678
California sea lion (*Zalophus californianus californianus*)		6,591
Southern sea otter (*Enhydra lutris ne*reis)	FT, DEP, PRO	N/G

Status Codes
FE- Federally listed as Endangered under FESA
FT - Federally listed as Threatened under FESA
DEP - Depleted under the MMPA,
SS - Listed as a Strategic Stock
ST - State-listed as Threatened under California Endangered Species Act
PRO - Fully Protected Mammal under Fish and Game Code §4700
N/D - Insufficient data to calculate PBR
N/G- Incidental take not governed under the MMPA, FESA takes precedence in management of this species

3.9.1.2 Humpback Whale, *Megaptera novaeangliae*

Humpback whales range from arctic waters south to California in the summer and can often be seen migrating along the California coast between April and November (Orr and Helm 1989). The best estimate of abundance is 1,024 humpback whales in the stock ranging from Mexico to Washington state (Calambokidis et al. 2000). Migrations range from calving grounds in Hawaii and off Mexico north to Alaska

to feed during summer. Whales also feed off California during the summer to fall season. Humpback prey include euphausiids and small schooling fish like anchovies, cod, sardines, and mackerel (Wynne and Folkens 1992).

The only fishery documented to interact with humpback whales is the California shark-swordfish drift gill-net fishery (Forney et al. 2000). In the past, two humpback deaths were attributed to entanglement in gill-net fishing gear (Heyning and Lewis 1990), and a humpback whale was observed with a 20-foot section of netting wrapped around and trailing behind it (Forney et al. 2000). In 1997, a humpback whale was snagged by a central California salmon troller and swam away with the hook trailing monofilament (Forney et al. 2000), but according to NOAA Fisheries, this type of injury is not likely to be serious. Humpback whales have been killed by ship strikes; one in 1993, and one in 1995, and possibly one in 1997 (Forney et al. 2000).

3.9.1.3 Northern Right Whale, *Eubalaena glacialis*

Northern right whales are considered rare in California, although they have been sighted as far south as central Baja (Ferrero et al. 2000). It is thought that northern right whales calve in temperate coastal waters during the winter months and migrate to higher latitudes during the summer (Braham and Rice 1984). A current abundance estimate for right whales in California waters is unavailable. Right whales were seen off Half Moon Bay in 1986 and 1987 (NOAA 1992). Another was observed offshore of the Big Sur coast February 27, 1998 (B. Durdos pers. comm.). Right whales are zooplankton specialists feeding on small crustaceans including copepods and euphausiids (Wynne and Folkens 1992). There are no known fishery injuries or mortalities associated with this species in California waters.

3.9.1.4 Sperm Whale, *Physeter macrocephalus*

Sperm whales are present in California offshore waters year-round (Dohl et al. 1983; Barlow 1995; Forney et al. 1995), reaching peak abundance from April through mid-June and from the end of August through mid-November (Rice 1974). Sperm whales also are known to occur inshore along submarine canyons, but typically prefer deepwater zones where they feed on giant squid (80 percent of their diet), octopus, fish, shrimp, crab, and small bottom sharks (Drumm 2000). Sperm whales are deep water divers; males have been known to dive to depths of 3,936 feet. Surveys conducted in 1993, and 1996 by Barlow and Taylor (2001), estimated 1,407 sperm whales off the coast of California Oregon and Washington.

NOAA Fisheries has reported observed mortality and serious injury of sperm whales in the California shark-swordfish drift gill-net fishery. Two sperm whales were observed taken in the drift gill-net fishery in 1996 and 1998 (Forney et al. 2000). There is also concern that the increasing anthropogenic noise in the ocean may negatively affect sperm whales.

3.9.1.5 Sei Whale, *Balaenoptera borealis*

Sei whales are considered rare in California waters and do not appear to be associated with coastal features as they are an open ocean, temperate water species. (Forney et al. 2000). There was one confirmed sighting of a sei whale in California waters during NOAA-Fisheries's ship surveys in 1991 to 1993 and 1996, but there are no abundance estimates of sei whales along the west coast. Sei whales feed on copepods, euphausiids, small fish and squid (Wynne and Folkens 1992). The California shark-swordfish drift gill-net fishery is the only fishery likely to interact with sei whales, although no fishery mortalities or serious injury have been observed (Forney et al. 2000). Ship strikes may occasionally kill sei whales although none have been documented thus far.

3.9.1.6 Fin Whale, *Balaenoptera physalus*

Fin whales migrate from the summer feeding grounds in the Gulf of Alaska to winter calving grounds in the Gulf of California. Fin whales are fairly common year-round in southern and central California (Dohl et al. 1983, Forney et al. 1995) with peak numbers in summer and fall. Barlow and Taylor (2001) estimated 1,851 fin whales off the coasts of California, Oregon and Washington. Fin whales feed on invertebrates and small schooling fish (Wynne and Folkens 1992).

In 1999, NOAA-Fisheries reported the mortality of a fin whale in the California shark swordfish offshore drift gill-net fishery (NMFS, NOAA, SWRO, 2003). Off the U. S. west coast, ship strikes accounted for single fin whale mortalities in 1991, 1996, and 1997; the average observed annual mortality for 1994 to 1998 was 0.4 animals (Forney et al. 2000).

3.9.1.7 Blue Whale, *Balaenoptera musculus*

Similar to fin whales, blue whales range from the Gulf of Alaska to tropical waters and can often be seen in southern California in June through November (Forney et al. 2000) aggregating along the shelf break. Feeding aggregations often occur during the summer in Monterey Bay. Blue whales eat euphausiids (95 percent of their diet) and copepods (Drumm 2000). NOAA-Fisheries estimates that there are 1,950 blue whales in California (Forney et al. 2000).

The only fishery likely to interact with blue whales is the California shark swordfish drift gill-net fishery, although no fishery mortalities or serious injurious have been observed (Forney et al. 2000). Ship strikes have been documented to kill blue whales.

3.9.1.8 Harbor Porpoise, *Phocoena phocoena*

Harbor porpoise are found in coastal and inland waters from Point Conception, California to Alaska. Harbor porpoise along the west coast are not migratory and do not move extensively between California, Oregon, and Washington (Calambokidis and Barlow 1991). Harbor porpoise in Washington and British Columbia are known to feed

on schooling fish and invertebrates including Pacific herring, mackerel, smelt, eelpout, grunt, croaker, and eulachon (Gearin et al. 1994, Wynne and Folkens 1992). Based on aerial surveys, it is estimated that there are approximately 7,579 harbor porpoise in central California (Caretta et al. 2001).

The harbor porpoise stock in central California is considered strategic, owing to increased mortality in the large mesh (>3.5 inches) set gill-net fishery. The entanglement of harbor porpoise in the set gill-net fishery has increased since the early 1990s. From 1996 through 1998, it is estimated that 63 harbor porpoise were incidentally killed in the fishery, the average annual mortality exceeding the PBR. Mortality data indicate an average of 79 harbor porpoise were killed annually from 1996 to 1999 in the fishery (Caretta et al. 2001). In April 2002, the Department's Director ordered a prohibition of gill and trammel net fishing from Pt. Reyes to Pt. Arguello to 60 fathoms or greater. Thus, set gill-net associated mortalities are likely to decrease. Additionally, there are efforts underway to encourage the voluntary use of "pingers," which have proven successful in reducing harbor porpoise mortalities on the east coast. Harbor porpoise are not found in southern California and they are not subject to gill-net mortality in northern California as there is no set gill-net activity in northern California. Aside from set gill-nets, there are no other known fishery-related injuries or mortalities of harbor porpoise.

3.9.1.9 Steller (Northern) Sea Lion, *Eumetopias jubatus*

Steller sea lions, also known as northern sea lions, occur throughout the north Pacific ranging from northern Japan to California (Loughlin et al. 1984). The eastern stock of Steller sea lions (which includes those found in California waters) is listed as federally threatened while the western stock (Alaska) population is listed as endangered. Critical habitat identified for Steller sea lions includes the major rookeries around Ano Nuevo Island, Southeast Farallon Island, Sugarloaf Island and Cape Mendocino (NOAA, NMFS, AK Regional Office 2003). In southern and central California, Steller sea lion numbers have declined while in northern California they are stable. During 1996, NOAA Fisheries counted 6,555 animals in California (Forney et al. 2000). Small breeding rookeries can be found at Año Nuevo Island, Southeast Farallon Island, Cape Mendocino, and at Cape St. George (Reeves et al. 1992). Off California, Steller sea lion sightings at sea have been concentrated in shallow waters over the shelf and upper slope (<400 m). Steller sea lions are considered opportunistic and consume a variety of fish, squid, octopus, crabs, and shrimp.

Steller sea lions have been incidentally taken in the California shark-swordfish drift gill-net fishery, as well as in groundfish trawl fisheries

3.9.1.10 Guadalupe Fur Seal, *Arctocephalus townsendi*

Guadalupe fur seals breed along the western coast of Guadalupe Island, west of Baja California, Mexico, although individuals have been seen in the Channel Islands and central California. According to NOAA Fisheries, individuals have been sighted in the

southern California Channel Islands, including two males who established territories on San Nicolas Island (NOAA/NMFS/OPR 2003). Commercial sealing during the 19th century reduced this once abundant seal population to near extinction in the late 1800s (Townsend 1931). Before sealing, Guadalupe fur seals ranged as far north as from Point Conception and possibly the Farallon Islands (Fleischer 1987). Guadalupe fur seals feed on fish and squid.

Drift and set gill-net fisheries may cause incidental mortality of Guadalupe fur seals, although no fishery mortalities or serious injurious have been observed (Forney et al. 2000). Additionally, stranding data show that Guadalupe fur seals interact with hook and line fisheries as animals have been found in central and northern California with fish hooks, monofilament line, and polyfilament string (Hanni et al. 1997).

3.9.1.11 Northern Elephant Seal, *Mirounga angustirostris*

Northern elephant seals breed on offshore islands in California and Baja California, Mexico from December to March (Stewart et al. 1994), and range along the coast up to Alaska in the non-breeding season. The population has increased exponentially in the past century (Reeves et al. 1992) and in 1996, the California stock was estimated to be 84,000 animals (Forney et al. 2000). Northern elephant seals feed on deepwater fish, squid, and octopus.

Northern elephant seals have been incidentally taken in the California shark-swordfish gill net fishery and the large mesh set gill net fishery (>3.5 inches). Northern elephant seals may interact with hook and line fisheries as stranding data reported to the California Marine Mammal Stranding Network in 1995 to 1998 included two injuries attributed to hook and line gear (Forney et al. 2000). California stranding data from 1995 to 1998 attributed 1 boat collision injury, 5 deaths from car collisions at Piedras Blancas (recent measures have been taken to prevent further car collision deaths), and 3 deaths from shootings (Forney et al. 2000). It should be noted that 1994 amendments to the MMPA made intentional lethal take of any marine mammal illegal except where imminently necessary to protect human life. The total human-caused mortality and serious injury (fishery related plus other sources) for this stock is less than their PBR (Forney et al. 2000).

3.9.1.12 Southern Sea Otter, *Enhydra lutris*

Southern sea otters range along the California mainland coast from Point Año Nuevo to Purisima Point and a colony exists on San Nicholas Island (Forney et al. 2000). They breed and give birth year-round in California. A spring 2000 survey revealed 2,317 animals counted along the mainland with additional animals at San Nicholas Island (USFWS 2000). Southern sea otters feed almost exclusively on marine invertebrates including clams, mussels, chitons, barnacles, starfish, abalone, urchins, crabs, octopus and squid (Miller 1974).

Fishery associated mortality includes drowning in set gill-nets, lobster traps, and one individual was discovered drowned in a crab pot off Pt. Santa Cruz (Forney et al. 2000). Southern sea otters are killed in the large mesh set gill-nets (>3.5 inches). Since April 2002, the Department has prohibited gill and trammel net fishing from Pt. Reyes to Pt. Arguello to 60 fathoms or greater. Thus, gill-net associated mortalities are likely to decrease. Southern sea otters have been found dead with wounds caused by boat propellers and 11 out of 1,680 carcasses, collected from 1968 to 1989, were known to have drowned as a result of becoming entangled in fishing lines. Southern sea otters are primarily found in water depths less than 100 feet.

3.9.2 Listed Marine and Coastal Birds in California Waters (Seabirds)

For bird species, the federal ESA is administered by the USFWS. In addition to the ESA, all seabirds are protected under the Migratory Bird Treaty Act of 1918, which establishes a federal prohibition, unless permitted by regulations, to "pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess... any migratory bird or any part, nest, or egg of any such bird " (16 USC Section 7030). This federal law is incorporated into state law through FGC §3513. As mentioned in Section 3.9, CESA also provides for the conservation of threatened and endangered species. The Department also designates taxa as "species of special concern" or SSC when species are: with declining population levels, limited ranges, and/or continuing threats which make them vulnerable to extinction (CDFG CNDDB). The goal of designating a species as a SSC is to halt or reverse the species decline by calling attention to their plight and addressing the issues of concern early enough to secure long-term viability. Finally, the FGC §3511 designates two marine seabirds as "fully protected," meaning there is no issuance of permits under FGC §2081 to take such species.

The coast of California supports a rich assemblage of seabirds. Seabirds spend a majority of their life at sea and are an integral part of the coastal marine ecosystem. In California waters, seabirds include members of the order Procellariiformes (storm-petrels, shearwaters, albatrosses), Pelecaniformes (pelicans and cormorants), Charadriiformes (gulls, terns, and alcids), Gaviiformes (loons), Podicipediformes (grebes), and Anseriformes (scoters). Table 3-5 lists seabird species likely to be in California state waters and their current listing and/or designation status. The bald eagle is included because it is a listed species found seasonally along the coast and offshore islands, and the osprey is a SSC found along the coast. Non-listed species are discussed in detail in Section 3.10.2 if they are documented to be involved in squid fishery interactions and/or consume squid as part of their diet.

Table 3-5 The federal and state status of seabirds in California waters*	
Species	Status**
Red-throated Loon (*Gavia stellata*)	
Pacific Loon *(G. pacifica*)	
Arctic Loon (*G. arctica*)	
Common Loon (*G. immer*)	SSC
Horned Grebe (*Podiceps auritus*)	
Red-necked Grebe (*P. grisegena*)	
Eared Grebe (*P. nigricollis*)	
Western Grebe (*Aechmophorus occidentalis*)	
Clark's Grebe *(A. clarkii*)	
Black-footed Albatross *(Phoebastria nigripes*)	
Northern Fulmar *(Fulmarus glacialis*)	
Pink-footed Shearwater *(Puffinus creatopus*)	
Buller's Shearwater (*P. bulleri*)	
Sooty Shearwater *(P. griseus*)	
Short-tailed Shearwater (*P. tenuirostris*)	
Black-vented Shearwater *(P. opisthomelas*)	
Fork-tailed Storm-Petrel *(Oceanodroma furcata)*	SSC
Leach's Storm-Petrel *(O. leucorhoa*)	
Ashy Storm-Petrel *(O. homochroa*)	FSC, SSC
Black Storm-Petrel *(O. melania*)	SSC
Least Storm-Petrel (*O. microsoma*)	
California Brown Pelican *(Pelecanus occidentalis californicus*)	FE, SE, FPO
Brandt's Cormorant *(Phalacrocorax penicillatus*)	
Double-crested Cormorant *(P. auritus*)	SSC
Pelagic Cormorant *(P. pelagicus*)	
Black Scoter *(Melanitta nigra*)	
White-winged Scoter *(M. fusca*)	
Surf Scoter *(M. perspicillata*)	
Western Snowy Plover (*Charadrius alexandrinus nivosus*)	FT, SSC
Black Oystercatcher (*Haematopus bachmani*)	
Red Phalarope *(Phalaropus fulicaria)*	
Red-necked Phalarope *(P. lobatus*)	
South Polar Skua (*Stercorarius maccormicki*)	
Pomarine Jaeger *(S. pomarinus*)	
Parasitic Jaeger (*S. parasiticus*)	
Bonaparte's Gull (*Larus philadelphia*)	
Heermann's Gull (*L. heermanni*)	
Mew Gull (*L. canus*)	
Ring-billed Gull *(L. delawarensis*)	
California Gull (*L. californicus*)	SSC
Herring Gull (*L. argentatus*)	
Thayer's Gull (*L. thayeri*)	
Western Gull *(L. occidentalis*)	
Glacous-winged Gull (*L. glaucescens*)	
Sabine's Gull (*Xema sabini*)	
Black-legged Kittiwake *(Rissa tridactyla*)	
Caspian Tern *(Sterna caspia*)	

Table 3-5 The federal and state status of seabirds in California waters*	
Royal Tern *(S. maxima*)	
Elegant Tern *(S. elegans*)	FSC, SSC
Common Tern *(S. hirundo)*	
Arctic Tern *(S. paradisaea*)	
Forster's Tern *(S. forsteri*)	
California Least Tern (*S. antillarum browni*)	FE, SE, FPO
Black Tern *(Chlidonias niger)*	FSC, SSC
Black Skimmer (*Rynchops niger*)	SSC
Common Murre *(Uria aalge*)	RE
Pigeon Guillemot *(Cepphus columba*)	
Marbled Murrelet *(Brachyramphus marmoratus)*	FT, SE
Xantus's Murrelet *(Synthliboramphus hypoleucus*)	FSC, SSC,*ST
Craveri's Murrelet (*S. craveri*)	
Ancient Murrelet (*S. antiquus*)	
Cassin's Auklet *(Ptychoramphus aleuticus*)	
Rhinoceros Auklet *(Cerorhinca monocerata*)	SSC
Tufted Puffin (*Fratercula cirrhata*)	SSC
Osprey (*Pandion haliaetus*)	SSC
Bald Eagle (*Haliaeetus leucocephalus*)	FT, SE, FPD

FE Federally listed as endangered under ESA
FT Federally listed as threatened under ESA
FPL Petitioned for federal listing under ESA
SE State listed as endangered under CESA
ST State listed as threatened under CESA
*ST In process of being State listed as threatened under CESA
CAN State Candidate Species under CESA
FSC Federal species of concern
SSC State species of special concern
DFGFP Fully protected under FGC §3511
FPD Federally proposed for delisting

3.9.2.1 California Brown Pelican, *Pelecanus occidentalis californicus*

The California brown pelican was listed as an endangered species under the ESA in 1970 and by the Commission under CESA in 1971 because of decreased population numbers and extensive reproductive failures. These resulted from the effects of dichlorodiphenyltrichloroethane or "DDT" in the late 1960s. Additionally, they are a fully protected species under FGC §3511. California brown pelicans are found in estuarine, marine subtidal, and pelagic waters along the California coast. They breed in the southern California Bight (SCB) at West Anacapa and Santa Barbara islands, and at several islands off Baja California, Mexico. During the non-breeding season, these birds disperse along the coast as far north as Vancouver, British Columbia and south to El Salvador. California brown pelicans are colonial nesters and require nesting grounds free from human disturbance and mammalian predators, and in proximity to adequate food supplies (Gress and Anderson 1983). Nest sites are located on steep, rocky slopes and bluff edges and are comprised of sticks or debris. Communal roost sites are essential habitat for California brown pelicans (Gress and Anderson 1983) because, unlike other seabirds, California brown pelicans have wettable plumage (Rijke 1970) which can become heavy and hypothermic in cold water if they do not come ashore regularly to dry and recondition their plumage. Roost site selection is based on minimal disturbances and microclimate features that aid in thermoregulation. California brown pelicans congregate in traditional high quality roosts at night with major night roosts supporting hundreds to thousands of pelicans (Briggs et al. 1987). Substantial numbers

(averaging in the thousands) roost on South Farallon Island and feed in the surrounding waters during the fall and winter.

California brown pelicans are plunge-diving birds that feed almost exclusively on fish and dive from distances of 6 to12 meters (6.6-13.2 feet) in the air (Johnsgard 1993). The main prey items in California are northern anchovies, Pacific sardines, and Pacific mackerel. After the collapse of the sardine fishery in the 1950s, northern anchovies were found to comprise 92 percent of the diet of California brown pelicans nesting in the SCB (Gress et al. 1980, Gress and Anderson 1983). In recent years however, Pacific sardine populations have been increasing and since the early 1992 are common items in the California brown pelican diet.

The California brown pelican may be affected by nearshore fishing activities (e.g., vessel proximity, motor noise, generators, lights, radios, gunshots, seal bombs, whistles, etc.) near known rookeries and roosting sites. The recovery plan for the California brown pelican (Gress and Anderson 1983) describes the negative effects of disturbance. Although they are large seabirds, California brown pelicans are nonetheless disturbed by events which are out of the ordinary (Anderson and Keith 1980, Anderson 1988). This includes not only direct human disturbance, but loud noises as well. This conclusion is bolstered by additional work on disturbance effects upon wintering California brown pelicans (Jaques and Anderson 1988). They found that not only are pelicans sensitive to subtle movements by researchers, they are also cautious about choosing a roosting site and even appear to rely on other species such as gulls for sentinels. In 1999, California brown pelican productivity declined noticeably on Anacapa Island (Gress, pers. comm.). It is hypothesized by USFWS that this decline was attributed to the presence of vessels fishing for market squid and the associated bright lights and noise near the rookeries during the breeding season, which could have caused undue stress and resulted in nest abandonment.

3.9.2.2 California Least Tern, *Sterna antillarum browni*

The California least tern is both state and federally listed as endangered, and is a fully protected species under FGC §3511. California least terns are small migratory colonial nesting seabirds that arrive at breeding sites in southern California around April and depart in August. Nesting starts in mid-May. Breeding colonies are located along marine and estuarine shores from San Francisco Bay to San Diego County. Wintering areas are unknown but are suspected to be the coast of South America (Massey 1977). California least terns nest on the ground on open sand or gravel. Clutch size is usually two to three eggs and a single brood is raised yearly (Rigney and Granholm 1990). Both parents incubate the eggs which hatch in 20 to 25 days. The semiprecocial young are tended by both parents, are mobile at 3 days, and can fly by 28 days (Rigney and Granholm 1990). Active management is necessary at nesting sites to deter predators and human disturbance.

California least terns feed on small fish in shallow nearshore waters or in shallow estuaries or lagoons. Most feeding takes place in the early morning and late afternoon.

As with other terns, California least terns hover in the air then dive for fish near the surface. In the CPFV fishery, terns may get hooked in the mouth or other body parts when they go after bait. Terns also may be taken on long-lines. The birds are attracted to the baited hooks as the gear is being set and become hooked at the surface where they are dragged underwater and drown. Terns also may be affected by ancillary marine fishing activities (e.g., vessel proximity, motor noise, generators, lights, radios, gunshots, seal bombs, whistles, etc.) near rookeries and roosting sites.

3.9.2.3 Marbled Murrelets, *Brachyramphus marmoratus*

Marbled murrelets are listed as federally threatened and state endangered due to small population numbers and loss of old-growth forests as nesting habitat. They breed along the coasts of the north Pacific Ocean from Japan, across the Aleutians, and south to central California (Harrison 1983). In California, they occur year-round in marine coastal and pelagic habitats from the Oregon border to Point Sal in Santa Barbara County, although during the nesting season they are concentrated closer to breeding areas (Sanders 1990). Marbled murrelets are the only California alcid to breed inland where they use dense stands of old-growth coastal coniferous forest for nesting and roosting. The estimated 1,600 breeding individuals nest in the northern California counties of Del Norte and Humboldt (approximately 42 percent of the population) and in the central California counties of San Mateo and Santa Cruz (approximately 44 percent of the population) (Carter et al. 1992). In the breeding season, marbled murrelets forage close to shore in shallow waters (<500 meters from shore), usually less than 95 feet deep, while in the nonbreeding season, they often forage farther from shore (Sealy 1972). Marbled murrelets feed by diving and pursuing small fish such as sand lance, northern anchovy, herring, juvenile rockfish, and capelin, and euphausiids (MMS 2001). Marbled murrelets are monogamous, solitary nesters that lay one egg from mid-May to mid-June. The young fledge from early July through early September. Marbled murrelets are threatened with habitat loss from logging and vulnerable to contamination from oil spills along the coast.

In the past, marbled murrelets were taken in the nearshore set gill and trammel net fisheries in central California (Carter et al. 1995a). Gill-net closures implemented in 1987 and 1990 have likely protected these birds from additional gill-net mortality (no additional mortalities have been documented since 1987). However, there have been reported mortalities of marbled murrelets in the sport hook-and-line fisheries off Santa Cruz (Carter et al. 1995a).

3.9.2.4 Bald Eagle, *Haliaeetus leucocephalus*

The bald eagle is federally (although petitioned for delisting) and state listed as endangered, and is a fully protected species under FGC §3511. Bald eagles are found seasonally along the coast and offshore islands of California. They require large bodies of water and adjacent snags or other perches so they can swoop from hunting perches or soaring flight to pluck fish from the water (Polite and Pratt 1990). Bald eagles scavenge dead fish, water birds, mammals, and possible squid found at the water

surface. Bald eagles also pursue live fish, but do not dive underwater nor rest on the water (as seabirds do); thus, interactions with fishermen are possible but not likely.

Formally a resident breeding species on all of the Channel Islands, the bald eagle disappeared from the islands by the early 1960s (Kiff 1998). More than 30 eagles have been released and breeding has been reestablished at Santa Catalina Island, Los Angeles County, and some live on the mainland in Santa Barbara County. A recovery plan for the bald eagle is currently in place that establishes geographical goals for population enhancement.

As part of the Montrose Settlements Restoration Program (the Department is a representative of this Trustee Council), about 12 juvenile bald eagles are proposed to be released on Santa Cruz Island in the summer of 2003. This is part of a feasibility study to determine if the program will attempt to reintroduce bald eagles to the northern Channel Islands. There is no information available to determine if bald eagles would be impacted by the squid fishery in the northern Channel Islands, however, squid fishing does occur off Santa Catalina Island and bald eagle breeding has been reestablished there. It is possible that artificial lighting from squid vessels could enable bald eagles, which are normally a diurnal feeder, to forage at night and possibly prey on seabird species. To ensure successful reintroduction of bald eagles to the northern Channel Islands, the Council should monitor potential release sites and the availability of prey for eagles prior to release. If the Council believes that eagles may be impacted by the market squid fishery or may result in impacts to other listed or sensitive species, they should coordinate activities with the Department to identify appropriate areas for release that will minimize impacts.

3.9.2.5 Xantus's Murrelets, *Synthliboramphus hypoleucus*

On February 5, 2004, the Commission determined that the Xantus's murrelet should be designated as a threatened species under the CESA and a formal rulemaking process is underway to add Xantus's murrelet to the list of species designated as threatened in CCR Title 14. The process is expected to be complete during July/August 2004. The Department recommended the listing after conducting a year-long review of the status of the species. Prior to their listing, Xantus's murrelets were considered a SSC by the Department. They are also a globally rare seabird species (one of the ten rarest seabird species in the North Pacific). A petition was filed for both state and federal listing due to its small population size and limited breeding range, as well as declining world population size (estimated as less than 10,000 birds) and known threats to colonies. In October 2002, the Commission designated the Xantus's murrelet as a threatened species candidate under the CESA. At the same time, the Commission also adopted emergency regulations governing incidental take of the murrelet during the candidacy period. The emergency regulations are intended to reduce night-time disturbance near breeding colonies. During the candidacy period (and until they are designated as threatened under CCR Title 14), Xantus's murrelets receive the same protection under CESA as species that are officially listed as threatened or endangered. The emergency regulations adopted by the Commission authorize incidental take of

Xantus's murrelets during the night-time (dusk to dawn) vessel operations from 1 February to 15 July, within 1 nautical mile of Santa Barbara and Anacapa islands, if vessels comply with the following conditions:

- 1) vessels are not engaged in night fishing or night diving;
- 2) external loud speakers on the vessels are not in use;
- 3) vessels are within a designated anchorage or safe harbor during the night, except when transiting through the specified areas; and
- 4) lighting on the vessels is limited to navigational lighting necessary for safe operations.

Take is authorized during night-time vessel operations from 16 July to 31 January, and at any time beyond the specified areas around Santa Barbara and Anacapa islands.

Xantus's murrelets are small birds (in the Alcid family) that feed on larval fish including northern anchovies, sardines, rockfish, Pacific sauries, and crustaceans, and forage in the immediate vicinity of the colony during the nesting season (Hunt et al. 1979). The world population of Xantus's murrelet only breeds from the Channel Islands south to Central Baja California. Eighty percent of the United States breeding population and 33.5 percent of the world's breeding population nest in the Channel Islands, primarily at Santa Barbara Island (also found at San Miguel, Santa Cruz, and Anacapa islands). They usually return to the nesting islands in February and disperse from the islands by mid-July, although they may visit the breeding sites starting in January. They nest in rock crevices along steep cliff edges, under bushes, on the ground in vegetation, in burrows, under debris piles, and under human made structures. Daylight hours are spent on nests or foraging at sea, whereas nest site selection, incubation shift changes, and fledging all occur under cover of night (Hunt et al. 1979). Chicks depart to the sea with their parents at night at two days of age and are dependent on their parents for an extended period of time (Gaston and Jones 1998). Chicks that get lost or separated from their parents at night, or those who leave the nest during the day, are often fed upon by predators (e.g., western gulls).

Population numbers of Xantus's murrelets have been declining for the past 20 years. Because they spend a substantial amount of time in the water, Xantus's murrelets are vulnerable to oil spills, contamination by marine pollution, and entanglement in fishing gear (Carter et al. 2000). Predators include peregrine falcons, western gulls, barn owls, deer mice, and introduced predators such as feral cats and black rats. No direct studies on sensitivity to humans have been conducted on Xantus's murrelets. However, their nesting abundance and distribution can be correlated with human activities (Keitt 2000), and human impacts and disturbance are considered one impediment to population increases in Baja California. Human-generated noise and disturbances are another cumulative impact for these specialized birds that evolved on island or offshore rock environments, far from human disturbance. Murrelets are known to be attracted to bright light sources, particularly on dark, foggy nights (Whitworth et al. 1997, Carter et al. 1999). Disorientation from lights can cause parent-chick separation (which will result in increased mortality of young-of-the-year) and has been observed in the Channel Islands (Keitt, Kelly, Naughton, McChesney, Zeidberg pers. comm.).

As with other alcids, Xantus's murrelets may be affected by ancillary fishing activities (e.g., presence of vessels, motor noise, generators, lights, radios, gunshots, seal bombs, whistles, etc.) near rookeries and roosting sites. Nesting sites can be disturbed by boats, low-flying aircraft, and intruding humans (Reimer and Brown 1997; Parker et al. 2000, 2001; Rojek and Parker 2000). When adults are disturbed they may knock eggs and chicks off nesting ledges, or leave them vulnerable to predation from western gulls and ravens. It has been documented that the small vessels used in the nearshore live trap fishery are disturbing nesting colonies of common murres at Hurricane/Castle Rock, Monterey County, and Point Reyes, Marin County (Parker et al. 2000, 2001; Rojek and Parker 2000). Documentation and data have shown that continued and increasing boat disturbance often results in the loss of chicks and eggs. While this documentation is limited to four colonies that are being actively monitored, there is no reason to believe that similar disturbance patterns do not exist at other alcid colonies.

Artificial night-lighting can be a problem for alcids which are nocturnal in colony or foraging habits. When flying in total darkness, alcids may become disoriented by and attracted to bright artificial lights (Verheijen 1958, Reed et al. 1985, Telfer et al. 1987). This may cause birds to crash into lighted boats, which can result in direct mortality or birds falling stunned and/or injured into the water or landing on deck (Dick and Donaldson 1978, Zeidberg pers. comm.). Injured birds become easy targets for predation after daylight. In worst cases, the adult birds may avoid the colony and not return to their nests, as nocturnal seabird species are known to reduce levels of colony attendance during lighted or full moonlight conditions, likely to avoid predation (Manuwal 1974; Watanuki 1980; Story and Grimmer 1986; Keitt, in review). In addition, for several species, including Xantus's murrelets, fledglings depart the colony at night. They may become attracted and disoriented by lights and collide with vessels, increasing the normal mortality rates of young-of-the year. This has been documented for fledging petrels and storm-petrels in Hawaii and is a major concern for the survival of these species (Byrd et al. 1978, Reed et al. 1985, Reed 1987, Telfer et al. 1987, Harrison 1990).

The concern over the potential impacts of artificial lights on seabirds in the Channel Islands arose in 1999 when large increases in artificial light intensity levels associated with nighttime squid fishery boat activity extended into the seabird breeding season. The use of bright lights (current regulation of 30,000 watts maximum per vessel) is thought to increase the mortality of Xantus's murrelets, and likely other alcid species, nesting in the Channel Islands. In 1999, increased mortality rates of Xantus's murrelets due to predation by barn owls were recorded (Channel Islands National Park, unpublished data). Additionally, western gulls, predators of Xantus's murrelet which are normally diurnal, were noted by researchers as more active at night when squid lights were on, and predation rates likely increased over normal levels (Channel Island National Park, unpublished data).

3.9.2.6 Rhinoceros Auklets, *Cerorhinca monocerata*

Rhinoceros auklets are considered an SSC by the Department due to small population numbers in the state. Rhinoceros auklets feed on small fish, crustaceans, and cephalopods (including market squid) by diving and pursuing their prey underwater (Cogswell 1977). A study on the winter diet of Rhinoceros auklets in Monterey Bay found market squid to be the predominant prey item (Baltz and Morejohn 1977). Rhinoceros auklets are colonial, monogamous nesters that breed along the coasts of the north Pacific Ocean (Harrison 1983). In California, approximately 1,800 birds nest in burrows and crevices on offshore islands from the Oregon border south to San Miguel Island (Carter et al. 1992). The largest colonies are located on offshore rocks in Del Norte County and on the Farallon Islands in central California. Rhinoceros auklets are nocturnal at nesting colonies and mostly enter and leave the burrow at night, a mechanism thought to reduce predation. They lay one egg which is incubated by both parents for 1 month. The semiprecocial young remain in their burrow for 35 to 45 days, then leave for the sea before reaching adult size (Harrison 1978). Rhinoceros auklets are sensitive to human disturbance and are vulnerable to oil spills. Because of their nocturnal habits at nesting colonies, rhinoceros auklets are accustomed to flying in total darkness and may become disoriented in bright lights.

3.9.2.7 Ashy, Black, and Fork-tailed Storm-Petrels; *Oceanodroma homochroa, O. melania, O. furcata*

Storm-petrels are small, highly pelagic seabirds that prey on small invertebrates (young squid, euphausiids, crab larvae) and small fish while they flutter along at the ocean's surface. They only come to land for nesting, otherwise they remain over the open sea. Four species breed in California on offshore islands nesting in burrows or rock crevices (Carter et al. 1992). Storm-petrels are monogamous, lay a single egg, and both parents participate in raising the nidicolous young. The adults are nocturnal in their nesting colony activities, which is thought to reduce predation by gulls that are normally diurnal (Ainley et al. 1974, Watanuki 1980, Storey and Grimmer 1986). Parents may only return with food to the young every few nights; thus, foraging trips may last several days. Since they come and go by night, they are rarely seen by man or other potential predators. The chicks are abandoned by the parents about a week before they have fully fledged. The young birds leave the nests to feed at sea once their flight feathers are completed developed.

Three species of storm-petrels, ashy, black, and fork-tailed, are considered SSCs by the Department, and the ashy is a globally rare seabird species (one of the ten rarest seabird species in the North Pacific). Ashy storm-petrels are restricted to the north-east Pacific Ocean, breeding on islands from central to southern California (with a few small colonies in Baja California and northern California). Approximately half of the world's population, estimated at less than 10,000 individuals, nest at the Farallon Islands, and half at the Channel Islands, primarily at San Miguel, Santa Barbara, and Santa Cruz islands (Carter et al. 1992). The breeding period is from April through November, although birds may visit their nesting colonies year-round. Dispersal in the non-breeding season is thought to be limited. Large numbers congregate each fall in Monterey Bay. Populations of ashy storm-petrels have declined by an estimated 34

percent over the past 20 years at the Farallon Islands (Sydeman et al. 1998a, 1998b) (long-term trends are not available for the Channel Islands population). Factors in their decline include habitat loss from invasive non-native plants; introduction of feral cats, house mice, and other nonnative animals; decline in zooplankton in the SCB; and predation by house mice, western gulls, burrowing owls, and other owl species (Sydeman et al. 1998, Nur et al. 1999). Ashy storm-petrels are also known to be sensitive to human disturbance, oil pollution, and marine pollution.

Black storm-petrels are found in the northeast Pacific Ocean. They primarily breed on islands off the coast of Baja California and in the Gulf of California (Harrison 1983). A small population, estimated at 274 individuals, breeds from April to October on Santa Barbara Island in Santa Barbara County (Carter et al. 1992). After breeding, birds generally move south towards northern South America, however, in warm-water years large numbers move as far north as Monterey and Point Reyes (Harrison 1983).

Fork-tailed storm-petrels are widely distributed in the northern Pacific Ocean, breeding on islands from the sea of Okhotsk, Russia, across the Aleutian Islands, and south to northern California (Harrison 1983). In California, the estimated breeding population of 410 birds breeds on six small islets off Del Norte and Humboldt counties from March to September (Carter et al. 1992). Individuals are observed as far south as southern California in the non-breeding season.

Storm-petrels are not likely to become entangled in fishing gear because of their feeding methods. However, they may be affected by ancillary fishing activities (e.g., vessel proximity, motor noise, generators, gunshots, seal bombs, lights, radios, etc.) near roosting and breeding sites. Because of their nocturnal colony habits, storm-petrels are accustomed to flying in total darkness and may become disoriented by, and attracted to bright artificial lights (Verheijen 1958, Reed et al. 1985, Telfer et al. 1987). This may cause birds to crash into lit boats, which can result in direct mortality or result in birds either falling stunned and/or injured into the water or landing on deck (Dick and Donaldson 1978). Injured birds become easy targets for predation after daylight. In worst cases, the adult birds may avoid the colony and not return to their nests, as nocturnal seabird species are known to reduce levels of colony attendance during lighted or full moonlight conditions, likely to avoid predation (Manuwal 1974; Watanuki 1980; Story and Grimmer 1986; Keitt 2000). In addition, storm-petrel fledglings depart the colony on their own at night. They may become attracted and disoriented by lights and collide with vessels, increasing the normal mortality rates of young-of-the-year. This is documented for fledging petrels and storm-petrels in Hawaii and is a major concern for survival of these species (Byrd et al 1978, Reed et al. 1985, Reed 1987, Telfer et al. 1987, Harrison 1990).

Storm-petrels (and related petrels and shearwaters) are known to be attracted to and strike lit long-line vessels, as well as other lit vessels, fishing at night in the southern hemisphere (Reid pers. comm., Weimerskirch et al. 2000), lit vessels at night in Alaska (Canez, Trapp, and Williams pers. comm.) and Newfoundland (Chardine pers. comm.), and artificial night-lighting in Hawaii (Reed et al. 1985, Telfer 1987). There are

documented interactions of inflight strikes of storm-petrels with lit fishing vessels and other lighted vessels in the Channel Islands (McChesney, Naughton, Zeidberg, pers. comm.). The concern over the potential impacts of artificial lights on seabirds in the Channel Islands arose in 1999 when large increases in artificial light intensity levels associated with night-time squid fishery boat activity extended into the seabird breeding season. The use of bright lights (current regulation of 30,000 watts maximum per vessel) is thought to increase the mortality of ashy storm-petrel and equally likely the black storm-petrel nesting in the Channel Islands. In 1999, western gulls, which are normally diurnal and a predator of storm-petrels, were noted by researchers as more active at night when squid lights were on, and predation rates likely increased over normal levels (Channel Island National Park, unpublished data).

3.9.2.8 Double-Crested Cormorant, *Phalacrocorax auritus*

Double-crested cormorants are year-long residents along the entire coastline of California. They feed mainly on mid-water to bottom-dwelling fish, diving from the surface to pursue prey underwater. Coastal cormorant species nest on rocky headlands and on offshore islands from the northern border of California to Santa Barbara County and on the Channel Islands. The breeding season is usually March to August or September. Cormorants are monogamous colonial nesters with clutch sizes ranging from two to seven eggs. Incubation is performed by both parents and the young are altricial. Predators on eggs and young include crows, ravens, and western gulls. Roosting sites on offshore rocks, islands, cliffs, wharfs, and jetties are important habitat for all cormorants year-round because, unlike other seabirds, their feathers are not completely waterproof and they need to dry them daily (Johnsgard 1993).

The double-crested cormorant is considered a SSC by the Department. This species is found over most of North America, with an estimated breeding population of 10,000 individuals in California (Carter et al. 1995b). The subspecies found along the California coast breeds mainly in marine and estuarine habitats, with some nesting inland (Harrison 1983). Population declines occurred throughout the 1900s and continue in some colonies due to habitat loss, marine pollution, human disturbance, and introduced predators (Carter et al. 1995b). In the Channel Islands, breeding numbers of double-crested cormorants, as well as Brandt's cormorants, have declined since 1991, probably due mostly to the El Niños in 1992-93 and 1997-98 (McChesney et al. 2000).

Cormorants can be affected by ancillary fishing activities (e.g., vessel proximity, motor noise, generators, lights, radios, gunshots, seal bombs, whistles, etc.) near rookeries and roosting sites. It has been documented that the small vessels used in the nearshore live trap fishery are disturbing nesting Brandt's cormorants at the Hurricane/Castle Rock, Monterey County, and the Point Reyes, Marin County, colonies (Parker et al. 2000, 2001; Rojek and Parker 2000). Human disturbance of breeding colonies is known to cause nest abandonment and increased predation of eggs and young by gulls (Ellison and Cleary 1978, Manuwal 1978). Similarly, continual disturbance of roosting sites could compromise the cormorant's abilities to waterproof its feathers and effect thermoregulation.

3.9.2.9 Black Skimmer, *Rynchops niger*

Black skimmers are considered a SSC by the Department. The black skimmer is a migratory colonial nesting seabird that arrives at breeding sites along the California coast in Orange and San Diego counties (and inland at the Salton Sea) by late April and departs by October, although some birds are resident year-round (Beedy 1990). The number of nesting colonies has increased along the coast, most likely due to colony protection and use of artificial nesting sites (Carter et al. 2001a). Black skimmers feed on small fish and crustaceans in calm, shallow waters by flying along the water's surface with their lower mandible cutting the surface (Cogswell 1977). Nesting takes place on the ground, on open sand or gravel, often near other nesting seabirds such as gulls and terns. Clutch size is usually four to five eggs and a single brood is raised yearly. The semiprecocial young are fed by both parents and are dependent upon their parents until a month after they are ready to fly (Erwin 1977). Preferred nesting habitats are beaches and sand bars, which makes them vulnerable to human disturbance.

3.9.2.10 Elegant Tern, *Sterna elegans*

Elegant terns are both a federal and Department SSC. Elegant terns are a migratory colonial nesting seabird that arrives at a few breeding sites along the southern California coast in June and depart by October (Beedy 1990). The number of nesting colonies have increased along the coast, most likely due to colony protection and use of artificial nesting sites (Carter et al. 2001). The preferred habitats are inshore coastal waters, bays, estuaries, and harbors; but never inland (Beedy 1990). After the breeding season, birds may disperse along the entire California coast but most migrate south as far as South America. Elegant terns feed on fish by diving into shallow nearshore waters as well as estuaries, bays, and lagoons.

3.9.2.11 Black Tern, *Chlidonias niger*

Black terns are considered a SSC by the Department. Black terns are restricted to freshwater habitats while breeding, but can be found at bays, salt ponds, river mouths, and pelagic waters during spring and fall migration (Beedy 1990) where they may forage in the coastal zone. Colonies formally occurred at interior lakes in California, but numbers have declined due to loss of foraging and nesting sites as well as pesticide pollution (Beedy 1990).

3.9.2.12 California Gull, *Larus californicus*

California gulls are considered a SSC by the Department. California gulls nest primarily inland (on islands in lakes) although they do nest in San Francisco Bay (Carter et al. 2001a) and visit the coast in the nonbreeding season (late summer to March). Along the coast, California gulls prefer sandy beaches, mudflats, rocky intertidal, and pelagic areas of marine and estuarine habitats, and wetlands (Rigney 1990). California gulls are omnivorous and feed on garbage, carrion, fish, earthworms, insects, and brine

shrimp (Rigney 1990). The breeding population in California has declined due to human-related habitat changes at interior colonies and associated introduction of predators (Rigney 1990, Carter et al. 1992). Gulls are not capable of deep dives, thus they are surface feeders and many may include squid species in their diets. Market squid is known to be consumed by wintering California, mew, glaucous-wing, and Heermann's gulls and black-legged kittiwakes (Baltz and Morejohn 1977, Morejohn et al. 1978).

Behavior patterns of gulls may be influenced by fishery activities. They are attracted to fishery operations where they feed on bait or on scavenged or discarded targeted species or bycatch. For example, gulls, which are normally diurnal, are known to forage at night near squid fishing boats where they are attracted by the activity and bright lights. Artificial lighting may increase foraging abilities of gulls on colonies, resulting in increased levels of predation on nocturnally nesting seabirds. In 1999, western gulls were noted by researchers as more active at night when squid lights were on in the Channel Islands (Channel Island National Park, unpublished data). Gulls and terns also may be affected by ancillary marine fishing activities (e.g., vessel proximity, motor noise, generators, lights, radios, gunshots, seal bombs, whistles, etc.) near rookeries and roosting sites.

3.9.2.13 Tufted Puffin, *Fratercula cirrhata*

Tufted puffins are considered an SSC by the Department. While colonies are found along the coasts of the northern Pacific Ocean, only a small number, estimated at 276 birds, breeds in California (Carter et al. 1992). They nest on offshore islands in northern California, at the Farallon Islands and Point Reyes in central California, and have recently recolonized southern California at the Channel Islands, where they had not been seen since the early 1900s (Carter et al. 2001a). Tufted puffins feed on medium-sized fish, crustaceans, and squid by diving and pursuing their prey underwater (Cogswell 1977). Diet studies in the Gulf of the Farallones found market squid to be a predominate prey item, along with anchovies and rockfish (Ainley et al. 1990). Tufted puffins are colonial nesters who burrow on island cliffs or grassy island slopes and may visit the nest burrow in daylight hours. Tufted puffins lay one egg which is incubated for about 45 days. The semiprecocial young is tended by both parents and remains in the burrow for close to 2 months. Fledglings depart for the sea alone, at night (Gaston and Jones 1998), and may become attracted and disoriented by lights and collide with vessels, increasing the normal mortality rates of young-of-the-year.

3.9.2.14 Common Loon, *Gavia artica*

The common loon is considered an SSC by the Department. The common loon is a fairly common transient in nearshore habitats along the coast of California during their wintering season, approximately September through May (Granholm 1990). It does not nest in California (Cogswell 1977), but nests in the northern US and Canada. The birds dive for food; the common loon as deep as 193 feet (Palmer 1962). For the most part, they consume fish while in the wintering grounds. Other loons that are found along the

California coast in the winter include Arctic, red-throated and Pacific loons. The Arctic loon is documented to consume market squid in Monterey Bay (Baltz and Morejohn 1977, Morejohn et al. 1978).

Large mesh set gill-nets are known to incidentally take common loons (Julian and Beeson 1998). Loons may interact with fishing activities involving various hook-and-line gear. The birds may get hooked in the mouth or other body parts as they pursue bait or catch. If they get hooked, the hook is either yanked out or the line is cut, leaving the hook in the bird. Loons also may be taken on long-lines. The birds are attracted to the baited hooks as the gear is being set and become hooked at the surface and are dragged underwater and drown.

3.9.2.15 Western Snowy Plover *Charadrius alexandrinus nivosus*

The Pacific coast population of the western snowy plover is federally listed as threatened and is a SSC. A draft recovery plan was written by the USFWS (Federal Register 14 Aug 2001). This small shorebird breeds above the mean high tide line on coastal beaches, dunes, estuaries, and lagoons from Washington to Baja, California (USFWS 2001). The U.S. pacific coast population is estimated at 2,000 or less individuals. The nesting season extends from March through September. Plovers lay between two and six eggs, which are incubated for about 24 days. The precocial young fledge between 29 and 47 days of age.

In winter, western snowy plovers range from southern Washington to central America in coastal areas, although some breeding groups in California remain on their breeding grounds year-round. Snowy plovers primarily fed on terrestrial and marine invertebrates.

Population declines have been attributed to habitat degradation, human disturbance, and predator expansion (including gulls, ravens, coyotes, foxes, and skunks) into nesting areas (Powell 2002). Declines have been particularly apparent in southern California and the CINPS has documented declines in breeding numbers in the Channel Islands since 1991 (Martin and Sydeman 1998). Breeding has not occurred on San Miguel Island since 1999, and numbers have been declining at Santa Rosa Island (only 23 birds in 2001) (Paige Martin, pers. comm.). The National Park Service prohibits access to the nesting area on the east side of Santa Rosa Island during the breeding season, from 1 March to 15 September. No studies have been conducted to determine if the bright lights and noise associated with the squid fishery has a negative impact on the breeding activity of western snowy plovers in the Channel Islands and along the coast in central and southern California. Increased light levels can alter the behavior of diurnal species and result in nest abandonment (Avery 2000, Bower 2000). Additionally, diurnal predators, such as western gulls, have been noted by researchers as more active at night when squid lights are on (Channel Island National Park, unpublished data). Thus, predation rates of plover adults, eggs, and/or chicks by diurnal predators could be increased over normal levels. Therefore, it is possible that

the fishery could have impacts to nesting plovers if fishing occurs close to breeding colonies during the breeding season.

3.9.3 Listed Marine (Sea) Turtles in California Waters

Sea turtles are long lived marine reptiles that spend their life at sea with the exception of the onshore nesting and egg incubation period. They are well adapted to life in the marine environment possessing streamlined bodies, flipper-like limbs, and the ability to navigate across the oceans. Sea turtles often travel long distances from their feeding grounds to their nesting beaches. All six species of sea turtles in the U.S. are protected under the ESA. Although sea turtles do not nest on the U.S. west coast, four species, green, leatherback, loggerhead, and olive ridley, are occasionally present in State waters. Because sea turtles nest on land, responsibility for their conservation is shared between NOAA Fisheries and the USFWS. Section 9.a.1.B and C of the ESA prohibits the taking of any listed species within the United States, the territorial sea of the United States, or the high seas. Taking includes the killing or injuring of any such species. Sea turtles killed or injured as a result of fishing activities would constitute a take under the ESA and is prohibited. Table 3-6 lists sea turtle species likely to be found in California state waters and their current designation status.

Table 3-6 The federal status of sea turtles found in California waters

Species	Status**
Green Turtle *Chelonia mydas*	FE
Leatherback Turtle *Dermochelys coriacea*	FE
Loggerhead Turtle *Caretta caretta*	FT
Olive ridley Turtle *Lepidochelys olivacea*	FE

**Status Codes
FE- Federally listed as Endangered under FESA
FT - Federally listed as Threatened under FESA

The following information on the distribution and threats to sea turtles, was derived from the corresponding Federal Turtle Recovery plans (NMFS/USFWS 1998a,1998b, 1998c, 1998d) and the 2000 NOAA Fisheries biological opinion for the California/Oregon drift gill-net fishery. Impacts to sea turtles in the California marine environment includes ingestion of marine debris, effects of pesticides, heavy metals, and PCB's, dredging activities, ship and boat strikes, marina and dock development, loss of foraging and refuge habitat, risk of oil spills, entrapment in saltwater intake systems of coastal power plants, commercial fishing interactions, and entanglement in discarded fishing gear. The discharge of garbage can be harmful as sea turtles have been known to ingest plastic bags, beverage six-pack rings, styrofoam, and other items commonly found aboard fishing vessels. Chemical contamination of the marine environment due to sewage, pesticides, agricultural runoff, solvents and industrial discharges is widespread along the coastal waters of California. Low-level chemical pollution, which may possibly cause immunosuppression, has been suggested as one factor in the epidemic outbreak of a tumor disease in green sea turtles. Direct poisoning as well as blockage of the gastrointestinal tract by ingested tar balls has been reported. Both the entanglement in, and ingestion of, synthetic debris have been documented by NOAA Fisheries. Oil spills

can result in death to sea turtles as oil affects respiration, skin, blood chemistry and salt gland functions. Indirect consequences of an oil spill include destruction of foraging habitat. Sea turtles are vulnerable to collisions with vessels and can be killed or injured when struck. The development of marinas in inshore waters can negatively impact sea turtles by destruction or degradation of their foraging habitat. Additionally, marina development leads to increased boat traffic. Dredging activities may directly injure and kill sea turtles or dredging may indirectly harm sea turtles by destroying their forage habitat. In San Diego Bay, juvenile and adult turtles spend most of their time motionless on the floor of dredge channels (Stinson 1984, McDonald and Dutton1992). Periodic dredging may injure or kill these turtles (NMFS/USFWS 1998a). The entrainment and entrapment of juvenile and sub-adult sea turtles in the saltwater cooling intake systems of coastal power plants has been documented in southern California at the NRG power plant in Carlsbad, as well as the Southern California Edison Nuclear Generating Station at San Onofre (NMFS/USFWS/1998a,b,c,d) and PG&E's Diablo Canyon power plant. Some of these turtles are released unharmed.

Fishing activities also impact sea turtles. Sea turtles may become entangled in abandoned fishing gear resulting in death or injury by drowning or loss of a limb. Commercial fishing operations result in thousands of incidental sea turtle deaths nationwide per year although exact numbers are not available for all fisheries. Fisheries known to take sea turtles include shrimp trawlers, gill net fisheries, hook-and-line, long line, trap (entanglement in fishery lines) and purse seine for anchovy, sardines and tuna (NMFS 2000 Biological Opinion). In California waters, NOAA Fisheries observer programs, conducted from 1990 to 2001, have documented loggerhead, green, leatherback, olive ridley, and "unidentified" sea turtles interacting with drift gill-nets off California. The California set gill-net fishery for halibut and angel shark, has been observed to take loggerhead, green, leatherback, and "unidentified" sea turtles (Julian and Beeson 1998, NOAA/NMFS/SWR 1999, Carretta, 2000, 2001). Long-line fishing gear is another documented gear type affecting sea turtles in California through entanglement and hooking (NMFS Southwest Fisheries Science Center). Turtles are known to be taken incidentally by the California-based pelagic long-line fleet (PFMC 2001). Table 3-7 lists the yearly number of sea turtles that have been stranded in California from1990 to 2000.

Table 3-7 Sea turtle stranding reported to the California sea turtle stranding network (2000).

Species	Year											
	2000	1999	1998	1997	1996	1995	1994	1993	1992	1991	1990	**Total**
Green sea turtle	12	6	3	7	5	3	4		8	2	10	**60**
Leatherback	1	10	2		3	1	4	9	2	8	11	**51**
Loggerhead	2		3	1	2	1	2	5	3		4	**23**
Olive Ridley	7	1	1	2	2		1	1	1	1	2	**19**
Unidentified	1			1						2	5	**9**
Total	**23**	**17**	**9**	**11**	**12**	**5**	**11**	**15**	**14**	**13**	**32**	**162**

Source: NOAA Fisheries, Southwest Region, 501 West Ocean Boulevard, Suite 4200, Long Beach, CA 90802- 4213, telephone (562) 980-4000. Web sites from which information was taken. Http://swr.ucsd.edu/psd/strand/turtle/index.htm, and3.

3.9.3.1 Green Sea Turtle, *Chelonia mydas*

The east Pacific green turtle is listed as threatened except for the breeding population on the Pacific coast of Mexico, which is listed as endangered. There is a resident population in San Diego Bay of 50 to 60 adults which concentrate in the warm water effluent of the power plant. From 1983 to 1991, 12 green turtles were entrained off the coast of California. Boat collisions were implicated in 80 percent of green sea turtle deaths recorded in San Diego and Mission Bays (MMS 2001). This species appears to be the second most observed marine turtle along the west coast waters of the United States and green turtles are the second most commonly stranded sea turtle, as 62 percent are found in a band from southern California southward.

Adult east Pacific green turtles are primarily herbivorous, eating sea grasses and algae, and, in some areas, they may feed on a variety of marine animals. Forage areas exist in bays and inlets along the coast of Baja California (Mexico) and southern California, however, these vital areas have yet to be delineated. Green turtles attain sexual maturity at an average age of 25 years and can live up to 60 years. They feed at or near the ocean surface and their dives do not normally exceed several meters in depth. Prey items consist of molluscs, polychaetes, fish, fish eggs, jellyfish, and commensal amphipods (NMFS Biological Opinion 2000). The primary threats to green sea turtles in U.S. waters include incidental capture by coastal fisheries, vessel impacts and water pollution (NMFS/USFWS 1998c). The only green turtle taken by the drift gill-net fishery (through 2000) was taken north of Point Conception. Juvenile green turtles detected sound frequencies in the range of 200 to 700 Hz and displayed a high level of sensitivity at about 400 Hz (MMS 2001).

3.9.3.2 Leatherback Sea Turtle, *Dermochelys coriacea*

The leatherback sea turtle is listed as endangered throughout its entire range under the ESA, as amended. The most recent estimate of the world population is currently 25,000 to 42,000 turtles (NMFS/NOAA Biological Opinion 2000). They are highly migratory, exploiting convergence zones and upwelling areas along the continental margins and open ocean. They feed from the surface to a maximum depth of 1,000 meters (normally 50 to 84 meters) during all hours of the day and night. Sexual maturity is around 13 or 14 years. Leatherbacks inhabiting the west coast of California are likely comprised of individuals originating from nesting assemblages located south of the equator in Indonesia and in the eastern Pacific (Mexico and Costa Rica). The highest density of leatherback sightings on the west coast of California is in and around Monterey Bay (Starbird et al. 1993), corresponding most likely to a southern movement to Mexican and Costa Rican breeding grounds. Female leatherbacks apparently migrate between foraging and breeding grounds at two to 3-year intervals. The high density of leatherback sightings in and around Monterey peak in August. Two leatherbacks tagged in Monterey (September 7, 2000) were documented on a southwest migratory pathway likely towards Indonesia nesting beaches. Stranding records for California, document that the 50 leatherbacks (1990 to 1999) stranded, making leatherbacks the most common turtle. The “Recovery Plan for U.S. Pacific Populations of the Leatherback Turtle” (NMFS/USFWS 1998a) states that the leatherback is the most common sea turtle in U.S. waters north of Mexico.

Foraging, for jellyfish in nearshore and oceanic areas, occurs throughout the northeastern Pacific. Leatherbacks feed mainly on open ocean soft-bodied invertebrates such as jellyfish and tunicates, but the diet may also include squid, fish, crustaceans, algae, and floating seaweed. Specific critical areas have not been identified nor has the relative importance of habitats (or the distribution and size) for "foraging populations" of any age class been specified by NOAA Fisheries. DNA evidence documents that leatherback turtles have transoceanic migratory patterns, with juvenile turtles leaving the natal beaches, crossing the ocean to the opposite side to feed, and then return as adults to breed and lay eggs. The primary threat to this species in U.S. waters is incidental take in fisheries. All of the leatherback turtles observed taken by the drift gill-net fishery (1990 to 2000) were located north of point Conception from September through January, and the majority of them were found in areas of coastal upwelling.

3.9.3.3 Loggerhead Sea Turtle, *Dermochelys caretta*

The loggerhead turtle is listed as a threatened species throughout its range. The United States and Mexico (primarily Baja California south) support important developmental habitats for juvenile loggerheads. Loggerheads are a cosmopolitan species, found in temperate waters and inhabiting pelagic waters, continental shelves, bays, estuaries and lagoons. There is no documented nesting in the U.S. Pacific, and U.S. waters (principally those off California) are used as foraging grounds and as migratory corridors for a wide range of juvenile size classes. Sexual maturity ranges between 25 to 35 years. They are omnivorous, feeding on a variety of benthic prey including shellfish, crabs, oysters, jellyfish, squid, and occasionally on fish. The

seasonal sightings in abundance may correspond to a larger, regional movement pattern. Sightings are typically confined to the summer months in the eastern Pacific, peaking in July to September off southern California and southwestern Baja California, Mexico where thousands are sighted feeding on the pelagic red crab (Stinson 1984). Genetic studies have shown these animals originate from Japanese nesting stock (NMFS Biological Opinion 2000).

As they age, loggerhead turtles move inshore and forage over a variety of benthic hard- and soft-bottom habitats. With the exception of four records from Hawaii (see Insular and Pelagic Range), U.S. Pacific sightings are confined to the west coast of the continent. It is not known whether these individuals are resident or transient. No studies of distribution, abundance, or residency in waters along California have been undertaken but loggerheads are know to occur within these waters. There is limited information on mortality of loggerheads on the U.S. west coast. Primary threats include natural disasters and incidental take in fisheries. El Niño events, may cause loggerheads to migrate north where they "cold stun" once they encounter colder water. Occasional cold strandings occur in Washington and Oregon. El Niño events can cause reduced food production for some turtle species which can reduce growth and fecundity. During 1983 to 1991, two loggerhead turtles were entrained and both of these were released alive. From 1990 to 2000, all of the loggerhead turtles incidentally taken in the drift gill-net fishery were located in a concentrated area south of San Clemente Island during El Niño years, which bring northward hundreds of thousands of pelagic red crabs to the California coast. Hearing of juvenile loggerheads is most sensitive at 250 to 1 KHz. Sensitivity declined rapidly above 1 KHz and was highest at 250 Hz (MMS 2001).

3.9.3.4 Olive Ridley Sea Turtle, *Lepidochelys olivacea*

The olive ridley turtle is listed as endangered on the Pacific coast of Mexico, and all other populations are listed as threatened. Olive ridley turtles are primarily pelagic, migrating throughout the Pacific from nesting grounds in Mexico and Central America to the north Pacific. Olive ridley turtles comprise the vast majority of sea turtle sightings (75 percent in eastern tropical Pacific study). Young turtles move offshore to occupy areas of surface current convergences until they are large enough to recruit to benthic feeding grounds. They feed on tunicates, salps, jellyfish, fish eggs, crustaceans, and small fish. Stranding records from 1990 to 1999 indicate that olive ridleys are rarely found off the coast of California, averaging 1.3 strandings annually (NMFS Biological Opinion 2000).

In the eastern tropical Pacific, the olive ridley occurs much more commonly in the open ocean than any other sea turtle (Pitman 1990), but this may only be a function of its being much more abundant than any of the other species, and, thus, increasing the likelihood of their being wayward individuals. Alternatively, olive ridleys may have a truly pelagic habit. Forage areas most likely exist along the coast of Baja California and southern California, however, these areas have not been identified. Major threats on the U.S. west coast include incidental take in fisheries and vessel collisions. Olive

ridleys have been incidentally killed in the California drift gill-net fishery and cold-stunning has occurred in Oregon and Washington (NMFS/USFWS 1998d).

3.9.4 Listed Fish in California Waters

Several fish species and their habitats are protected under ESA. EFH and HAPC have been described in Amendment 14 of the PFMC FMP for Pacific salmon. In estuarine and marine areas, salmon EFH extends from the nearshore and tidal submerged environments within State territorial waters out to the full extent of the EEZ offshore of Washington, Oregon, and California north of Point Conception. Evolutionarily Significant Units (ESU) have been described for steelhead.

3.9.4.1 Tidewater Goby

The tidewater goby was listed as endangered under the ESA in 1994. Tidewater gobies are endemic to California and are found in shallow coastal lagoons, stream mouths, and shallow areas of bays in low salinity waters. They are a small, 2-inch long, bottom-dwelling fish which is nearly transparent (Federal Register Vol 65 No. 224 page 69693-69717). Historically the northern population ranged from Del Norte County to Los Angeles County while the southern population ranged from Aliso Creek in Orange County to Agua Hedionda Lagoon in northern San Diego County. Since 1994, the northern populations have nearly doubled. Since the 1900s tidewater gobies have disappeared from nearly 50 percent of the coastal lagoons within their historic range, including 74 percent of the lagoons south of Morro Bay in central California (USFWS 2001). Critical habitat was designated in Orange and San Diego Counties in November 2000 for the southern population (Federal Register Vol 65 No. 224 page 69693-69717).

Gobies are often found in low salinity waters (10 ppt) but can tolerate higher salinities when moving between coastal streams in the ocean. They live approximately 3 years and feed on crustaceans and aquatic insects. Coastal development, loss of saltmarsh habitat, and alterations of upstream flow are the major reasons for the gobies decline.

3.9.4.2 Salmon

Salmon and steelhead populations, once abundant in California, have declined to about 10 percent or less of historical levels. Chinook, coho, and steelhead are the most abundant anadromous salmonids in California. Pink, chum, and sockeye salmon do not normally spawn in California. Historically, chinook and coho salmon were taken in the commercial fishery as far south as Point Conception as late as 1964. Chinook salmon have four distinct runs in the State: fall, late-fall, winter, spring. Coho salmon only have one run and are most common in small coastal streams. Steelhead are migratory anadromous rainbow trout. Steelhead spawning migrations are complicated by the fact that adult steelhead may be entering rivers to spawn, or unlike salmon, returning to the ocean following spawning. Resident time in freshwater portions of rivers and streams varies between less than 1 year for chinook salmon and up to 6 years for steelhead.

Only winter-run steelhead occur along the south-central coast. They enter their home streams from November to April (depending on water flows) to spawn. Juveniles migrate to sea usually in spring and spend the next 1 to 3 years feeding. Submarine canyons and other regions of pronounced upwelling are thought to be particularly important during El Niño events (MMS 2001). Females can spawn multiple times unlike salmon which die after spawning. Many small coastal streams are closed entirely by sand bars that build across the mouths of streams during periods of low rainfall and mild ocean conditions in summer. Heavy winter rainfall and subsequent runoff removes the bar and provides a pathway for migrating fish. The runoff provides olfactory clues to attract migrating adult salmon into the stream. Heavy runoff also serves to "flush" smolts from the estuaries into the ocean.

The Southern ESU steelhead inhabits streams and rivers from the Santa Maria River south to Malibu Creek. The critical habitat for steelhead includes all river reaches and estuarine areas accessible to listed steelhead in the coastal river basins between the two reaches described previously. The Northern ESU steelhead are federally listed as threatened, the Central California Coast ESU steelhead and South/Central California Coast ESU steelhead are federally threatened, and the Southern California ESU steelhead are federally listed as endangered. The Sacramento river winter-run chinook salmon is a State and federal listed endangered species. Chinook salmon-Central Coastal ESU is federally listed as threatened. Spring-run chinook salmon are State and federally listed as threatened. Coho salmon-Central California Coast ESU is State endangered and federal threatened. Coho salmon-Southern Oregon/Northern California ESU is federal threatened. Coho salmon-Northern California is a State candidate for listing and federally listed as threatened.

3.10 Non-listed Species

3.10.1 Non-listed Marine Mammals (MMPA Protected)

3.10.1.1 Short-finned Pilot Whale *Globicephala macrorhynchus*

Short-finned pilot whales were commonly seen off California and a resident population was documented around Santa Catalina Island (Dohl et al. 1980, Miller et al. 1983). However, since the 1982 to1983 El Niño event, sightings of pilot whales have been rare (Shane 1995, Forney et al. 2000). In 1993, six groups of pilot whales were seen off California (Carretta et al. 1995, Barlow and Gerrodette 1996), but according to NOAA Fisheries, sightings remain rare. Short-finned pilot whales are gregarious, living in herds of a few to several hundred, often occurring with bottlenose dolphins (Leatherwood et al. 1988). Short-finned pilot whales predominantly consume squid and occasionally small fish (Seagars and Henderson, 1985). Their seasonal abundance appears to be correlated with the seasonal abundance of spawning squid (Bernard and Reilly 1990, Miller et al. 1983). NOAA Fisheries estimates the California, Oregon, and Washington population of pilot whales at 970 animals (Barlow 1997).

There is documented mortality of short-finned pilot whales in squid purse seine fishery operations off southern California (Miller et al. 1983, Heyning et al. 1994, Seagars and Henderson 1985, Carretta et al 2001). Pilot whales are attracted to spawning aggregations of squid, their main food prey. Near Santa Catalina they were noted to move inshore as the squid spawning season began (Miller et al. 1983, Dohl et al. 1980). Interactions between the squid fishery and pilot whales at Santa Catalina were observed in January through March, 1980 (Miller et al. 1983). Pilot whales were seen wrapped in purse seine nets where they drowned or had their flukes severed as they were brought aboard by power blocks. Additionally, there were observations of dead pilot whales with severed flukes and squid in their stomachs, indicating capture in squid nets. From aerial surveys of pilot whales in the vicinity, Miller et al. (1983) estimated at least 30 pilot whales were killed annually in the squid fishery at this one location. Some pilot whale mortality was likely intentional rather than incidental with fishermen shooting and killing the animals to protect gear and catch. From interviews and observations Miller found that fishermen viewed pilot whales as competitors as the animals would scare squid from the lights. In addition to the round haul vessels, Miller also describes dip net squid fishermen shooting at pilot whales. Heyning et al. (1994) records 14 short-finned pilot whale mortalities in southern California (1975 to 1988) with evidence of squid purse seine fishery interaction.

However, no recent mortality of short-finned pilot whales has been reported, presumably because short-finned pilot whales are no longer common in the areas utilized by the squid fishery. According to NOAA Fisheries, pilot whale sightings have been extremely rare during their surveys and the areas where pilot whales used to be regularly seen, primarily Santa Catalina and San Clemente islands, no longer provide sightings (K. Forney, NOAA Fisheries, pers. comm.). There have been, however, anecdotal reports of pilot whales near squid fishing operations in southern California in the 1998 to 1997 fishing season (Carretta et al. 2001). Mortality also could be unreported because the fishery is not being observed for marine mammal mortality. The only other fishery to document short-finned pilot whale mortality is the shark-swordfish drift gill-net fishery.

3.10.1.2 Risso's Dolphin *Grampus griseus*

Risso's dolphins are distributed world-wide in temperate waters and are commonly seen off the west coast on the shelf in the southern California Bight (SCB) and in the slope and offshore waters (Forney et al. 2000). Highest densities tend to occur along the shelf break. Risso's dolphins were rarely seen in the SCB in the 1950s but numbers have increased since the 1982 to1983 El Niño, particularly around Santa Catalina Island (Kruse et al. 1990, Shane 1995), where it is thought that Risso's dolphins replaced pilot whales after the 1982 to 1983 El Niño event (Shane 1995). Risso's dolphins are common in Monterey Bay. Risso's dolphins are gregarious, and schools may include several hundred animals, but the average group consists of 30 individuals (Kruse et al. 1990). Risso's dolphins consume cephalopods and occasionally fish (Kruse et al. 1990, Leatherwood et al. 1988). Studies at Santa Catalina Island concluded that Risso's are nocturnal feeders (Shane 1995). NOAA Fisheries estimates that there are

approximately 16,500 Risso's dolphins in California, Oregon, and Washington (Barlow 1997).

Risso's dolphins have been observed in the vicinity of commercial squid boats (Shane 1995) and there is documented mortality of unknown extent for Risso's dolphins in the squid purse seine fishery off southern California (Heyning et al. 1994). Some of the mortality is likely intentional rather than incidental with fishermen killing the animals to protect gear and catch. With the 1994 amendments to the MMPA intentional takes are now illegal. However, mortality of Risso's dolphins is likely unreported because the fishery is not being observed for marine mammal mortality. There is documented mortality of Risso's dolphins in the shark-swordfish drift gillnet fishery (Forney et al. 2000).

3.10.1.3 Bottlenose Dolphin *Tursiops truncatus*

Bottlenose dolphins are distributed worldwide in tropical and temperate waters. In California, NOAA Fisheries separates bottlenose dolphins into two stocks, offshore and coastal, based on their distribution. Coastal dolphins generally are found within a kilometer or two of shore. Bottlenose dolphins are social animals usually found in groups of 2 to 15 (Wells and Scott 1999). Offshore bottlenose dolphins consume predominantly squid, while coastal bottlenose dolphins eat a variety of fish, squid, and crustaceans (Drumm 2000). NOAA Fisheries estimates that there are approximately 956 offshore bottlenose dolphins in California, Oregon, and Washington, and 206 coastal dolphins in California waters (Caretta et al. 2001).

Coastal bottlenose dolphins have documented mortality in the California large mesh set gill-net fishery while offshore bottlenose dolphins have documented interactions with the California shark-swordfish drift gill-net fishery, as well as the anchovy, mackerel, and tuna purse seine fisheries (Forney et al. 2000; FR Vol. 68 No. 7 2003). Offshore bottlenose dolphins are often associated with Risso's dolphins and short-finned pilot whales, thus, they also may experience some mortality in the squid fishery as well (Heyning et al. 1994). However, the fishery is not being observed for marine mammal mortality so this is unknown. Because of their selective use of the coastal habitat, coastal bottlenose dolphins may be susceptible to other fishery related injury and mortality. In southern California, coastal bottlenose dolphins have been found to have the highest levels of pollutants in their system, especially DDT, of any cetacean examined (O'Shea et al. 1980, Schafer et al. 1984).

3.10.1.4 Pacific White-sided Dolphin *Lagenorhynchus obliquidens*

Pacific white-sided dolphins are primarily found in shelf and slope waters off the west coast. They appear to occur primarily off California in cold water months and move northward to Oregon and Washington as waters warm in late spring or summer. Pacific white-sided dolphins forming groups of several hundred or less and seek out other marine mammals (Leatherwood and Reeves 1983). Pacific white-sided dolphins feed on a variety of small schooling fish and squid, primarily at night (Wynne and

Folkens 1992, Leatherwood and Reeves 1983). They have taken hake (depths of greater than 400 ft), cephalopods, and anchovies (400 to 650 foot depth), and white seaperch. NOAA Fisheries estimates that there are approximately 25,000 animals in California, Oregon, and Washington (Barlow 1997).

There is documented mortality and injury in the shark-swordfish drift gill-net fishery and the domestic groundfish trawl fishery.

3.10.1.5 Short-beaked Common Dolphin *Delphinus delphis*

Short-beaked common dolphins are the most abundant cetacean off California. Historically, they were only reported south of Pt. Conception but on recent NOAA Fisheries surveys they were commonly sighted as far north as the Oregon border (Forney et al. 2002). Their distribution extends south into Mexican waters. Off southern California, they tend to occur along sea mounts and escarpments (Leatherwood and Reeves 1983). Common dolphins are known to feed on small schooling fish and squid at night and are among the most gregarious of dolphins (Leatherwood and Reeves 1983, Leatherwood et al.1988). Based on three ship surveys, NOAA Fisheries estimates the population for California, Oregon and Washington waters at 373,573 animals (Barlow 1997).

In California waters there is documented mortality of short-beaked common dolphins primarily in the shark-swordfish drift gill-net fishery although some have been taken in the large mesh (>3.5 inches) set gill-net fishery. One stranding report reported a common dolphin with a hook and line in its mouth (Forney et al. 2002), while another reported a common dolphin with severed flukes (Heyning et al. 1994).

3.10.1.6 Long-beaked Common Dolphin (*Delphinus capensis*)

Long-beaked common dolphins occur from Baja California to central California (Forney et al. 2001). Only recently have they been recognized as a distinct species having previously been included with the short-beaked common dolphin. Off southern California, they tend to occur along sea mounts and escarpments feeding at night on small schooling fish and squid (Leatherwood and Reeves 1983, Leatherwood et al.1988). Based on three ship surveys, NOAA Fisheries estimates the population for California, Oregon and Washington waters at 32,239 animals (Barlow 1997).

In California waters, there is documented mortality of long-beaked common dolphins primarily in the shark-swordfish drift gill net fishery although some have been taken in the large mesh (>3.5 inches) set gill net fishery (Forney et al. 2001). Heyning et al. (1994) reports seven long-beaked common dolphin strandings with severed flukes due to fishery interactions.

3.10.1.7 California Sea Lion, *Zalophus californianus californianus*

The California sea lion is the most commonly recognized and most abundant

pinniped in California. California sea lions are a migratory species that range from southern Mexico to Canada. They breed during July primarily at the Channel Islands in southern California, although some breeding occurs at Año Nuevo Island and the Farallon Islands. After the breeding season, adult and sub-adult males migrate north, although some remain at haul-out sites in central and northern California then return south in March to May. Movements of females are unknown. Recent 1999 population estimates, based on pup counts with a multiplication factor, ranged from 204,000 to 214,000 animals (Forney et al. 2000). The California sea lion is considered an opportunistic feeder and eats anchovy, sardine, salmon, rockfish, flatfish, and lamprey among other species. Market squid is one of the most important prey of sea lions in southern California (Lowry and Caretta 1999).

California sea lions are incidentally killed in the set and drift gill-net fisheries. Mortality also occurs in the salmon troll and in the round haul fisheries for herring, anchovy, mackerel, sardine, tuna, squid, the CPFV fishery, and the California groundfish trawl (Miller et al. 1983, NMFS 1995, NMFS,NOAA,OPR. 2002). Although illegal, the mortality associated with the round haul fisheries is likely intentional with fishermen killing the animals to protect gear and catch (Miller et al. 1983). In addition to the round haul vessels, Miller describes dip net squid fishermen also shooting at sea lions. From interviews with fishermen and observations, Miller et al. (1983) found that squid fishermen viewed sea lions as competitors as the animals would scare squid from the lights.

Strandings data for 1998 (California, Oregon and Washington) showed three mortalities from boat collisions, 30 deaths from entrainment in power plants, and 70 deaths and eight injuries from shootings (Forney et al. 2000). Algal blooms along the coast resulting in the production of domoic acid have been responsible for additional California sea lion deaths. The total human-caused mortality and serious injury (fishery related plus other sources) for the California sea lion stock is less than their PBR (Forney et al. 2000). In 1998, an outbreak of domoic acid toxicity resulting from a bloom of the diatom *Pseudonitzchia australis* affected California sea lions along the central California coast (Scholin et al. 2000).

3.10.2 Non-listed Marine and Coastal Birds (Seabirds)

3.10.2.1 Common Murre *Uria aalge*

The common murre is a large alcid which breeds in both the north Pacific and north Atlantic oceans. In California, they are year-round residents off the coast of northern and central California, with small numbers observed in southern California. (Cogswell 1977). They are diurnal feeders that prey on fish by pursuing them underwater. Prey items include cephalopods (including squid), crustaceans, and a variety of small fish (e.g., juvenile rockfish, sand lance, Pacific herring, sardines, and anchovies) (Baltz and Morejohn 1977, Morejohn et al 1978, Ainley et al. 1990). Diet studies in the Gulf of the Farallones point to market squid as a principal prey item (Ainley et al. 1990). Common murres are colonial, monogamous nesters who nest on cliff ledges of rocky islands and

seacoasts and on the flat tops of low rocky islands from the Oregon border to central Monterey County. The largest colonies are found on offshore rocks in Del Norte and Humboldt counties and at the Farallon Islands in San Francisco County. Eggs are laid on the bare ground or rock from late-April to late-June. The eggs hatch from late-May to mid-July, and the young fledge from mid-June to mid-August (Sowls et al. 1980). The altricial young remains at the nest for 1 month, then jumps to the ocean below. Thereafter, the half-grown, flightless chick is accompanied and fed at sea by the male parent for about 2 months (Gaston and Jones 1998).

Central California common murre numbers declined an estimated 52.6 percent between 1980 and 1986 due to mortality in gill nets and oil spills and low breeding success during a severe El Niño-Southern Oscillation event (Takekawa et al. 1990, Carter et al. 2001b). Population numbers have increased in the 1990s but are still substantially lower than historical levels (Carter et al. 2001b). Oil spills and entanglement in fishing gear are still threats to the viability of local colonies. Human disturbance, such as by aircraft and boats, also can impact nesting success at colonies depending on proximity to colony, timing, frequency, and duration of disturbances (Thayer et al. 1999, Parker et al. 2000, 2001, Rojek and Parker 2000). Common murres have been targeted by Trustee Agencies (California Department of Parks and Recreation California State Lands Commission, DFG, NOAA, and USFWS) for restoration actions in recent oil spill damage assessments because of the tenuous status of the Central California population and the fact that they are the most common victims of oil spills in California. Much of the millions of dollars in natural resource damages collected by DFG in the past few years have been based on injuries to, and compensatory restoration for, common murres (Page and Carter 1987, Page et al. 1990).

Large mesh set gill-nets are known to take alcids incidentally and have previously taken common murres in central California (Carter et al. 1995a, Julian and Beeson 1998). Hooking of common murres was recorded during CPFV observer programs in central California (from Morro Bay to Bodega, and in a few years up to Eureka in northern California) from 1987 to 1998 (DFG, unpublished data). Common murres have been documented being caught by salmon fisherman along the central California coast and are likely to be involved in hook-and-line fishery interactions. There is a potential for the other alcids to interact with hook-and-line nearshore fishing activities (entanglements), but no data exist to qualify or quantify these events.

Nesting sites can be disturbed by boats, low-flying aircraft, and intruding humans depending on the proximity to the colony, timing, frequency and duration of the disturbance (Thayer et al. 1999, Parker et al. 2000, Rojek and Parker 2000). When adults are disturbed, they may knock eggs and chicks off nesting ledges, or leave them vulnerable to predation from western gulls and ravens. It has been documented that the small vessels used in the nearshore live-trap fishery are disturbing nesting common murres at Hurricane/Castle Rock, Monterey County, and Point Reyes, Marin County, colonies (Hampton and Kelly 2001). Documentation and data have shown that continued and increasing boat disturbance often results in the loss of chicks and eggs. While this documentation is limited to four colonies that are being actively monitored,

there is no reason to believe that similar disturbance patterns do not exist at other colonies as well.

3.10.2.2 Western Gull, *Larus occidentalis*

The western gull breeds along the Pacific coast from British Columbia to central Baja California (Carter et al. 1992). The largest breeding numbers (estimated at about 61,800 birds) occur in California. The Farallon Islands in central California harbor the largest colony in the world, and large numbers are found in the Channel Islands (Carter et al. 1992). Western gulls do not disperse far from their breeding range in the winter. They are omnivorous and feed on garbage, fish, cephalopods (including market squid), euphausiids, offal, and birds and eggs (including adult and chicks of auklets and petrels, gull chicks, and eggs). Off the Farallon Islands, breeding birds are known to primarily feed in surface waters on live prey (Ainley et al. 1990). Western gull numbers have increased in the past few decades, likely due to the increased use of human and fishing garbage disposal sites for food and reduced human disturbance (Carter et al. 2001a). As a result, increased predation on rare birds, such as Ashy storm-petrels on the Farallon Islands where western gull numbers have reached saturation, could become a threat to those petrels with small population numbers (Nur et al. 1999).

Behavior patterns of gulls may be influenced by fishery activities. They are attracted to fishery operations where they feed on bait or on scavenged or discarded targeted species or bycatch. For example, gulls, which are normally diurnal, are known to forage at night near squid fishing boats where they are attracted by the activity and bright lights. Artificial lighting may also increase lighting and foraging abilities of gulls on colonies, resulting in increased levels of predation on nocturnally nesting seabirds. In 1999, western gulls were noted by researchers as more active at night when squid lights were on in the Channel Islands (Channel Island National Park, unpublished data). Gulls and terns also may be affected by ancillary marine fishing activities (e.g., vessel proximity, motor noise, generators, lights, radios, gunshots, seal bombs, whistles, etc.) near rookeries and roosting sites.

3.10.2.3 Heermann's Gull *Larus heermanni*

Heermann's gulls nest in the Gulf of California and Baja, California, Mexico (Carter et al. 1992). A few nesting attempts have been recorded in California. They are a common visitor to California, from the Mexican border to Monterey Bay in the summer and fall, after they disperse from breeding grounds. Heermann's gulls prefer to feed in kelp beds, rocky shorelines, and sandy beaches, where they fed on fish, shrimp, mollusks, and crustaceans, as well as scavenge on shorelines (Beedy 1990). Market squid is known to be consumed by wintering California, mew, glaucous-wing, and Heermann's gulls and black-legged kittiwakes (Baltz and Morejohn 1977, Morejohn et al. 1978). Market squid and northern anchovy were the most important prey items for glaucous-wing and Heermann's gulls in Monterey Bay (Baltz and Morejohn 1977). Gull behavior is detailed in the western gull section above.

3.10.2.4 Brandt's and Pelagic Cormorants; *Phalacrocorax penicillatus*, *P. pelagicus*

Brandt's and pelagic cormorants are year-long residents along the entire coastline of California. Both species feed mainly on mid-water to bottom-dwelling fish, diving from the surface to pursue prey underwater. Brandt's cormorants are known to forage on market squid (Baltz and Morejohn 1977, Morejohn et al. 1978, Ainley et al. 1990). They forage principally in nearshore waters less than 50 meters in depth and at short distances from nesting or roosting sites (Ainley et al. 1981, Hebshi 1998). Coastal cormorant species nest on rocky headlands and on offshore islands from the northern border of California to Santa Barbara County and on the Channel Islands. The breeding season can start as early as January for pelagic cormorants and is completed by September for all species. Cormorants are monogamous colonial nesters with clutch sizes ranging from 2 to 7 eggs. Incubation is performed by both parents and the young are altricial. Predators on eggs and young include crows, ravens, and western gulls. Roosting sites on offshore rocks, islands, cliffs, wharfs, and jetties are important habitat for all cormorants year-round because, unlike other seabirds, their feathers are not completely waterproof and they need to dry them daily (Johnsgard 1993).

Cormorants can be affected by ancillary fishing activities (e.g., vessel proximity, motor noise, generators, lights, radios, gunshots, seal bombs, whistles, etc.) near rookeries and roosting sites. It has been documented that the small vessels used in the nearshore live trap fishery are disturbing nesting Brandt's cormorants at the Hurricane/Castle Rock, Monterey County, and the Point Reyes, Marin County, colonies (Parker et al. 2000, 2001; Rojek and Parker 2000). Human disturbance of breeding colonies is known to cause nest abandonment and increased predation of eggs and young by gulls (Ellison and Cleary 1978, Manuwal 1978). Similarly, continual disturbance of roosting sites could compromise the cormorant's abilities to waterproof its feathers and effect thermoregulation.

Large mesh (> 3.5 in. or 8.9 cm) set gill-nets are known to incidentally take cormorants (Julian and Beeson 1998, Forney et al. 2001) and both species are known to interact with fishing activities involving various hook-and-line gear. In the CPFV fishery they are attracted to the bait which is used for chumming, as well as baited lines. In addition, cormorants may be taken on longlines. The birds are attracted to the baited hooks as the gear is being set, and become hooked at the surface and dragged underwater and drowned. Because they are deep-divers and pursue their prey underwater, there is additional opportunity for interaction with nearshore fisheries. In 1998, Point Reyes Bird Observatory (unpublished data) documented hooking of cormorants by rockfish and lingcod long-line vessels near the Farallon Islands.

Cormorants also may be affected by ancillary fishing activities (e.g., vessel proximity, motor noise, generators, lights, radios, gunshots, seal bombs, whistles, etc.) near rookeries and roosting sites. It has been documented that the small vessels used in the nearshore live trap fishery are disturbing nesting Brandt's cormorants at the Hurricane/Castle Rock, Monterey County, and the Point Reyes, Marin County, colonies

(Parker et al. 2000, Rojek and Parker 2000). Disturbance of breeding colonies is known to cause nest abandonment and increased predation of eggs and young by gulls (Manuwal 1978, Granholm 1990).

3.10.3 Non-listed Fish and Incidentally-taken Species

Fish generally are classified into inhabiting coastal, benthic, or pelagic habitats. Complex relationships exist between marine plant and animal communities. Many fish species are highly dependent upon particular types of habitat and may show little large-scale movement after they recruit to these areas. Localized removals of large portions of the biomass of individual species may have significant short-term and long-term effects on both a population and community-wide scale, within these particular habitats and also, to an unknown extent, outside these habitats.

Fish species may be incidentally taken by the squid fishery. Through the Department's port sampling program, 2,402 samples were collected between October 1998 and October 2003 in California, with 886 observed landings containing incidentally caught fish and invertebrates. This represents a 37% occurrence by frequency of bycatch (Table 3-8). Two or more species were observed as bycatch in 47% of landings with bycatch. Most of this bycatch was other coastal pelagic species, including Pacific sardine, Pacific mackerel, northern anchovy and jack mackerel. Approximately 3.2% of sampled landings contained squid egg cases. Previous drafts of this MSFMP reported that incidental catch of squid eggs was 2%. In addition, if examined by port area, squid eggs occurred in 8.3% of the Monterey samples. This higher level of observed egg cases is most likely due to the shallower nature of the northern fishery and is a source of concern. Under the proposed management strategy, the fishery is monitored by evaluating escapement of squid eggs from the fishery. If the fishery damages squid spawning beds, and this damage is a significant source of egg mortality, the monitoring program will be biased unless this additional source of mortality is accounted for. Less than 2 percent of the landings contained species that are prohibited from being landed using seine gear (e.g., barracuda, yellowtail). In terms of species of concern, there have been 7 observations of Chinook (King) salmon representing 1.6% of observed landings in Monterey as well as one observation of salmon (species unknown). In addition, bocaccio was observed in 1.2% of the Monterey landings.

Currently, the type of net used to fish for squid is unregulated, although purse seines used for squid typically do not hang as deep as purse seines used for other species, so contact with the bottom is reduced. Incidental catches of squid eggs and other species increase in the squid fishery when the nets are set in shallower water (less than 22 fathoms), where bottom contact may occur (Lutz and Pendleton 2001). Damage to the substrate, and thus, mortality of squid eggs associated with purse seining for squid has not been quantified.

Along with anchovy and sardine, market squid are important as forage to a long list of fish and they serve as an important food source for many larger pelagic fish that are commercially and recreationally important, such as white seabass, California yellowtail,

kelp bass, barred sand bass, California barracuda, California halibut, and other nearshore species. In Monterey Bay, 19 species of fish were found to feed upon market squid, including many commercially important species such as Pacific bonito, salmon, halibut, and tuna (Fields 1965; Morejohn, Harvey, and Krasnov 1978). It is not currently possible to estimate the total amount of CPS used as forage by finfish in the California Current ecosystem or the size of the CPS populations necessary to sustain predator populations. However, the CPSFMP along with the MSFMP contain the goal of providing adequate forage for dependent species and is implemented by harvest policies that reserve a portion of the biomass as forage for dependent species.

Table 3-8. Percent frequency of occurrence of observed market squid incidental catch by port area. A total of 2,402 port samples were taken between October 1998 and October 2003. Source: CDFG Port Sampling Data.

Common Name	Total All Ports	Monterey Moss Landing	Santa Barbara Ventura	San Pedro Terminal Is.
PACIFIC SARDINE	18.5	9.5	18.9	21.5
PACIFIC MACKEREL	6.9	2.3	6.0	9.7
NORTHERN ANCHOVY	5.0	3.9	4.0	6.2
JACK MACKEREL	4.0	6.7	0.1	6.6
MARKET SQUID EGGS	**3.2**	**8.3**	**1.7**	**2.3**
PACIFIC BUTTERFISH	2.0	4.4	1.8	1.0
BAT RAY	1.9	1.4	2.3	1.6
JACKSMELT	1.3	6.7	0.1	0.1
CALIFORNIA BARRACUDA	**0.9**		**1.0**	**1.1**
PACIFIC ELECTRIC RAY	0.9	4.9		
PELAGIC RED CRAB	0.9		2.0	0.1
DUNGENESS CRAB	0.7	3.9		
SANDDAB	0.6	2.1	0.4	0.2
SEA STAR	0.6	0.9	0.1	0.9
SCULPIN	0.6			1.4
HORN SHARK	0.4			0.9
TURBOT	0.4	1.9		
SOLE	0.4		0.6	0.3
CABEZON	0.3	0.2	0.1	0.6
ROCK CRAB	0.3		0.5	0.3
CHINOOK (KING) SALMON	**0.3**	**1.6**		
MEXICAN POMPANO	0.3		0.6	0.1
CALIFORNIA HALIBUT	0.3	0.5	0.1	0.4
RAY	0.3	0.2		0.6
MIDSHIPMAN	0.2	0.2		0.5
PACIFIC SANDDAB	0.2	0.7		0.3
BOCACCIO	**0.2**	**1.2**		
QUEENFISH	0.2		0.2	0.2
SMELT	0.2			0.4
WHITE CROAKER	0.2			0.4
PACIFIC SAURY	0.2	0.9		
FLYINGFISH	0.2		0.1	0.3
ROCKFISH	0.2	0.5	0.1	0.1
PACIFIC HERRING	0.2	0.9		
ENGLISH SOLE	0.2	0.7		0.1
MISCELLANEOUS FISH	0.2			0.4
CURLFIN TURBOT	0.1	0.5		0.1
MACKEREL UNCLASSIFIED	0.1	0.5	0.1	
OCTOPUS	0.1		0.2	0.1
SALEMA	0.1	0.7		
BLUE SHARK	0.1		0.2	
HORNYHEAD TURBOT	0.1			0.2

Table 3-8. Percent frequency of occurrence of observed market squid incidental catch by port area. A total of 2,402 port samples were taken between October 1998 and October 2003. Source: CDFG Port Sampling Data.

Common Name	Total All Ports	Monterey Moss Landing	Santa Barbara Ventura	San Pedro Terminal Is.
SPECKLED SANDDAB	0.1	0.2		0.1
SURFPERCH	0.1	0.5		
SEA URCHIN	0.1		0.2	
CALIFORNIA LIZARDFISH	0.1			0.2
SAND SOLE	0.1	0.5		
DIAMOND TURBOT	0.1			0.2
BARRED SAND BASS	0.1			0.2
BIGMOUTH SOLE	0.1			0.2
CALIFORNIA SPINY LOBSTER	0.0		0.1	
BLACKSMITH	0.0			0.1
GREENSPOTTED ROCKFISH	0.0		0.1	
BIG SKATE	0.0	0.2		
WAHOO	0.0			0.1
BLUE ROCKFISH	0.0	0.2		
YELLOWTAIL	**0.0**			**0.1**
SKATE	0.0		0.1	
SHRIMP UNCLASSIFIED	0.0			0.1
SHOVELNOSE GUITARFISH	0.0			0.1
SALMON	**0.0**	0.2		
Total Port Samples Taken	**2,402**	**415**	**988**	**999**

3.10.4 Market Squid *Loligo opalescens*

Market squid, *Loligo opalescens*, belong to the family Loliginidae. These squid are less than 1/8 inch at hatching and grow to have a mantle length of approximately 6 inches at the time of spawning. Squid use their fins for swimming and the funnel for extremely rapid "jet" propulsion forward or backward. The squid's capacity for sustained swimming allows it to migrate long distances as well as to move vertically through hundreds of meters of water in its daily feeding. This species is a terminal spawner; spawning occurs at the end of their lifespan, when spawning adults are targeted by commercial fisheries. Recent age and growth information suggests that maximum age is less than 1 year, and the average age of squid taken in the fishery is approximately 6 to 7 months. Refer to Section 1, Chapter 2 in the MSFMP for a more detailed description of market squid.

Market squid are the focus of the largest commercial fishery in California and are harvested commercially by targeting of spawning aggregations primarily off southern California and Monterey Bay, although some catch occurs throughout their range in other non-directed fisheries. Peak catches occur off southern California during the fall and winter and off central California during the late spring and summer. Though market squid are harvested near the surface and generally considered pelagic, they are actually found over the continental shelf from the surface to depths of at least 2,600

feet. They prefer oceanic salinities (Jefferts 1983). Adults and juveniles are most abundant between temperatures of 10°C and 16°C (Roper and Sweeney 1984). The California squid fishery accounts for most of the coast-wide landings; minor amounts of market squid are landed in Canada, Washington, and Oregon. The size of the Mexican fishery is unknown but is thought to be minor.

Genetic analyses have had limited success in distinguishing stocks within a fishery. Gilly et al. (2001) investigated genetic differences between the northern and southern squid fisheries. No temporal or spatial genetic differences for market squid were found within the southern California Bight. No temporal differences occurred between stocks in the Monterey area. Only slightly significant differences were observed between the Southern California and Monterey stocks, suggesting that market squid does not have 100 percent identity between the two fisheries. Additional genetic research is taking place, focusing on genetic differences at the extremes of the market squid range (Alaska and Baja California) before looking for differences within the range (Monterey and the Channel Islands). Thus, the number of market squid stocks or subpopulations along the Pacific Coast is unknown at this time.

Spawning market squid tend to congregate in dense schools, usually over sandy habitats where they deposit extensive egg masses. In central California, spawning activity starts around April and ends around October, while in southern California, spawning activity starts around October and ends in April or May. During some years, however, reproductive activity and landings may occur throughout most of the year. Year-round spawning in several areas statewide at different times of year likely reduces the effects of poor local conditions on survival of eggs or hatchlings, and suggests that stock abundance is not solely dependent on availability of squid in a single spawning area. Females attach each egg capsule individually to the bottom. As spawning continues, mounds of egg capsules covering more than 100 square meters may be formed, appearing to carpet the sandy substrate. It is well established that market squid die after completing their first and only spawning period (McGowan 1954, Fields 1965) but the duration of the spawning period is unknown.

The best information available indicates that squid endure very high natural mortality rates and the adult population is composed almost entirely of new recruits. No spawner-recruit relationship has been demonstrated. These observations suggest that the entire stock is replaced annually, even in the absence of fishing. Thus, the stock is entirely dependent on successful spawning each year coupled with good survival of recruits to adulthood. Full recruitment of market squid into the fishery occurs at an average age of 6 months.

Market squid are an integral part of the food web to many marine vertebrates. Fish, sea turtles, seabirds, and marine mammals all utilize the availability of squid as a prey item. In Monterey Bay, 19 species of fish were found to feed upon market squid, including many commercially important species such as Pacific bonito, salmon, halibut, and tuna (Fields 1965; Morejohn, Harvey, and Krasnov 1978). Market squid are used as bait in some of these commercial fisheries – they are the primary invertebrate bait for

commercial and recreational fishermen of adult white seabass in California west coast waters (WSFMP 2002). Seabirds such as the sooty shearwater, rhinoceros auklet, short-tailed shearwater, common murre, and the kittiwake all feed on market squid, and it is the primary prey item in the diet of harbor porpoises in Monterey Bay (Lowry and Caretta 1999). Squid also factors into the diets of the sea otter, elephant seal, northern fur seal, California sea lion (Lowry and Caretta 1999), Dall's porpoise, Pacific striped dolphin, short-finned pilot whale (Hacker 1992), Risso's dolphin (Kruse et al. 1990), offshore bottlenose dolphins (Drumm 2000), Pacific white-sided and common dolphins (Leatherwood and Reeves 1983), and the sperm whale and bottlenose whale (Fields 1965).

Just as availability of prey affects squid foraging, the changing abundance of squid affects potential predators. Short-finned pilot whales, blue sharks, and Pacific bonito all increase their consumption of market squid during spawning season. When short-finned pilot whales were common in the SCB near Santa Catalina Island they moved inshore as spawning season began (Miller et al. 1983, Dohl et al. 1980). Blue sharks near Santa Catalina Island (Tricas 1978) may move inshore as spawning season begins, while Pacific bonito consumption of squid is influenced by the shoaling behavior of squid spawning in nearshore waters of southern California (Oliphant 1971).

Socioeconomic Environment

3.11 Land Use and Existing Infrastructure

Coastal population growth includes both a movement toward the shore and the expansion of a large population base. Population increases between 2000 and 2020 are projected to be about 9 percent (12 to 13 million people) in each decade. Compared with other areas of the nation, the largest coastal population increases between 1994 and 2015 are expected to be in southern California, Florida, Texas, and Washington. Ten counties account for almost one-third of all anticipated coastal population growth in the nation, with the largest population increases projected for Los Angeles (1.6 million) and San Diego (1.3 million) counties. However, Del Norte, Humboldt, and Mendocino counties have the lowest population density of the coastal counties - approximately 1 percent (MMS 1987).

The dominant industries of northern California are currently tourism and commercial fishing and historically lumber harvesting and processing. Land use is mainly open space principally in support of the tourist and timber industries. Native American land use is 67 percent in the coastal zone of Humboldt County and 89.6 percent in Mendocino County (MMS 1987). Local coastal plans were adopted by the California Coastal Commission in the mid 1980s.

The majority of land use in central California is undeveloped forest and range land, although large areas are used for agriculture (NOAA 1992). Commercial agriculture occurring in watersheds that drain to the nearshore zone include: artichokes (90 percent of U.S. production), broccoli (60 percent of U.S. production), celery (25 percent of U.S.

production), and lettuce (80 percent of U.S. production). The total market value of agricultural production in Monterey County was almost $2.3 billion in 1998. Central California coastal population changes were highest in 1980 to 1990 (18 percent increase), but have decreased in recent years due to lack of housing and infrastructure.

Land use in southern California historically was dominated by agriculture and the petroleum industry (MMS 2001). Conversion of agricultural land, open space, or other land uses will be required to house, educate, and employ the projected population increases. Land use now has shifted away from agriculture, resulting in a more urbanized population. This shift caused an increase in population and increased pressure on public facilities and services such as water supply, sewage treatment, housing, and schools. Property taxes generated by the value of petroleum deposits and onshore oil and gas infrastructure were an important source of property tax revenue. More details on employment and population statistics, housing, and infrastructure, for San Luis Obispo, Santa Barbara, and Ventura counties, can be found in the Draft Environmental Impact Statement: “Delineation Drilling Activities Offshore Santa Barbara County MMS 2001".

For many in this country, coastal areas define a way of life and a sense of place. Historically, the beauty and economic prosperity of coastal areas have drawn people to the nation’s shores. In California, approximately 80 percent of the state’s residents live in the 14 coastal counties. Coastal waters constitute a unique natural resource with significant economic, social, and ecological values. Approximately 95 percent of the more than 17,000 heavily polluted surface waters surveyed nationally are polluted by urban runoff (California Coastal Commission 1996). More than one-half of the nation’s coastal wetlands and 9 percent of California’s historic wetlands have been destroyed, and many of the remaining wetlands suffer from chronic disturbance and degradation.

Coastal states issued over 8,000 ocean and bay beach closing or advisories over a 6-year period because of poor water quality. In 1992, beaches nationwide were closed or advisories against swimming were issued on almost 3,000 occasions. The California Beach Closure Report states urban or storm runoff (from land areas) caused or contributed to at least 11 beach closures for a total of approximately 260 days in 1993 (California Coastal Commission 1996). The State Water Resources Control Board (SWRCB) and the California Coastal Commission recognize that nonpoint source pollution from land activities is the most significant cause of coastal water quality degradation. The SWRCB (1998) has determined that surface runoff is the major source of pollution to the State’s impacted streams, rivers, groundwater basins, wetlands, estuaries, harbors, bays, and ocean waters.

Coastal resources are highly vulnerable to human intervention in the watershed. Land use practices or implementation of development plans can result in increased runoff within a watershed and thus, individually or cumulatively, affect the water and sediment quality. For example, land use practices can change natural geomorphic features through grading, removing natural vegetation, or creating impervious surfaces, all of which increase the transfer of pollutants to the marine environment. Land use

activities introduce a wide range of pollutants to coastal waters and the underlying sediments.

There are two principal impacts that typically result from urbanization. First, the hydrology of the area is changed. The change typically consists of increased runoff volumes, flows, and velocities, accompanied by reduced groundwater recharge. Second, the increase in human activities within a watershed creates pollutants. These pollutants are transported in runoff and subsequently discharged into the marine ecosystem. Urban activities that contribute to marine ecosystem degradation range from automobile use to complex chemical processing and power generation. The predominant continuing sources of organochlorine pesticides are runoff and atmospheric deposition from past applications on agricultural land. Other practices such as liberation of inorganic mercury from fuel burning and other incineration operations continue, as do urban runoff and atmospheric deposition of metals and polynuclear aromatic hydrocarbons. Sources of polychlorinated biphenyls to the atmosphere include municipal and hazardous waste landfills, refuse and sewage sludge incinerators, and occasional leakage from electrical transformers and capacitors. Increasingly higher percentages of urban land use in watersheds correlates with steadily increasing contamination from most chemical classes including the urban-type pesticides (e.g., diazinon) (EPA 1997).

3.12 Transportation

Federal regulations concerning marine navigation are codified in 33 CFR Parts 1 through 399 and are implemented by the U.S. Coast Guard and the U.S. Army Corps of Engineers. Federal regulations for marine vessel shipping are codified in 46 CFR Parts 1 through 599 and are implemented by the Coast Guard, Maritime Administration, and Federal Maritime Commission. California laws concerning marine navigation are codified in the Harbors and Navigation Code and are implemented by local city and county governments.

Types of transportation in the nearshore area include: commercial ships (e.g., tankers, container ships, bulk carriers, military vessels), commercial fishing vessels, research vessels, and recreational boats. The major ports in California are San Francisco Bay, Los Angeles and Long Beach, and the Port of San Diego. Most of the commercial shipping along the California coast follows customary north-south shipping lanes. Within these shipping lanes, approximately 27 percent of commercial vessel traffic travels within 0 to 5 nautical miles of the coast, 36 percent within 5 to 10 nautical miles and 20 percent over 15 nautical miles off the coast (Advanced Research Projects Agency 1994). Between San Francisco Bay and the ports of Los Angeles and Long Beach, vessel traffic totals an estimated 4,000 coastal transits per year by large vessels. About 20 percent of these transits are crude oil tankers. The majority of the remainder are large commercial vessels greater than 300 gross tons, including container ships and bulk carriers (SLC 1999).

Baleen whales have been observed to travel several kilometers from their

original position in response to a straight-line pass by a vessel (MMS 2001). Although large cetaceans have occasionally been struck by freighters or tankers, and sometimes by small recreational boats, no such incidents have been reported with crew or supply boats to oil platforms off California. However, the single documented instance of a collision between a marine mammal and support vessel involved an adult male elephant seal struck in the Santa Barbara Channel in June 1999 (MMS 2001). In the Santa Barbara Channel and Santa Maria Basin, approximately 90 to 140 crew boat and 10 to 12 supply boat trips are made each week. In addition, 25 crew boat trips are made each week to State Platform Holly (MMS 2001).

Members of the Western States Petroleum Association, whose tankers carry crude oil from Alaska, agreed in 1990 to voluntarily keep laden vessels a minimum of 50 nautical miles from shore along the central coast of California. Southbound tankers loaded with oil from Alaska bound for Los Angeles, pass about 85 nautical miles offshore of Point Sur before turning eastward to enter the Santa Barbara Channel. The quantity of oil transported along the San Francisco Bay to Long Beach route was estimated to be 292.3 million barrels per year. For the trans-Pacific route, it was estimated that 5.8 million barrels of oil per year are transported (MMS 2001). Farther north they pass approximately 45 nautical miles offshore of Cape Mendocino. Other ports of call for Alaskan oil are Seattle, Washington and San Francisco, California. Slower-going ocean tank barges transit the central coast of California approximately 15 to 25 nautical miles from shore to minimize interaction with the oil tankers further out and the speedier container ships closer in.

In 1991, annual movements of all types of vessels transiting in, out, and solely within San Francisco Bay exceeded 86,000 trips, of which approximately 56,000 were ferries, 13,000 were tugs with tows, and 6,000 were commercial vessels (Advanced Research Projects Agency 1994). The remaining 11,000 trips were split between tankers, military vessels, dredges, and several smaller categories. Over 80 percent of these movements were by small vessels (ferries, tugs, dredge barges) primarily involved transits with in the Bay. Movements through the Golden Gate accounted for less than 10 percent (8,600) of all vessel traffic, although they represent a large percentage of the commercial cargo, Coast Guard, Navy, tanker, and other large vessel movements. Approximately 38 percent of vessels arriving and departing San Francisco Bay use the northern traffic lane, 20 percent the western lane, and 42 percent the southern lane. The Coast Guard estimates that the volume of recreational and small vessel traffic, such as fishing vessels, is 25 to 50 times the number of large commercial and military movements (Advanced Research Projects Agency 1994). Offshore of the southern entrance to San Francisco Bay is the Navy submarine operating area.

3.13 Noise

Ambient noise levels can vary dramatically, depending upon proximity to major metropolitan areas, shipping traffic lanes, commercial fishing operations, and offshore oil and gas activities, as well as ambient oceanographic conditions and seafloor composition and topography. In busy port regions, shipping activities can contribute to

ambient noise levels, although such sources are transitory. In addition, commercial vessels and tankers moving up and down the west coast also contribute noise to the marine environment. Shipping traffic is most significant at frequencies from 20 to 300 Hertz (Hz). Fishing vessels produce high frequency sound peaking at 300 Hz, whereas larger cargo vessels produce lower frequency sounds (MMS 2001). Marine mammals also produce underwater sounds which can travel up to 185 km for fin whale vocalizations (MMS 2001). Humpback whales produce sounds between 20 to 2,000 Hz and gray whales sounds are from less than 100 Hz to 2 kHz.

Sources of human-caused noise affecting marine organisms include commercial shipping activities, military operations, fishing and recreational vessels, and machinery associated with dredging and other forms of coastal construction. Many of these noises are produced at the same frequency used by marine mammals for communication. In addition, sound waves travel farther in water than in air, and therefore marine mammals are able to detect and react to noises at long distances from their source (15 to 18 miles for some). This reaction is responsible for some of the success of "pingers" on fishing nets designed to deter entanglements with marine mammals and turtles.

Response of animals to acoustic stimuli has generally shown alterations in behavior and physiological effects, depending on the species studied, characteristics of the stimuli (e.g., amplitude, frequency, pulsed or non-pulsed), season, ambient noise, previous exposure of the animal, physiological or reproductive state of the animal, and other factors. Possible adverse effects from loud sounds include discomfort, masking of other sounds, and behavioral responses resulting in avoidance of the noise source (MMS 1987). Whales have been documented altering their migration routes in response to noise. These behavior changes range from startle to avoidance responses. Sperm whales have been observed to dive immediately in response to a twin otter airplane passing 150 to 230 meters overhead (MMS 2001).

For vessels used in the offshore oil and gas production field, the approximate size of crew and supply boats, tones dominate up to about 50 Hz. Broadband components may extend up to 100 kHz, but they peak much lower at 50 to 150 Hz. Oil platforms also are serviced by helicopters. An estimated source level for a Bell 212 helicopter, is about 150 dB at altitudes of 150 to 600 meters, with the dominant frequency at 22 Hz tone with harmonics. Broadband helicopter noise is approximately 165 dB at frequencies of 45 to 7 KHz. A Bell 214 was audible in air for 4 minutes before passing, for 38 seconds at 3 meters depth, and for 11 seconds at 18 meters.

Very little data on the effects of sound on fish, larvae, and eggs have been collected. There are some data showing that sound can cause some damage to sensory cells of the ears of fishes, but not to the lateral line or cristae of the semicircular canals (vestibular receptor). Some behavioral studies of fish suggest that human generated sounds affect a fish's ability to detect biologically meaningful environmental sounds (Gisiner 1998). This is significant since croakers are known to produce sounds which may be used to communicate with one another (Moyle and Cech 1996). Strong sound

waves (e.g. blasting, air guns for oil and gas exploration) have resulted in the death of fish due to bursting of their swim bladders.

Research has shown that many seabird species are disturbed by human activities, including boat noise, close to and within breeding colonies and at roosting sites (Manuwal 1978, Anderson and Keith 1980, Carney and Sydeman 1999). Boating noise would include noise from motors, generators, radios, whistles, seal bombs, and gunshots. High-speed boating approaches are known to increase the level of disturbances (Carney and Sydeman 1999). Possible side effects from loud sounds include disruption of normal nesting and roosting activities, increased predation of eggs and chicks as result of flushing of birds from nests, and nest abandonment. Changes in hormone production can also occur with repeated disturbances, which can also result in altered behavior and nest abandonment (Avery 2000, Bower 2000).

3.14 Utilities

Many different types of utilities exist in the nearshore area. They can generally be classified into three groups: offshore cables, offshore oil and gas pipelines, and service pipelines. Communication cables, both offshore and onshore, are regulated by the Federal Communications Commission and the California Public Utilities Commission. Offshore pipelines fall under the regulatory jurisdiction of a number of federal and state agencies. In federal waters the Federal Energy Regulatory Commission, MMS, and the U.S. Department of Transportation are responsible for regulating various aspects of oil and gas pipelines. In state waters, the State Lands Commission (SLC), the State Fire Marshal's Office of Pipeline Safety, and the Department of Conservation's Division of Oil, Gas, and Geothermal Resources regulate those pipelines. Service pipelines, such as sewage treatment plant outfalls, are regulated by the SWRCB through their issuance of National Pollution Discharge Elimination System permits. The location of many undersea cables and sewage outfalls constructed before 1984 are located on NOAA's nautical charts. However, the various location of the U.S. navy undersea communication cables is generally classified information and their location is not revealed.

3.15 Archaeology/Paleontology

Cultural resources include prehistoric and historic archaeological sites, districts, and objects; standing historic structures, buildings, districts, and objects; and locations of important historic events, or sites of traditional/cultural importance. Cultural resources are primarily found on land, but submerged resources such as shipwrecks and prehistoric and historic sites and artifacts are known to occur in the waters off California. The analysis of cultural resources can provide valuable information on the cultural heritage of both local and regional populations.

Archaeological resources are any material remains (sites) of human life or activities that are at least 50 years of age and that are of archaeological interest.

Material remains include physical evidence of human habitation, occupation, use or activity including the site, location, or context in which such evidence is situated. Prehistoric archaeological sites consist of various forms of evidence of human activities that spanned time from approximately 13,000 years ago until the time of European contact in 1542 of California. Sites may be submerged and include intact sites buried beneath the seabed, isolated artifacts deposited on the seafloor from erosion of an upland site, or remnants of aboriginal watercraft.

MMS has conducted two archaeological baseline studies that cover the entire Pacific Region. These studies include the California, Oregon, and Washington Archaeological Resource Study which ran from Morro Bay north to the Canadian border, and the Archaeological Resource Study from the Mexican Border to Morro Bay (MMS 2001). The baseline study for northern California, Washington, and Oregon compiled information on 2,762 known prehistoric archaeological sites within a narrow strip of land along the coast (3,135 recorded in Del Norte, Humboldt, and Mendocino counties MMS 1987). The baseline study for southern California documented 1,681 known prehistoric archaeological sites from Morro Bay to the Mexican border. A total of 4,443 prehistoric archaeological sites along the Pacific coast represents only those sites that have been recorded to date and it is likely that there are thousands of additional undocumented sites.

Archaeological evidence from the Channel Islands indicates that prehistoric populations may have settled in the area and traversed coastal areas by water as early as 13,000 years ago (MMS 2001). Although sea levels were much lower than today, the Channel Islands still were separated from the mainland by a minimum of 5 miles. The presence of archaeological sites dating to the late Pleistocene/Early Holocene era, approximately 12,000 to 8,000 Before Present (BP) suggests that maritime travel occurred between the mainland and the islands and that aboriginal populations may have exploited littoral and nearshore resources (MMS 2001). However, along the Monterey county coastline, very little use of the area occurred prior to 5,500 BP with high increases in coastal usage between 5,500 to 1,000 years BP.

The CSLC has compiled a database of shipwrecks off California. The information can be viewed at http://shipwrecks.slc.ca.gov and is incorporated by reference. Data includes information on such wrecks as the Brother Jonathan which sank off Crescent City and the Persephone which sank off Point Arguello. The MMS baseline study for northern California, Oregon, and Washington identified a total of 3,850 shipwrecks from Morro Bay north to the Canadian border. The baseline study for southern California identified a total of 916 shipwrecks from Morro Bay south to the Mexican border. The total of 4,766 shipwrecks recorded for the Pacific Region represents only those shipwrecks that have been documented through literature searches (MMS 2001).

The first European exploration of the southern and central California coast occurred in 1542 from vessels under the command of Juan Rodriquez Cabrillo. During the exploration, Cabrillo died and, according to some sources, is buried on one of the offshore Channel Islands (MMS 2001). For the next 267 years, until permanent

Spanish colonization started in 1769, the area was largely ignored except for an occasional voyage of exploration and discovery. Vessels of commerce, the Manila galleons, sailed down the California coast en route to Acapulco from Asia. Some of the galleons were lost along the California coast and reports of a galleon lost in the Channel Islands can not be completely dismissed (MMS 2001).

During the American period (1846 to present), coastwise shipping increased. Prior to completion of the Southern Pacific railroad, coastal communities, most lacking natural harbors, constructed piers as a means of accessing maritime trade for shipment of agricultural products. A thriving lumber trade between ports in the Pacific Northwest and the coastal communities developed and continued into the 1920s. In the 20th century, as coastwise trade decreased, it was replaced by trans-Pacific trade, commercial fishing, military activity, petroleum exploration and development, and leisure as sources of widespread maritime activity. The California coast contains the remains of the various vessels that came to grief while engaged in each of these activities. Shipwrecks tend to be concentrated around sites that focus maritime traffic. The earliest reported shipwreck along the Monterey county coastline was in 1831 and in San Luis Obispo 1852 (MMS 2001).

Chapter 4. Environmental Consequences of the Proposed Project

4.1 Proposed Project

Consistent with CEQA and the Commission's certified regulatory program, this Chapter addresses whether implementation of the proposed project could result in a significant or potentially significant environmental impact under CEQA. The MSFMP options, which will be used by the Commission for the conservation and management of the fishery, are described in Chapter 2 of this document and in further detail in Section 1, Chapter 3 of the MSFMP. Whether implementation of the proposed project will result in potentially significant impacts under CEQA, is a function of potential impacts due to implementation of the various options.

The proposed project (preferred alternative) is comprised of options from the fishery control rules, restricted access and ecological concerns components. The restricted access options (H3, I1, K3, L3, M3, and M4) in conjunction with the fishery control rule option (A2) and status quo weekend closures are designed to prevent an overfished condition from occurring because it disburses the take of market squid throughout the season and allows spawning to take place throughout the season. The ecological concerns option R4 establishes an area and time closure for squid vessels fishing for squid using attracting lights around Anacapa and Santa Barbara islands from 1 February through 30 September. This seabird area closure would be 1 nautical mile from the high water mark for these islands and would exclude the Channel Island MPAs implemented in April 2003, because no commercial squid fishing is presently allowed in these areas. The seabird closure is intended to offset some of the negative impacts of light pollution at seabird rookeries for 12 seabird species (including one endangered, one candidate/threatened, and three other SSC) during their breeding seasons. Option Q3 establishes an area closed to squid fishing in all waters north of Pillar Point at any time. The creation of this squid harvest replenishment/general habitat closure area is intended to prevent squid fishery interactions in an area that has not been traditionally utilized for commercial squid fishing and where there is the potential for interactions with non-target species such as fish, sea turtles, seabirds, and marine mammals. This option would create a forage reserve for fish, sea turtles, seabirds, marine mammals, and other marine species that consume squid in the northern half of the state. Additionally, it would provide areas of uninterrupted spawning for market squid.

In Section 1 of the MSFMP, some proposed project options also are status quo options (e.g., C2, D1, F1, G1). Some of these options are current regulations (e.g., D1, F1, G1) put in place until a fishery management plan for market squid could be developed and adopted. These interim regulations will be superceded by the adoption of the MSFMP. Because the Department recommends continuing these existing market squid regulations while adding new restrictions to the fishery, they are part of the MSFMP's proposed project. However, for purposes of CEQA analyses, these existing regulations are not discussed in this chapter as they reflect the pre-project status quo. A discussion of the status quo options can be found in Chapter 5 of this ED.

Effects to the Physical Environment

4.1.1 Effects to Air Quality

Impacts on air quality are considered significant if the project causes or contributes to a violation of the federal or California ambient air quality standards and/or exposes sensitive receptors to substantial pollutant concentrations.

Major source of air pollutants under the proposed MSFMP would be fishing vessel exhaust and activities associated with fish processing businesses, including related vehicle trips. In this regard, sources of air emissions are generally the same for the proposed project as currently exist in the status quo market squid fishery. Managing the fishery under the proposed project is not likely to change air quality from present conditions. Implementing the proposed fishery control rules and restricted access options reduces the number of vessels fishing for squid but it does not necessarily reduce fishing effort as the remaining vessels make up for the market demand, thus, effort is not likely to be reduced from the status quo. The proposed permit transfer options could improve air quality as new less polluting more efficient vessels would replace the old ones. However, this change would be incremental. Seabird time and area closures around Anacapa and Santa Barbara islands should eliminate air quality impacts from market squid vessels in the closed areas, but the vessels are likely to fish elsewhere, so from a regional perspective, air quality effects should be the same as current levels. The squid harvest replenishment/general habitat closure area option should eliminate air quality impacts from market squid vessels in waters north of Pillar Point, so air quality impacts in that area may be slightly reduced. However, the vessels are likely to fish elsewhere, so from a broader regional perspective, air quality effects are likely to be the same as current levels. Thus, air quality impacts resulting from the proposed project, as a consequence, are not expected to change or adversely affect existing air quality conditions or the overall amount of emissions associated with current fishing activities. In this respect, air quality impacts that might result from implementation of the proposed project are expected to be less than significant. Finally, significant impacts on air quality are not expected from the combined effects of the individual project options because implementation of the proposed MSFMP will benefit natural resources held in trust for the people of California when compared to existing conditions.

4.1.2 Effects to Water Quality

Water quality impacts are considered significant if the project causes or contributes to the violation of water quality standards, criteria, or waste discharge requirements, and substantially degrade water quality such that acute toxicity results.

While effects to water quality will occur with the proposed project, they are not expected to exceed current levels (e.g., discharges of oily bilge water, squid inks and separation waters, re-suspension of bottom sediments, refuse and sanitary waste dumping, and sloughing of bottom paint into water). Managing the fishery under the proposed project

is not likely to change water quality from present conditions. Implementing the proposed fishery control rules and restricted access options reduces the number of vessels fishing for squid but it does not necessarily reduce fishing effort as the remaining vessels make up for the market demand, thus, effort is not likely to be reduced from the status quo. The proposed permit transfer options could improve water quality as new less polluting more efficient vessels would replace the old ones. However, this change would be incremental. Seabird time and area closures around Anacapa and Santa Barbara islands would eliminate water quality impacts from market squid vessels in the closed area, but the vessels are likely to fish elsewhere, so from a regional perspective, water quality effects should be the same as current levels. The squid harvest replenishment/general habitat closure area option should eliminate water quality impacts from market squid vessels in waters north of Pillar Point, so water quality impacts in that area may be slightly reduced. However, the vessels are likely to fish elsewhere, so from a broader regional perspective, water quality effects are likely to be the same as current levels. Thus, water quality impacts resulting from the proposed project, as a consequence, are not expected to change or adversely affect existing water quality conditions. Therefore, effects on water quality from implementation of the proposed project are expected to be less than significant. Finally, significant impacts on water quality are not expected from the combined effects of the individual project options because implementation of the proposed MSFMP will benefit natural resources held in trust for the people of California when compared to existing conditions.

4.1.3 Effects to Geology

Impacts on geological resources are considered significant if the project results in changes to unique geological features that are not reversible, or contributes to, or triggers, or accelerates, any geological processes such as erosion or marine landslides. Effects to geology are not expected to occur with the proposed project, as fishing for squid takes place over nearshore sandy bottom areas where squid deposit their egg cases. Implementing the proposed fishery control rules and restricted access options functions to decrease the number of vessels fishing for squid, but it does not necessarily reduce fishing effort as the remaining vessels make up for the market demand, thus, effort is not likely to be reduced from the status quo. Impacts on geological resources resulting from the proposed project are not expected to exceed current levels. Therefore, effects on geological resources from implementation of the proposed project are expected to be less than significant. Finally, significant impacts on geological resources are not expected from the combined effects of the individual project options because implementation of the proposed MSFMP will benefit natural resources held in trust for the people of California when compared to existing conditions.

4.1.4 Effect to Physical Oceanography

Impacts on physical oceanography are considered significant if the project results in substantial changes in currents, dissolved oxygen, salinity, temperature, or upwelling. For purposes of these significance criteria, project-related changes in physical

oceanographic conditions are considered substantial where such changes exceed the range of normal variability of identified physical parameters.

There are no known fishing activities, in the proposed project, that have the potential to change salinity, currents, dissolved oxygen, or temperature. The same is true of reasonably foreseeable activities under the proposed MSFMP. In this regard, effects from implementation of the proposed project are not expected to result in significant impacts on physical oceanography.

Effects to the Biological Environment

4.1.5 Effects to Coastal Habitat

Impacts on coastal habitat are considered significant if the project results in a substantial adverse effect, including through habitat modification, on any species identified as a candidate, sensitive, or special status species, or if the project results in a substantial adverse effect on any sensitive natural community, interferes substantially with the movement of any native resident or migratory fish or wildlife species, or impedes the use of native nursery sites, such as estuaries. Significant effects also would occur if the project results in a measurable change in regional species composition, ecological function, or community structure. Finally, a significant effect would result if the project would reduce the number or restrict the range of an endangered, rare, or threatened species as defined by CCR Title 14 §15380. For purposes of these significance criteria, project related changes are substantial where such changes result in a measurable decline in the aforementioned parameters beyond normal variability in the localized area.

In general, fishing activities associated with implementation of the proposed project that could adversely affect coastal habitats include: discharge of pollutants, physical disturbance of bottom sediments and benthic flora and fauna due to anchoring and net placement, physical displacement and/or disturbance of listed species from their respective habitats, and through the removal of market squid as prey for fish, sea turtles, seabirds, and marine mammals. However, these effects and disturbances are not unique to the proposed project. They currently exist and occur as a result of present and ongoing fishing activities in the market squid fishery and similar effects are expected to occur with adoption of the proposed project. For example; fishing activities will continue in the market squid fishery with the same gear currently used.

Implementing the proposed project is not expected to increase impacts to coastal habitat beyond those associated with current fishing activities. Implementing the proposed fishery control rules and restricted access options will reduce the number of vessels but not necessarily the effort as the remaining vessels would make up for the market demand. The proposed permit transfer options could improve water quality in the coastal zone as new less polluting more efficient vessels would replace the old ones. However, this change would be incremental. Consequently, project related

effects on coastal habitat from the implementation of these options are expected to be less than significant.

Implementation of the seabird time and area closures and the squid harvest replenishment /general habitat closure area option would reduce current disturbances to seabird species in the Channel Islands and at the Farallon Islands. Artificial night-lighting can be a problem for several seabird species that are nocturnal in colony or foraging habits. The concern over the potential impacts of artificial lights on seabirds in the Channel Islands arose in 1999 when large increases in artificial light intensity levels associated with night-time squid fishery boat activity extended throughout the seabird breeding season. Breeding seabirds in California susceptible to inflight strikes include Xantus's murrelet, Cassin's auklet, rhinoceros auklet, all of the storm-petrel species (ashy, black, fork-tailed, and Leach's), and the fledgling chicks of tufted puffins. Additionally, California brown pelicans, cormorants, and other seabirds are affected by the ancillary fishing activities. (e.g., vessel proximity, motor noise, generators, lights, human voices, seal bombs, gunshots, radios) of the market squid fishery near roosting and breeding sites. Personnel from the CINPS have reported squid boats fishing as close as 75 to 450 feet (< 1/8 mile) from Anacapa Island, and as many as 12 boats at one time. In 2003, squid vessels harvested more squid north of their traditional Monterey fishing grounds than the past 12-year average. In 2003, squid landed in the vicinity of the Farallon Islands increased a 1,000 times more than the previous 12-year average.

Implementation of the proposed project would establish area and time closure for fishing for squid using attracting lights around Anacapa and Santa Barbara islands from 1 February through 30 September. This area closure would be 1 nautical mile from the high water mark for these islands. Implementation of seabird time and area closures around Anacapa and Santa Barbara islands may result in shift of fishing activities for the southern market squid fleet. However, the closed areas represent less than 1 percent of the squid fishing effort during the closed area time frame over the past 2 years and less than 3 percent over the past 8 years (based on data from landings), so the shift in effort would be considered minimal. Prohibiting the use of attractant lights at these islands would likely compel squid vessels to fish in other locations. Implementation of the squid harvest replenishment/general habitat closure area in all waters north of Pillar Point may also result in a shift of fishing activities for the northern California market squid fleet. However, prior to 2003, the area proposed for closure was not typically fished for market squid. Landings from the closed area represented less than 6 percent of the 12-year average of the northern fleet's landings (based on years 1990 to 2002). Finally, significant impacts on coastal habitat are not expected from the combined effects of the individual project options because implementation of the proposed MSFMP will benefit natural resources held in trust for the people of California when compared to existing conditions.

4.1.6 Effects to Benthic Habitat

Impacts on benthic habitat are considered significant if the project results in a substantial adverse effect, including through habitat modification, on any species identified as a candidate, sensitive, or special status species, or if the project results in a substantial adverse effect on any sensitive natural community, or interferes substantially with the movement of any native resident or migratory fish or wildlife species, or impedes the use of native nursery sites, such as offshore reefs. Significant effects also would occur if the project results in a measurable change in regional species composition, ecological function, or community structure. For purposes of these significance criteria, project-related changes are substantial where such changes result in a measurable decline of the aforementioned parameters beyond normal variability in the localized area.

Physical disturbances to the soft-bottom habitat from implementation of the proposed project are not predicted to cause additional changes in species abundance or composition from existing conditions. Implementation of the proposed project would utilize the same gear as currently exists. Presently, there is concern over the use of chains as a seine weight in the commercial fishery. Chains have the potential of digging deeper into the ocean floor. Net bottoms may also scrape the ocean floor and do harm to squid eggs. However, soft-bottom infauna that may be disturbed by anchoring or net damage are expected to repopulate or recolonize. Currently, purse seine nets used for squid typically do not hang as deep as purse seines used for other species, so contact with the bottom is reduced. Incidental catches of squid eggs and other species increase in the squid fishery when the nets are set in shallower water (less than 22 fathoms), where bottom contact may occur (Lutz and Pendleton 2001). Damage to the substrate, and thus, mortality of squid eggs associated with purse seining for squid has not been quantified.

However, changes are expected to be within the natural variability for the resources and not beyond that which currently occurs. Similar effects are expected to occur with adoption of the proposed project because fishing activities will continue in the market squid fishery with the same gear currently used. Implementing the proposed fishery control rules and restricted access options will reduce the number of vessels but not necessarily the effort as the remaining vessels would make up for the market demand. The proposed permit transfer options could improve water quality above the benthic zone as new less polluting more efficient vessels would replace the old ones. But, this change would be incremental. Implementation of seabird time and area closures around Anacapa and Santa Barbara islands may result in shift of fishing activities for the southern fleet. However, the closed areas represent less than 1 percent of the squid fishing effort during the closed area time frame over the past 2 years and less than 3 percent over the past 8 years, so the shift in effort would be considered minimal. Implementation of the squid harvest replenishment/general habitat closure area in all waters north of Pillar Point may also result in a shift of fishing activities for the northern California market squid fleet. However, prior to 2003, the area proposed for closure was not typically fished for market squid. Landings from the closed area represented less than 6 percent of the 12-year average of the northern fleet's landings (based on years 1990 to 2002), so the shift in effort would be considered minimal. Thus, even with

adoption of the proposed project, the present condition of benthic habitat in and around the market squid fishery is not expected to change relative to existing conditions. Effects on benthic habitat from implementation of the proposed project are expected to be less than significant under CEQA. Finally, significant impacts on benthic habitat are not expected from the combined effects of the individual project options because implementation of the proposed MSFMP will benefit natural resources held in trust for the people of California when compared to existing conditions.

4.1.7 Effects to Pelagic Habitat

Impacts on pelagic habitat are considered significant if the project results in a substantial adverse effect, including through habitat modification, on any species identified as a candidate, sensitive, or special status species, or if the project results in a substantial adverse effect on any sensitive natural community, interferes substantially with the movement of any native resident or migratory fish or wildlife species, or impedes the use of native nursery sites, such as offshore reefs. Significant effects also would occur if the project results in a measurable change in regional species composition, ecological function, or community structure. Finally, a significant effect would result if the project would reduce the number or restrict the range of an endangered, rare, or threatened species as defined by CCR Title 14 §15380. For purposes of these significance criteria, project related changes are substantial where such changes result in a measurable decline in the aforementioned parameters beyond normal variability in the localized area.

In general, fishing and other activities associated with implementation of the proposed project could adversely affect pelagic habitat through discharge of pollutants, and physical displacement of listed species from habitats. These effects, however, are not unique to the proposed project. Instead, the effects currently exist and occur as a result of present and ongoing fishing activities in the market squid fishery, thus, similar affects are expected to continue with adoption of the proposed project because, for example, fishing activities will continue in the market squid fishery with the same gear currently used. Implementing the proposed fishery control rules and restricted access options will reduce the number of vessels but not necessarily the effort as the remaining vessels would make up for the market demand. The proposed permit transfer options could improve water quality in the pelagic zone as new less polluting more efficient vessels would replace the old ones. But, this change would be incremental. Implementation of seabird time and area closures around Anacapa and Santa Barbara islands may result in shift of fishing activities for the southern fleet. However, the closed areas represent less than 1 percent of the squid fishing effort during the closed area time frame over the past 2 years and less than 3 percent over the past 8 years, so the shift in effort would be considered minimal. Implementation of the squid harvest replenishment/general habitat closure area in all waters north of Pillar Point may also result in a shift of fishing activities for the northern California market squid fleet. However, prior to 2003, the area proposed for closure was not typically fished for market squid. Landings from the closed area represented less than 6 percent of the 12-year average of the northern fleet's landings (based on years 1990 to 2002). Thus, even with adoption of the

proposed project, the present condition of pelagic habitat in and around the market squid fishery is not expected to change relative to existing conditions. For the same reason, project-related effects on pelagic habitat are generally expected to be less than significant under CEQA. Finally, significant impacts on pelagic habitat are not expected from the combined effects of the individual project options because implementation of the proposed MSFMP will benefit natural resources held in trust for the people of California when compared to existing conditions.

4.1.8 Effects to Areas of Special Concern

Impacts on areas of special concern are considered significant if the project has a substantial adverse effect on those designated special areas identified in local or regional plans, policies, regulations, or by the Department, USFWS, or NOAA Fisheries. Such effects are substantial where the project would result in the area no longer functioning as a designated special area.

In general, squid fishing and other activities associated with the proposed project could affect areas of special concern. These effects, however, are not unique to the proposed project. Instead, these affects and conditions currently exist in the market squid fishery and occur as a result of fishing and other activities. These activities and effects are expected to continue at the same level even with implementation of the proposed project. For example, fishing activities will continue in the market squid fishery with the same gear currently used. Implementation of the fishery control rules and restricted access components will reduce the number of vessels but not necessarily the effort as the remaining vessels would make up for the market demand. Implementation of seabird time and area closures around Anacapa and Santa Barbara islands may result in shift of fishing activities for the southern fleet. However, the closed areas represent less than 1 percent of the squid fishing effort during the closed area time frame over the past 2 years and less than 3 percent over the past 8 years, so the shift in effort would be considered minimal. Implementation of the squid harvest replenishment/general habitat closure area in all waters north of Pillar Point may also result in a shift of fishing activities for the northern California market squid fleet. However, prior to 2003, the area proposed for closure was not typically fished for market squid. Landings from the closed area represented less than 6 percent of the 12-year average of the northern fleet's landings (based on years 1990 to 2002). For these reasons, project-related effects on areas of special concern are expected to be less than significant under CEQA. Finally, significant impacts on areas of special concern are not expected from the combined effects of the individual project options because implementation of the proposed MSFMP will benefit natural resources held in trust for the people of California when compared to existing conditions.

4.1.9 Effects to Protected, Threatened, and Endangered Species

Impacts on endangered, rare or threatened species, or species otherwise protected by State or federal law, are significant if the project would result in danger of irreparable injury to, or mortality in, any population of any such species where such a change

occurs at a rate that threatens the viability of the population; if the project would impair the recovery of any such species, or where the project has the potential to reduce the number or restrict the range of an endangered, rare, or threatened species as defined by CCR Title 14 §15380; where the project results in an adverse environmental impact on endangered, rare or threatened species, or species otherwise protected by State or federal law, that are individually limited, but cumulatively considerable.

In general, fishing and other activities associated with implementation of the proposed project could affect threatened or endangered species, or species otherwise protected by State or federal law. These effects, however, are not unique to the proposed project. Instead, these effects and conditions currently exist in the market squid fishery and occur as a result of fishing and other activities in the fishery. These activities effects are expected to continue even with implementation of the proposed project. Thus, even with adoption of the proposed project, the present and ongoing effects on threatened and endangered species in and around the market squid fishery are not expected to change relative to existing conditions.

4.1.9.1 Effects to Protected or Listed Marine Mammals

The effects of fishery management decisions on marine mammal populations are typically considered in the context of direct and indirect effects. Direct effects are those where a marine mammal is incidentally taken, seriously injured, or disturbed, as a result of activities associated with the fishery. These would include serious injury or death resulting from entanglement in fishing gear, serious injury or death resulting from interactions with fishing gear, and disturbances that significantly impair essential behavioral patterns including breeding, feeding, or refuge. Indirect effects are those that may be caused by the fishery, but are later in time or farther removed in distance, yet are reasonably foreseeable and causally related. Indirect effects include negatively affecting the marine mammal's prey abundance and availability. NOAA Fisheries's PBR calculation (see Section 3.9.1.1) includes a reduction to account for indirect effects that may have caused the marine mammal stock to be reduced below its OSP (K. Forney pers. comm., Barlow et al. 1995), such as adverse impacts on behavior, reproduction, survival, loss of habitat, prey abundance and availability, or a change in spatial distribution and/or abundance.

<u>Indirect Effects</u>
Market squid are eaten by a number of marine mammals. Their importance in the marine mammal diet varies among species. Squid has been documented as an important dietary component of the sea otter, northern elephant seal, northern fur seal, California sea lion (Lowry and Caretta 1999), Dall's porpoise, Pacific striped dolphin, Risso's dolphin, and toothed whales such as the short-finned pilot whale (Hacker 1992), sperm whale, and bottlenose whale (Fields 1965). The proportion of the diet that squid makes up varies dramatically between species, geographical location, and environmental conditions. Most marine mammals are not squid specialists (squid is rarely the sole prey item) and because of its highly variable abundance squid cannot be relied on as a stable food source, additionally, it has limited energetic value (O'Dor et al.

1986). Therefore, marine mammals must often switch to more abundant or energetically profitable prey species or target squid when they are most abundant during spawning aggregations and minimal energy is needed for capture. For the California sea lion, squid occur in 35 to 44 percent of scat samples collected at rookery sites in the southern California Bight which can represent volumes as high as 27 percent of the diet by weight in non El Niño years and 16 percent in El Niño years (Lowry and Carretta 1999). In terms of prey rank, squid was either the primary or secondary prey item after northern anchovy, depending on location and environmental conditions. During an El Niño event, the presence of market squid in California sea lion and Pacific harbor seal scat samples decreased more than three-fold as compared to non-El Niño periods (Henry 1997, Lowry and Carretta 1999).

Consumption estimates of squid are known for some marine mammals, although these can vary dramatically because squid availability changes with location and environmental conditions. For example, sea lions in southern California have been estimated to consume 68,000 tons of squid in non El Niño years and 30,000 tons in El Niño years (STAR Working Paper 4, Appendix E) [Additional information on landings of squid and the percent frequency of occurrence in sea lions diets can be found in Section 1 of the MSFMP under section 2.1.6]. Dr. William Gilly estimated that three marine mammal species, California sea lion, Dall's porpoise, and Risso's dolphin, consume 125,000 tons of squid annually (pers. comm.). The changing availability of squid also affects potential predators. Short-finned pilot whales increase their consumption of market squid during the squid spawning season. It has been suggested that short-finned pilot whales in the southern California Bight near Santa Catalina Island (Miller et al. 1983 and Dohl et al. 1980) may move inshore as the squid spawning season begins.

In order to assess market squid fishery impacts on marine mammals that consume squid it is necessary to know how much the marine mammal depends on that resource. Although there is documentation detailing consumption of squid by some marine mammal species (described above), it is not possible to estimate the total amount of market squid consumed by all marine mammals in California waters. Thus, at the current time it is not possible to determine the allocation of market squid necessary to sustain marine mammal populations and consequently, makes analysis of whether market squid fishery management practices are having a potentially adverse impact on these species difficult. However, it should be noted that the goal of squid fishery management is to maintain a long-term economically viable fishery that matches the level of effort to the health of the resource, and under MLMA, the Department must consider the ecosystem impacts of the squid fishery, namely the conservation of not only squid, but of the other marine species that depend on squid.

The goals of the MSFMP include ensuring sustainability of the squid resource and the marine life that depends on squid. The restricted access program along with the seasonal catch limit and weekend closures function to disburse the take of market squid throughout the season and allow spawning to take place throughout the season. Additionally, fisheries independent data suggests that squid distribution is widespread

and that fishing does not occur in all areas of distribution and that not all spawning grounds are targeted. Historical evidence from research cruises along the west coast, as well as recent catch data, suggests that squid biomass may be very large at times and distributed widely along the entire west coast. The squid fishery has a monitoring program which assists in management of the squid fishery to achieve sustainability and the squid harvest is monitored through an egg escapement model. Implementation of seabird time and area closures around Anacapa and Santa Barbara islands and the squid harvest replenishment/general habitat closure area in waters north of Pillar Point would benefit marine mammals from an increase in prey species available to marine mammals in the closed areas. This would benefit all marine mammal species in the closed area that prey on squid. The latter option would make half of the state a squid harvest replenishment area. Finally, the effects of removing squid from the ecosystem is not unique to the proposed project as this condition currently exists in the market squid fishery. Removal of squid as prey available to marine mammals is expected to continue even with implementation of the proposed project.

Direct Effects

Implementation of the proposed project could affect listed and marine mammal species of special concern through interaction with fishing gear. These effects, however, are not unique to the proposed project. Instead, these effects and conditions currently exist in the market squid fishery and presently occur as a result of fishing and other activities in the market squid fishery. These activities and effects are expected to continue even with implementation of the proposed project.

In the remote possibility that listed marine mammals are taken in the squid fishery, the take is ultimately governed by NOAA Fisheries. If the take does not exceed the species' PBR, NOAA Fisheries does not consider the take significant as NOAA Fisheries has determined that the loss of marine mammals below the PBR does not adversely affect the population or stock viability. The Department would defer to the governing agency for enforcement. Therefore, while there is a remote possibility for the squid fishery to interact with marine mammals such that mortality results and thereby significant by CEQA definition, NOAA Fisheries has determined that the loss of marine mammals below the PBR does not adversely affect the population or stock viability.

The restricted access options, in conjunction with the fishery control rule options, are designed to prevent an overfished condition by disbursing the take of market squid and allowing spawning to take place throughout the season. These options reduce the number of vessels but not necessarily the effort as the remaining vessels make up for the market demand. The number of brail vessels may increase, but the squid brail fishery is considered a Category III fishery (fisheries with a remote likelihood of marine mammal interaction or no known serious injuries or mortalities with marine mammals) and there is no evidence that listed marine mammals interact with brail vessels. Additionally, the design of the permit transfer system does not allow for increases in the harvesting capability of the fleet. Accordingly, total fishing effort would be equal to or less than current conditions (status quo). Implementation of the harvest replenishment/general habitat closure option would establish areas that are closed to

squid fishing in all waters north of Pillar Point at any time. This would benefit all marine mammal species that interact with squid fishing operations in the closed area.

Given the past absence of squid purse seine fishery interactions, serious injury or mortality, with any of the baleen whale stocks including; humpback whale, northern right whale, sei whale, fin whale, and the blue whale in California waters and the majority of the toothed whales, including the sperm whale, we assume that implementation of the fishery control rule and restricted access components would have an insignificant effect on these cetacean species. There are no reports of squid purse seine fishery interactions, serious injury or mortality, with the Guadalupe fur seal, northern elephant seal, or Steller sea lion stocks, and no reports of squid purse seine interactions with the southern sea otter. Thus, we assume that implementation of these components would have an insignificant effect on these pinniped and fissiped species and is not expected to change relative to existing conditions.

Implementation of seabird time and area closures around Anacapa and Santa Barbara islands and the squid harvest replenishment/general habitat closure area in waters north of Pillar Point would eliminate squid fishery- marine mammal interactions in the closed areas. However, the closed areas could shift squid fishing effort to areas with higher marine mammal populations (e.g. adjacent to pinniped rookeries, haul out sites, foraging areas) particularly at the Channel Islands. Pinniped rookeries are present at several Channel Islands that are subject to disturbance by commercial and recreational fishermen. However, closures have already been enacted to keep fishing boats reasonable distances offshore from the rookeries to minimize interactions and disturbances, particularly during the pupping and breeding season. The proposed closure areas at the Channel Islands represent less than 1 percent of the squid fishing effort during the closed area time frame over the past 2 years and less than 3 percent over the past 8 years, while the proposed closure in northern waters is not an area frequently fished for market squid (at least prior to 2003). Thus, the shift in effort is considered minimal. Therefore, we assume that implementation of the time and area closures of the proposed project would have a less than significant impacts to protected and listed marine mammals and is not expected to change relative to existing conditions. Finally, significant impacts on listed marine mammals are not expected from the combined effects of the individual project options because implementation of the proposed MSFMP will benefit natural resources held in trust for the people of California when compared to existing conditions.

4.1.9.2 Effects to Listed Marine and Coastal Birds (Seabirds)

The effect of fishery management decisions on seabird populations is typically considered in the context of direct and indirect effects. Direct effects are those where a seabird is incidentally injured seriously or killed as a result of activities associated with the fishery. This would include serious injury or death resulting from bycatch or entanglement in fishing gear, serious injury or death resulting from seabirds in flight striking a fishing vessel, and disturbances that significantly impair essential behavioral patterns including breeding, feeding, or sheltering. Indirect effects are those that may

be caused by the fishery, but are later in time or farther removed in distance, yet are reasonably foreseeable and causally related. This includes the reduction of seabird prey abundance and availability.

Seabirds can be affected by a wide variety of factors including human disturbance, changes in key prey species, oil spills, toxic contaminants, fishery interactions, predation, and changes in climatic conditions. Unfortunately, there are many informational voids concerning seabird ecology, especially winter ecology, which makes it difficult to determine if a particular fishery is having a negative effect on a seabird population. Population monitoring has been conducted for some species that nest on cliffs and flat ground (e.g., California brown pelican, cormorants, common murres, California least tern) and for crevice dwelling species (e.g., Xantus's murrelets, storm-petrels, auklets, pigeon guillemots), but the data are not complete or uniform for all seabird breeding colonies throughout the state. Information concerning fishery interactions is, for the most part, anecdotal and difficult to quantify. Food habit data and the relationship to changes in key prey species are not well known, nor are the effects of environmental changes. This lack of information makes an analysis of whether fishery management practices are having a potentially significant impact on seabirds difficult.

Indirect Effects

Market squid are eaten by a number of seabirds. Their importance in the seabird diet varies among species. Squid has been documented as an important dietary component of the common murre, ashy storm-petrel, black storm-petrel, fork-tailed storm-petrel and rhinoceros auklet (Morejohn et al. 1978). The proportion of the diet that squid makes up varies dramatically between species, geographical location, and environmental conditions. Most seabird species are not squid specialists (squid is rarely the sole prey item) and because of its highly variable abundance squid cannot be relied on as a stable food source, additionally, it has limited energetic value (O'Dor et al. 1986). Therefore, squid predators often must switch to more abundant or energetically profitable prey species (Ainley et al. 1996, Sydeman et al. 1997), or target squid when they are most abundant during spawning aggregations when minimal energy is needed for capture. For seabirds such as the common murre, squid composes 6 to 20 percent of the diet (by weight) depending on season, and is usually ranked third or fourth after northern anchovy, Pacific herring, and shiner surfperch (Ainley, et al. 1996). In terms of frequency of occurrence, the presence of squid varies dramatically. For diving birds such as rhinocerous auklets, common murres, artic loons, and Brandt's cormorants, the frequency of occurrence of squid in the diet can range from 85 to 33 percent (Baltz and Morejohn 1977). For plunging, surface feeding birds, such as shearwaters and gulls, the frequency of occurrence ranges from 67 to 0 percent (Baltz and Morejohn 1977).

In order to assess market squid fishery impacts on seabirds that consume squid it is necessary to know how much seabirds depend on the squid resource. Although there is documentation detailing consumption of squid by some seabird species, it is not possible to estimate the total amount of market squid consumed by all seabirds in California waters. Thus, at the current time it is not possible to determine the allocation

of market squid necessary to sustain seabird populations and consequently, makes analysis of whether market squid fishery management practices are having a potentially adverse impact on these species difficult. However, it should be noted that the goal of squid fishery management is to maintain a long-term economically viable fishery that matches the level of effort to the health of the resource, and under MLMA, the Department must consider the ecosystem impacts of the squid fishery, namely the conservation of not only the squid, but of the other marine species that depend on squid.

The goals of the MSFMP include ensuring sustainability of the squid resource and the marine life that depends on squid. The restricted access program along with the seasonal catch limit and weekend closures function to disburse the take of market squid throughout the season and allow spawning to take place throughout the season. Additionally, fisheries independent data suggests that squid distribution is widespread and that fishing does not occur in all areas of distribution and that not all spawning grounds are targeted. Historical evidence from research cruises along the west coast, as well as recent catch data, suggests that squid biomass may be very large at times and distributed widely along the entire west coast. The squid fishery has a monitoring program which assists in management of the squid fishery to achieve sustainability and the squid harvest is monitored through an egg escapement model. Implementation of seabird time and area closures around Anacapa and Santa Barbara islands and the squid harvest replenishment/general habitat closure area in waters north of Pillar Point would benefit seabirds from an increase in prey species available to seabirds in the closed areas. This would benefit all seabird species in the closed area that prey on squid. The latter option would make half of the state a squid harvest replenishment area. Finally, the effects of removing squid from the ecosystem is not unique to the proposed project as this condition currently exists in the market squid fishery. Removal of squid as prey available to marine bird species is expected to continue even with implementation of the proposed project.

Direct Effects

Implementation of the proposed project could affect listed marine bird species through interaction with fishing activities and disturbance. These effects, however, are not unique to the proposed project. Instead, these effects and conditions currently exist in the market squid fishery and presently occur as a result of fishing and other activities in the market squid fishery. The restricted access options, in conjunction with the fishery control rule options, are designed to prevent an overfished condition from occurring by disbursing the take of market squid throughout the season and by allowing market squid spawning to take place throughout the season. Implementation of the fishery control rule and restricted access options will reduce the number of vessels but not necessarily the effort as the remaining vessels would make up for the market demand. The number of brail vessels may increase, but the design of the permit transfer system does not allow for increases in the harvesting capability of the fleet. Accordingly, total fishing effort would be equal to or less than the status quo project. There is still the potential for vessels to interact with several surface-feeding and scavenging seabird species (gulls, albatrosses, fulmars, and shearwaters) which may be attracted to the vessels to

feed on squid. Thus, we cannot rule out the possibility that the squid purse seine fishery may interact with these species. Currently, the fishery does not have observers so interactions with these species have not been reported. However, these effects and conditions currently exist in the market squid fishery and the activities and effects are expected to continue even with implementation of the proposed project.

Seabird Closure Option

Implementation of the seabird closure option would establish area and time closure areas for squid vessels using attracting lights around Anacapa and Santa Barbara islands from 1 February through 30 September from 1 nautical mile from the Mean High Water mark for these islands. It is assumed that the squid fishery will not fish at night without the use of attracting lights, thus, this closure would discourage squid vessels from these areas at night. This area and time closure will serve primarily to protect nesting California brown pelicans, an endangered and fully protected species, from light disturbance associated with the squid fishery during the height of their breeding season. In addition, all seabirds that forage in the waters and/or breed on these islands (see Tables 3-5, 4-1, Figures 4-1, 4-2) would benefit because there would be decreased interactions from lights associated with the squid vessels. Santa Barbara Island is considered one of the most important seabird nesting areas in the southern California Bight, in terms of numbers of species and numbers of breeding birds, while Anacapa Island supports the largest breeding colony of California brown pelicans in the United States.

Thus, the time and area closures would significantly reduce any potential impact of light pollution near breeding habitat for the listed California brown pelican, candidate/threatened Xantus's murrelet, and several SSC (ashy storm-petrel, black storm-petrel, double crested cormorant). Anacapa and Santa Barbara islands provide nesting habitat for all of the breeding California brown pelicans in the United States, about 75 percent of the Channel Island population and about 25 percent of the world's population of Xantus's murrelet, about 33 percent of the Channel Island population and about 14 percent of the world's population of ashy storm-petrel, and all of the breeding black storm-petrels (Santa Barbara Island) in the United States (as well as habitat for other species listed in Table 4-1). The majority of the Channel Islands seabirds nest between March and August, thus the time closure from 1 February to 30 September would incorporate the entire breeding season for several seabird nesting species, during most years. California brown pelicans have a protracted breeding season which can start as early as January and end as late as October. Ashy storm-petrel nesting is also protracted (starts in April) and the majority of chicks fledge in September and October. Xantus's murrelets may visit breeding sites starting in January. Breeding seabirds would still be susceptible to inflight strikes and colony disturbances if attracting lights are used in the squid fishery close to seabird breeding colonies during January and October. However, the closures would not reduce any impacts to the federally threatened western snowy plover which nest on the east side of Santa Rosa Island. No studies have been conducted to determine if the bright lights and noise associated with the squid fishery has a negative impact on the breeding activity of western snowy

plovers although it is known that increased light levels can alter the behavior of diurnal species and result in nest abandonment (Avery 2000, Bower 2000). Additionally, diurnal predators, such as western gulls, have been noted by researchers as more active at night when squid lights are on (Channel Island National Park, unpublished data). Thus, predation rates of plover adults, eggs, and/or chicks by diurnal predators could be increased over normal levels. Therefore, it is possible that the fishery could have impacts to nesting plovers if fishing occurs close to breeding colonies during the breeding season. But since the market squid fishery typically fishes during the winter months, impacts to this species would only occur if fishing extended into the breeding season.

Additionally, under this seabird closure option, noise associated with squid fishing activities (e.g., engine noise, generators, radios, gunshots, seal bombs, gunshots, human voices) still has the potential to cause disturbances to breeding seabirds which require nesting and roosting sites free from human disturbance. In the last 2 years, there has been an increased trend for squid fishermen to fish during daylight hours. Thus, it is likely that the squid fleet will fish in these areas during the daytime and noise and disturbance will still be an issue for breeding seabirds. At this time, there is no control over the number of squid vessels in any particular area. Personnel from the CINPS have reported squid boats fishing as close as 75 to 450 feet (< 1/8 mile) from Anacapa Island, and as many as 12 boats at one time. California brown pelicans, cormorants, alcids, and other seabirds, are affected by ancillary fishing activities near roosting and breeding sites. Research has shown that many seabird species are disturbed by events which are out of the ordinary (Manuwal 1978, Anderson and Keith 1980, Carney and Sydeman 1999). This includes not only direct human disturbance, but also loud noises. Disturbances (including close vessel approach) at California brown pelican, double-crested and Brandt's cormorants, and common murre colonies are known to cause nest abandonment and increased egg predation (Ellison and Cleary 1978, Anderson and Keith 1980, Anderson 1988, Parker et al. 2000, Rojek and Parker 2000, Parker et al. 2001). The low productivity of California brown pelicans on Anacapa Island in 1999 has been attributed to both the noise and associated lights of squid vessels close to the island.

Although it is assumed that most participants in the squid fishery will not fish at night without the use of attracting lights, some squid vessels may choose to fish at night without attracting lights. Even then, some level of artificial lighting will be necessary for squid vessels to conduct their operations safely. We cannot rule out the possibility that unregulated artificial night lighting associated with the market squid fishery will result in disorientation of these species and collisions with vessels. With no control over the number of vessels in an area, it is possible that multiple boats with operating lights could be close to seabird colonies during sensitive periods in their nesting season. For example, small amounts of light on vessels in the Channel Islands have been observed to cause disorientation in Xantus's murrelets and their chicks when they depart the colony (Zeidberg pers. comm.). Thus, noise and disturbance will still be an issue for seabirds. Monitoring the squid fishery to determine where the fishery is concentrated after implementation would be necessary to assess impact to seabirds.

Under the proposed seabird closure option not all seabird colonies in the Channel Islands will receive protection. Castle Rock and Prince Island off San Miguel Island are considered, along with Santa Barbara Island, to be the most important seabird nesting areas in the southern California Bight, in terms of numbers of species and numbers of birds. The only nesting colonies in the Channel Islands of the SSC species rhinoceros auklet and tufted puffin are found on San Miguel Island (Figure 4-3, Table 4-1), and western snowy plovers are found on Santa Rosa Island. San Miguel and Santa Cruz islands provide important habitat for ashy storm-petrels (about 68 percent of the Channel Island population) and Xantus's murrelets (about 18 percent of the Channel Island population) and small numbers of both of these species have been found breeding on Santa Catalina and San Clemente islands. Squid fishing does currently occur off Santa Cruz Island but rarely occurs off San Miguel Island. Closures to light use around Anacapa and Santa Barbara islands could result in increased night-fishing pressure around Santa Cruz Island and an extension of the fishery to San Miguel Island and possibly increased effort at Santa Rosa. This could result in negative impacts to seabird species on these islands, and the level of impact is potentially greater than the status quo due to the importance of San Miguel Island for breeding seabirds. Some protection will occur at Prince Island given that it is in the Harris Point State Marine Reserve, a no-take MPA. But since the market squid fishing season typically occurs during the winter months, impacts to these other islands would only occur if fishing extended into the breeding season and squid were available in these areas. In summary, the proposed seabird closure option would reduce the ongoing impacts of light use currently associated with the squid fishery from the status quo. If this option is chosen, we recommend monitoring the squid fishery, through the evaluation of squid fishing logbooks, to determine where the fishery is concentrated after implementation. We also recommend measuring noise and other activities to determine if the squid fishery is impacting seabird colonies in the Channel Islands. Additionally, we need to determine if the area and time closures to use of attracting lights in the squid fishery is enforceable. Then, if the data warrants, additional conservation and management measures can be formulated.

Squid Harvest Replenishment/General Habitat Closure Area Option

Implementation of the squid harvest replenishment/general habitat area closure option would establish areas that are closed to squid fishing in all waters north of Pillar Point at any time. This would include the Gulf of the Farallones National Marine Sanctuary (GFNMS) and the Farallon Islands (a National Wildlife Refuge), Cordell Bank National Marine Sanctuary, and part of the Monterey Bay National Marine Sanctuary. The Farallon Islands are home to one of the largest and most diverse seabird colonies in the continental U.S. They provide critical nesting habitat for 12 species of marine and coastal birds including the SSC ashy storm-petrel, double-crested cormorant, tufted puffin and rhinoceros auklet (see Table 4.1).

In 2003, market squid vessels harvested more squid north of the traditional Monterey fishing grounds, in the area between Pigeon Point and Point Reyes, than the prior 12-

year average (1990-2002) (see Figure 3-7a-b in Section 1). In 2003, approximately 5,744 tons or 40 percent of the northern California market squid landings were taken from Pigeon Point to Point Reyes compared to the 12-year average of 666 tons or 7 percent. This disturbed some biologists and other users of the area. The removal of squid biomass in this area was of particular concern because squid are an important prey item for the many seabirds that utilize these waters including the common murre, ashy storm-petrel, and rhinoceros auklet feed (Morejohn et al. 1978). Additionally, the squid fishery has the potential to directly affect seabirds from squid fishing activities (see previous section concerning seabird issues in the Channel Islands).

The Farallon Islands provide nesting habitat for 50 percent of the U.S. population of breeding ashy storm-petrels (Carter et al. 1992). The only other major nesting site for the ashy storm-petrel is at the Channel Islands. Populations of ashy storm-petrels have declined by an estimated 34 percent over the past 20 years at the Farallon Islands (Sydeman et al. 1998a, 1998b) and would be at risk from interaction with the squid fishery. Factors in their decline include habitat loss from invasive non-native plants; introduction of feral cats, house mice, and other nonnative animals; and predation by house mice, western gulls, burrowing owls, and other owl species (Sydeman et al. 1998, Nur et al. 1999). Ashy storm-petrels are also known to be sensitive to human disturbance, oil pollution, and marine pollution. Thus, ashy storm-petrels could be affected by ancillary squid fishing activities (e.g., vessel proximity, motor noise, generators, gunshots, seal bombs, radios, etc.) near their roosting and breeding sites. Another issue of concern would be the increase in artificial light intensity levels associated with night-time squid fishery boat activity during the breeding season. Artificial night lighting associated with the market squid fishery could significantly impact recovery of this species and impacts to the Farallon Island populations of ashy storm-petrels could have serious, long-term consequences for the survival of this species.

Squid fishing activities also have the potential to impact the other 11 species of marine and coastal birds that breed at the Farallon Islands including the SSC double-crested cormorant, rhinoceros auklet, and tufted puffins. Disturbance and noise associated with squid fishing activities (e.g., engine noise, generators, radios, gunshots, seal bombs, gunshots, human voices) at the Farallon Islands has the potential to cause disturbances to breeding seabirds which require nesting and roosting sites free from human disturbance, such as the alcids and cormorants. Rhinoceros auklets are nocturnal at nesting colonies and accustomed to flying in total darkness. They too, may become disoriented in bright lights and are susceptible to inflight strikes resulting in mortality or injury. Additionally, fledgling chicks of tufted puffins depart for the sea alone, at night (Gaston and Jones 1998), and may become attracted and disoriented by lights and collide with vessels, increasing the normal mortality rates of the young-of-the-year. Behavior patterns of gulls may be influenced by fishery activities. For example, gulls, which are normally diurnal, are known to forage at night near squid fishing boats where they are attracted by the activity and bright lights. Artificial lighting may also increase lighting and foraging abilities of gulls on other seabird colonies, resulting in increased levels of predation on nocturnally nesting seabirds. In 1999, western gulls were noted by researchers as more active at night when squid lights were on in the Channel Islands

(CINPS, unpublished data). Implementation of the squid harvest replenishment/general habitat closure in all waters north of Pillar Point would eliminate direct and indirect market squid fishery impacts to ashy storm-petrels, double-crested cormorants, rhinoceros auklets, tufted puffins and the other eight species of nesting seabirds that breed at the Farallon Islands and forage in the surrounding waters.

In conclusion, significant impacts on listed marine and coastal seabirds are not expected from the combined effects of the individual project options because implementation of the proposed MSFMP will benefit natural resources held in trust for the people of California when compared to existing conditions.

Table 4-1 Seabird species that breed (indicated by an X) in the Channel Islands and the Farallon Islands									
	ANA	**SBI**	**SMI**	**SRI**	**SCR**	**CAT**	**SCL**	**SNI**	**Farallon Is.**
Diurnal Species									
California Brown Pelican*	X	X	R		R		R	R	
Double-Crested Cormorant**	X	X	X					X	X
Brandt's Cormorant	X	X	X	X	X		X	X	X
Pelagic Cormorant	X	X	X	X	X				X
Western Gull	X	X	X	X	X	X	X	X	X
Pigeon Guillemot	X	X	X	X	X				X
Tufted Puffin**			X						X
Western Snowy Plover ŧ,**			-----x	X					
Black Oystercatcher	X	X	X	X	X		X	X	X
Common Murre									X
Nocturnal Species									
Ashy Storm-Petrel**	P	X	X		X	X	X		X
Black Storm-Petrel**		X	X			X	X		
Leach's Storm-Petrel		X	X						X
Xantus's Murrelet**, ***	X	X	X		X	X	X		
Rhinoceros Auklet**			X						X
Cassin's Auklet	X	X	X		X				X

*Federally and State listed as endangered, ŧ Federally listed as threatened, ** Department Species of Special Concern (SSC), -----x = not seen since 1991
*** Species in the process of being added to the State threatened species list CCR Title 14
P= probable nesting, R= Roost site
ANA=Anacapa, SBI= Santa Barbara, SMI= San Miguel, SRI= Santa Rosa,
SCR= Santa Cruz, CAT= Santa Catalina, SCL= San Clemente, SNI= San Nicolas

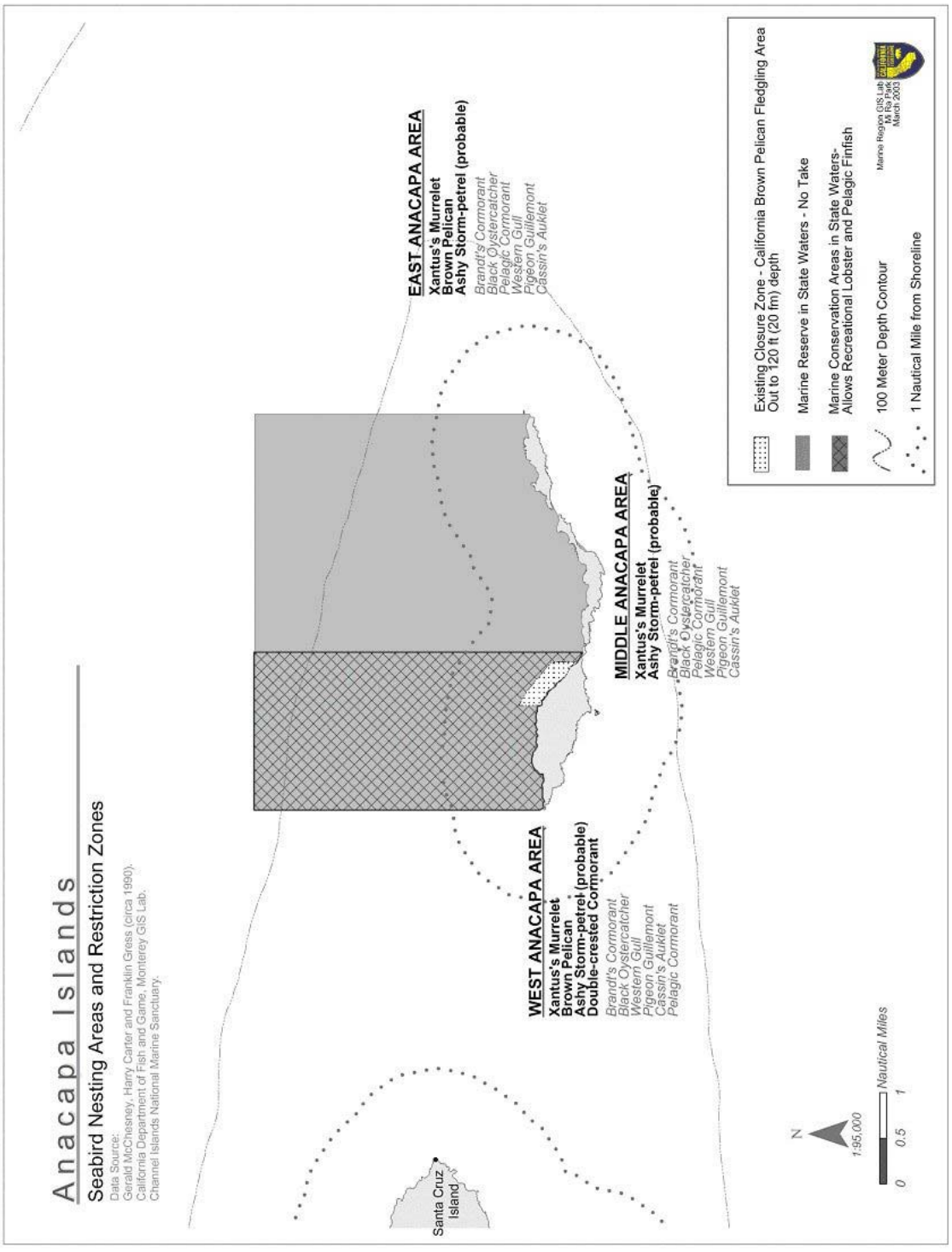

Figure 4-1. Seabird nesting at Anacapa Island

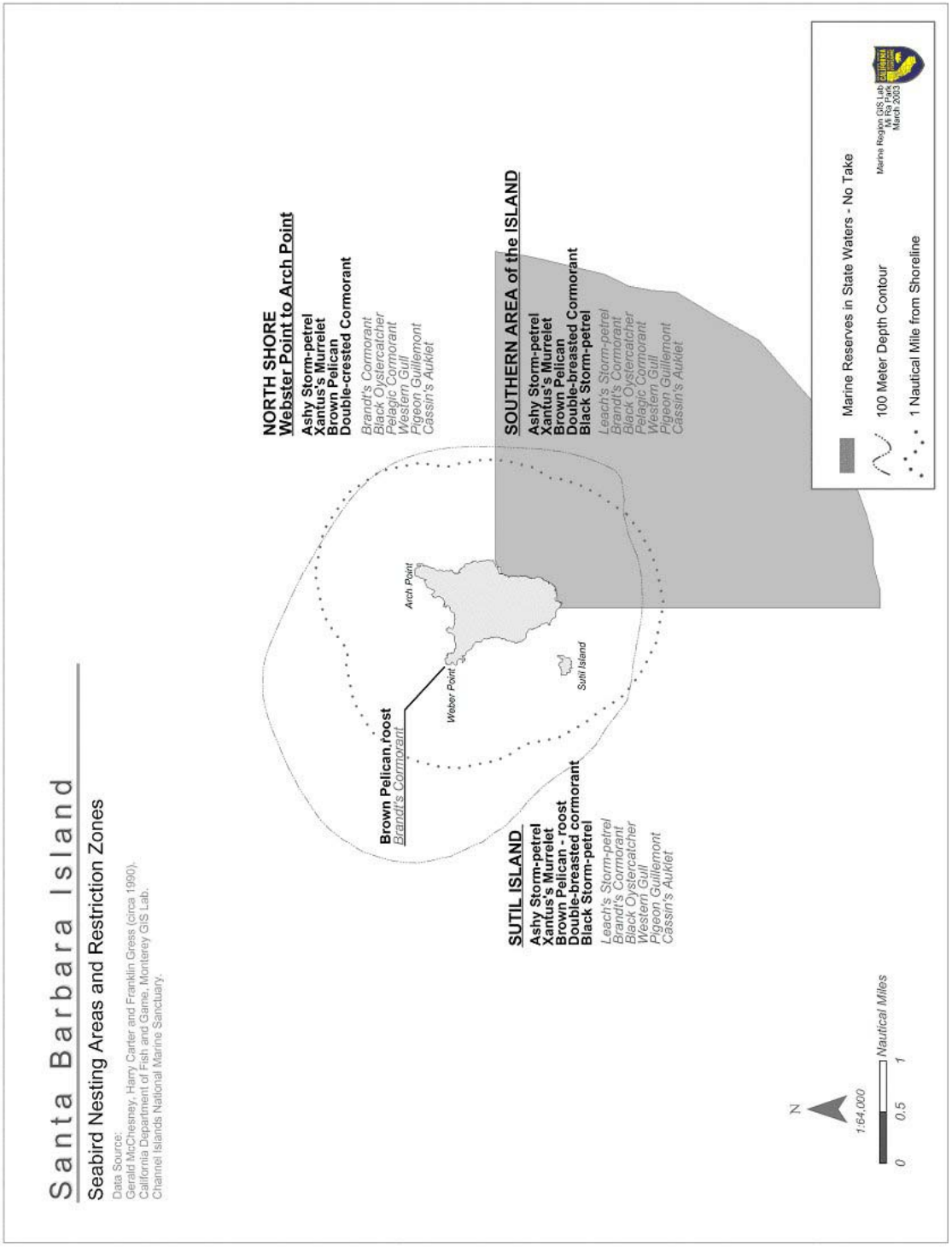

Figure 4-2. Seabird nesting at Santa Barbara Island

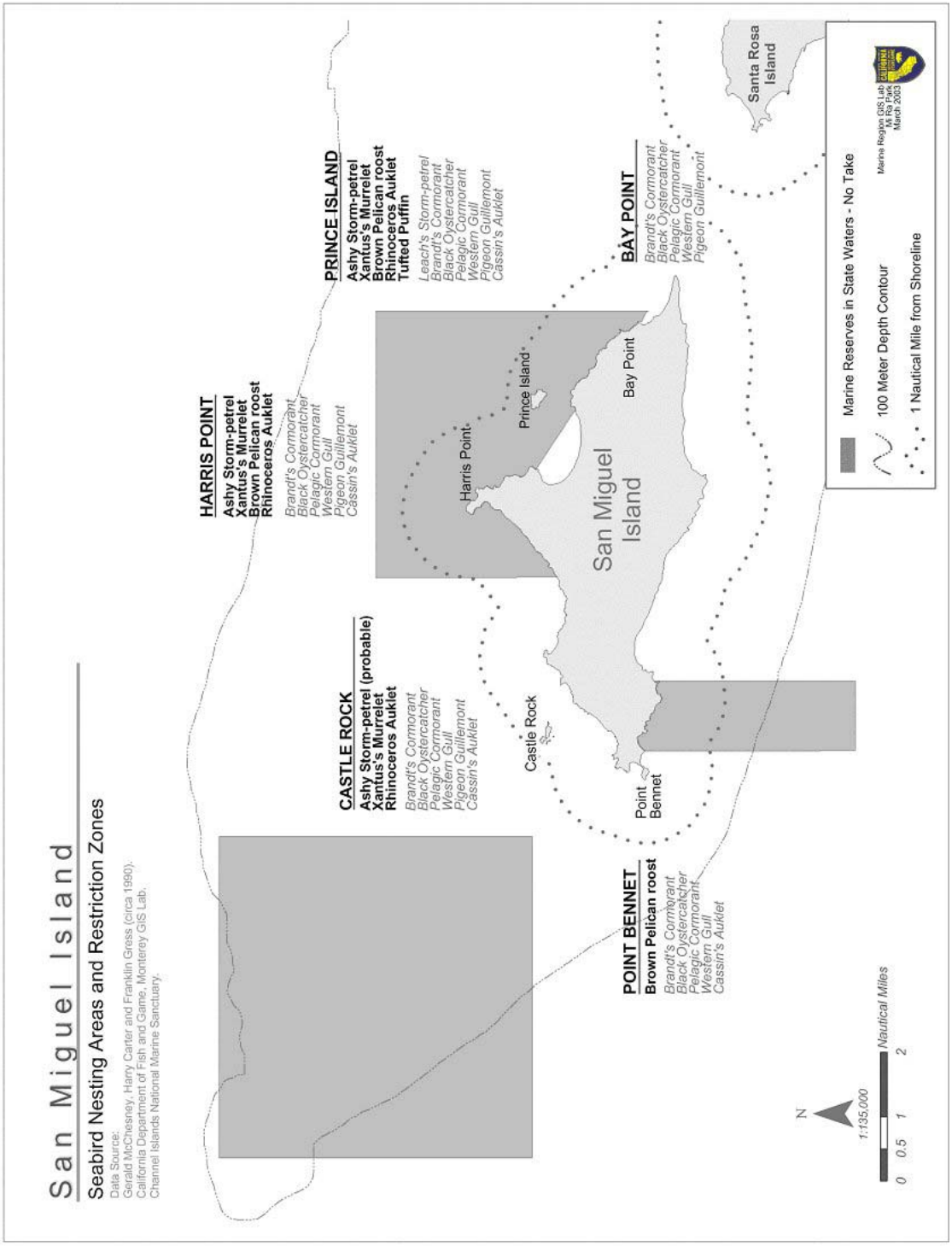

Figure 4-3. Seabird nesting at Anacapa Island

4.1.9.3 Effects to Listed Marine (Sea) Turtles

Implementation of the proposed project is not expected to additionally affect sea turtles. Implementation of the fishery control rule and restricted access options will reduce the number of vessels but not necessarily the effort as the remaining vessels would make up for the market demand. Accordingly, total fishing effort would be equal to or less than the current conditions, thus, impacts to sea turtles from this option would be the same as those in the current fishery. Implementation of the seabird time and area closures around Anacapa and Santa Barbara islands may result in shift of fishing activities for the southern fleet. There would be no sea turtle interaction during closed times and in closed areas, but if fishing effort shifted to other areas it could increase the potential of interactions between sea turtles and fishing gear. However, the southern fleet targets a multitude of fishing spots including other areas of the Channel Islands and the coastal area from Point Conception south to La Jolla. Additionally, the proposed closure areas at the Channel Islands represent less than 1 percent of the squid fishing effort during the closed area time frame over the past 2 years and less than 3 percent over the past 8 years. Implementation of the harvest replenishment/general habitat closure option would establish an area closed to squid fishing in all waters north of Pillar Point at any time. There would be no sea turtle interaction in the closed area, but if fishing effort shifted to other areas it could increase the potential of interactions between sea turtles and fishing gear. However, the proposed closure in northern waters was not an area frequently fished for market squid (at least prior to 2003). Thus, the shift in effort is considered minimal. Finally, the current interaction levels with sea turtles are very low, thus, implementation of time and/or area closures is not expected to significantly increase from the no-project alternative. A potential benefit to sea turtles may occur from an increased productivity of prey species available to sea turtles in the closed areas as these areas would function as squid harvest replenishment areas during the closed times. It is doubtful that the proposed project would reduce the numbers of market squid available as prey items to sea turtles, as fishing activities would continue at current levels.

Thus, effects on sea turtles from implementation of the proposed project are expected to be less than significant under CEQA. Finally, significant impacts on marine turtles are not expected from the combined effects of the individual project options because implementation of the proposed MSFMP will benefit natural resources held in trust for the people of California when compared to existing conditions.

4.1.9.4 Effects to Listed Fish

The effects of fishery management decisions on populations of fish species are typically considered in the context of direct and indirect effects. Direct effects are those where a fish is incidentally taken (bycatch) during harvest activities. Indirect effects include negatively affecting fish prey abundance and availability.

<u>Indirect Effects</u>

Market squid are eaten by a number of fish although their importance in the diet varies among species. In Monterey Bay, 19 species of fish were found to feed upon market squid, including many commercial and recreational important species such as Pacific bonito, salmon, halibut, and tuna (Fields 1965, Morejohn et al. 1978). Predators from many trophic levels utilize both small pelagic fishes, such as northern anchovy, sardine, and squid as either a primary or supplementary food source. The proportion of the diet that squid makes up varies dramatically between species, geographical location, and environmental conditions. Most squid predators are not squid specialists (squid is rarely the sole prey item) and because of its highly variable abundance squid cannot be relied on as a stable food source, additionally, it has limited energetic value (O'Dor et al. 1986). Therefore, squid predators often must switch to more abundant or energetically profitable prey species (Ainley et al. 1996, Sydeman et al. 1997), or target squid when they are most abundant during spawning aggregations and minimal energy is needed for capture. The amount of squid in the diet of fish predators changes dramatically between geographical locations due to differences in environmental conditions and availability. For chinook salmon, squid composed 7 to 9 percent of diet (by volume) and ranked third or fourth behind northern anchovy, euphausids, and juvenile rockfish depending on location, San Francisco or Monterey (Morejohn et al. 1978). At other locations along the west coast, squid is not an important prey item for chinook since they prey mainly on fish (Groot and Margolis 1991). In chilipepper rockfish, squid ranked third behind juvenile rockfish and other fishes (Morejohn et al. 1978). Other fish predators in which squid ranked high as a prey item includes mainly bottom dwelling species including curlfin turbot, speckled and Pacific sanddabs, lingcod, petrale sole, and Pacific halibut (Morejohn et al. 1978). Several pelagic species also feed on squid when available such as blue shark, common thresher shark, and albacore (Morejohn et al. 1978). The changing availability of squid also affects potential predators. Blue sharks and Pacific bonito increase their consumption of market squid during the squid spawning season. It has been suggested that blue sharks near Santa Catalina Island (Tricas 1979) may move inshore as the squid spawning season begins. Pacific bonito consumption of squid is influenced by the shoaling behavior of squid spawning in nearshore waters of southern California (Oliphant 1971).

In order to assess market squid fishery impacts on fish species that consume squid it is necessary to know how much the fish depends on that resource. Although there is documentation detailing consumption of squid by some fish species, it is not possible to estimate the total amount of market squid consumed by all fish in California waters. Thus, at the current time it is not possible to determine the allocation of market squid necessary to sustain fish that predate on fish and consequently, makes analysis of whether market squid fishery management practices are having a potentially adverse impact on these species difficult. However, it should be noted that the goal of squid fishery management is to maintain a long-term economically viable fishery that matches the level of effort to the health of the resource, and under MLMA, the Department must consider ecosystem impacts of the squid fishery, namely the conservation of not only the exploited species, but of the other species that depend on that resource.

The goals of the MSFMP include ensuring sustainability of the squid resource and the marine life that depends on squid. The restricted access program along with the seasonal catch limit and weekend closures function to disburse the take of market squid throughout the season and allow spawning to take place throughout the season. Additionally, fisheries independent data suggests that squid distribution is widespread and that fishing does not occur in all areas of distribution and that not all spawning grounds are targeted. Historical evidence from research cruises along the west coast, as well as recent catch data, suggests that squid biomass may be very large at times and distributed widely along the entire west coast. The squid fishery has a monitoring program which assists in management of the squid fishery to achieve sustainability and the squid harvest is monitored through an egg escapement model. Implementation of seabird time and area closures around Anacapa and Santa Barbara islands and the squid harvest replenishment/general habitat closure area in waters north of Pillar Point would benefit fish that prey on squid from an increase in prey species available to them in the closed areas. The latter option would make half of the state a squid harvest replenishment area. Finally, the effects of removing squid from the ecosystem is not unique to the proposed project as this condition currently exists in the market squid fishery. Removal of squid as prey available to fish species is expected to continue even with implementation of the proposed project.

Direct Effects

Fishing and other activities associated with the MSFMP will not occur in tidewater goby habitat (low salinity waters in estuaries) therefore, no effects are predicted. No fishing activities will occur in salmon spawning or rearing habitats. Restricted access options serve to reduce fishing effort but not significantly less than that in the no-project alternative. Implementation of seabird time and area closures around Anacapa and Santa Barbara islands and the squid harvest replenishment/general habitat closure area in waters north of Pillar Point would eliminate any potential for bycatch in the closed areas. There would be no catch interaction during closed times in closed areas, but exclusion of squid fishing in closed areas could shift fishing effort to other areas which could increase the potential of catch of listed fish. However, bycatch is minimal in the commercial market squid fishery. Ongoing dockside sampling efforts, conducted statewide since 1998, revealed a small increase of salmon bycatch in squid catches delivered to central California commercial markets. A total of eight salmon (seven chinook salmon, one unidentified salmon) were observed as bycatch in 2002 and 2003. Four of the seven Chinook salmon were caught north of Pigeon Point, while the remaining Chinook and unidentified salmon were collected from landings in Monterey Bay. However, none of these salmon were listed species. Thus, effects on listed fish from implementation of the proposed project are expected to be less than significant under CEQA.

4.1.10 Effects to Non-listed Species

Impacts are considered significant if the proposed project has substantial adverse effects on biological functions such as feeding, migration, or reproduction, or where the

project impedes the use of nursery sites, or modifies habitat such that a regional shift in species distribution occurs.

With the implementation of the proposed project, all non-listed species have the continued potential for interactions with fishing gear proposed project would utilize the same fishing gear as currently exists in the market squid fishery.

4.1.10.1 Effects to Non-listed Marine Mammals

Indirect effects to non-listed marine mammal species who consume squid are discussed in Section 4.1.9.1, under effects to protected or listed marine mammals.

Direct Effects

The restricted access options reduces the number of vessels but not necessarily the effort as those remaining vessels will make up for the market demand. The number of brail vessels may increase, but the squid brail fishery is considered a Category III fishery (those with a remote likelihood of marine mammal interaction or no known serious injuries or mortalities with marine mammals) and although there were past mortalities of short-finned pilot whales and California sea lions, these animals were likely intentionally killed to protect catch or gear, rather than incidental kills (such as entanglements). These takes are now illegal under the 1994 Amendment to the MMPA. The design of the permit transfer system does not allow for increases in the harvesting capability of the fleet. Accordingly, total fishing effort would be equal to or less than current conditions. As described in Chapter 3, there have been recent anecdotal reports of pilot whale sightings in the vicinity of squid fishing operations. There is documented mortality for California sea lions, short-finned pilot whales, and Risso's dolphins in the market squid fishery off southern California and because offshore bottlenose dolphins are often associated with Risso's dolphins and short-finned pilot whales, they too may experience some serious injury or mortality in the squid purse seine fishery (Heyning et al. 1994). Additionally, Pacific white-sided dolphins and short-beaked and long-beaked common dolphins also may experience interactions with the market squid fishery due to their distribution and habit of feeding on squid at night. Some of the past mortalities of non-listed marine mammal species probably represented animals that were intentionally killed to protect catch or gear, rather than those incidentally killed by squid fishing gear. These takes are now illegal under the 1994 Amendment to the MMPA. However, the fishery is not monitored so recent mortality of these species has not been reported. It is assumed that any impacts to these species are less than significant.

Implementation of time and area closures around Anacapa and Santa Barbara islands for squid vessels using attracting lights from 1 February to 30 September and the squid harvest replenishment/general habitat closure area in all waters north of Pillar Point is not likely to increase total fishing effort beyond current level, but it may result in a shift of fishing location. There would be no marine mammal interactions during closed times and in closed areas, but exclusion of squid fishing in closed areas could shift fishing effort to areas with higher marine mammal populations (e.g. adjacent to pinniped

rookeries, haul out sites, foraging areas). This could result in a higher rate of squid fishery interaction with marine mammals, particularly at the Channel Islands. However, the southern fleet targets a multitude of fishing spots including other areas of the Channel Islands and the coastal area from Point Conception south to La Jolla, while the closed area in waters north of Pillar Point was not an area frequently fished for market squid (at least prior to 2003). Additionally, the closed areas in the Channel Islands represent less than 1 percent of the squid fishing effort during the closed area time frame over the past 2 years and less than 3 percent over the past 8 years, so the shift in fishing effort is considered minimal. Finally, there are already closures in existence that prohibit fishing in sensitive marine mammal habitat. A potential benefit to marine mammals may occur from an increased availability of market squid available to marine mammals in the closed areas. Thus, we assume that implementation of the proposed project is not expected to have additional impacts to marine mammals and is not expected to change relative to existing conditions.

4.1.10.2 Effects to Non-listed Marine and Coastal Birds (Seabirds)

Indirect impacts to non-listed seabirds are discussed in Section 4.1.9.2, under effects to protected or listed seabirds.

Direct Effects

Implementation of the proposed project could affect non-listed marine bird species through interaction with fishing activities, disturbance, discharge of pollutants, and removal of prey species. These effects, however, are not unique to the proposed project. Instead, these effects and conditions currently exist in the market squid fishery and presently occur as a result of fishing and other activities in the market squid fishery. These activities and effects are expected to continue even with implementation of the proposed project.

Implementation of the fishery control and restricted access options will reduce the number of vessels but not necessarily the effort as the remaining vessels would make up for the market demand. The number of brail vessels may increase, but the design of the permit transfer system does not allow for increases in the harvesting capability of the fleet. Accordingly, total fishing effort would be equal to or less than the status quo. There is still the potential for vessels to interact with several surface-feeding and scavenging seabird species (gulls, albatrosses, fulmars, and shearwaters) which may be attracted to the vessels to feed on squid. Thus, we cannot rule out the possibility that the squid purse seine fishery may interact with these species. Currently, the fishery does not have observers so interactions with these species have not been reported. However, these affects and conditions currently exist in the market squid fishery and the activities and effects are expected to continue even with implementation of the proposed project.

Implementation of the seabird closure would establish area and time closure areas for squid vessels using attractant lights around Anacapa and Santa Barbara islands from 1 February through 30 September from 1 nautical mile from the Mean High Water mark

for these islands. It is assumed that the squid fishery will not fish at night without the use of attracting lights, thus, this closure would discourage squid vessels from these areas at night. This area and time closure will serve to protect all seabirds that forage in the waters and/or breed on these islands (see Tables 3.5, 4.1, Figures 4.1, 4.2) because there would be decreased interactions from lights associated with the squid vessels. Santa Barbara Island is considered one of the most important seabird nesting areas in the southern California Bight, in terms of numbers of species and numbers of breeding birds, while Anacapa supports the largest breeding colony of California brown pelicans in the United States. Thus, the time and area closures would significantly reduce any potential impact of light pollution near breeding habitat for the Brandt's cormorant, pelagic cormorant, western gull, pigeon guillemot, black oystercatcher, Leach's storm petrel and Cassin's auklet. The majority of the Channel Islands seabirds nest between March and August, thus the time closure from 1 February to 30 September would incorporate the entire breeding season for several seabird nesting species, during most years.

However, under this option, noise associated with squid fishing activities (e.g., engine noise, generators, radios, gunshots, seal bombs, human voices) still has the potential to cause disturbances to breeding seabirds which require nesting and roosting sites free from human disturbance. In the last 2 years, there has been an increased trend for squid fishermen to fish during daylight hours. Thus, it is likely that the squid fleet will fish at Anacapa and Santa Barbara during the daytime and noise and disturbance will still be an issue for breeding seabirds. At this time, there is no control over the number of squid vessels in any particular area. Personnel from the CINPS have reported squid boats fishing as close as 75 to 450 feet (< 1/8 mile) from Anacapa Island, and as many as 12 boats at one time. California brown pelicans, cormorants, alcids, and other seabirds, are affected by ancillary fishing activities (e.g., vessel proximity, motor noise, generators, gunshots, seal bombs, radios, etc.) near roosting and breeding sites. Research has shown that many seabird species are disturbed by events which are out of the ordinary (Manuwal 1978, Anderson and Keith 1980, Carney and Sydeman 1999). This includes not only direct human disturbance, but also loud noises. Disturbances (including close vessel approach) at California brown pelican, double-crested and Brandt's cormorants, and common murre colonies are known to cause nest abandonment and increased egg predation (Ellison and Cleary 1978, Anderson and Keith 1980, Anderson 1988, Parker et al. 2000, Rojek and Parker 2000, Parker et al. 2001).

Although it is assumed that the squid fishery will not fish at night without the use of attracting lights, however, some squid vessels will choose to fish at night without attracting lights. In this case some level of artificial lighting will be necessary for squid vessels to conduct their operations safely. We cannot rule out the possibility that this artificial night lighting, associated with the market squid fishery, will result in disorientation of these species and collisions with vessels. With no control over the number of vessels in an area, it is possible that multiple boats with operating lights could be close to seabird colonies during sensitive periods in their nesting season. For example, small amounts of light on vessels in the Channel Islands have been observed

to cause disorientation in Xantus's murrelets and their chicks when they depart the colony (Zeidberg pers. comm.). Thus, noise and disturbance will still be an issue for seabirds. Monitoring the squid fishery to determine where the fishery is concentrated after implementation would be necessary to assess impact to seabirds.

Under the proposed option not all seabird colonies in the Channel Islands will receive protection. Castle Rock and Prince Island off San Miguel Island are considered, along with Santa Barbara Island, to be the most important seabird nesting areas in the southern California Bight, in terms of numbers of species and numbers of birds. The only nesting colonies in the Channel Islands of the SSC species rhinoceros auklet and tufted puffin are found on San Miguel Island (Figure 4-3, Table 4-1). San Miguel and Santa Cruz islands provide important habitat for ashy storm-petrels (about 68 percent of the Channel Island population) and Xantus's murrelets (about 18 percent of the Channel Island population) and small numbers of both of these species have been found breeding on Santa Catalina and San Clemente islands. Squid fishing does currently occur off Santa Cruz Island but rarely occurs off San Miguel Island. Closures to light use around Anacapa and Santa Barbara could result in increased night-fishing pressure around Santa Cruz Island and an extension of the fishery to San Miguel Island. This could result in negative impacts to seabird species on these islands, and the level of impact is potentially greater than the status quo due to the importance of San Miguel Island for breeding seabirds. Some protection will occur at Prince Island since it is in the Harris Point State Marine Reserve a no-take MPA. But since the market squid fishing season typically occurs during the winter months, impacts to these other islands would only occur if fishing extended into the breeding season and squid were available in these areas.

In summary, the proposed seabird closure option at the Channel Islands would reduce the impacts of light use associated with the squid fishery from the status quo. If this option is chosen, we recommend monitoring of the squid fishery to determine where the fishery is concentrated after implementation. We also recommend monitoring of the squid fishing to determine if noise and other activities associated with the squid fishery is impacting seabird colonies in the Channel Islands and to determine if the area and time closures to use of attracting lights in the squid fishery is enforceable.

Implementation of the squid harvest replenishment/general habitat closure option would establish areas that are closed to squid fishing in all waters north of Pillar Point at any time. This would include the GFNMS and the Farallon Islands. The Farallon Islands are home to one of the largest and most diverse seabird colonies in the continental U.S., providing critical nesting habitat for 12 species of marine and coastal birds. In 2003, market squid vessels harvested more squid north of the traditional Monterey fishing grounds, in the area between Pigeon Point and Point Reyes, than the prior 12 year average (1990-2002) (see Figure 3-7a-b in Section 1). In 2003, approximately 5,744 tons or 40 percent of the northern California market squid landings were taken from Pigeon Point to Point Reyes compared to the 12-year average of 666 tons or 7 percent. This disturbed some biologists and other users of the area. The removal of squid biomass in this area was of particular concern because squid are an important

prey item for the many seabirds that utilize these waters. Additionally, the squid fishery has the potential to directly affect (disturb) seabirds from ancillary squid fishing activities such as vessel proximity, motor noise, generators, gunshots, seal bombs, radios and the bright lights near their roosting and breeding sites. Behavior patterns of gulls may be influenced by fishery activities. For example, gulls, which are normally diurnal, are known to forage at night near squid fishing boats where they are attracted by the activity and bright lights. Artificial lighting may also increase lighting and foraging abilities of gulls on other seabird colonies, resulting in increased levels of predation on nocturnally nesting seabirds. In 1999, western gulls were noted by researchers as more active at night when squid lights were on in the Channel Islands (CINPS, unpublished data). Implementation of the squid harvest replenishment/general habitat closure in all waters north of Pillar Point would eliminate direct and indirect market squid fishery impacts to the 12 species of nesting seabirds that breed at the Farallon Islands and forage in the surrounding waters.

Finally, significant impacts on non-listed marine and coastal seabirds are not expected from the combined effects of the individual project options because implementation of the proposed MSFMP will benefit natural resources held in trust for the people of California when compared to existing conditions.

4.1.10.3 Effects to Non-listed Fish

Indirect impacts to non-listed fish are discussed in Section 4.1.9.4 under effects to listed fish.

Direct Effects

The restricted access component reduces the number of vessels but not necessarily the effort as those remaining vessels will make up for the market demand. Accordingly, total fishing effort is likely to be equal to or less than current conditions. Implementation of seabird time and area closures around Anacapa and Santa Barbara islands and the squid harvest replenishment/general habitat closure area in waters north of Pillar Point would eliminate any potential for bycatch in the closed areas. There would be no catch interaction during closed times in closed areas, but exclusion of squid fishing in closed areas could shift fishing effort to other areas which could increase the potential of catch of non-listed fish or remove market squid from the fish that prey upon them. However, incidental bycatch is minimal in the commercial market squid fishery. Through the Department's port sampling program, 2,402 samples were collected between October 1998 and October 2003 in California, with 886 observed landings containing incidentally caught fish and invertebrates. This represents a 37 percent occurrence by frequency of bycatch (See Section 1 Table 2-6). Two or more species were observed as bycatch in 47 percent of landings with bycatch. Most of this bycatch were other coastal pelagic species, including Pacific sardine, Pacific mackerel, northern anchovy and jack mackerel. Thus, effects on non-listed fish from the implementation of the proposed project are expected to be less than significant under CEQA.

4.1.10.4 Effects to Market Squid Resource

The goal of squid fishery management is to sustain both the squid population and the marine life that depend on squid. The proposed options protect the market squid resource by minimizing the risk of overfishing, and they reduce other ecological impacts. The restricted access component of the proposed project, in conjunction with the status quo and proposed fishery control rule options, are designed to prevent an overfished condition from occurring by disbursing the take of market squid throughout the season and allowing spawning to take place throughout the season. Restricted access will reduce the number of vessels but not necessarily the effort as those remaining vessels will make up for the market demand. Accordingly, total fishing effort is likely to be equal to or less than current conditions. Implementation of the seabird time and area closures and the squid harvest replenishment/general habitat closure area option is likely to result in no or little interaction with squid during closed times and in closed areas, so a potential benefit to the squid resource would occur from an increased productivity of squid in the closed areas. Additionally, areas closed to squid fishing would not incur the loss of squid egg cases (in Department sampling, approximately 3.2 percent of sampled landings contained squid egg cases). Exclusion of squid fishing in closed areas could shift fishing effort to other areas. However, the proposed closures in the Channel Islands represent less than 1 percent of the squid fishing effort during the closed area time frame over the past 2 years and less than 3 percent over the past 8 years, plus the southern fleet targets a multitude of fishing spots including other areas of the Channel Islands and the coastal area from Point Conception south to La Jolla. The proposed northern closure is not an area frequently fished for market squid (at least prior to 2003), so the shift in effort is considered minimal. Thus, effects on the market squid resource from the implementation of the proposed project is expected to be less than significant under CEQA.

Socioeconomic Environment

4.1.11 Effects to Land Use and Existing Infrastructure

Impacts are considered significant if the project would require new facilities such as housing, streets, parks, and other amenities to meet the demands of the project. Impacts also are considered significant if the project conflicts with any applicable land use plan, policy, or regulation of an agency with jurisdiction for an area affected by the project, but only where such a conflict results in a potentially significant change in existing physical conditions in and around the affected area.

Development activities within watersheds and in coastal marine areas often affect the habitat of marine organisms on both long-term and short-term scales. Runoff from development sites reduces the quality and quantity of suitable fish habitat by the introduction of pesticides, fertilizers, petrochemicals, and construction chemicals. Sediment runoff can restrict tidal flows and tidal elevations resulting in losses of important fauna and flora. Shoreline stabilization projects that affect reflective wave energy can impede or accelerate natural movements of sand, thereby impacting intertidal and sub-tidal habitats (PFMC 1998). However, effects of the proposed project

would be similar to current effects. Land use should not be affected by any proposed options.

With implementation and development of the MSFMP, impacts from the proposed project would be the same as currently exist in the market squid fishery. Fishing activities generally do not affect land use. Fishery control rules, restricted access, and time and area closures effects to land use are expected to be less than significant since the implementation of all these parts has the potential to reduce fishing activity and associated pressure on land based facilities from those that currently exist.

4.1.12 Effects to Transportation

Impacts are considered significant if the project causes an increase in traffic that is substantial in relation to the existing traffic load and capacity, if the project causes an exceedence in the applicable level of service standard, or the project causes a substantial increase in hazards due to design features or incompatible uses.

In general, the primary causes of change in demand for public and private services is a substantial change in demographic, economic, or social conditions of an area in a short period of time. The proposed project is not expected to result in a measurable change in the demand for public or private services. Therefore, the proposed project would have negligible effects on transportation.

4.1.13 Effects to Noise

Impacts are considered significant if the project results in exposure of persons or wildlife and aquatic species to noise levels in excess of applicable noise standards or criteria, a permanent increase in ambient noise levels in the project vicinity above existing levels, a substantial temporary or periodic increase in existing ambient noise levels in the project vicinity, or where the proposed project exposes sensitive noise receptors to noise levels in excess of existing conditions.

In general, squid fishing and other activities associated with the proposed project could affect ambient noise levels. These effects, however, are not unique to the proposed project. Instead, these affects and conditions currently exist in the market squid fishery and presently occur as a result of fishing and other activities in the market squid fishery.

These activities and effects are expected to continue even with implementation of the proposed project. Thus, even with adoption of the proposed project, the present and ongoing affect of noise are not expected to change relative to existing conditions.

Implementation of the restricted access options will reduce the number of vessels but not necessarily the effort as the remaining vessels would make up for the market demand. Implementation of time and area closures around Anacapa and Santa Barbara islands and in waters north of Pillar Point could result in a shift of fishing effort location. There would be less noise during closed times in the closed areas, but fishing

effort could shift to areas more sensitive to noise impacts (e.g., adjacent to pinniped rookeries, seabird breeding sites, adjacent to local communities). However, the closed areas in the Channel Islands represent less than 1 percent of the squid fishing effort during the closed area time frame over the past 2 years and less than 3 percent over the past 8 years, while the proposed closure in northern waters is not an area frequently fished for market squid (at least prior to 2003). Thus, the shift in fishing effort is considered minimal. Monitoring the squid fishery to determine where the fishery is concentrated after implementation will determine the impact of this effect. For these reasons, project-related effects on noise are generally expected to be less than significant.

4.1.14 Effects to Utilities

Impacts are considered significant if the proposed project requires the construction of or results in the need to construct new facilities or expansion of existing facilities, the construction of which would cause significant environmental effects.

No sizeable demand from project-related employment is expected to affect utilities. Therefore, the proposed project would have less than significant effects to utilities.

4.1.15 Effects to Archeology/Paleontology

Federal law, 36 CFR, Part 800 provides that environmental analyses need only consider effects on significant cultural resources. Significant resources include: resources listed on the National Register of Historic Places, eligible for listing in the National Register, designated as a National Historic Landmark, or listed in or eligible for listing in the California Register of Historical Resources. Impacts on historical resources are significant where the project may cause a substantial adverse change in the significance of a historical resource. A substantial adverse change in the significance of an historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource is materially impaired as defined in CCR Title 14 §15064.5, subdivision (b)(2). For the purposes of this significance threshold, historical resources shall include resources identified in CCR Title 14 §15064.5, subdivision (a). The significance of project-related impacts on archaeological and paleontological resources shall be determined in accordance with CCR Title 14 §15064.5, subdivision (c).

Most of the coastal shallow water areas where squid spawn have been characterized, by various EIRs, and are not considered sensitive for prehistoric resources (SLC 1999). Most fishing activity will occur away from shipwrecks due to high potential for gear damage or losses if shipwrecks are encountered. Decreasing the fishing fleet with restricted access would decrease effects to archaeological resources. Therefore, impacts to archaeology/paleontology would be less than significant due to the direct avoidance of these resources by fishery participants.

4.2 Potential Growth Inducing Factors

The proposed MSFMP is not expected to result in potentially significant growth inducing affects. The proposed project could foster some very limited economic activity, but that incremental affect would not be of a magnitude that it would stimulate the establishment of new businesses, population growth, or the construction of additional housing. In addition, no project characteristics are likely to remove obstacles to population growth or encourage or facilitate other activities that could significantly affect the environment, either individually or cumulatively.

4.3 Significant Irreversible Environmental Effects

CEQA section 15126(f) requires that the proposed project address potential impacts that could result in significant irreversible environmental changes, including the use of non-renewable resources and irretrievable commitment of resources. Irreversible commitments of resources are those that can not be reversed, except perhaps in the extreme long term (millions of years). The classic instance is when a species becomes extinct; this is an irreversible loss. Irretrievable commitments are those that are lost for a period of time. Most of the potential effects would be classified as irretrievable not irreversible. The proposed project would not result in significant irreversible environmental changes or irretrievable commitments of environmental resources. The project is designed to avoid significant adverse impacts to other species, their habitat, and listed or locally unique species.

4.4 Short-term Uses and Long-term Productivity

CEQA section 15126(e) requires that the cumulative and long-term effects of the proposed project that could affect the state of the environment, could narrow the range of beneficial uses of the environment, or that could pose long-term risks to health or safety be addressed. The proposed project will not affect a variety of short-term uses currently available nor are any significant impacts expected to occur. In addition, it will not adversely affect long-term productivity of statewide populations of market squid as the MSFMP is designed to bring squid populations and fishery participants into balance that promotes sustainability.

4.5 Cumulative Effects

In this section, the proposed project is analyzed in relation to other major projects in the region. Cumulative effects on environmental resources can result from the incremental effects of the project when added to other past, present, and reasonably foreseeable future projects in the area. Cumulative effects can result from individually minor but collectively significant actions over a period of time. The harvest levels in the proposed project become the cumulative harvest and are expected to have the overall effect of a sustainable harvest of market squid.

Other projects considered in the cumulative analysis include: delineation drilling

on OCS leases off Santa Barbara, development of the 36 undeveloped but leased OCS tracts, transportation of oil from Alaska and overseas, commercial fishing of depressed stocks, stormwater runoff, fiber optic cable installation, geophysical surveys, decommissioning (removing) of existing platforms, and commercial and residential development.

The development of the 36 offshore leases is anticipated between 2002 and 2030 (MMS 2001). Development of these leases would expect to increase crew and boat supply trips by approximately 3 percent above current levels. Impacts to marine mammals and marine and coastal birds are expected to result in temporary (less than 1-hour) localized disturbances. Helicopter trips routinely involve eight to ten trips each day per platform (MMS 2001). Pipeline construction activities would occur during the development phase. These activities would displace fishing activities from the associated infrastructure.

Since the prevailing onshore wind conditions exist along the coast, cumulative effects of air pollution could come from OCS activities, oil and container ship traffic, installation of fiber optic cables, and displaced fishing activities. During the next 28 years, all existing oil and gas platforms in federal and State waters are expected to be removed (MMS 2001). Platforms Hazel, Heidi, Hilda, and Hope were removed from State waters in 1996. In 2000, 877 oil tankers visited the Port of Los Angeles, Port of Long Beach and El Segundo. Of those, 192 were United States flagged oil tankers and 685 were foreign flagged oil tankers. The long-term oil supply outlook for California remains one of declining in-state and Alaska supplies leading to increasing dependence on foreign oil sources (CEC 1999). Since 1989, California refineries have received about half of Alaska's total production. If this trend remains unchanged into the 20-year future, the supply volumes from Alaska to California would decline by 61 percent from current levels. The CEC (1999) estimates that import of 168 to 257 million more barrels per year is expected by 2017 based on a very gradual decline in California's in-state supply. This estimate means 337 more tanker deliveries per year, about one per day.

Commercial and residential development are expected to grow along the coast with the influx of increased pollution discharges, loss of upstream and wetland habitat development in harbors and marinas, and increases in transportation corridors. This increase in development along the coastal strand has the potential to further stress already depressed fish stocks with added pollution and loss of habitat. Increases in development also have the potential to increase non-point discharges to rivers including agricultural contaminants and sediments. Loss of nearshore habitat due to increased sediment loads may affect squid habitat stability in the long-term.

The timing of fiber optic cable installation is unknown, however some operations have begun and while the majority are expected to be in the nearshore environment within the next five years (MMS 2001). Global West project includes seven landfalls between San Francisco and San Diego, while MCI Worldcom and AT&T would land at Montana de Oro State park in San Luis Obispo County. Effects include disturbing the sediments

for cable placement and physical sediment disturbance in deeper waters where the cable is not buried or over hard substrate.

Cumulative effects of the proposed project are not expected to be cumulatively considerable, that is, significant, when compared to the additional proposed projects described above.

Chapter 5. Analysis of Alternatives to the Proposed Project

The proposed project includes measures that work in combination to reach the goals of the MSFMP. Some of these measures have alternative options that could be selected and inserted instead of or in addition to the recommended options. This document includes a range of reasonable alternatives to the proposed project, or its location, which could feasibly accomplish the basic objectives of the project and could avoid or substantially lessen one or more of the project-related effects. Sufficient information is provided about each alternative to allow the Commission and the public a meaningful evaluation, analysis, and comparison to the proposed project. CEQA guidelines state the ED need not consider an alternative whose effect can not be reasonably ascertained and whose implementation is remote and speculative, nor be required to consider alternatives which are infeasible. Of those alternatives, the document need examine in detail only the ones that the lead agency determines could feasibly attain most of the basic objectives of the project. This chapter examines the alternative options as well as the no project alternative.

5.1 The No Project Alternative

The purpose of describing and analyzing the no project alternative (status quo) or current conditions, is to allow decision makers to compare the impacts of approving proposed or alternative project options with the impacts of not approving the proposed or alternative project options.

Some of the no project “alternatives” are currently regulations (A.5, D.1, G.1, F.1), and were put in place until a MSFMP could be developed and adopted. These regulations will sunset with the adoption of the MSFMP although the Department recommends continuing some of them (see Chapter 4 Proposed Project). Status quo regulations (D.1) prohibit the take of market squid for commercial purposes each week between noon Friday and noon Sunday from Point Conception south to the U.S.-Mexico border. The closure extends an existing squid fishery closure for the same time period north from Point Conception to the California-Oregon border and affects vessels catching squid and vessels using lights to attract squid, and does not apply to those pursuing squid for live-bait purposes. There also is an existing gear restriction (G.1) which states that each vessel fishing for squid and lighting for squid will utilize a total of no more than 30,000 watts of light to attract squid at any time and that each vessel fishing for squid or lighting for squid will reduce the light scatter of its fishing operations by shielding the entire filament of each light used to attract squid and orient the illumination directly downward, or provide for the illumination to be completely below the surface of the water. Others regulations (F.1) do not require a squid permit when fishing for live bait or for vessels landing or taking market squid not to exceed 2 tons in a calendar day. Interim regulations set a seasonal harvest limit of 125,000 tons (A.5). Status quo conditions do not propose daily trip limits, capacity goals, permit transfers, experimental permits, a regional management access control date, or any additional time and area closures or restrictions such as squid harvest replenishment areas or for seabird

protection (C.2, H.5, K.1, L.1, M.1, O.3, P.2, Q.1, R.5). There are currently 184 squid vessels and 41 light boats in the fishery (I.2).

The following sections describe any existing impacts the market squid fishery may have on environmental factors.

5.1.1 Effects to Air Quality

Increases in ambient air pollutant levels above NAAQS or CAAQS would not reasonably be expected to occur in the foreseeable future with the no project alternative, based on current plans, and consistent with available infrastructure and community services.

5.1.2 Effects to Water Quality

Short-term and long-term pollution effects will continue at former levels under the no project alternative. Anthropogenic sources of pollution include: point source discharges, dredging activities, surface runoff, thermal discharges and oil/hydrocarbon discharges. The current levels of fishing activities are not anticipated to alter sediment deposition rates except for the short-term effects of bottom disturbance from fishing equipment (e.g., anchors, nets, trawl doors) and the associated increases in suspended sediment and turbidity plumes. However, the market squid fishery can directly affect water quality. In Port Hueneme Harbor, in 1999, several squid boat operators were cited in violation of the Clean Water Act. The California Regional Water Quality Control Board (CRWQCB) of Los Angeles cited these operators for discharging water from squid holding tanks into the harbor. The discharge formed a thick foam surrounding the boats and offloading areas, and levels of nitrate, ammonia, and organic nitrogen well exceeded the established limits [as squid die, ink and ammonia are released, the increased ammonia levels are toxic to most marine life; meanwhile, the ink decomposes, decreasing the dissolved oxygen levels in the surrounding area, which suffocates the remaining organisms (CRWQCB 2000)].

Current impacts of dredging and effects to habitat and organisms at the dredge disposal site will continue. Dredging and disposal of dredged material may adversely affect infaunal and bottom-dwelling organisms at the site by removing immobile organisms, by smothering organisms, or by forcing mobile animals, such as fish, to leave the area. Releases of petroleum products and garbage would continue, but not likely increase. The withdrawal of ocean water by offshore water intake structures occurs along the California coast. Water withdrawn for cooling water, or a source of drinking water from desalinization plants, affect organisms through impingement on intake screens, entrainment through the heat-exchange systems, or discharge plumes of both heated and non-heated effluent. Wastewater effluent and non-point source/stormwater discharges may affect the growth and condition of groundfish, other species of fish, and prey species if high contaminant levels are discharged. Storm water runoff from urban areas is a major source of pollution in coastal waters. Because runoff is an untreated pollution source, it contains high concentrations of contaminants and is a significant health hazard to humans (MMS 2001). If contaminants are present, their effects may

be manifested by absorption across gill membranes or through bioaccumulation as a result of consuming contaminated prey. The use of biocides to prevent biofouling or the discharge of brine, as a byproduct of desalinization, can reduce or eliminate the suitability of water bodies for populations of fish species and their prey in the general vicinity of the discharge pipe.

Effects of water quality on marine organisms and their environment would continue to occur with the no project alternative. While fishing activities are not known to affect salinity, temperature, currents, and dissolved oxygen levels in the ocean, some fishing activities temporarily increase turbidity and the potential to release pollutants adsorbed to the sediments. The full extent of these impacts have not been fully researched. Therefore, effects to water quality would continue with the the no project alternative.

5.1.3 Effects to Geology

Effects to geology, with the no project alternative, would include the continued minor modifications to the sea floor from net placement and anchor placement. These impacts are generally temporary but could be locally important if unique geological features are permanently damaged. However, effects to geology are not expected as fishing for squid takes place over nearshore sandy bottom areas where squid deposit their egg cases. The current fishing levels are not anticipated to increase erosion processes nor affect slope stability.

5.1.4 Effects to Physical Oceanography

No changes to circulation patterns or oceanographic conditions (e.g., water temperature, dissolved oxygen levels, and salinity) are expected with the no project alternative. Fishing activities have a remote possibility of affecting dissolved oxygen levels if an accident occurred and a full load of squid were discharged into an area with minimal circulation such that the decaying squid process utilized the oxygen in that localized area.

5.1.5 Effects to Coastal Habitat

Fishing activities associated with the no project alternative include discharge of pollutants, physical disturbance of bottom sediments and benthic flora and fauna due to anchoring, net placement, physical displacement and/or disturbance of listed species from their respective habitats, and through the removal of market squid as prey for fish, sea turtles, seabirds, and marine mammals.

The night-lighting activities of the market squid fishery may be impacting several seabird species in the Channel Islands. This would continue with the no project alternative. Artificial night-lighting can be a problem for several seabird species that are nocturnal in colony or foraging habits. The concern over the potential impacts of artificial lights on seabirds in the Channel Islands arose in 1999 when large increases in artificial light intensity levels, associated with night-time squid fishery boat activity, extended

throughout the seabird breeding season. Breeding seabirds in California susceptible to inflight strikes include Xantus's murrelet, Cassin's auklet, rhinoceros auklet, all of the storm-petrel species (ashy, black, fork-tailed, and Leach's), and the fledgling chicks of tufted puffins. Additionally, Brown pelicans, cormorants, and other seabirds are affected by the ancillary fishing activities. (e.g., vessel proximity, motor noise, generators, lights, human voices, gunshots, seal bombs, radios, etc.) of the market squid fishery near roosting and breeding sites. Personnel from the CINPS have reported squid boats fishing as close as 75 to 450 feet (< 1/8 mile) from Anacapa Island, and as many as 12 boats at one time.

To avoid risks to nesting brown pelicans and interactions with other seabird species of concern, status quo regulations include a maximum allowable light wattage and specific requirements for orientation and shielding of lights. However, research has not been conducted to measure the effects of the shielded lights and reduced wattage regulations on seabird rookeries and enforcement is difficult. While these regulations reduce the illumination intensity of each vessel, they do not avoid all impacts to sensitive species, as reduced wattage and shielding still produces light above ambient levels. In addition, the shielded lights and reduced wattage regulations do not avoid interactions with nocturnally active species. Artificial night lighting, associated with the market squid fishery, will continue the impacts documented such as disorientation of these species and collisions with vessels. This issue is discussed in additional detail in the sections on marine and coastal birds.

5.1.6 Effects to Benthic Habitat

Soft and hard-bottom seafloor resources have been, and continue to be, impacted by commercial and recreational fishing activities. Physical disturbances to the soft-bottom habitat from the no project alternative may cause minor changes in localized species abundance or composition from existing fishing activities. Soft-bottom infauna are expected to rapidly repopulate or recolonize, and changes are expected to be within natural variability for the resources. Squid fishing boats affects the benthic resources by removing marine plants, corals, and sessile organisms, upending rocks, and resuspending sediments and associated pollutants. Existing effects to hard-bottom substrate result in minor changes in species composition and community structure by altering the natural composition of the substrate such as breaking the larger rocks into smaller pieces by trawl gear. Anchors and their chains can crush or smother long-lived animals and break portions of the rock formation. A study conducted in 1995 (MMS 2001) found that hard-bottom communities will not recover to pre-disturbed conditions where substrate has been altered and, instead, a different type of hard substrate community develops. Recovery takes years to decades depending on the complexity of the community being altered.

Through the Department's port sampling program, it was identified that approximately 3.2 percent of sampled landings contained squid egg cases. Currently, the type of net used to fish for squid is unregulated, although purse seines used for squid typically do not hang as deep as purse seines used for other species, so contact with the bottom is

reduced. Incidental catches of squid eggs and other species increase in the squid fishery when the nets are set in shallower water (less than 22 fathoms), where bottom contact may occur (Lutz and Pendleton 2001). Damage to the substrate, and thus, mortality of squid eggs associated with purse seining for squid has not been quantified. Effects of the no project alternative include disturbance and displacement of fish, temporary loss of prey items, permanent loss of hard-substrate habitat and associated communities, and alteration of community structure on both a temporary and permanent basis depending on the changes to the benthic habitat.

5.1.7 Effects to Pelagic Habitat

Effects to pelagic habitats would still occur from pollution discharges. The no project alternative project would not change gear types from those that currently exist in the market squid fishery. In addition, removal of squid would continue to affect the fish, sea turtles, seabirds, and marine mammals that prey on them.

5.1.8 Effects to Areas of Special Concern

Currently, EFH is affected by non-fishing activities including: dredging, fill, excavation, mining, impoundment, discharge, water diversions, thermal additions, introduction of exotic species, elimination, diminishing, or disruption of the function of EFH, and pollution from point and non-point sources. These would continue with the no project alternative. In addition, fishing activities would continue in sanctuaries, refuges, and reserves as currently permitted by law.

5.1.9 Effects to Protected, Threatened, and Endangered Species

5.1.9.1 Effects to Protected or Listed Marine Mammals

Under this alternative, existing management of the market squid fishery would continue as regulated by the Commission, although some regulations are destined to sunset in the near future. NOAA Fisheries lists the market squid purse seine fishery as Category II fishery, with the short-finned pilot whale listed as the marine mammal species/stock incidentally injured or killed. NOAA Fisheries lists the squid brail (dip net) fishery as a Class III fishery, a fishery with a remote likelihood of marine mammal interaction or no known serious injuries or mortalities with marine mammals.

<u>Indirect Effects</u>
Market squid are eaten by a number of cetacean and pinniped species as well as southern sea otters. Their importance in the marine mammal diet varies among species. (this issue is discussed in detail in section 4.1.9.1). Although there is information about which prey species are consumed by marine mammals, it is not possible to estimate the total amount of market squid consumed by marine mammals in California waters. Thus, it is not possible to determine the allocation of market squid necessary to sustain marine mammal populations and consequently, makes analysis of whether market squid fishery management practices are having a potentially adverse impact on these species

difficult. However, it should be noted that goal of squid fishery management is to maintain a long-term economically viable fishery that matches the level of effort to the health of the resource, and under MLMA, the Department must consider the ecosystem impacts of the squid fishery, namely the conservation of not only squid, but of the other marine species that depend on squid. Current management regulations include a 2-day weekend closure which is precautionary management. In the absence of conclusive biological information upon which to base a quota or other management approach, a 2-day per week time period allows for uninterrupted spawning in areas where squid are present. Unlike a seasonal quota or seasonal closure, this measure spreads the escapement out throughout the year, rather than concentrating it at the beginning or end. Current interim management measures also include a seasonal statewide catch limitation which limits landings to a maximum seasonal catch, a research and monitoring program which assists in management of the squid fishery to achieve sustainability, and monitoring of the squid harvest through an egg escapement model at 30 percent.

Direct Effects

All six species of endangered whales are known to utilize California waters for either feeding or during migrations. There are no reports of squid purse seine fishery-related mortality or serious injury in any of the baleen (suborder Mysticeti) whale stocks including; humpback whale, northern right whale, sei whale, fin whale, and the blue whale in California waters. Subsequently, there are no reports of squid purse seine fishery-related mortality or serious injury in the majority of the toothed (Odontocetes) whales stocks including the listed sperm whale.

There are no reports of squid purse seine fishery-related mortality or serious injury in the Guadalupe fur seal, Steller sea lion, northern elephant seal, or southern sea otter stocks in California waters. There are pinniped rookeries present at several Channel Islands and offshore islands, including Año Nuevo Island and the Farallon Islands, that are subject to disturbance by commercial and recreational fishermen. However, closures have already been enacted to keep fishing boats a reasonable distance offshore from the rookeries to minimize interactions and disturbances, particularly during the pupping and breeding season.

5.1.9.2 Effects to Listed Marine and Coastal Birds (Seabirds)

Indirect Effects

Market squid are eaten by a number of marine birds. Their importance in the diet varies among species. This issue is discussed in detail in section 4.1.9.2. Although there is information about which prey species are consumed by seabirds, it is not possible to estimate the total amount of market squid consumed by seabirds in California waters. Thus, it is not possible to determine the allocation of market squid necessary to sustain seabird populations and consequently, this makes analysis of whether market squid fishery management practices are having a potentially significant impact on seabirds difficult. However, it should be noted that the goal of squid fishery management is to maintain a long-term economically viable fishery that matches the level of effort to the

health of the resource, and under MLMA, the Department must consider the ecosystem impacts of the squid fishery, namely the conservation of not only squid, but of the other marine species that depend on squid. Current regulations include a 2-day weekend closure and a seasonal statewide limit on catch, which are precautionary management measures. In the absence of conclusive biological information upon which to base a quota or other management approach, a 2-day per week time period allows for uninterrupted spawning in areas where squid are present. Unlike a seasonal quota or seasonal closure, this measure spreads the escapement out throughout the year, rather than concentrating it at the beginning or end. Current interim management measures also include a seasonal statewide catch limitation (landings cap) which limits landings to a maximum seasonal catch, a research and monitoring program which assists in management of the squid fishery to achieve sustainability, and monitoring of the squid harvest through an egg escapement model at 30 percent.

Direct Effects

Several surface-feeding and scavenging species of seabirds (including gulls, albatrosses, fulmars, and shearwaters) are attracted to fishery operations to feed on bait or discarded targeted species and bycatch. The potential exists for these species to become entangled resulting in mortality or serious injury. In addition, these species consume squid, which could be an additional attraction to such vessels. Thus, there remains the possibility that the squid purse seine fishery may interact with these species. Since the fishery is not monitored, mortality of these species has not been documented.

There are documented interactions of inflight strikes of ashy storm-petrels and Xantus's murrelets with lighted fishing vessels and other lighted vessels, particularly on dark, foggy nights, in the Channel Islands (Whitworth et al. 1997, McChesney, Naughton, Zeidberg, pers. comm.). Artificial night-lighting can be a problem for several seabird species that are nocturnal in colony or foraging habits. Breeding seabirds in California that are susceptible to inflight strikes include Xantus's murrelet, Cassin's auklet, rhinoceros auklet, all of the storm-petrel species (ashy, black, fork-tailed, and leach's), and the fledgling chicks of tufted puffins. When flying in total darkness, seabirds may become disoriented by and attracted to bright artificial lights (Verheijen 1958, Reed et al. 1985, Telfer et al. 1987). This may cause birds to crash into lighted boats, which can result in direct mortality or result in birds either falling stunned and/or injured into the water or landing on deck (Dick and Donaldson 1978). Injured birds become easy targets for predation after daylight. Storm-petrels (and related petrels and shearwaters) are known to be attracted to and strike lighted longlining vessels, as well as other lighted vessels, fishing at night in the southern hemisphere (Reid, pers. comm., Weimerskirch et al. 2000), lighted vessels at night in Alaska (Canez, Trapp, and Williams, pers. comm.) and Newfoundland (Chardine, pers. comm.), and artificial night-lighting in Hawaii (Reed et al. 1985, Telfer 1987).

In addition, fledglings of the species listed above depart the colony only at night, and hence may become attracted and disoriented by lights and collide with vessels, increasing the normal mortality rates of young-of-the-year, as is documented for

fledging petrels and storm-petrels in Hawaii and is a major concern for survival of these species (Byrd et al 1978, Reed et al. 1985, Reed 1987, Telfer et al. 1987, Harrison 1990). Disorientation from lights can cause parent-chick separation of Xantus's murrelets and has been observed in the Channel Islands (B. Keitt, P. Kelly, M. Naughton, G. McChesney, pers. comm.).

Close to breeding colonies, artificial lighting may result in adult birds avoiding the colony and not returning to their nests to attend their eggs and chicks. Studies have shown that nocturnal seabird species display highly reduced activity levels on moonlit nights when they are apparently more susceptible to predation (Manuwal 1974, Watanuki 1980, Story and Grimmer 1986, Keitt, in review). Even on a moonless night, lighted vessels are capable of increasing light levels at a colony up to moonlight levels. Physics calculations show that one unshielded vessel burning 30,000 watts needs to be about 1 mile away from a colony to bring the light levels down to moonlight levels and even further to emit levels below moonlight (J. Fajans, pers. comm.). Brad Keitt (Island Conservation and Ecology Group, unpublished data) measured light levels on Middle Anacapa from market squid light boats on 2 April 2000 at full moonlight levels at an estimated distance of 1 kilometer. From his studies of black-vented shearwaters in Mexico (which are also nocturnal and preyed on by western gulls), he concluded that increased predation of nocturnal birds in the Channel Islands likely occurs with artificial lighting (Keitt pers. comm.). Successive nights of high artificial light levels, in combination with the lunar cycle, close to breeding colonies could disrupt the normal nesting activities of these birds, resulting in increased predation, nest abandonment, or increased mortality of eggs and chicks.

The concern over the potential impacts of artificial lights on seabirds in the Channel Islands arose in 1999 when large increases in artificial light intensity levels associated with night-time squid fishery boat activity extended throughout the seabird breeding season. The use of bright lights is thought to increase the mortality of Xantus's murrelets and ashy storm-petrel (and equally likely the black storm-petrel, rhinoceros auklet, and Cassin's auklet) nesting in the Channel Islands. In 1999, increased mortality rates of Xantus's murrelets due to predation by barn owls were recorded (CINPS, unpublished data). Additionally, western gulls, which are normally diurnal, and a predator of murrelets, storm-petrels, and western snowy plovers, were noted by researchers as more active at night when squid lights were on, and predation rates likely increased over normal levels (CINPS, unpublished data).

During the 1999 season, higher than average rates of nest abandonment and chick mortality, which could not be explained by other environmental factors, were recorded for California brown pelicans (Gress, unpublished data). Brown pelicans and other seabirds are affected by ancillary fishing activities (e.g., vessel proximity, motor noise, generators, seal bombs, gunshots, lights, radios, etc.) near roosting and breeding sites. Research has shown that many seabird species are disturbed by events which are out of the ordinary (Manuwal 1978, Anderson and Keith 1980, Carney and Sydeman 1999). This includes not only direct human disturbance, but also loud noises. Disturbances at brown pelican and double-crested cormorant colonies are known to cause nest

abandonment and increased egg predation (Ellison and Cleary 1978, Anderson 1988). Increased light levels are known to alter the behavior of diurnal species (e.g., brown pelicans, cormorants, gulls) leading to nest abandonment, and as a result increased egg and chick mortality (Avery 2000, Bower 2000).

Following the 1999 season, the Department and federal agencies, concerned about the brown pelican population recovery and population levels of the Xantus's murrelet and ashy storm-petrel in the Channel Islands, were interested in avoiding any potential new interactions with these birds. To avoid risks to nesting brown pelicans and interactions with other seabird species of concern, the Commission has implemented a maximum allowable light wattage and specific requirements for orientation and shielding of lights for vessels fishing or lighting for squid. The management measures specify: (1) to reduce wattage from any individual vessel to 30,000 kilowatts, and (2) to require the use of shielding for all vessels commercially fishing or landing squid. These interim regulations went into effect 30 May 2000.

However, according to some local wardens, the wording in the regulations for shields is vague and poor for enforcement purposes. Of six tickets written for shield violations, there was only one conviction (for the fishermen who pleaded guilty for not having any shields at all). The other five cases, for angle violations, were rejected by the local District Attorney. Additionally, the wording for wattage cannot be enforced as the regulations state that a maximum wattage rather than a maximum number of bulbs. Fishermen claim that although their wattage may add up to 40,000 watts they are only using 30,000 watts or less (analogous to using a dimmer switch on household lights). Although current regulations specify shielding (shielding of the entire filament of lights used to attract squid and orientation of the illumination directly downward, or provide for the illumination to be completely below the surface of the water) occasionally shields are not used, they do not cover the entire filament, or they are incorrectly angled.

Research has not been conducted to measure the effects of the shielded lights and reduced wattage regulations on seabird rookeries. While these regulations reduce the illumination intensity of each vessel, they do not avoid all impacts to sensitive species, as reduced wattage and shielding still produces light above ambient levels. At this time, there is no control over the number of squid vessels in any particular area. Since illumination levels are additive, multiple boats close to colonies will cumulatively illuminate islands above normal levels. Personnel from the CINPS have reported squid boats fishing as close as 75 to 450 feet (< 1/8 mile) from Anacapa Island, and as many as 12 boats at one time. Furthermore, noise associated with squid fishing activities (e.g., engine noise, generators, radios, human voices, seal bombs, gunshots) still has the potential to cause disturbances to breeding seabirds.

In addition, the shielded lights and reduced wattage regulations do not avoid interactions with nocturnally active species. Artificial night lighting, associated with the market squid fishery, can continue to result in disorientation of these species and collisions with vessels. Small amounts of light on vessels in the Channel Islands have been observed to cause disorientation in Xantus's murrelets and their chicks.

The Channel Islands provide important breeding habitat for listed (California brown pelican snowy plover, and bald eagle) candidate/threatened Xantus's murrelet, and SSC (ashy storm-petrel, black storm-petrel, rhinoceros auklet, tufted puffin, and double-crested cormorant), and globally rare seabird species (Xantus's murrelet and ashy storm-petrel).

Anacapa and Santa Barbara islands are the only United States breeding sites for the California brown pelican, a federal and state endangered species. The islands also provide nesting habitat for 80 percent of the U.S. population and 33.5 percent of the world's population of breeding Xantus's murrelet and 50 percent of the U.S. population and 41 percent of the world's population of breeding ashy storm-petrel. The only other major nesting site for the ashy storm-petrel, the Farallon Islands, is in decline. The only black storm-petrel colony in the United States is found on Santa Barbara Island. Impacts to the Channel Island populations of these species can have serious, long-term consequences for the survival of these species.

The American Trader Trustee Council, of which the Department is a representative, oversees the compensation for natural resources losses attributable to the American Trader oil spill. Part of their restoration plan is to restore seabird nesting habitat for burrow/crevice and ground nesting nocturnal seabirds on Anacapa Island by eradicating the introduced black rat (efforts conducted in 2002). These efforts at conservation could be negatively countered by lost reproduction as a result of disturbance by large levels of artificial illumination from nearby vessels. Other threats to these species, which all cumulatively contribute to their declining numbers, include: human disturbance in the colony (i.e., entering sea caves), exotic predators, pollution (egg-shell thinning due to DDT still occurs in the Channel Islands), oil spills, and alterations in food availability. Given what we know about the effects of artificial night lighting and human disturbance of colonies for these seabird species, as well as for related species around the world, artificial night lighting associated with the market squid fishery could significantly impact recovery of these species if it occurs during the breeding season.

5.1.9.3 Effects to Marine (Sea) Turtles

Based on interactions between sea turtles and fish harvesters occurring throughout the world, incidental catch poses a minor threat in habitats utilized by these species, including coastal feeding grounds and migratory corridors that exist along the western United States and Mexico. All gear types, aside from rod and reel have the potential to affect turtles, but would be highly unlikely to result in mortality. Studies of threats to sea turtles in other areas have revealed that the primary threats are incidental take in collisions with fishing boats. Various species of turtles are accidentally taken in several commercial and recreational fisheries including: bottom trawls commonly used by shrimp vessels in the Gulf of California, gill-nets, traps, round nets, haul seines, and beach seines commonly used in inshore and coastal waters of Baja California. It is thought that trawls, tuna purse seines, hook-and-line, driftnets, bottom and surface

longlines may kill additional numbers of turtles in different areas of the eastern Pacific. Pollution effects to turtles continue with the no project alternative.

Stranding data from 1990 to 1999 for California indicate an average of 2.1 loggerhead turtles strandings per year. Entanglement and ingestion of marine debris, including abandoned nets, continue to pose a threat to leatherbacks, which seem to have a talent for seeking out and getting tangled in floating lines. There are no documented squid fishery interactions with any of the four species of sea turtles. Studies of threats to sea turtles in other areas have revealed that the primary threats are incidental take in collisions with fishing boats, thus there is the possibility that sea turtles could be hit by a market squid fishery boat. At present, no significant take of sea turtles is known to occur as a result of market squid fishing activities.

5.1.9.4 Effects to Listed Fish

Market squid, along with anchovy and sardine, are important as forage to many fish including all depleted, threatened, and endangered salmon stocks along the coast. Although it is not currently possible to estimate the total amount of CPS used as forage by finfish in the California Current ecosystem or the size of CPS populations necessary to sustain predator populations, the CPS FMP, along with the MSFMP, contain the goal of providing adequate forage for dependent species. This goal is implemented through harvest policies that reserve a portion of the biomass as forage for all dependent species. It is doubtful that the no project alternative could reduce the numbers of market squid available as prey items to adult salmon, as fishing activities would continue at current levels.

The market squid fishery does not occur in tidewater goby habitat (low salinity waters in estuaries) and therefore no effects are predicted. No fishing activities occur in salmon spawning or rearing habitats. Ongoing dockside sampling efforts, conducted statewide since 1998, revealed a small increase of salmon bycatch in squid catches delivered to central California commercial markets. A total of eight salmon (seven chinook salmon, one unidentified salmon) were observed as bycatch in 2002 and 2003. Four of the seven Chinook salmon were caught north of Pigeon Point, while the remaining Chinook and unidentified salmon were collected from landings in Monterey Bay. Most of this bycatch was other coastal pelagic species, including Pacific sardine, Pacific mackerel, northern anchovy, and jack mackerel and although there were salmonid species reported in the incidental bycatch, they were not listed species. At present, no significant take of listed salmonids is known to occur as a result of market squid fishing operations.

5.1.10 Effects to Non-Listed Species

5.1.10.1 Effects to Non-Listed Marine Mammals

<u>Indirect Effects</u>
Indirect effects to marine mammals in general are discussed in detail in section 4.1.9.1

Direct Effects

There are no reports of squid purse seine fishery-related mortality or serious injury in any of the baleen whale stocks in California waters. Subsequently, there are no reports of squid purse seine fishery-related mortality or serious injury in the majority of the toothed whales stocks in California waters. The exceptions are in the Delphinidae family, where reports of squid purse seine fishery-related mortality or serious injury in southern California are noted for the short-finned pilot whale and Risso's dolphin. Because offshore bottlenose dolphins are often associated with Risso's dolphins and short-finned pilot whales, they too may experience some serious injury or mortality in the squid purse seine fishery (Heyning et al. 1994). Additionally, Pacific white-sided dolphins, short-beaked and long-beaked common dolphins may also experience interactions with this fishery.

The squid purse seine fishery is listed as Category II under NOAA Fisheries classification, with the short-finned pilot whale listed as the marine mammal species/stock incidentally injured or killed. Although there are historical accounts of serious injury and mortality interactions between the squid purse seine fishery and short-finned pilot whales, sightings of pilot whales have been rare since the 1982 to 1983 El Niño event (Forney et al. 2000). Additionally, some past mortalities represented animals that were intentionally killed to protect catch or gear, rather than incidental kills in nets and gear. These takes are now illegal under the 1994 Amendment to the MMPA. There are no recent reports of short-finned pilot whale mortalities associated with this fishery, most likely because short-finned pilot whales are no longer common in the areas utilized by the squid purse seine fishery and because the fishery is not monitored. However, there have been anecdotal reports of pilot whale sightings in the vicinity of squid fishing operations during the 1997 to 1998 fishing season. Thus, based on historical accounts of mortality and the fact that the squid purse seine fishery is listed as a Category II fishery, it is possible that the squid purse seine fishery may interact with short-finned pilot whales. The squid brail fishery is considered a Category III fishery, (those with a remote likelihood of marine mammal interaction or no known serious injuries or mortalities with marine mammals), and there are documented pilot whale mortalities associated with brail vessels. But these mortalities likely represented animals that were intentionally killed to protect catch or gear, rather than incidental kills and these takes are now illegal under the 1994 Amendment to the MMPA. Thus, it is possible that the brail squid fishery may interact with short-finned pilot whales.

Additionally, Pacific white-sided dolphins feed on squid at night and primarily occur off California in cold water months. Short-beaked and long-beaked common dolphins also feed on squid at night and can be found off southern California. Thus, these species may experience interactions with the market squid fishery. However, as mentioned above, the fishery is not monitored so recent mortality of these species has not been reported. Additionally, according to NOAA Fisheries (Forney et al. 2000), some past mortalities probably represented animals that were intentionally killed to protect catch or gear, rather than incidental kills, and these takes are now illegal under the 1994

Amendment to the MMPA. Based on historical accounts, distribution, current food habits, and behavior, it is possible that the squid purse seine fishery may interact with Risso's dolphins, offshore bottlenose dolphins, Pacific white-sided dolphins, and short-beaked and long-beaked common dolphins.

There are documented interactions of serious injury and mortality of California sea lions with squid purse seine and squid brail vessels. These mortalities likely represented animals that were intentionally killed to protect catch or gear, rather than incidental kills where the animals became entangled in gear, and such takes are now illegal under the 1994 Amendment to the MMPA. However, the squid purse seine and squid brail fishery may continue to interact with California sea lions. Nonetheless, the total fishery mortality (from all fisheries) and serious injury (estimated to be 1,208 sea lions) for the California sea lion stock is less than the potential biological removal level (PBR) of 6,591 sea lions (Forney et al. 2000) [see section 3.9.1.1 for a detailed explanation of PBR]. Finally, the majority of sea lion-fishery interactions occur in the gill-net fishery rather than the squid purse seine fishery. Currently, the squid fishery is not monitored so mortality of sea lions in the squid fishery has not been reported.

5.1.10.2 Effects to Non-Listed Marine and Coastal Birds (Seabirds)

Indirect Effects
Indirect effects to seabirds in general are discussed in detail in section 4.1.9.2.

Direct Effects
Several surface-feeding and scavenging species of seabirds (gulls, albatrosses, fulmars, and shearwaters) are attracted to fishery operations to feed on bait or discarded targeted species and bycatch. The potential exists for these species to become entangled resulting in mortality or serious injury. In addition, these species consume squid, which could be an additional attraction to such vessels. Thus, we cannot rule out the possibility that the market squid fishery may interact with these species. Currently, the fishery is not monitored so mortality of these species has not been reported.

Artificial night-lighting can be a problem for several seabird species that are nocturnal in colony or foraging habits. Non-listed breeding seabirds in California that are susceptible to inflight strikes include Cassin's auklet, fork-tailed storm-petrel, and Leach's storm-petrel. When flying in total darkness, seabirds may become disoriented by and attracted to bright artificial lights (Verheijen 1958, Reed et al. 1985, Telfer et al. 1987). This may cause birds to crash into lighted boats, which can result in direct mortality or result in birds either falling stunned and/or injured into the water or landing on deck (Dick and Donaldson 1978). Injured birds become easy targets for predation after daylight. Storm-petrels and related petrels and shearwaters are known to be attracted to and strike lighted longlining vessels, as well as other lighted vessels, fishing at night in the southern hemisphere (Reid, pers. comm., Weimerskirch et al. 2000), lighted vessels at night in Alaska (Canez, Trapp, and Williams, pers. comm.) and

Newfoundland (Chardine, pers. comm.), and artificial night-lighting in Hawaii (Reed et al. 1985, Telfer 1987).

5.1.10.3 Effects to Non-Listed Fish

Bycatch in the market squid fishery is minimal and the effects of removing squid from the ecosystem is not unique to the proposed project as this condition currently exists in the market squid fishery. Thus, removal of squid as prey available to fish species is expected to continue with the no project alternative. Fish continue to be exposed to various pollutants throughout the coastal areas. They also continue to be targeted and incidentally taken in other fisheries. Fish populations could either increase or decrease depending on the effort manifested. Fishing success may be adversely affected for up to 10 days following seismic surveys for oil and gas exploration. The decline in fishing success due to behavioral response may be experienced as far as 10 km from the survey area (MMS 2001). Exploration and development of undeveloped federal leases would continue to have a potential effect on marine organisms and would continue with the no project alternative.

5.1.10.4 Effects to the Market Squid Resource

Market squid is the state's largest fishery by volume. In addition to supporting an important commercial fishery, the market squid resource is important to the recreational fishery and is forage for other fish taken for commercial and recreational purposes, as well as for marine mammals, birds, and other marine life. The growing international market for squid and declining squid production from other parts of the world has resulted in an increased demand for California market squid, which, in turn, has led to newer, larger, and more efficient vessels entering the fishery and increased processing capacity. The recent expansion in the fishery combined with record harvests of market squid may result in overfishing of the resource, damaging the resource, and financially harming those persons engaged in the taking, landing, processing, and sale of market squid. However, there are several status-quo mechanisms in place to protect the squid resource. In October 2001, the Commission established a seasonal harvest limit of 125,000 tons. The limit was based on the highest recorded seasonal catch level for the fishery (1999 to 2000) and serves to prevent volumetric growth of the fishery should market demand encourage such expansion.

Status quo regulations (CCR Title 14 §149) prohibit the take of market squid for commercial purposes each week between noon Friday and noon Sunday from Point Conception south to the U.S.-Mexico border. The closure extends an existing squid fishery closure for the same time period north from Point Conception to the California-Oregon border (FGC §8420.5). The regulations affect vessels catching squid and vessels using lights to attract squid, and do not apply to those pursuing squid for live-bait purposes. This precautionary measure was adopted to provide spawning squid at least 2 nights respite from fishing pressure. Unlike a seasonal quota or closure, this measure spreads the escapement throughout the year, rather than concentrating it during one particular period.

Current status quo does not include a capacity goal for light boats and no permit transfers. The status quo does not propose any additional time and area closures, beyond the weekend closure, or additional gear restrictions. The status quo institutes monitoring the squid fishery through the egg escapement model as a proxy for MSY. Until a defensible estimate of market squid biomass is available, the egg escapement model serves to protect the resource and assure sustainability of the fishery.

The status quo continues the existing squid research and monitoring program, including fishery-dependent sampling efforts conducted at ports statewide, ongoing monitoring of catch information, and continuation of independent research contracts, especially those focused on developing management models. Further, the fishery-dependent sampling is critical for real-time monitoring of the market squid fishery through the egg escapement model of 30 percent.

The status quo maintains the logbook system in place by the Department for squid fishing vessels and squid light boats. These records provide valuable catch information and may be essential in modeling the market squid population.

Through the Department's port sampling program, it was identified that approximately 3.2 percent of sampled landings contained squid egg cases. However, the 125,000 ton cap is to prevent expansion beyond the current fishery and does not take the 3.2 percent loss into consideration. Currently, the type of net used to fish for squid is unregulated, although purse seines used for squid typically do not hang as deep as purse seines used for other species, so contact with the bottom is reduced. Incidental catches of squid eggs and other species increase in the squid fishery when the nets are set in shallower water (less than 22 fathoms), where bottom contact may occur (Lutz and Pendleton 2001). Damage to the substrate, and thus, mortality of squid eggs associated with purse seining for squid has not been quantified.

5.1.11 Effects to Land Use and Existing Infrastructure

Development activities within watersheds and in coastal marine areas often affect habitat of market squid and other fish species on both long-term and short-term scales. Runoff of toxins from development sites reduces the quality and quantity of suitable fish habitat by the introduction of pesticides, fertilizers, petrochemicals, and construction chemicals. Sediment runoff can restrict tidal flows and tidal elevations resulting in the loss of important fauna and flora. Shoreline stabilization projects that affect reflective wave energy can impede or accelerate natural movements of sand, thereby impacting intertidal and sub-tidal habitats (PFMC 1998). Development pressure on coastal areas would continue with the no project alternative.

5.1.12 Effects to Transportation

No additional changes to circulation patterns or transportation corridors are expected with the no-project alternative.

5.1.13 Effects to Noise

No additional changes to noise levels are expected with the no project alternative.

5.1.14 Effects to Utilities

No additional changes to utility usage are expected with the no project alternative.

5.1.15 Effects to Archeology/Paleontology

No additional changes to archaeology are expected with the no project alternative as most fishers would prefer to avoid shipwrecks and the potential for losing or damaging their gear.

5.2 Other Project Alternatives

Consistent with CEQA and the Commission's certified regulatory program, the following sections address whether implementation of the alternative project options could result in a significant or potentially significant environmental impact under CEQA. It is the purpose of this section to provide information about each option to allow meaningful evaluation, analysis, and comparison with the proposed project. This will allow the Commission and the public a meaningful evaluation, analysis, and comparison of options. This document discusses a range of reasonable alternatives to the proposed project, or its location that could feasibly accomplish the basic objectives of the project and could avoid or substantially lessen one or more of the project-related effects. Of those alternatives, this document examines in detail only the ones that could feasibly attain most of the basic objectives of the project. CEQA guidelines state that this document need not consider every conceivable alternative to a project. Rather it must consider a reasonable range of potentially feasible alternatives that will foster informed decision making and public participation. Additionally, it is not required to consider alternatives which are infeasible (CCR Title 14 §15126.6). Thus, the following sections do not consider alternatives whose effect cannot be reasonably ascertained and whose implementation is remote and speculative.

As stated above, CEQA guidelines state the ED need not consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative, nor be required to consider alternatives which are infeasible. There are 38 alternative options to the proposed project options (see Table 2-4). Five of these options (A.6, D.2, D.3, G.2, I.5) are infeasible, do not meet the goals and objectives of the MLMA and the MSFMP, or they result in significant environmental impacts under CEQA.

Without seasonal catch limitations (A.6), weekend closures (D.2, D.3), and limited entry (I.5) options the fishery is likely to be overfished and the resource damaged. Removal and/or exemptions to weekend closures in the northern Channel Islands would result in

increased fishing effort and interactions with seabirds could increase. Removal of existing gear options regarding shields and light wattage (G.2), is likely to result in significant impacts to nesting seabirds; including the State and federally protected California brown pelican, candidate/threatened Xantus's murrelet, and SSC ashy storm-petrel, black storm-petrel, rhinoceros auklet, and tufted puffin. Thus, these options would not accomplish the objectives of the MSFMP, and consequently, they are not discussed any further in this document

Implementation of the other 35 options is not likely to result in significant impacts to the environment, provided the option is not implemented in conjunction with A.6, D.2, D.3, G.2 or I.5. It is anticipated that options will be selected to collectively prevent significant impacts on environment from occurring as it is the goal of the MSFMP to sustain both the squid population and the marine life that depends on it.

5.2.1 Seasonal Catch Limit of 80,000 tons (A.1)

Implementation of option A1 would establish a statewide seasonal catch limitation of 80,000 tons. This seasonal catch limitation is based on the seasonal catch limitation using a 3-year recent average catch from the 1999-2000 to 2001-2002 seasons with the assumption that the stock is below B_{MSY} (average spawning biomass) and above the MSST. This approach uses a multiplier of 0.67. Under this option, a maximum statewide seasonal catch limitation of 80,000 tons would be implemented. Compared to the proposed project, the effects to the environment from this option have the potential to be decreased.

5.2.2 Regional Catch Limit Based on Multi-Year Averages (A.3)

Implementation of A3 would establish regional seasonal catch limitations based on a multi-year recent average catch for each region with the assumption that the stock is above B_{MSY}. The regions would be north and south of Point Conception. This option would prevent localized negative ecological effects in the northern region as the entire seasonal catch could not be taken from Monterey Bay (this fishery begins earlier than the southern region). Compared to the proposed project, the effects to the environment from this alternative have the potential to be similar.

5.2.3 Seasonal Catch Limit Based on Environmental Conditions (A.4)

Implementation of option A4 would base the seasonal catch limitation on environmental conditions. In a non-El Niño period the seasonal harvest would be 115,000 tons, while during an El Niño period the seasonal harvest would be 11,000 tons. This option is below the proposed project seasonal catch limitation of 118,000 tons. Reducing landings during an El Niño period is likely to decrease fishing effort and lower the potential for interactions between fish, marine turtles, seabirds, and marine mammals. During El Niño periods, the availability and abundance of squid are typically less than in non-El Niño periods. Lowered landings during El Niño periods would potentially benefit species that consume squid as more squid would be available for their consumption.

Compared to the proposed project, the effects to the environment from this option have the potential to be decreased.

5.2.4 Establish a seasonal catch limitation of between 24,000 to 125,000 tons (A.7)

Implementation A.7 would allow the Commission to select a range of seasonal catch limitations from 24,000 tons to 125,000 tons so it may apply whatever level of precaution it believes is appropriate from a policy standpoint. The maximum value (125,000 tons) represents the current interim regulation, while the minimum value represents a six-year average of seasonal landings from the 1997-1998 to 2002-2003 seasons and the assumption that the stock is below the MSST. The primary purpose of this option is to give the Commission greater flexibility in determining a seasonal catch limitation with a level of protection they are comfortable with. This option was added at the direction of the Commission at its 1 August 2003 meeting. Compared to the proposed project, the effects to the environment from this option have the potential to be decreased.

5.2.5 Establishing Daily Trip Limits (C.1)

Implementation of C.1 would establish a daily trip limit between 30 tons to 137.8 tons. The current fishery is controlled by market orders and although there are vessels in the current fleet capable of delivering loads well in excess of 60 tons, there is rarely the opportunity to deliver a vessel's full capacity tons because market-imposed trip limits of 30 tons are routine (although a vessel may deliver to more than one processor daily). Processors set the limit at 30 tons because of limited processing and freezing capacity. Market squid are included as part of the CPS FMP as a monitored-only species and the CPS FMP federal guidelines limit CPS finfish harvest to a 137.8 tons daily trip limit. But the majority of the vessels are well under this volume. Compared to the proposed project, the effects to the environment from this alternative have the potential to be similar.

5.2.6 Maintain existing weekend closures in waters south of Point Conception, and extend the range of closures to include additional days and/or times for areas north of Point Conception (D.4)

Option D.4 was added to address concerns of overfishing in Monterey Bay at the request of the Commission and/or via public comment. In the 2002-2003 fishing season, there were record catches of market squid landed in Monterey. Fishermen were concerned vessels were fishing both day and night and as a result, the squid resources were being depleted. This increase in the number of vessels fishing for squid was the result of several factors including; the collapse of the Falkland Islands squid fishery (which kept demand for California squid at a high level), other southern California CPS fishery catches were minimal (e.g., sardine and anchovy catches), domoic acid closures for the human and feed consumption of anchovies and sardine basically closed the southern California CPS fishery, and southern California market

squid landings in 2002-2003 were much lower than average due to El Niño conditions. The Monterey squid fishery has traditionally been a nighttime fishery since the 1860s, but in 2000, the fishery started setting for squid during daylight hours. When squid schools are located in the daytime using sonar, the entire fleet will fish the area until all the squid are caught or no squid can be found. The fleet will then disperse and go into a search pattern. In essence, the fleet is now actively searching for schools of squid before they are able to reach the spawning grounds. In May 2003, the majority of the Monterey squid fleet voluntarily did not fish on Thursdays or Fridays. The fishermen agreed to take those days off due to increased conflicts between vessels and lack of squid by the end of the week. However, by the end of the month, there was concern that not all of the fleet was complying with the voluntary effort. Thus, Option D.4 would expand the extent of the weekend closure for all squid fishers north of Point Conception. Closures may include either additional days and/or times for areas north of Point Conception. Compared to the proposed project, the effects to the environment from this option have the potential to be decreased.

5.2.7 Establish a Permit for Live Bait and Incidental Catch (F.2)

Implementation of option F.2 is not likely to have any significant ecological effects under CEQA as the take of squid for live bait is considered minor. Compared to the proposed project, the effects to the environment from this option have the potential to be similar.

5.2.8 Establish a wattage limitation between 15,000 to 30,000 watts of light for each vessel fishing for squid with continued shielding requirements (G.3)

Implementation of this option would establish gear restrictions that state each vessel fishing for squid and lighting for squid will utilize a wattage limitation set at a value between the range of 15,000 to 30,000 watts of light to attract squid at any time and that each vessel will reduce the light scatter of its fishing operations by shielding the entire filament of each light used to attract squid and orient the illumination directly downward, or provide for the illumination to be completely below the surface of the water. Research has not been conducted to measure the effects of the shielded lights and reduced wattage regulations on seabird rookeries. While these regulations reduce the illumination intensity of each vessel, they do not avoid all impacts to sensitive species, as reduced wattage and shielding still produces light above ambient levels. At this time, there is no control over the number of squid vessels in any particular area. Since illumination levels are additive, multiple boats close to colonies will cumulatively illuminate islands above normal levels. Personnel from the CINPS have reported squid boats fishing as close as 75 to 450 feet (< 1/8 mile) from Anacapa Island, and as many as 12 boats at one time. Furthermore, noise associated with squid fishing activities (e.g., engine noise, generators, radios, human voices, seal bombs, gunshots) still has the potential to cause disturbances to breeding seabirds.

In addition, the shielded lights and reduced wattage regulations do not avoid interactions with nocturnally active species. Artificial night lighting, associated with the market squid fishery, can continue to result in disorientation of these species and

collisions with vessels. Small amounts of light on vessels in the Channel Islands have been observed to cause disorientation in Xantus's murrelets and their chicks.

The Channel Islands provide important breeding habitat for listed (California brown pelican, snowy plover, and bald eagle) candidate/threatened (Xantus's murrelet), SSC (ashy storm-petrel, black storm-petrel, rhinoceros auklet, tufted puffin, and double-crested cormorant), and globally rare seabird species (Xantus's murrelet and ashy storm-petrel). Anacapa and Santa Barbara islands are the only United States breeding sites for the California brown pelican. The islands also provide nesting habitat for 80 percent of the U.S. population and 33.5 percent of the world's population of breeding Xantus's murrelet and 50 percent of the U.S. population and 41 percent of the world's population of breeding ashy storm-petrel. The only other major nesting site for the ashy storm-petrel, the Farallon Islands, is in decline. The only black storm-petrel colony in the United States is found on Santa Barbara Island. Impacts to the Channel Island populations of these species can have serious, long-term consequences for the survival of these species.

Given what we know about the effects of artificial night lighting and human disturbance of colonies for these seabird species, as well as for related species around the world, artificial night lighting associated with the market squid fishery could significantly impact recovery of these species if it occurs during the breeding season (this issue is discussed in greater detail in section 5.1.9.2). Thus, compared to the proposed project, the effects to seabirds and the environment from this option have the potential to be similar. This option was added at the request of the Commission and/or via public comment.

5.2.9 Modify shields to improve effectiveness (G.4)

Implementation of G.4 would establish modifications to shields for each vessel fishing for squid or lighting for squid so that the light scatter would be reduced, or provide for the illumination to be completely below the surface of the water. While these regulations would function to reduce the illumination intensity of each vessel, they do not avoid all impacts to sensitive seabird species, even with reduced wattage and shielding, light is produced above ambient levels. This issue is discussed above in Section 5.2.8, and in greater detail in Section 5.1.9.2. Thus, compared to the proposed project, the effects to seabirds and the environment from this option have the potential to be similar. This option was added at the request of the Commission and/or via public comment.

5.2.10 Capacity Goals for Vessels and Light Boats at 10 Permits Each (H.1)

Implementation of H.1 would set the capacity goal for both market squid vessel permits and market squid light boat permits at 10 permits each. H.1 would establish a capacity goal for market squid vessel permits that produces a highly productive and more specialized fleet. This option assumes that the maximum catch that would ever be

possible for each boat is caught on every trip. Compared to the proposed project, the effects to the environment from this option have the potential to be similar.

5.2.11 Capacity Goals for Vessels and Light Boats at 10 Permits Each (H.2)

Implementation of H.2 would set the capacity goal for both market squid vessel permits and market squid light boat permits at 52 permits each. The capacity goal for market squid brail permits would be 18. Compared to the proposed project, the effects to the environment from this option have the potential to be similar.

5.2.12 Capacity Goals for Vessels and Light Boats at 104 Permits Each (H.4)

Implementation of H.3 would set would set the capacity goal for both market squid vessel permits and squid light boat owner's permits at 104 permits each. This would result in a less productive but more diverse fleet. This option assumes that the average catch for each boat continues. The capacity goal for market squid brail permits would be 18. If the vessel fished a maximum of 45 days per season, 104 vessels operating in this manner would land the maximum seasonal catch. Compared to the proposed project, the effects to the environment from this option have the potential to be similar.

5.2.13 Initial Issuance of Market Squid Fleet Permits (I.3)

Implementation of I.3, allow a permit purchase by any permit holder who held a permit in the first year of the moratorium (239 vessel permits and 62 light boat permits) would result in too many permit holders and would not reduce the number of boats in the fishery, subsequently, the capacity goal would not be met. Compared to the proposed project, the effects to the environment from this option have the potential to be increased.

5.2.14 Initial Issuance of Market Squid Fleet Permits (I.4)

Implementation of I.4 would increase of the number of transferable market squid vessel, market squid brail, and squid light boat owner's permits resulting in a longer time period to reach the capacity goal. Compared to the proposed project, the effects to the environment from this option have the potential to be similar.

5.2.15 Market Squid Vessel Permit Transfer Option (K.2)

Implementation of option K.2 would establish full transferability of market squid vessel permits. This would provide flexibility to meet the needs of the fleet but will not help to achieve the capacity goal. Compared to the proposed project, the effects to the environment from this option have the potential to be similar.

5.2.16 Market Squid Brail Permit Transfer Option (L.2)

Implementation of the permit transfer option L.2 would establish full transferability of market squid brail permits, provided a 15-ton daily trip limit is implemented. Brail vessels are a minor component of the fleet and do not significantly contribute to fleet capacity. Compared to the proposed project, the effects to the environment from this option have the potential to be similar.

5.2.17 Market Squid Light Boat Permit Transfer Options (M.2)

Implementation of the permit transfer option M.2 would not significantly increase the capacity. This would only be allowed if the initial number of permits issued is equal to or less than the capacity goal. Compared to the proposed project, the effects to the environment from this option have the potential to be similar.

5.2.18 Establish 1 to 5 Experimental Market Squid Vessel Transferable Permits (O.1)

Implementation of O.1 would allow the Commission to issue one to five transferable market squid vessel permits to any individual for placement on any vessel for the purpose of developing a squid fishery in areas previously not utilized for squid production. Any additional criteria that the Commission should wish to impose upon a permittee, such as a requirement that the permittee carry observers, or a requirement that the permittee operate only in a specified geographic range, could be added at the Commission's discretion as a special condition of the permit. Individuals issued permits pursuant to O.1 would still be required to adhere to all commercial squid fishing regulations in CCR Title 14 §149, and all terms and conditions for permits defined in CCR Title 14 §149.1, excepting initial issuance criteria defined in CCR Title 14 §149.1(c). Since these permits would count towards the capacity goal, and permittees would be subject to all commercial squid fishing regulations (including closed areas) then compared to the proposed project, the effects to the environment from this option have the potential to be similar. This option was added at the request of the Commission and/or via public comment.

5.2.19 Establish 1 to 5 Experimental Market Squid Vessel Non-transferable Permits (O.2)

Implementation of O.2 would allow the Commission to issue one to five non-transferable market squid vessel permits to any individual for placement on any vessel for the purpose of developing a squid fishery in areas previously not utilized for squid production. Any additional criteria that the Commission should wish to impose upon a permittee, such as a requirement that the permittee carry observers, or a requirement that the permittee operate only in a specified geographic range, could be added at the Commission's discretion as a special condition of the permit. Individuals issued permits pursuant to O.2 would be required to adhere to all commercial squid fishing regulations in CCR Title 14 §149, and all terms and conditions for permits defined in CCR Title 14 §149.1, excepting initial issuance criteria defined in CCR Title 14 §149.1(c). Since these permits would count towards the capacity goal, and permittees would be subject

to all commercial squid fishing regulations (including closed areas) then compared to the proposed project, the effects to the environment from this option have the potential to be similar. This option was added at the request of the Commission and/or via public comment.

5.2.20 Establish a Regional Restricted Access Control Date for the Purpose of Considering a Future Restricted Access Program (P.1)

Implementation of P.1 would set a regional control date for purposes of developing a future regional restricted access commercial fishery program. This provision would establish a control date to notify participants of intent to adopt a regional restricted access program for the squid fishery at a future date. A range of control date options (April 1, 1998 – October 17, 2003) is proposed for consideration. Fishery participation on or after this date may apply toward a permit for a specified geographic region under a future regional restricted access program for the market squid fishery if one is developed. Fishery participation prior to the control date would not be used as a measure of participation to qualify for initial issuance of regional restricted access permits. Only participation on or after the control date may be used to determine eligibility in a future regional restricted access program. The port of landing of these catches or records of light boat activity would be used to determine eligibility in specific geographic areas. Possession of any market squid vessel, brail, or light boat permit issued pursuant to CCR Title 14 §149.1, would not guarantee issuance of a permit under any future squid regional restricted access program. Beginning with the fishing season immediately following adoption of a regional restricted access program, market squid fishery permits issued pursuant to CCR Title 14 §149.1 would be replaced with the appropriate regional permits that would be subject to specific conditions for issuance. Permits previously issued under CCR Title 14 §149.1 would be nullified and no longer subject to renewal provisions. Compared to the proposed project, the effects to the environment from this option have the potential to be similar. This option was added at the request of the Commission and/or via public comment.

5.2.21 Close All Waters Within Depths of 100 Fathoms Around San Nicholas Island (Q.2)

Implementation of Q.2 is not likely to have significant ecological effects under CEQA as the areas proposed for closure are not currently fished by squid fishermen on a regular basis. This option could benefit those marine mammal, seabird, sea turtle, and fish species who consume squid in the closed areas, as well as the market squid that spawn in the closed areas and incidentally caught species. Implementation of this option is not expected to negatively affect other environmental factors. Compared to the proposed project, the effects to the environment from this option have the potential to be similar.

5.2.23 Establish areas that are closed to squid fishing in all waters of the Gulf of the Farallones National Marine Sanctuary [GFNMS] (Q.4)

Implementation of this option would prohibit the take of market squid for commercial purposes in all waters of the GFNMS. Under this option marine species would be protected from direct and indirect squid fishery interactions in areas that have not been traditionally utilized for commercial squid fishing.

The GFNMS, designated in 1981, encompasses a 1,255 square mile area of the Pacific Ocean north and west of San Francisco Bay. In the south central part of the GFNMS are the Farallon Islands, a National Wildlife Refuge. Although comprising just over 100 acres total, the Farallon Islands and Noon Day Rock are inhabited by some of the largest seabird and marine mammal colonies in the continental United States south of Alaska (Point Reyes Bird Observatory [PRBO] webpage).

In 2003, squid vessels harvested more squid north of the traditional Monterey fishing grounds, in the area between Pigeon Point and Point Reyes, than the prior 12 year average (1990-2002) (see Figure 3-7a-b in Section 1). In 2003, approximately 5,744 tons or 40 percent of the northern California market squid landings were taken between Pigeon Point and Point Reyes compared to the 12-year average of 666 tons or 7 percent. Between Pillar Point and Point Reyes, 1,619 tons or 11 percent of the northern California landings were taken in 2003 compared to the 12-year average of 116 tons or 1.2 percent of the northern California landings. This disturbed some biologists and other users of the area. The removal of squid biomass is of particular concern because squid are an important prey item for the many marine mammals, seabirds, sea turtles, and fish that utilize these waters which include the GFNMS, the Farallon Islands, Cordell Bank National Marine Sanctuary, and part of the Monterey Bay National Marine Sanctuary. Squid has been documented as an important dietary component of the northern elephant seal, northern fur seal, California sea lion (Lowry and Caretta 1999), Dall's porpoise, Pacific striped dolphin, Risso's dolphin, and toothed whales such as the short-finned pilot whale (Hacker 1992), sperm whale, and bottlenose whale (Fields 1965). In addition, seabirds such as the common murre, ashy storm-petrel, black storm-petrel, fork-tailed storm-petrel and rhinoceros auklet feed on market squid (Morejohn et al. 1978). Many commercially important species of fish feed upon market squid, including Pacific bonito, halibut, and tuna (Fields 1965, Morejohn et al. 1978) as well as all stable, depleted, threatened, and endangered salmon stocks along the coast. In fact, predators from many trophic levels utilize both small pelagic fishes, such as northern anchovy and sardine, and squid as either a primary or supplementary food source.

In addition to the indirect impacts on species that consume squid, the squid fishery has the potential to directly affect species. There is the potential for interaction with marine mammals, the impact to seabirds from noise and lights, vessel strikes to sea turtles, and the potential for bycatch of listed salmon and other fish species in purse seine gear. Of particular concern are the impacts of squid fishing activities on seabirds. The Farallon Islands provide important breeding habitat for ashy storm-petrels, a SSC. In fact, the Farallon Islands provide nesting habitat for 50 percent of the U.S. population of breeding ashy storm-petrels (Carter et al. 1992). The only other major nesting site for the ashy storm-petrel is at the Channel Islands. Ashy storm-petrels have a protracted

breeding season and at the Farallon Islands can occupy nests year-round (Ainley & Boekelheide 1990). Data found 50 percent of monitored burrows were occupied during the months of March through October while even in November, December, and January at least 10 percent of the burrows were occupied. Populations of ashy storm-petrels have declined by an estimated 34 percent over the past 20 years at the Farallon Islands (Sydeman et al. 1998a, 1998b) and would be at risk from squid fishery interactions. Factors in their decline include habitat loss from invasive non-native plants; introduction of feral cats, house mice, and other nonnative animals; and predation by house mice, western gulls, burrowing owls, and other owl species (Sydeman et al. 1998, Nur et al. 1999).

Ashy storm-petrels are also known to be sensitive to human disturbance, oil pollution, and marine pollution. Ashy storm-petrels may be affected by ancillary fishing activities (e.g., vessel proximity, motor noise, generators, lights, gunshots, seal bombs, radios, etc.) near their roosting and breeding sites. Because of their nocturnal colony habits, ashy storm-petrels are accustomed to flying in total darkness and may become disoriented by, and attracted to bright artificial lights (Verheijen 1958, Reed et al. 1985, Telfer et al. 1987). This may cause them to crash into lit boats, which can result in direct mortality or result in birds either falling stunned and/or injured into the water or landing on deck (Dick and Donaldson 1978). Injured birds become easy targets for predation after daylight. In worst cases, the adult birds may avoid the colony and not return to their nests, as nocturnal seabird species are known to reduce levels of colony attendance during lighted or full moonlight conditions, likely to avoid predation (Manuwal 1974; Watanuki 1980; Story and Grimmer 1986; Keitt 2000). In addition, storm-petrel fledglings depart the colony on their own at night. They may become attracted and disoriented by lights and collide with vessels, increasing the normal mortality rates of young-of-the-year. This is documented for fledging petrels and storm-petrels in Hawaii and is a major concern for survival of these species (Byrd et al 1978, Reed et al. 1985, Reed 1987, Telfer et al. 1987, Harrison 1990).

The concern over the potential impacts of artificial lights on seabirds in the Channel Islands arose in 1999 when large increases in artificial light intensity levels associated with night-time squid fishery boat activity extended into the seabird breeding season. The use of bright lights (current regulation of 30,000 watts maximum per vessel) was thought to increase the mortality of ashy storm-petrel nesting in the Channel Islands. In 1999, western gulls, which are normally diurnal and a predator of storm-petrels, were noted by researchers as more active at night when squid lights were on, and predation rates likely increased over normal levels (CINPS, unpublished data). Given what we know about the effects of artificial night lighting and human disturbance of colonies artificial night lighting associated with the market squid fishery could significantly impact recovery of this species and impacts to the Farallon Island populations of ashy storm-petrels could have serious, long-term consequences for the survival of this species.

Squid fishing activities have the potential to impact the other species of marine and coastal birds that breed at the Farallon Islands including the SSC double-crested cormorant, rhinoceros auklet, and tufted puffin. Disturbance and noise associated with

squid fishing activities (e.g., engine noise, generators, radios, gunshots, seal bombs, gunshots, human voices) at the Farallon Islands has the potential to cause disturbances to breeding seabirds which require nesting and roosting sites free from human disturbance, such as the alcids and cormorants. Rhinoceros auklets are nocturnal at nesting colonies and accustomed to flying in total darkness. They too, may become disoriented in bright lights and are susceptible to inflight strikes resulting in mortality or injury. Additionally, fledgling chicks of tufted puffins depart for the sea alone, at night (Gaston and Jones 1998), and may become attracted and disoriented by lights and collide with vessels, increasing the normal mortality rates of the young-of-the-year. As mentioned above, behavior patterns of gulls may be influenced by fishery activities. Gulls, which are normally diurnal, are known to forage at night near squid fishing boats where they are attracted by the activity and bright lights. Artificial lighting may also increase lighting and foraging abilities of gulls on other seabird colonies, resulting in increased levels of predation on nocturnally nesting seabirds.

In addition to seabirds, the Farallon Islands provide breeding, pupping and/or haul-out habitat for five species of pinnipeds, including northern elephant seal, northern fur seal, Steller sea lion (which is federally listed as threatened) California sea lion and Pacific harbor seal. The waters in the Gulf of the Farallones are highly productive and are a designated feeding area for endangered humpback and blue whales (NOAA/NOS 2003).

Thus, implementation of this option would provide a squid harvest replenishment/general habitat closure area that would protect marine mammals, seabirds, sea turtles, and fish from the direct and indirect squid fishery interactions, although the closure would encompass a smaller area compared the proposed project option. However, exclusion of squid fishing in closed areas could shift fishing effort to areas with other populations of fish, sea turtles, seabirds or marine mammals, increasing the rate of squid fishery interaction with these other species. Compared to the proposed project, the level of impact on seabirds would be similar as market squid vessels would be excluded from the Farallon Islands and surrounding waters at all times, thus incorporating the entire breeding season for all nesting seabird species. Implementation of this option is not expected to negatively affect other environmental factors. This option was added at the request of the Commission and/or via public comment.

5.2.24 Establish areas that are closed to squid fishing in waters extending offshore 1 nautical mile from the mean high water mark of Southeast Farallon Island, Middle Farallon Island, North Farallon Island and Noon Day Rock (Q.5)

Implementation of this option would prohibit the take of market squid for commercial purposes in waters extending offshore 1 nautical mile from the mean high water mark of Southeast Farallon Island, Middle Farallon Island, North Farallon Island and Noon Day Rock. This option is intended to protect marine species from direct and indirect squid fishery interactions in areas that have not been traditionally utilized for commercial squid fishing.

The Farallon Islands are located in the south central portion of the GFNMS and although comprising just over 100 acres total, the Farallon Islands and Noon Day Rock are inhabited by some of the largest seabird and marine mammal colonies in the continental United States south of Alaska (PRBO webpage).

In 2003, squid vessels harvested more squid north of the traditional Monterey fishing grounds, in the area between Pigeon Point and Point Reyes, than the prior 12 year average (1990-2002) (see Figure 3-7a-b in Section 1). In 2003, approximately 5,744 tons or 40 percent of the northern California market squid landings were taken between Pigeon Point and Point Reyes compared to the 12-year average of 666 tons or 7 percent. Between Pillar Point and Point Reyes, 1,619 tons or 11 percent of the northern California landings were taken in 2003 compared to the 12-year average of 116 tons or 1.2 percent of the northern California landings. Landings from the Farallon Islands were 1,323 tons or 9 percent of the northern California landings compared to the 12-year average of 0.3 tons or 0.03 percent. This disturbed some biologists and other users of the area. The removal of squid biomass is of particular concern because squid are an important prey item for the many marine mammals, seabirds, sea turtles, and fish that utilize these waters which include the GFNMS, the Farallon Islands, Cordell Bank National Marine Sanctuary, and part of the Monterey Bay National Marine Sanctuary. Squid has been documented as an important dietary component of the northern elephant seal, northern fur seal, California sea lion (Lowry and Caretta 1999), Dall's porpoise, Pacific striped dolphin, Risso's dolphin, and toothed whales such as the short-finned pilot whale (Hacker 1992), sperm whale, and bottlenose whale (Fields 1965). In addition, seabirds such as the common murre, ashy storm-petrel, black storm-petrel, fork-tailed storm-petrel and rhinoceros auklets feed on market squid (Morejohn et al. 1978). Many commercially important species of fish feed upon market squid, including Pacific bonito, halibut, and tuna (Fields 1965, Morejohn et al. 1978) as well as all stable, depleted, threatened, and endangered salmon stocks along the coast. In fact, predators from many trophic levels utilize both small pelagic fishes, such as northern anchovy and sardine, and squid as either a primary or supplementary food source.

In addition to the indirect impacts on species that consume squid, the squid fishery has the potential to directly affect species. There is the potential for interaction with marine mammals, the impact to seabirds from noise and lights, vessel strikes to sea turtles, and the potential for bycatch of listed salmon and other fish species in purse seine gear. Of particular concern are the impacts of squid fishing activities on seabirds. The Farallon Islands provide important breeding habitat for ashy storm-petrels, a SSC. The Farallon Islands provide nesting habitat for 50 percent of the U.S. population of breeding ashy storm-petrels (Carter et al. 1992). The only other major nesting site for the ashy storm-petrel is at the Channel Islands. Ashy storm-petrels have a protracted breeding season and at the Farallon Islands can occupy nests year-round (Ainley & Boekelheide 1990). Data found 50 percent of monitored burrows were occupied during the months of March through October while even in November, December and January at least 10 percent of the burrows were occupied. Populations of ashy storm-petrels have declined by an estimated 34 percent over the past 20 years at the Farallon Islands (Sydeman et al.

1998a, 1998b) and would be at risk from squid fishery interactions. Factors in their decline include habitat loss from invasive non-native plants; introduction of feral cats, house mice, and other nonnative animals; and predation by house mice, western gulls, burrowing owls, and other owl species (Sydeman et al. 1998, Nur et al. 1999).

Ashy storm-petrels are also known to be sensitive to human disturbance, oil pollution, and marine pollution. Ashy storm-petrels may be affected by ancillary fishing activities (e.g., vessel proximity, motor noise, generators, lights, radios, seal bombs, gunshots, etc.) near their roosting and breeding sites. Because of their nocturnal colony habits, ashy storm-petrels are accustomed to flying in total darkness and may become disoriented by, and attracted to bright artificial lights (Verheijen 1958, Reed et al. 1985, Telfer et al. 1987). This may cause birds to crash into lit boats, which can result in direct mortality or result in birds either falling stunned and/or injured into the water or landing on deck (Dick and Donaldson 1978). Injured birds become easy targets for predation after daylight. In worst cases, the adult birds may avoid the colony and not return to their nests, as nocturnal seabird species are known to reduce levels of colony attendance during lighted or full moonlight conditions, likely to avoid predation (Manuwal 1974; Watanuki 1980; Story and Grimmer 1986; Keitt 2000). In addition, storm-petrel fledglings depart the colony on their own at night. They may become attracted and disoriented by lights and collide with vessels, increasing the normal mortality rates of young-of-the-year. This is documented for fledging petrels and storm-petrels in Hawaii and is a major concern for survival of these species (Byrd et al 1978, Reed et al. 1985, Reed 1987, Telfer et al. 1987, Harrison 1990).

The concern over the potential impacts of artificial lights on seabirds in the Channel Islands arose in 1999 when large increases in artificial light intensity levels associated with night-time squid fishery boat activity extended into the seabird breeding season. The use of bright lights (current regulation of 30,000 watts maximum per vessel) was thought to increase the mortality of ashy storm-petrel nesting in the Channel Islands. In 1999, western gulls, which are normally diurnal and a predator of storm-petrels, were noted by researchers as more active at night when squid lights were on, and predation rates likely increased over normal levels (CINPS, unpublished data). Given what we know about the effects of artificial night lighting and human disturbance of colonies artificial night lighting associated with the market squid fishery could significantly impact recovery of this species and impacts to the Farallon Island populations of ashy storm-petrels could have serious, long-term consequences for the survival of this species.

Squid fishing activities have the potential to impact the other species of marine and coastal birds that breed at the Farallon Islands including the SSC double-crested cormorant, rhinoceros auklet, and tufted puffin. Disturbance and noise associated with squid fishing activities (e.g., engine noise, generators, radios, gunshots, seal bombs, gunshots, human voices) at the Farallon Islands has the potential to cause disturbances to breeding seabirds which require nesting and roosting sites free from human disturbance, such as the alcids and cormorants. Rhinoceros auklets are nocturnal at nesting colonies and accustomed to flying in total darkness. They too, may become disoriented in bright lights and susceptible to inflight strikes resulting in mortality or

injury. Additionally, fledgling chicks of tufted puffins depart for the sea alone, at night (Gaston and Jones 1998), and may become attracted and disoriented by lights and collide with vessels, increasing the normal mortality rates of the young-of-the-year. As mentioned above, behavior patterns of gulls may be influenced by fishery activities. Gulls, which are normally diurnal, are known to forage at night near squid fishing boats where they are attracted by the activity and bright lights. Artificial lighting may also increase lighting and foraging abilities of gulls on other seabird colonies, resulting in increased levels of predation on nocturnally nesting seabirds.

In addition to seabirds, the Farallon Islands provide breeding, pupping and/or haul-out habitat for five species of pinnipeds, including northern elephant seal, northern fur seal, Steller sea lion (which is federally listed as threatened) California sea lion and Pacific harbor seal.

Thus, implementation of this option would provide a squid harvest replenishment/general habitat closure area that would protect marine mammals, seabirds, sea turtles, and fish from the direct and indirect squid fishery interactions although the closure would encompass a smaller area compared the proposed project option. However, exclusion of squid fishing in closed areas could shift fishing effort to areas with other populations of fish, sea turtles, seabirds or marine mammals, increasing the rate of squid fishery interaction with these other species. Compared to the proposed project, the level of impact on seabirds is expected to be slightly increased. Although market squid vessels would be excluded from the Farallon Islands at all times, thus incorporating the entire breeding season for all nesting seabird species, squid vesses could fish in important foraging areas outside the closed area thereby reducing available forage. Implementation of this option is not expected to negatively affect other environmental factors. This option was added at the request of the Commission and/or via public comment.

5.2.25 Prohibit the take of squid for commercial purposes in District 10 (Q.6)

Implementation of this option Q.6 would prohibit the take of market squid for commercial purposes in District 10. District 10 includes the ocean waters of the state and the tidelands lying between the southern boundary of Mendocino County and a line extending west from the Pigeon Point Lighthouse, in San Mateo County, including Tomales Bay to a line drawn from the mouth of an unnamed creek about 1,500 feet north of Tomasini Point to the mouth of unnamed creek at Shell Beach; excluding Bodega Lagoon, all that portion of Bolinas Bay lying inside of Bolinas bar, that portion of San Francisco Bay lying east of a line drawn from Point Bonita to Point Lobos, and all rivers, streams and lagoons (CDFG 2003). This option is intended to protect marine species from direct and indirect squid fishery interactions in areas that have not been traditionally utilized for commercial squid fishing

In 2003, squid vessels harvested more squid north of the traditional Monterey fishing grounds, in the area between Pigeon Point and Point Reyes, than the prior 12 year average (1990-2002) (see Figure 3-7a-b in Section 1). In 2003, approximately 5,744

tons or 40 percent of the northern California market squid landings were taken from Pigeon Point to Point Reyes compared to a 12-year average of 666 tons or 7 percent. This disturbed some biologists and other users of the area. The removal of squid biomass is of particular concern because squid are an important prey item for the many marine mammals, seabirds, sea turtles, and fish that utilize these waters which include the GFNMS, the Farallon Islands, Cordell Bank National Marine Sanctuary, and part of the Monterey Bay National Marine Sanctuary. Squid has been documented as an important dietary component of the northern elephant seal, northern fur seal, California sea lion (Lowry and Caretta 1999), Dall's porpoise, Pacific striped dolphin, Risso's dolphin, and toothed whales such as the short-finned pilot whale (Hacker 1992), sperm whale, and bottlenose whale (Fields 1965). In addition, seabirds such as the common murre, ashy storm-petrel, black storm-petrel, fork-tailed storm-petrel and rhinoceros auklets feed on market squid (Morejohn et al. 1978). Many commercially important species of fish feed upon market squid, including Pacific bonito, halibut, and tuna (Fields 1965, Morejohn et al. 1978) as well as all stable, depleted, threatened, and endangered salmon stocks along the coast. In fact, predators from many trophic levels utilize both small pelagic fishes, such as northern anchovy and sardine, and squid as either a primary or supplementary food source.

In addition to the indirect impacts on species that consume squid, the squid fishery has the potential to directly affect species. There is the potential for interaction with marine mammals, the impact to seabirds from noise and lights, vessel strikes to sea turtles, and the potential for bycatch of listed salmon and other fish species in purse seine gear. Of particular concern are the impacts of squid fishing activities on seabirds. The Farallon Islands provide important breeding habitat for ashy storm-petrels, a SSC. The Farallon Islands provide nesting habitat for 50 percent of the U.S. population of breeding ashy storm-petrels (Carter et al. 1992). The only other major nesting site for the ashy storm-petrel is at the Channel Islands. Ashy storm-petrels have a protracted breeding season and at the Farallon Islands can occupy nests year-round (Ainley & Boekelheide 1990). Data found 50 percent of monitored burrows were occupied during the months of March through October while even in November, December and January at least 10 percent of the burrows were occupied. Populations of ashy storm-petrels have declined by an estimated 34 percent over the past 20 years at the Farallon Islands (Sydeman et al. 1998a, 1998b) and would be at risk from squid fishery interactions. Factors in their decline include habitat loss from invasive non-native plants; introduction of feral cats, house mice, and other nonnative animals; and predation by house mice, western gulls, burrowing owls, and other owl species (Sydeman et al. 1998, Nur et al. 1999).

Ashy storm-petrels are also known to be sensitive to human disturbance, oil pollution, and marine pollution. Ashy storm-petrels may be affected by ancillary fishing activities (e.g., vessel proximity, motor noise, generators, lights, seal bombs, gunshots, radios, etc.) near their roosting and breeding sites. Because of their nocturnal colony habits, ashy storm-petrels are accustomed to flying in total darkness and may become disoriented by, and attracted to bright artificial lights (Verheijen 1958, Reed et al. 1985, Telfer et al. 1987). This may cause birds to crash into lit boats, which can result in direct mortality or result in birds either falling stunned and/or injured into the water or

landing on deck (Dick and Donaldson 1978). Injured birds become easy targets for predation after daylight. In worst cases, the adult birds may avoid the colony and not return to their nests, as nocturnal seabird species are known to reduce levels of colony attendance during lighted or full moonlight conditions, likely to avoid predation (Manuwal 1974; Watanuki 1980; Story and Grimmer 1986; Keitt 2000). In addition, storm-petrel fledglings depart the colony on their own at night. They may become attracted and disoriented by lights and collide with vessels, increasing the normal mortality rates of young-of-the-year. This is documented for fledging petrels and storm-petrels in Hawaii and is a major concern for survival of these species (Byrd et al 1978, Reed et al. 1985, Reed 1987, Telfer et al. 1987, Harrison 1990).

The concern over the potential impacts of artificial lights on seabirds in the Channel Islands arose in 1999 when large increases in artificial light intensity levels associated with night-time squid fishery boat activity extended into the seabird breeding season. The use of bright lights (current regulation of 30,000 watts maximum per vessel) was thought to increase the mortality of ashy storm-petrel nesting in the Channel Islands. In 1999, western gulls, which are normally diurnal and a predator of storm-petrels, were noted by researchers as more active at night when squid lights were on, and predation rates likely increased over normal levels (CINPS, unpublished data). Given what we know about the effects of artificial night lighting and human disturbance of colonies artificial night lighting associated with the market squid fishery could significantly impact recovery of this species and impacts to the Farallon Island populations of ashy storm-petrels could have serious, long-term consequences for the survival of this species.

Squid fishing activities have the potential to impact the other species of marine and coastal birds that breed at the Farallon Islands including the SSC double-crested cormorant, rhinoceros auklet, and tufted puffin. Disturbance and noise associated with squid fishing activities (e.g., engine noise, generators, radios, gunshots, seal bombs, gunshots, human voices) at the Farallon Islands has the potential to cause disturbances to breeding seabirds which require nesting and roosting sites free from human disturbance, such as the alcids and cormorants. Rhinoceros auklets are nocturnal at nesting colonies and accustomed to flying in total darkness. They too, may become disoriented in bright lights and susceptible to inflight strikes resulting in mortality or injury. Additionally, fledgling chicks of tufted puffins depart for the sea alone, at night (Gaston and Jones 1998), and may become attracted and disoriented by lights and collide with vessels, increasing the normal mortality rates of the young-of-the-year. As mentioned above, behavior patterns of gulls may be influenced by fishery activities. Gulls, which are normally diurnal, are known to forage at night near squid fishing boats where they are attracted by the activity and bright lights. Artificial lighting may also increase lighting and foraging abilities of gulls on other seabird colonies, resulting in increased levels of predation on nocturnally nesting seabirds.

In addition to seabirds, the Farallon Islands provide breeding, pupping and/or haul-out habitat for five species of pinnipeds, including northern elephant seal, northern fur seal, Steller sea lion (which is federally listed as threatened) California sea lion and Pacific

harbor seal. The waters in the Gulf of the Farallones are highly productive and are a designated feeding area for endangered humpback and blue whales.

Thus, implementation of this option would provide a squid harvest replenishment/general habitat closure area that would protect marine mammals, seabirds, sea turtles, and fish from the direct and indirect squid fishery interactions although the closure would encompass a smaller area compared the proposed project (District 10 extends from approximately Pigeon Point to Mendocino-Sonoma county line). However, exclusion of squid fishing in closed areas could shift fishing effort to areas with other populations of fish, seabirds or marine mammals, increasing the rate of squid fishery interaction with these other species. Compared to the proposed project, the level of impact on seabirds is expected to be similar as market squid vessels would be excluded from the Farallon Islands and surrounding waters at all times, thus incorporating the entire breeding season for all nesting seabird species. Implementation of this option is not expected to negatively affect other environmental factors. This option was added at the request of the Commission and/or via public comment.

5.2.26 Establish Areas Closed to Squid Fishing around San Miguel, Anacapa, and Santa Barbara Islands from 1 February through 30 September (R.1)

The area closures would be 1 nautical mile from the high water mark for these islands and would exclude the Channel Island MPAs implemented in April 2003, because no commercial squid fishing is presently allowed in these areas. This is the best seabird closure option (proposed by the Department) as it would serve to protect most seabirds that forage in the waters and/or breed on Anacapa, Santa Barbara, and San Miguel islands. Castle Rock and Prince Island, off San Miguel Island, and Santa Barbara Island are considered to be the most important seabird nesting areas in the southern California Bight, in terms of numbers of species and numbers of birds. Anacapa Island supports the largest breeding colony of California brown pelicans in the United States. The majority of the Channel Islands seabirds nest between March and August, however, California brown pelicans have a protracted breeding season which can start as early as January and end as late as October. Ashy storm-petrel nesting is protracted (starts in April) and the majority of chicks fledge in September and October. Xantus's murrelets may visit breeding sites starting in January. The time closure from 1 February to 30 September would incorporate the entire breeding season for most seabird nesting species at these islands. Breeding seabirds would not be susceptible to inflight strikes and colony disturbances with this option.

Implementing R.1 is expected to have no significant effects on other environmental factors. Implementation of these closures may result in shift of fishing activities for the southern market squid fleet. However, based on past fishing effort, the effort at the closed areas is considered minimal. Marine species that forage on squid would benefit from an increase in prey forage in the closed areas as would spawning squid. Marine species that negatively interact with the squid fishery would benefit from a lack of

interaction in the closed areas. Compared to the proposed project, the effects to other environmental factors from this option have the potential to be decreased.

5.2.27 Establish Areas Closed to Squid Fishing around Anacapa and Santa Barbara Islands from 1 February through 30 September (R.2)

The area closure would be 1 nautical mile from the high water mark for these islands and would exclude the Channel Island MPAs implemented in April 2003, because no commercial squid fishing is presently allowed in these areas. Under option R.2, not all seabird colonies in the Channel Islands will receive protection, in particular, Castle Rock off San Miguel Island (Prince Island off San Miguel Island, will receive some protection under the Harris Point State Marine Reserve MPA [no-take]). San Miguel Island supports the only nesting colonies, in the Channel Islands, of rhinoceros auklet and tufted puffin, both SSC (refer to Figure 4.3). San Miguel and Santa Cruz islands provide important habitat for ashy storm-petrels (about 68 percent of the Channel Island population) and Xantus's murrelets (about 18 percent of the Channel Island population) and small numbers of both of these species have been found breeding on Santa Catalina and San Clemente islands. Squid fishing does currently occur off Santa Cruz Island but increasingly occurs off San Miguel Island. Closures to light use around Anacapa and Santa Barbara could result in increased night-fishing pressure around Santa Cruz Island and an extension of the fishery to San Miguel Island in non-MPA areas. This could result in negative impacts to seabird species on these islands. However, compared to the proposed project, the level of impact to seabirds would be less as market squid vessels would be excluded from the closed areas entirely (the proposed project restricts the use of attracting lights at Anacapa and Santa Barbara islands but does not exclude squid fishing). Additionally, the market squid fishing season typically occurs during the winter months, impacts to these other islands would only occur if fishing extended into the breeding season and squid were available in these areas.

Implementation of this option is not expected to negatively affect other environmental factors. Marine species that forage on squid would benefit from an increase in prey forage in the closed areas as would spawning squid. Marine species that negatively interact with the squid fishery would benefit from a lack of interaction in the closed areas. Compared to the proposed project, the effects to other environmental factors from this option have the potential to be similar.

5.2.28 Establish Areas Closed to Squid Fishing Using Attracting Lights around San Miguel, Anacapa, and Santa Barbara Islands from 1 February through 30 September (R.3)

The area closure would be 1 nautical mile from the high water mark for these islands and would exclude the Channel Island MPAs implemented in April 2003, because no commercial squid fishing is presently allowed in these areas. Under option R.3, noise associated with squid fishing activities (e.g., engine noise, generators, radios, seal bombs, gunshots, human voices) still has the potential to cause disturbances to

breeding seabirds which require nesting and roosting sites free from human disturbance. At this time, there is no control over the number of squid vessels in any particular area. Research has shown that many seabird species are disturbed by events which are out of the ordinary (Manuwal 1978, Anderson and Keith 1980, Carney and Sydeman 1999). This includes not only direct human disturbance, but also loud noises. Disturbances (including close vessel approach) at California brown pelican, double-crested and Brandt's cormorants, and common murre colonies are known to cause nest abandonment and increased egg predation (Ellison and Cleary 1978, Anderson and Keith 1980, Anderson 1988, Parker et al. 2000, Rojek and Parker 2000, Parker et al. 2001). In addition, it is likely that some level of artificial lighting will be necessary for squid vessels to conduct their operations safely, even without attracting lights. Artificial night lighting, associated with the market squid fishery, would continue to result in disorientation of these species and collisions with vessels. With no control over the number of vessels in an area, it is possible that multiple boats with operating lights could be close to seabird colonies during sensitive periods in their nesting season. For example, small amounts of light on vessels in the Channel Islands have been observed to cause disorientation in Xantus's murrelets and their chicks when they depart the colony. However, it is assumed that squid fishers will fish in areas not closed to attracting lights rather than attempting to fish without lights in areas closed to attracting lights. Monitoring the squid fishery to determine where the fishery is concentrated after implementation will reinforce this assumption. If this option is chosen, we recommend monitoring of the squid fishery to determine where the fishery is concentrated after implementation. We also recommend monitoring of the squid fishing to determine if noise and other activities associated with the squid fishery is impacting seabird colonies in the Channel Islands. Compared to the proposed project, the level of impact on seabirds would be decreased as market squid vessels would be excluded from San Miguel Island.

Implementation of this option is not expected to negatively affect other environmental factors. Marine species that forage on squid would benefit from an increase in prey forage in the closed areas as would spawning squid. Marine species that negatively interact with the squid fishery would benefit from a lack of interaction in the closed areas. Compared to the proposed project, the effects to other environmental factors from this option have the potential to be similar.

5.2.29 Establish areas that are closed to squid fishing around the Farallon Islands from 1 February through 30 September (R.6)

Implementation of this option would establish areas that would prohibit the take of market squid for commercial purposes extending offshore 1 nautical mile from the mean high water mark of Southeast Farallon Island, Middle Farallon Island, North Farallon Island and Noon Day Rock from 1 February through 30 September. This option was designed to provide various levels of protection to multiple seabird species which may have reduced, threatened, or endangered population levels, however, it does not protect all seabird species. Seabirds are discussed in detail within the summary for Q.5 (squid harvest replenishment/general habitat closures at Southeast Farallon, Middle

Farallon, and North Farallon Islands, and Noon Day Rock), refer to Q.5 for additional details. Compared to the proposed project, which would close all waters north of Pillar Point to squid fishing at all times, the level of impact on seabirds would be increased as market squid vessels would not be excluded all year long. Implementation of this option is not expected to negatively affect other environmental factors. This option was added at the request of the Commission and/or via public comment.

5.2.30 Establish areas closed to squid fishing in all waters of the Gulf of the Farallones National Marine Sanctuary from 1 February through 30 September (R.7)

Implementation of this option would establish areas that would prohibit the take of market squid for commercial purposes in all waters of the GFNMS from 1 February through 30 September. This option was designed to provide various levels of protection to multiple seabird species which may have reduced, threatened, or endangered population levels, however, it does not protect all seabird species. Seabirds are discussed in detail within the summary for Q.4 (squid harvest replenishment/general habitat closures at the GFNMS), refer to Q.4 for additional details. Compared to the proposed project, which would close all waters north of Pillar Point to squid fishing at all times, the level of impact on seabirds would be increased as market squid vessels would not be excluded all year long. Implementation of this option is not expected to negatively affect other environmental factors. This option was added at the request of the Commission and/or via public comment.

5.2.31 Establish area and time closure areas for fishing for squid using attracting lights around the Farallon Islands from 1 February through 30 September (R.8)

Implementation of this option would establish areas closed to squid fishing using attracting lights extending offshore 1 nautical mile from the mean high water mark of Southeast Farallon Island, Middle Farallon Island, North Farallon Island and Noon Day Rock from 1 February through 30 September. This option was designed to provide various levels of protection to multiple seabird species which may have reduced, threatened, or endangered population levels, however, it does not protect all seabird species. Seabird species with protracted breeding seasons would not be fully protected. Additionally, noise and disturbance would still be an issue (see seabird discussion under R.3, and seabird closure option in section 4.1.9.2 and 4.1.10.2). Impacts to seabirds are also discussed in detail within the summary for Q.5 (squid harvest replenishment/general habitat closures at Southeast Farallon, Middle Farallon, and North Farallon Islands, and Noon Day Rock), refer to Q.5 for additional details. When compared to the proposed project, which would close all waters north of Pillar Point to squid fishing at all times, the level of impact on seabirds would be increased as market squid vessels would not be excluded all year long and disturbance would still be an issue. Implementation of this option is not expected to negatively affect other environmental factors. This option was added at the request of the Commission and/or via public comment.

5.2.32 Establish areas and time closure areas for fishing for squid using attracting lights in all waters of the Gulf of the Farallones National Marine Sanctuary from 1 February through 30 September (R.9)

Implementation of this option would establish areas closed to squid fishing using attracting lights in all waters of the GFNMS from 1 February through 30 September. This option was designed to provide various levels of protection to multiple seabird species which may have reduced, threatened, or endangered population levels, however, it does not protect all seabird species. Seabird species with protracted breeding seasons would not be fully protected. Additionally, noise and disturbance would still be an issue (see seabird discussion under R.3, and seabird closure option in section 4.1.9.2 and 4.1.10.2). Impacts to seabirds are also discussed in detail within the summary for Q.4 (squid harvest replenishment/general habitat closures at the GFNMS), refer to Q.4 for additional details. When compared to the proposed project, which would close all waters north of Pillar Point to squid fishing at all times, the level of impact on seabirds would be increased as market squid vessels would not be excluded all year long and disturbance would still be an issue. Implementation of this option is not expected to negatively affect other environmental factors. This option was added at the request of the Commission and/or via public comment.

5.2.33 Establish areas that are closed to squid fishing around San Miguel, Anacapa and Santa Barbara islands from 1 February through 30 November (R.10)

Implementation of this option would establish areas that are closed to squid fishing around San Miguel, Anacapa and Santa Barbara islands from 1 February through 30 November. The area closure should be 1 nautical mile from the high water mark for these islands and would exclude the Channel Island MPAs, implemented in April 2003, because no commercial squid fishing is presently allowed in these areas. R.10 is the best seabird closure option as it would serve to protect most seabirds that forage in the waters and/or breed on Anacapa, Santa Barbara, and San Miguel islands. Castle Rock and Prince Island, off San Miguel Island, and Santa Barbara Island are considered to be the most important seabird nesting areas in the southern California Bight, in terms of numbers of species and numbers of birds. Anacapa Island supports the largest breeding colony of California brown pelicans in the United States. The majority of the Channel Islands seabirds nest between March and August, however, California brown pelicans have a protracted breeding season which can start as early as January and end as late as October. Ashy storm-petrel nesting is protracted (starts in April) and the majority of chicks fledge in September and October. Xantus's murrelets may visit breeding sites starting in January. The time closure from 1 February to 30 November would incorporate the entire breeding season for seabird nesting species at these islands. Breeding seabirds would not be susceptible to inflight strikes and colony disturbances with this option.

Implementing this option is expected to have no significant effects on other environmental factors. Implementation of these closures may result in shift of fishing activities for the southern market squid fleet. However, based on past fishing effort, the

effort at the closed areas is considered minimal. Marine species that forage on squid would benefit from an increase in prey forage in the closed areas as would spawning squid. Marine species that negatively interact with the squid fishery would benefit from a lack of interaction in the closed areas. Compared to the proposed project, the level of impact on seabirds would be decreased as market squid vessels would be excluded from San Miguel Island and the time closure would incorporate the entire breeding season for seabird nesting species at these islands. Implementation of this option is not expected to negatively affect other environmental factors. Marine species that forage on squid would benefit from an increase in prey forage in the closed areas as would spawning squid. Marine species that negatively interact with the squid fishery would benefit from a lack of interaction in the closed areas. This option was added at the request of the Commission and/or via public comment.

5.2.34 Establish areas that are closed to squid fishing around Anacapa and Santa Barbara islands from 1 February through 30 November (R.11)

Implementation of this option would establish areas that are closed to squid fishing around Anacapa and Santa Barbara islands from 1 February through 30 November. The area closure would be 1 nautical mile from the high water mark for these islands and would exclude the Channel Island MPAs implemented in April 2003, because no commercial squid fishing is presently allowed in these areas. Under option this option, not all seabird colonies in the Channel Islands will receive protection, in particular, Castle Rock off San Miguel Island (Prince Island off San Miguel Island, will receive some protection under the Harris Point State Marine Reserve MPA [no-take]). San Miguel Island supports the only nesting colonies, in the Channel Islands, of rhinoceros auklet and tufted puffin, both SSC (refer to Figure 4.3). San Miguel and Santa Cruz islands provide important habitat for ashy storm-petrels (about 68 percent of the Channel Island population) and Xantus's murrelets (about 18 percent of the Channel Island population) and small numbers of both of these species have been found breeding on Santa Catalina and San Clemente islands. Squid fishing does currently occur off Santa Cruz Island but rarely occurs off San Miguel Island. Closures to light use around Anacapa and Santa Barbara could result in increased night-fishing pressure around Santa Cruz Island and an extension of the fishery to San Miguel Island in non-MPA areas. This could result in negative impacts to seabird species on these islands. However, compared to the proposed project, the level of impact would be less as market squid vessels would be excluded from the closed areas entirely (the proposed project restricts the use of attracting lights at Anacapa and Santa Barbara islands but does not exclude squid fishing). Additionally, the market squid fishing season typically occurs during the winter months, impacts to these other islands would only occur if fishing extended into the breeding season and squid were available in these areas. Finally, the time closure would incorporate the entire breeding season for seabird nesting species at these islands.

Implementation of this option is not expected to negatively affect other environmental factors. Marine species that forage on squid would benefit from an increase in prey forage in the closed areas as would spawning squid. Marine species that negatively

interact with the squid fishery would benefit from a lack of interaction in the closed areas. Compared to the proposed project, the effects to other environmental factors from this option have the potential to be similar. This option was added at the request of the Commission and/or via public comment.

Literature Cited

Advanced Research Projects Agency. 1994. Draft EIS/EIR for the California Acoustic Thermometry of Ocean Climate Project and its Associated Marine Mammal Research Program.

Ainley, D. G., S. Morrel, and T. J. Lewis. 1974. Patterns in the life histories of storm-petrels on the Farallon Islands. Living Bird. 13:295-312.

Ainley, D. G., D. W. Anderson, and P. R. Kelly. 1981. Feeding ecology of marine cormorants in southwestern North America. Condor. 83:120-131.

Ainley, D. G., C. S. Strong, T. M. Penniman, and R. J. Boekelheide. 1990. The feeding ecology of Farallon seabirds. Pages 51-127 *in* D. G. Ainley and R. J. Boekelheide, eds. Seabirds of the Farallon Islands: Ecology, Dynamics, and Structure of an Upwelling-system Community. Stanford University Press, Stanford, CA.

Anderson, D. W. 1988. Dose-response relationship between human disturbance and brown pelican breeding success. Wildlife Society Bulletin. 16:339-345.

Anderson, D. W. and J. O. Keith. 1980. The human influence on seabird nesting success: conservation implications. Biological Conservation. 18:65-80.

Avery, D. 2000. The effects of light on circadian rhythms, sleep, and mood. Abstract from Dark Skies Northwest Regional Meeting, University of Washington, Seattle, Washington, 2 December 2000.

Baltz, D. M. and G. V. Morejohn. 1977. Food habits and niche overlap of seabirds wintering on Monterey Bay, California. Auk. 94(3):526-543.

Barlow, J. 1995. The Abundance of Cetaceans in California Waters. Part I: Ship Surveys in Summer and Fall of 1991. Fish Bull. 93:114. 93(1).

Barlow, J. 1997. Preliminary estimates of cetacean abundance off California, Oregon and Washington based on a 1996 ship survey and comparisons of passing and closing modes. Administrative Report LJ-97-11, Southwest Fisheries Science Center, National Marine Fisheries Service, P.O. Box 271, La Jolla, CA 92038. 25p.

Barlow, J., S.L. Swartz, T.C. Eagle, and P.R. Wade. 1995. U.S. Marine Mammal Stock Assessments: Guidelines for Preparation, Background, and a Summary of the1995 Assessments. U.S. Dep. Commer., NOAA Tech. Memo. NMFS OPR6, 73 p.

Barlow, J. and T. Gerrodette. 1996. Abundance of cetaceans in California waters based on 1991 and 1993 ship surveys. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-SWFSC-233.

Barlow, J. and B. L. Taylor. 2001. Estimates of large whale abundance off California, Oregon, Washington, and Baja California based on 1993 and 1996 ship surveys. Administrative Report LJ-01-03 available from Southwest Fisheries Science Center, National Marine Fisheries Service, P.O. Box 271, La Jolla, CA 92038. 12p.

Beedy E. Black skimmer. Elegant tern. Black tern. Heerman's gull. 1990. (accessed January 2002) http://www.dfg.ca.gov/whdab/

Bernard, H. J. and S. B. Reilly. Pilot Whales *Globicephala*. Chapter 10 Page 252 *In* S. H. Ridgeway and Sir R. Harrison editors. Handbook of Marine Mammals. Vol. 6. The Second Book of Dolphins and the Porpoises. Academic Press. 1990.

Bower, J. 2000. The dark side of light. Audubon, 102(2):92-97.

Braham, H. W., and D. W. Rice. 1984. The right whale, *Balaena glacialis*. Mar. Fish. Rev. 46(4):3844.

Briggs, K.T., W.B. Tyler, D.B. Lewis and D.R. Carlson. 1987. Bird communities at sea off California: 1975 to 1983. Studies in Avian Biol. No. 11. 74 pp.

Byrd, V., J. Sincock, and T. Telfer. 1978. The status of Newell's Manx Shearwater, a threatened species. Pacific Seabird Group 5:80.

Calambokidis, J. and J. Barlow. 1991. Chlorinated hydrocarbon concentrations and their use for describing population discreteness in harbor porpoises from Washington, Oregon, and California. pp. 101-110 In: J. E. Reynolds III and D. K. Odell (eds.) Marine mammal strandings in the United States. NOAA Tech. Rep. NM FS 98.

Calambokidis, J., T. Chandler, K. Rasmussen, L. Schlender, and G. H. Steiger. 2000. Humpback and blue whale photo-identification research off California, Oregon and Washington in 1999. Final Contract Report to Southwest Fisheries Science Center, National Marine Fisheries Service, P.O. Box 271, La Jolla, CA 92038.

California Air Resources Board. 1991. Methods for assessing air source emissions in California 1989. Sacramento, California. 100p.

California Air Resources Board. 1994. Emission inventory and -1991. Prepared by Technical Support Division. Air Resources Board. California Environmental Protection Agency. Sacramento, California. 36p. + appendices.

California Coastal Commission. 1996. Procedural guidance Manual: Addressing Polluted Runoff in the California Coastal Zone.

California Coastal Commission. 1997. California Offshore Oil and Gas Leasing and Development Status Report.

California Department of Fish and Game. 2001. Status of the market squid fishery with recommendations for a conservation and management plan. Calif. Dept. of Fish and Game Marine Region Report to the Legislature. 73 pp.

California Department of Fish and Game Code. 2001. Addenda p. 482.

California Department of Fish and Game. 2003. Digest of Commercial Fish Laws. 174 pp.

California Regional Water Quality Control Board, Los Angeles Region. Enforcement Agenda Item No. 12: Staff Report for Administrative Civil Liability Complaint No. 99-122 for Sun Coast Calamari. 427th Regular Meeting (Pasadena), January 26, 2000.

California State Lands Commission. 1999. Draft EIR for Global West Fiber Optic Cable Project. Vols I & II.

Carretta, J. V. 2001. Preliminary estimates of cetacean mortality in California gillnet fisheries for 2000. Report SC/53/SM9 [Available from Southwest Fisheries Science Center, National Marine Fisheries Service, 8604 La Jolla Shores, Dr., La Jolla, CA 92037, USA.

Carretta, J. V. 2002. Preliminary estimates of cetacean mortality in California gillnet fisheries for 2001. Report SC/54/SM12, revised 27 March, 2002 [Available from Southwest Fisheries Science Center, National Marine Fisheries Service, 8604 La Jolla Shores, Dr., La Jolla, CA 92037, USA.

Carretta, J. V., K. A. Forney. and J. Barlow 1995. Report of 1993-94 marine mammal surveys conducted within the U.S. Navy Outer Sea Test Range off Southern California. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-
217. 90p.

Carretta, J.V., J. Barlow, K.A. Forney, M. Muto, and J. Baker. 2001. U. S. Pacific Marine Mammal Stock Assessments: 2001. NOAA Technical Memorandum NOAA-TM-NMFS-SWFSC-317.

Carney, K. M. and W. J. Sydeman. 1999. A review of human disturbance effects on nesting colonial waterbirds. Waterbirds. 22(1):68-79.

Carter, H.R., G.J. McChesney, D.L. Jaques, G.S. Strong, M.W. Parker, J.E. Takekawa, D.L. Jory, and D.L. Whitworth. 1992. Breeding populations of seabirds in California, 1989-1991. Volume 1 - populations estimates, and Volume 2 - colony maps and appendices. Unpublished draft final report, U.S. Fish and Wildlife Service, Northern Prairie Wildlife Research Center, Dixon, California.

Carter H.R., M.L.C. McMcAllister, and M.E.P. Islelb. 1995a. Mortality of marbled murrelets in gill nets in North America. In: 1995. Ecology and Conservation of the

Marbled Murrelet. Gen. Tech. Rep. PSW-GTR-152. Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Dept. of Agriculture; 420 p.

Carter, H.R., A.L. Sowls, M.S. Rodway, U.W. Wilson, R.W. Lowe, G.J. McChesney, F. Gress, and D.W. Anderson. 1995b. Population size, trends, and conservation problems of the double-crested cormorant on the Pacific Coast of North America. Colonial Waterbirds. 18 (Special Publication 1):189-215.

Carter, H.R., D.L. Whitworth, J.Y. Takekawa, T.W. Keeney, and P.R. Kelly. 2000. Atsea threats to Xantus' murrelets (*Synthliboramphus hypoleucus*) in the southern California bight. Pages 435-447 *in* D. R. Browne, K.K. Mitchell, and H.W. Chaney (editors). Proceedings of the fifth California Islands symposium, 29 March to 1 April 1999, U.S. Minerals Management Service, Camarillo, California.

Carter, H.R., D S. Gilmer, J.E. Takekawa, R.W. Lowe and U.W. Wilson. 2001a. Breeding Seabirds in California, Oregon, and Washington. Accessed January 2002). http://biology.usgs.gov/s+t/noframe/b022.htm

Carter, H.R., U.W. Wilson, R.W. Lowe, M.S. Rodway, D.A. Manuwal, J.E. Takekawa, and J.L. Yee. 2001b. Population trends of the common murre (Uria aalge californica). Pages 33 - 128 *in* D.A. Manuwal, H.R. Carter, T.S. Zimmerman, and D.L. Orthmeyer, editors. Biology and conservation of the common murre in California, Oregon, Washington, and British Columbia. Volume 1: Natural history and population trends. U.S. Geological Survey, Biological Resources Division, Information and Technology Report USDS/BRD/ITR2000-0012, Washington, D.C.

Cogswell HL. 1977. Water birds of California. Univ. Calif. Press, Berkeley. 399 p.
Cowen, R. K. 1990. Sex changes and life history patterns of the Labrid, *Semicossyphus pulcher*, across and environmental gradient. Copeia 1990(3):787-795.

Dickerson, T. and R. Leos. 1992. California market squid. *In* California=s living marine resources and their utilization. CA Sea Grant. pp. 36-39.

Dibblee, T. W. and H. Eherenspeck. 1998. General geology of Santa Rosa Island, California, in: P. Weigand, ed., Contributions to the Geology of the Northern Channel Islands, Pacific Section, American Association of Petroleum Geologists, p. 49-75 .

Dick, M. H. and W. Donaldson. 1978. Fishing vessel endangered by crested auklet landings. Condor. 80:235-236.

Dohl, T. P., K. S. Norris, R. C. Guess, J. D. Bryant, and M. W. Honig. 1980. Summary of marine mammal and seabird surveys of the Southern California Bight area, 1975-1978. Part II. Cetacea of the Southern California B ight. Final Report to the Bureau of Land Management, NTIS Rep. No. PB81248189. 414p.

Dohl T.P., R.C. Guess, M.L. Duman, and R.C. Helm. 1983. Cetaceans of central and northern California, 1980 to 1983: Status, abundance, and distribution. Final Report to the Minerals Management Service, Contract # 1412000129090. 284 p.

Drumm L, National Marine Mammal Lab. Detailed information on whales. 2000. (accessed January 2002). http://www.nmml.afsc.noaa.gov/education/cetaceans.

Ellison, L. N. and L. Cleary. 1978. Effects of human disturbance on breeding of double-crested cormorants. Auk. 95:510-517.

Environmental Protection Agency. 1997. The Incidence and Severity of Sediment Contamination in Surface Waters of the United States Volume 1: National Sediment Quality Survey. EPA 823-R-97-006

Erwin EM. 1977. Black skimmer breeding ecology and behavior. Auk 94:709-717.

Ferrero R.C., D.P. DeMaster, P.S. Hill, M. Muto, and A.L. Lopez. 2000. Alaska Marine Mammal Stock Assessments, 2000. NOAA Technical Memorandum NMFSAFSC119.

Fields, W.G. 1965. The structure, development, food relations, reproduction, and life history of the squid, *Loligo opalescens* Berry. Calif. Dep. Fish Game. Fish Bulletin 131. 108 pp.

Fleischer LA. 1987. Guadalupe fur seal, *Arctocephalus townsendi*. In: J.P. Croxall and R.L. Gentry (eds.). Status, biology, and ecology of fur seals. Proceedings of an international symposium and workshop. Cambridge, England, 23-27 April 1984 . p. 43-48. U.S. Dept. of Commerce, NOAA, NMFS, NOAA Tech. Rept. NMFS 51.

Forney K.A., J. Barlow, and J.V. Carretta. 1995. The abundance of cetaceans in California waters. Part II: Aerial surveys in winter and spring of 1991 and 1992. Fish. Bull. 93:1526.

Forney K.A., J. Barlow, M.M. Muto, M. Lowry, J. Baker, G. Cameron, J. Mobley, C. Stinchcomb, and J.V. Carretta. 2000. U.S. Pacific marine mammal stock assessments: 2000. NOAA/TM/NMFS/SWFSC/300.

Forney, K.A., S.R. Benson, and G.A. Cameron. 2001. Central California gillnet effort and bycatch of sensitive species. Pages 141-160 *in* E.F. Melvin and J.K. Parrish, editors. Proceedings of the symposium - Seabird bycatch: trends, roadblocks, and solutions, 26-27 February 1999, Blaine, Washington, annual meeting of the Pacific Seabird Group. University of Alaska Sea Grant, AK-SG-01-01.

Gaston, A. J. and I. L. Jones. 1998. The Auks, Alicidae. Oxford University Press. New York, NY. 349 pp.

Gearin P.J., S.R. Melin, R.L. DeLong, H. Kajimura, and M.A. Johnson. 1994. Harbor porpoise interactions with a chinook salmon setnet fishery in Washington state. Special Issue, 15, Report of the International Whaling Commission. p. 427-438.

Gilly, W., Fountain, M., and A. Novakovic. 2001. Population analysis of the California market squid, *Loligo opalescens*, using DNA microsatellite analysis. *In* Status of the market squid fishery with recommendations for a conservation and management plan. Calif. Dept. Fish Game Marine Region Report to the Legislature. (see MSFMP Appendices).

Gisiner, R. 1998. Workshop on the effects of anthropogenic noise in the marine environment. Marine Mammal Science Project. Office of Naval Research. 140pp.

Granholm S. Double-crested, Brandt's and Pelagic Cormorants. (Accessed January 2002). http://www.dfg.ca.gov/whdab/

Gress F., P.R. Kelly, D.B. Lewis, and D.W. Anderson. 1980. Feeding activities and prey preference of California brown pelicans breeding in the Southern California Bight. Unpublished report. Calif. Dept. of Fish and Game, Endangered Species Program, Sacramento, CA. 38 p.

Gress F. and D.W. Anderson. 1983. A recovery plan for the California brown pelican. U.S. Fish and Wildlife Service, Portland, OR. 179 p.

Group of Experts on the Scientific Aspects of Marine Pollution. 1993. Impact of oil and related chemicals on the marine environment. Reports and Studies No. 50. International Maritime Organization, London. 180+ix p

Hacker, Sinclair E. 1992. Stomach contents of four short-finned pilot whales (*Globicephala macrorhynchus*) from the Southern California Bight. Marine Mammal Science, 8(1): 76-81.

Hanni K.D., D.J. Long, R.E. Jones, P. Pyle, and L.E. Morgan. 1997. Sightings and strandings of Guadalupe fur seals in central and northern California, 1988-1995. J. of Mamm. 78:684-690.

Harrison C. 1978. A field guide to the nests, eggs and nestlings of North American birds. W. Collins Sons and Co., Cleveland, OH. 416 p.

Harrison, C. S. 1990. Seabirds of Hawaii: Natural History and Conservation. Cornell University Press, New York, New York.

Harrison, P. 1983. Seabirds, an identification guide. Houghton Mifflin Company, Boston, MA. 448 p.

Hebshi, A. 1998. Foraging site preferences of Brandt's cormorants off the Santa Cruz, California, Coast. Colonial Waterbirds. 21(2):245-250.

Hedgpeth, J. W. 1968. Between Pacific Tides, Fourth Edition.

Henry, A. E., 1997. Prey Dynamics of Pacific Harbor Seals and California Sea Lion foraging near San Nicolas Island. MS Thesis, San Diego State University, San Diego, California. pp. 115.

Heyning J.E. and T.D. Lewis. 1990. Fisheries interactions involving baleen whales off southern California. Rep. Int. Whal. Commn. 40:427431.

Heyning J.E., T.D. Lewis, and C.D. Woodhouse. 1994. A note on odontocete mortality from fishing gear entanglements off Southern California. Rep. Int. Whal. Commn. Special Issue 15:439-442.

Hunt G.L., R.L. Pitman, M. Naughton, K. Winnett, A. Newman, P.R. Kelly, and K.T. Briggs. 1979. Distribution, status, reproductive ecology, and foraging habits of breeding seabirds. Book II, Part III, Vol. III of Marine Mammal and Seabird Surveys of the Southern California Bight Area, 1975 to 1979. Unpublished Report to the Bureau of Land Management, Univ. of California, Irvine, California.

Jaques D.L. and D.W. Anderson. 1988. Brown pelican use of the Moss Landing Wildlife Management Area: roosting behavior, habitat use, and interactions with humans. Calif. Dept. of Fish and Game, Nongame Bird and Mammal Section Report. 58 p. and appendices.

Jefferts, K. 1983. Zoogeography and systematics of cephalopods of the northeastern Pacific Ocean. Oregon State University Sea Grant College Program. 4 pp.

Johnsgard, P.A. 1993. Cormorants, darters, and pelicans of the world. Smithsonian Institution Press, Washinton, D.C. 444 p.

Julian F. and M.. Beeson. 1998. Estimates of marine mammal, turtle, and seabird mortality for two California gillnet fisheries: 1990 1995. Fishery Bulletin 96:271-284.

Keitt B.S. 2000. Status of the Xantus' murrelet (*Synthliboramphus hypoleucus*) on the islands of Baja California, Mexico. Unpublished report, Island Conservation and Ecology Group, Davenport, California.

Kiff, L. G. 1998. Historical changes in resident populations of California islands raptors. Pages 651-673 in D. M. Power, editor. The California Islands: Proceedings of a multidisciplinary symposium. Santa Barabra Museum of Natural History, Santa Barbara, CA.

Kruse, S., Caldwell, D. K. and M. C. Caldwell. Risso's Dolphin *Grampus griseus*. Chapter 8 Page 199 *In* S. H. Ridgeway and Sir R. Harrison editors. Handbook of Marine Mammals. Vol. 6 The Second Book of Dolphins and the Porpoises. Academic Press. 1990.

Leatherwood, S., Reeves, R. R., Perrin, W. F., and W. E. Evans. 1988. Whales, dolphins, and porpoises of the Eastern North Pacific and adjacent waters. A guide to their indentification. Dover Publications In., New York. Page125.

Leatherwood S., and R. R. Reeves. 1983. The Sierra Handbook of Whales and Dolphins. Sierra Book Club. Pp. 204-207.

Lipinski, M. 1986. Methods for the validation of squid age from statoliths. J. Mar. Biol. Assoc. U.K. 66: 506-526

Loughlin T.R., D.J. Rugh, and C.H. Fiscus. 1984. Northern sea lion distribution and abundance: 19561980. J. Wildl. Manage. 48:729-740.

Lowry, Mark S. and James V. Carretta. 1999. Market squid (*Loligo opalescens*) in the diet of California sea lions (*Salophus californianus*) in southern California (1981-1995). CalCOFI Rep., 40: 196-202.

Lutz, S. and L. Pendleton. 2001. Socio-economic study of the San Pedro historic purse seine fleet. 2001. USCFISH. http://www.usc.edu/dept/economics/usclace/uscfish/USCFISHSocioEcoStudy(June2001).pdf

Lynn, R. J., K. A. Bliss, and L. E. Eber. 1982. Vertical and Horizontal Distributions of Seasonal Mean Temperature, Salinity, Sigma-t, Stability, Dynamic Height, Oxygen, and Oxygen Saturation in the California Current, 1950 to 1978. Atlas No. 30 California Cooperative Fisheries Investigation. La Jolla, California.

Malins, D.C. and H.O. Hodgins. 1981. Petroleum and marine fishes: A review of uptake, disposition, and effects. Environmental Science and Technology, 15(11):1272-1280.

Manuwal, D. A. 1974. The natural history of Cassin's auklet. Condor. 76:421-431.4

Manuwal, D.A. 1978. Effect of man on marine birds: a review. Pages 140-160 in Wildlife and people: the proceedings of the John S. Wright Forestry Conference. Department of forestry and natural resources and the cooperative extension service, Purdue University, IN.

Martin, P. L. and W. J. Sydeman. 1998. Seabird monitoring, Channel Islands National Park, 1993-1996 Report. National Park Service, Channel Islands National Park, Ventura, California. Technical Report 98-03.

Massey B.W. 1977. Occurrence and nesting of the least tern and other endangered species in Baja California, Mexico. West. Birds 8:67-70

McChesney, G. J., H. R. Carter, F. Gress, W. R. McIver, J. W. Mason, W.Keeney,and P. R. Kelly. 2000. Effects of El Nino events on cormorant breeding populations in the

Southern California Bight. Abstract from the Pacific Seabird Group meeting, 23-26 February 2000, Napa, California.

McCulloch. 1980. A summary of Regional geology, Environmental Geology, OCS Resource Appraisal, Petroleum Potential and Operational Considerations in the Area of Proposed Lease Sale 73, Offshore California U. S. Geological Survey Open File Report 80-2007, 139 p.

McGowan, J.A. 1954. Observations on the sexual behavior and spawning of the squid, *Loligo opalescens*, at La Jolla, California. Calif. Fish Game Fish Bull. 40(1): 47-55.

McDonald, D., and P. Dutton. 1992. Status of sea turtles in San Diego Bay, 1990 - 1992 Final Report to the U.S. Fish and Wildlife Services. 16 pp.

Miller D.J. 1974. The sea otter, *Enhydra lutris*, its life history, taxonomic status and some ecological relationships. Calif. Dept. Fish and Game, Sacramento. Marine Leaflet No. 7. 13 p.

Miller D.J., M.J. Herder, and J.P. Scholl. 1983. California marine mammal/fishery interaction study, 1979 to 1981. NOAA/NMFS/ SWFSC Admin. Rep. LJ8313C. 234 p.

Minerals Management Service. 1987. Northern California proposed oil and gas lease sale 91: draft environmental impact statement. Vol 1. p. IV 40 to IV 46.

Minerals Management Service. 2000. Draft OCS environmental assessment: extended-reach exploratory drilling project cavern point unit, leases OCS-P 0210 and OCS-PO527 Venoco Inc. and Poseiden Petroleum LLC. 62pp.

Minerals Management Service. 2001. Draft EIR Delineation Drilling June 2001.
Minerals Management Service. 2001. Draft EIR OCS Oil and Gas Leasing Program: 2002-2007 October 2001. Vol I & II

Morejohn, G. V., J. T. Harvey, and L. T. Krasnow. 1978. The importance of *Loligo opalescens* in the food web of marine vertebrates in Monterey Bay, California. In: C.W. Recksiek and H.W. Frey (Editors), Biological, oceanographic, and acoustic aspects of the market squid, *Loligo opalescens* Berry. California Department of Fish and Game, Fish Bulletin No. 169:67-98.

Moyle, P.B. and J.J. Cech. 1996. Fishes: an introduction to ichthyology. University of California , Davis. Prentice Hall, New Jersey. P.174.

National Marine Fisheries Service and and U.S. Fish and Wildlife Service. 1998a. Recovery plan for U.S. Pacific Populations of the leatherback turtle (*Dermochelys coriacea*). National Marine Fisheries Service, Silver Spring, MD.

NMFS and USFWS 1998b. Recovery plan for U.S. Pacific Populations of the loggerhead turtle (*Caretta caretta*). National Marine Fisheries Service, Silver Spring, MD.

NMFS and USFWS 1998c. Recovery plan for U.S. Pacific populations of the East Pacific green turtle (*Chelonia mydas*). National Marine Fisheries Service, Silver Spring, MD.

NMFS and USFWS 1998d. Recovery plan for U.S. Pacific populations of the olive ridley turtle (*Lepidochelys olivacea*). National Marine Fisheries Service, Silver Spring, MD.

NMFS. NOAA. 2000. Biological Opinion, Section 7 Consultation on authorization to take listed marine mammals incidental to commercial fishing operations under Section 101(a)(5)(E) of the Marine Mammal Protection Act for the California/Oregon Drift Gillnet Fishery.

NMFS, NOAA. Alaska Regional Office and Alaska Science Center. Steller Sea Lions. 2003. (Accessed January 2003) http://www.fakr.noaa.gov/protectedresources/stellers.htm

NMFS, NOAA, Office Protected Resources. Guadalupe fur seals. (accessed February 2002) http://www.nmfs.noaa.gov/prot_res/species/Pinnipeds/guadalupefurseal.html

NMFS, NOAA, Office of Protected Resources. Sea Turtles. (accessed January 2003). http://www.nmfs.noaa.gov/prot_res/species/turtles/

NMFS, NOAA, Southwest Regional Office, California/Oregon Drift Gillnet Fishery, Observer Program data Summaries. 1999/2000 fishing seasons. (accessed February 2003). http://swr.ucsd.edu/fmd/observer/catch9900.htm

NMFS,NOAA. OPR. 2002. List of Fisheries. (accessed January 2003) http://www.nmfs.noaa.gov/prot_res/PR2/Fisheries_Interactions/2002_LOF.pdf (same as Federal Register Vol 67 No. 12 January 17 2002)

NMFS, NOAA, OPR. 2003. Proposed List of Fisheries (accessed February 2003). http://www.nmfs.noaa.gov/prot_res/readingrm/Fisheries/2003_LOF_proposed_rule.pdf. Same as Federal Register Vol. 68 No. 7 January 10 2003.

NMFS, NOAA, Office of Protected Resources. Frequently Asked Questions for List if Fisheries. 2003. (accessed February 2003). http://www.nmfs.noaa.gov/prot_res/PR2/Fisheries_Interactions/List_of_fisheries_FAQ.html

NMFS, NOAA, Southwest Regional Office. Drift Gillnet Observer Data. 2003. (accessed January 2003). http://swr.ucsd.edu/fmd/observer/catch9900.htm

National Oceanic and Atmospheric Administration. 1991. Coastal Environmental Quality in the United States, 1990.

NOAA. 1992. Final EIS/Management Plan Monterey Bay National Marine Sanctuary. Vol. 1

NOAA 1997. Natural History of the Monterey Bay National Marine Sanctuary. 259p

NOAA/NOS. 2003. Gulf of the Farallones National Marine Sanctuary State of the Sanctuary Report. National Ocean Service. Silver Springs, MD. 32pp.

National Research Council. 1985. Oil in the sea: inputs, fates, and effects. National Academy Press, Washington, DC. 601+xviii p

Nur, N., W.J. Sydeman, D. Girman, T.B. Smith, and D. Gilmer. 1999. Population status, prospects, and risks faced by two seabirds of the California current: the ashy stormpetrel, *Oceanodroma homochroa*, and Xantus' murrelet, *Synthliboramphus hypoleucus*. Final report to the U. S. Geological Survey, Biological Resources Division.

O'Dor, R.K. and D.M. Webber 1986. The constraints on cephalopods: why squid aren't fish. Can. J. Zool. 64:1591-1605.

Oliphant, Malcolm S. 1971. Pacific bonito food habits. Calif. Dept. Fish Game, Fish Bulletin 152: 64-82.

Orr R.T. and R.C. Helm. 1989. Marine mammals of California. California Natural History Guides: University of California Press, Berkeley. 93 p.

O'Shea, T. J., R. R. Reeves, and A. Kirk Long (eds.). 1999. Marine Mammals and Persistent Ocean Contaminants: Proceedings of the Marine Mammal Commission Workshop, Keystone, Colorado, 12-15 October 1998. Marine Mammal Commission, Bethesda, MD. 150pp.

Pacific Fishery Management Council. 1998. The coastal pelagic species fishery management plan draft amendment eight. p. A78-A90.

PFMC. 2001. Environmental Assessment/Regulatory Impact Review/Initial Regulatory Flexibility Analysis for Proposed Groundfish Acceptable Biological Catch and Optimum Yield Specifications and Management Measures for the 2002 Pacific Coast Groundfish Fishery.

PFMC: Pacific Fisheries Management Council. 2002. Status of the Pacific Coast Coastal Pelagic Species Fishery and Recommended Acceptable Biological Catches. 48 pp.

PFMC: Pacific Fisheries Management Council. 2003. Status of the Pacific Coast Coastal Pelagic Species Fishery and Recommended Acceptable Biological Catches. 41 pp.

Page, G. W., and H. R. Carter, eds. 1987. Impacts of the 1986 San Joaquin Valley Crude oil spill on marine birds in central California. Special Scientific Report, Point Reyes Bird Observatory, Stinson Beach California.

Page, G.W., H.R. Carter, and R G. Ford. 1990. Numbers of seabirds killed or debilitated in the 1986 Apex Houston oil spill in central California. Pages 164-174 in: S. G. Sealy, editor. Auks at sea. Studies in Avian Biology 14.

Palmer R.S, ed. 1962. Handbook of North American birds. Vol. 1. Yale University Press, New Haven CT. 567 p.

Parker, M., J. Boyce, R. Young, N. Rojek, C. Hamilton, V. Slowik, H. Gellerman, S. Kress, H. Carter, G. Moore, and L.E. Cohen. 2000. Restoration of common murre colonies in central California: annual report 1999. Unpublished report, U.S. Fish and Wildlife Service, San Francisco Bay National Wildlife Refuge Complex, Newark, California (prepared for the *Apex Houston* Trustee Council). 59 p.

Parker, M., C. Hamilton, I. Harrald, H. Knechtel, M. Murphy, V. Slowik, H. Carter, R. Golightly, S. Kress, G. Moore, and S. Boehm. 2001. Restoration of common murre colonies in central California: annual report 2000. Unpublished report, U.S. Fish and Wildlife Service, San Francisco Bay National Wildlife Refuge Complex, Newark, California (prepared for the Apex Houston Trustee Council). 59 p.

Pitman, R.L. 1990. Pelagic distribution and biology of sea turtles in the eastern tropical Pacific. Pages 143-148 *in* T.H. Richardson, J.I. Richardson, and M. Donnelly (compilers), Proc. Tenth Annual Workshop on Sea Turtle Biology and Conservation. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-SEFC-278. 286 pp.

Polite C. and Pratt J. 1990. Bald eagle. http://www.dfg.ca.gov/whdab/

Powell, Abbey. 2002. Western snowy plovers and California least terns. U.S. Geological Service, Status and Trends of the Nation's Biological Resources. http://biology.usgs.gov/s+t/SNT/noframe/ca168.htm

Reed, J. R., J. L. Sincock, and J. P. Hailman. 1985. Light attraction in endangered procellariiform birds: reduction by shielding upward radiation. Auk. 102:377-383.

Reed, J. R. 1987. Polarizing filters fail to reduce light attraction in Newell's shearwaters. Wildlife Society Bulletin, 15:596-598.

Reeves R.R., B.S. Stewart, and S. Leatherwood. 1992. The Sierra Club handbook of seals and Sirenians. Sierra Club Books. San Francisco, California.

Reimer, S.D. and R.F. Brown. 1997. Monitoring human-wildlife interactions and disturbance of seabirds and pinnipeds at three arch rocks national wildlife refuge, 1993-1994. Oregon Department of Fish and Game, Wildlife Diversity Program, Marine Region, Newport, OR. Technical Report #97-6-01. 27 p.

Restrepo, V.R., G.G. Thompson, P.M. Mace, W.L. Gabriel, L.L. Low, A.D. MacCall, R.D. Methot, J.E. Powers, B.L. Taylor, P.R. Wade, and J.F. W itzig. 1998. Technical guidance on the use of precautionary approaches to implementing National Standard 1 of the Magnuson-Stevens Fishery Conservation and Management Act. NOAA Technical Memorandum NMFS-F/SPO.

Rice D.W. 1974. Sperm whale *Physeter macrocephalus*, Linnaeus 1758. p. 177-233 In: S.H. Ridgway and R.J.Harrison (eds.). Handbook of Marine Mammals, Vol. 4. Academic Press, London.

Richmond et al. 1981. Regional Geology, Seismicity and Potential Geologic Hazards and Constraints, OCS Oil and Gas Lease Sale 53, Northern and Central California Sale 53. U. S. Geological Survey Open File Report 81-318. 36p.

Rigney M. California gull.1990. (accessed January 2000). http://www.dfg.ca.gov/whdab/

Rigney M. and Granholm S. California least terns, Forster's tern. 1990. (accessed June 2000) http://www.dfg.ca.gov/whdab/

Rijke A.M. 1970. Wettability and phylogenetic development of feather structure in water birds. J. Exp. Biol. 52:469479.

Rojek, N.A. and M.W. Parker. 2000. Factors affecting the recovery of common murres nesting on the Castle/Hurricane rock complex. Pacific Seabirds. 27(1):47.

Sanders, S. 1990. Marbled murrelet. 1990. (accessed June 2000). http://www.dfg.ca.gov/whdab/

Schafer, H. A., R. W. Gossett, C. F. Ward , and A. M . Westcott. 1984. Chlorinated hydrocarbons in marine mammals. Biennial Report, 1983-84, Southern California Coastal Water Research Project, Long Beach, California.

Scholin, C. A., Gu lland, F., D oucette, G. J., Benson, S., Busman, M., Chavez, F. P., Cordaro, J., DeLong, R., DeVogelaere, A., Harvey, J., Haulena, M.,Lefebvre, K ., Lipscomb, T., Loscutoff, S., Lowenstine, L. J., Marin III, R., Miller, P. E., McLellan, W. A., Moeller, P. D. R., Powell, C. L., Rowles, T., Silvagni, P., Silver, M., Spraker, T., Trainer, V., and Van Dolah, F. M. 2000. Mortality of sea lions along the central California coast linked to a toxic diatom bloom. Nature, 403:80-84.

Sealy S.G. 1972. Adaptive differences in breeding biology in the marine bird family Alcidae. Ph.D. Thesis, Univ. Michigan, Ann Arbor. 283 p.

Seagars, D. J. and J. R. Henderson. 1985. Cephalopod remains from the stomach of a short-finned pilot whale collected near Santa Catalina Island, California. J. Mamm., 66(4): 777-779.

Shane, S. H. 1995. Relationship between pilot whales and Risso's dolphins at Santa Catalina Island, California, USA. Marine Ecology Progress Series. Vol. 123: 5-11.

Sowls A.L., A.R. DeGange, J.W. Nelson, and G.S. Lester. 1980. Catalog of California seabird colonies. U.S. Dep. Inter., Fish and Wildlife Serv., Wash. DC. Biol. Serv. Program USFWS/OBS-80/37. 371 p.

Starbird, C., A. Baldridge, and J.T. Harvey. 1993. Seasonal occurrence of leatherback sea turtles (*Dermochelys coriacea*) in the Monterey Bay region, with notes on other sea turtles, 1986-1991. Calif. Fish and Game 79(2): 54-62.

Stewart B.S., B.J. Le Boeuf, P.K. Yochem, H.R. Huber, R.L. DeLong, R.J. Jameson, W. Sydeman, and S.G. Allen. 1994. History and present status of the northern elephant seal population. In: B. J. Le Boeuf and R. M. Laws (eds.) Elephant Seals. Univ. Calif. Press, Los Angeles.

Stinson, M. L. 1984. Biology of sea turtles in San Diego Bay, California, and in the northeastern Pacific Ocean. M. S. thesis. San Diego State University. 578 p.

Storey, A. E. and B. L. Grimmer. 1986. Effect of illumination on the nocturnal activities of Manx shearwaters: colony avoidance or inconspicuous behavior? Bird Behavior. 6:85- 89.

Sydeman, W.J., K.A. Hobson, P.Pyle, and E.B. McLaren. 1997 Trophic relationships among seabirds: Combined stable isotope and conventional dietary approach. The Condor 99:327-336.

Sydeman, W., N. Nur, and P. Marting. 1998a. Population viability analyses for endemic seabirds of the California marine ecosystem: the Ashy Storm-Petrel *(Oceanodroma homochroa*) and Xantus' Murrelet (Synthliboramphus hypoleucus). Final report to USGS Biological Resources Division, Species At Risk Program.

Sydeman, W. J., N. Nur, E. B. McLaren, and G. J. McChesney. 1998b. Status and trends of the ashy storm -petrel on southeast Farallon Island, California, based upon capture-recapture analyses. Condor. 100:438-447.

Takekawa, J.E., H.R. Carter, and T.E. Harvey. 1990. Decline of the common murre in central California, 1980-1986. Studies in Avian Biology. 14:149-163.

Telfer, T.C., J.L. Sincock, G.V. Byrd, and J.R. Reed. 1987. Attraction of Hawaiian seabirds to lights: conservation efforts and effects of moon phase. Wildlife Society Bulletin. 15:406-413.

Thayer, J.A., W.J. Sydeman, N.P. Fairman and S.G. Allen. 1999. Waterbirds. 22(1):130-139.

Thomas, W. H. and D. L. R. Siebert. 1974. Distribution of Nitrate, Nitrite, Phosphate, and Silicate in the California Current Region, 1969. In California Cooperative Fisheries Investigation, A. Fleminger and S.G. Wyllie (eds.) Altas No. 20, La Jolla, California

Townsend C.H. 1931. The fur seal of the California Islands with new descriptive and historical matter. Zoologica 9:443-457.

Tricas, Timothy C. 1979. Relationships of the blue shark, *Prionace glauca*, and its prey species near Santa Catalina Island, California. Fishery Bulletin, 77(1): 175-182.

USFWS. Tidewater goby. 2001. (accessed January 2003). http://www.ccfwo.r1.fws.gov/goby.html

USFWS. 2000. Reinitiation of formal consultation on the containment program for the southern sea otter (1989/FW81). Biological Opinion. 40 p.

USFWS. 2001. Western Snowy Plover (*Charadrius alexandrinus nivosus*) Pacific Coast Population Draft Recovery Plan. Portland, Oregon. xix + 630 pp.

Van Horn, W., A. Melancon, and J. Sun (eds.). 1988. Outer continental shelf oil and gas program: cumulative effects. U.S. Department of the Interior, Minerals Management Service, Herndon, VA. OCS Report MMS 88-0005

Vedder, J.G., H.G. Greene, S.H. Clarke, and M.P. Kennedy, 1986, Geologic Map of the Mid-Southern California continental margin, in: H.G. Greene, and M.P. Kennedy eds., California Continental Margin Geologic Map Series, California Department of Conservation.

Vercoutere. T. W., H. T. Mullins, K. McDougall, and J. B. Thompson. 1987. Sedimentation across the Central California Oxygen Minimum Zone: An alternative coastal upwelling sequence. J. Sed. Petrol. 57: 709-722.

Verheijen, F. J. 1958. The mechanisms of the trapping effect of artificial light sources upon animals. Netherlands Journal of Zoology. 13:1-107.

Watanuki, Y. 1980. Moonlight avoidance behavior in Leach's storm petrels as a defense against Slaty-backed gulls. Auk. 103:14-22.

Weimerskirch, H., D. Capdeville, and G. Duhamel. 2000. Factors affecting the number and mortality of seabirds attending trawlers and long-liners in the Kerguelen area. Polar Biology, 23:236-249.

Wells, R. S., and M. D. Scott. Bottlenose Dolphin *Tursiops truncatus*. Chapter 7 Page 137 *In* S. H. Ridgeway and Sir R. Harrison editors. Handbook of Marine Mammals. Vol. 6 The Second Book of Dolphins and the Porpoises. Academic Press. 1990.

Whitworth, D.L., J.Y. Takekawa, H.R. Carter, and W.R. McIver. 1997. A night-lighting technique for at-sea capture of Xantus' murrelets. Colonial Waterbirds. 20(3):525-531.

Wynne K. and P. Folkens. 1992. Guide to marine mammals of Alaska. Alaska Sea Grant Program. University of Alaska Fairbanks, Fairbanks, AK

Personal and Written Communications

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List of Acronyms

ASBS	Areas of Special Biological Significance
ASL	Above Sea Level
B_{MSY}	Average Spawning Biomass
BETX	benzene, toluene, ethylbenzene, and xylene
CAAQS	California Ambient Air Quality Standards
CARB	California Air Resources Board
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CINMS	Channel Islands National Marine Sanctuary
CINPS	Channel Islands National Park Service
CO	carbon monoxide
Commission	Fish and Game Commission
CPS FMP	Federal Coastal Pelagic Species Fishery Management Plan
CRWQCB	California Regional Water Quality Control Board
CSLC	California State Lands Commission
Department	California Department of Fish and Game
ED	Environmental Document
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIR	Environmental Impact Report
EPA	Environmental Protection Agency
ESA	Endangered Species Act (federal) aka FESA
FGC	Fish and Game Code
FMP	Fishery Management Plan
GFNMS	Gulf of the Farallones National Marine Sanctuary
HAPC	Habitat Areas of Particular Concern
LOF	List of Fisheries
MLMA	Marine Life Management Act
MLPA	Marine Life Protection Act
MMA	Marine Managed Area
MMAIA	Marine Managed Areas Improvement Act
MMPA	Marine Mammal Protection Act
MMS	Minerals Management Service
MPA	Marine Protected Area
MSFCMA	Magnuson-Stevens Fishery Conservation & Management Act
MSFMP	Market Squid Fishery Management Plan
MSST	Minimum Stock Size Threshold
MSY	Maximum Sustainable Yield
NAAQS	National Ambient Air Quality Standards
NOx	nitrogen oxides
NO2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration

NOAA Fisheries NOAA's Fisheries Service

List of Acronyms Continued

NS&T	National Status and Trends
O3	ozone
OCS	Outer Continental Shelf
OSP	Optimum Sustainable Population
PFMC	Pacific Fishery Management Council
PBR	Potential Biological Removal
PRC	Public Resources Code
SB	Senate Bill
SFAC	Squid Fishery Advisory Committee
SRSC	Squid Research Scientific Committee
SO2	sulfur dioxide
SSC	Species of Special Concern
T&E	Threatened and Endangered Species
USFWS	United States Fish and Wildlife Service
USC	United States Code
USGS	United States Geological Survey
VOCs	volatile organic compounds

Section 3:

Market Squid Fishery Management Plan

Regulations

Section 3: MSFMP Regulations

Table of Contents

Chapter 1. Regulatory Actions

1.1 Final Statement of Reasons for Regulatory Action

1.1.1 Memo to Executive Director

Transmittal memo signed by the Director to be sent to the Fish and Game Commission office dated 15 December 2004.

State of California

M e m o r a n d u m

To: Robert R. Treanor
Executive Director
Fish and Game Commission

Flex your POWER
HELP CALIFORNIA CONSERVE ENERGY

Date: December 15, 2004

From: **L. RYAN BRODDRICK, Director**
Department of Fish and Game

Subject: Submission of Final Statement of Reasons Re: Market Squid Fishery Management Plan, Commercial Take of Squid, and Market Squid Restricted Access Program

At its August 27, 2004 meeting in Morro Bay, and its December 3, 2004 meeting in Monterey, the Commission adopted the Market Squid Fishery Management Plan and its implementing regulations, and certified the plan as the final environmental document. Management measures identified in the plan are designed to ensure sustainability of the squid fishery resource while reducing the potential for overfishing and other impacts. A restricted access program, which includes mechanisms to reduce the number of commercial squid permits, is a primary component of the plan. The Final Statement of Reasons supporting the need for these regulatory actions is attached.

As the proposed regulations specify that the restricted access program will become effective with the next fishing season commencing April 1, 2005, it is imperative that the rulemaking documents be forwarded to the Office of Administrative Law for review as soon as possible. The Department requests that the Commission seek expedited review of the file and effectiveness of the regulations upon filing with the Secretary of State so that the Department's License and Revenue Branch will have adequate time to process permit applications and issue permits prior to the April 1 opening date.

If you have any questions or need additional information, please contact Ms. Patricia Wolf, Regional Manager of the Department's Marine Region, by telephone at (562) 342-7108.

Attachment(s)

cc: P Wolf
Department of Fish and Game
Los Alamitos, California

File: Director, Deputy Director, Marine Region, Conservation Education Branch, M. Vojkovich, J. Milton

1.1.2 Final Statement of Reasons for Regulatory Action

STATE OF CALIFORNIA
FISH AND GAME COMMISSION
FINAL STATEMENT OF REASONS FOR REGULATORY ACTION

Add Sections 53.00, et seq; 149.1, and 149.3
Amend Section 149
Title 14, California Code of Regulations
Re: Market Squid Fishery Management Plan, Commercial Take of Squid, and Market Squid Restricted Access Program

I. Date of Initial Statement of Reasons: October 6, 2003
Date of Amended Initial Statement of Reasons: April 12, 2004
Date of Second Amended Initial Statement of Reasons: May 27, 2004

II. Date of Pre-adoption Statement of Reasons: July 19, 2004
Date of Amended Pre-Adoption Statement of Reasons: September 20, 2004

III. Date of Final Statement of Reasons: December 6, 2004

IV. Dates and Locations of Scheduled Hearings:

(a) Notice Hearing: Date: August 1, 2003
Location: Long Beach, CA

(b) Discussion Hearings: Date: November 7, 2003
Location: San Diego, CA
(cancelled)

Date: December 5, 2003
Location: Sacramento, CA

Date: May 4, 2004
Location: San Diego, CA

(c) Adoption Hearing: Date: August 27, 2004
Location: Morro Bay, CA

Second Adoption Hearing: Date: December 3, 2004
Location: Monterey, CA

V. Update:

At its August 27, 2004 meeting in Morro Bay, the Commission adopted the Market Squid Fishery Management Plan, its implementing regulations, and certified the plan as the final environmental document. Management measures identified in the plan are designed to ensure sustainability of the squid fishery resource while reducing the potential for overfishing and other impacts. A restricted access program, which includes mechanisms to reduce the number of commercial squid permits, is a primary component of the plan.

While the Commission acted on most of the content of the proposed regulations at that meeting, it directed the Department to expand the proposed options relating to non-transferable permits. Furthermore, based on the motions made by the Commission, additional modifications were needed to some subsections of the proposed regulatory text (Subsection (g) of Section 149, and subsections (b),(c),(d),(g),(k) and (o) of Section 149.1). Those modifications were presented in the Amended Pre-adoption Statement of Reasons, dated September 20, 2004, and were noticed to the public on October 15. No substantive changes were made to the proposed language of the September 20, 2004 Amended Pre-adoption Statement.

The Commission acted at its second adoption hearing (December 3, 2004 in Monterey) to select initial issuance criteria for non-transferable permits, and to approve the changes needed to the regulatory text.

At the August 27, 2004 adoption hearing, the Commission did not adopt proposed Section 149.2, which would have required a permit for the sale of squid as live bait, nor Section 149.4 which would have established a Regional Control date.

A summary of the actions taken at the two adoption hearings is provided in the following table, which will result in amendment of Section 149, Title 14, CCR, and addition of Sections 53.00 et seq., Section 149.1, and Section 149.3, Title 14, CCR.

MARKET SQUID FISHERY MANAGEMENT PLAN IMPLEMENTING REGULATIONS ADOPTED BY THE COMMISSION ON AUGUST 27, 2004 AND DECEMBER 3, 2004	
FISHERY CONTROL RULES	
A. Seasonal Statewide Catch Limitation	
	Establish a seasonal catch limitation of 118,000 tons.
B. Monitoring the Fishery using an Egg Escapement Method	
	Monitor the fishery through the egg escapement method at a threshold level required in the CPS FMP while pursuing a biomass estimate of market squid.
C. Daily Trip Limit for Market Squid Vessels and Brail Vessels	
	Do not establish daily trip limits.
D. Weekend Closures	
	Continue closures from noon Friday to noon Sunday from the U.S.-Mexico border to the California-Oregon border.

MARKET SQUID FISHERY MANAGEMENT PLAN IMPLEMENTING REGULATIONS ADOPTED BY THE COMMISSION ON AUGUST 27, 2004 AND DECEMBER 3, 2004	
FISHERY CONTROL RULES	
E. Monitoring Program	
	Continue existing squid monitoring programs (port sampling and logbooks).
F. Live Bait Fishery and Incidental Catch of Market Squid	
	Continue existing regulations that do not require a squid permit when fishing for live bait or for incidental take 2 tons or less.
G. Gear Restrictions	
	Maintain existing gear restrictions requiring light shields and specifying a maximum wattage (30,000 watts).
	Lower edges of the shields shall be parallel to the deck of the vessel.
RESTRICTED ACCESS PROGRAM	
H. Market Squid Fleet Capacity Goal	
	Establish a capacity goal for market squid vessels that produces a moderately productive and specialized fleet [55 vessels, 18 brail and 34 light boats (these are the combined capacity goals for both Transferable and Non-Transferable permits of the same class)].
I. Initial Issuance of Permits	
	<u>Transferable Permits:</u> *Market Squid Vessel Permit:* Possession of a current market squid vessel permit (2004-2005) and a minimum of 50 landings in window period January 1, 2000 through March 31, 2003; *Brail Permit:* Possession of a current market squid vessel permit (2004-2005) and a minimum of 10 landings made with brail gear in window period January 1, 2000 through March 31, 2003; *Light Boat Permit:* Possession of a current market squid permit (either vessel or light for 2004-2005), and submission of one light boat log demonstrating fishery activity on or before December 31, 2000. <u>Non-Transferable Permits:</u> *Market Squid Vessel Permit:* Possession of a current market squid vessel permit (2004-2005), possession of a California commercial fishing license for at least 20 years, and a minimum of 33 landings prior to August 27, 2004. Only receipts that demonstrate catch aboard a vessel that does not already qualify for issuance of a transferable permit of any permit class are eligible. *Brail Permit:* Possession of a current market squid vessel permit (2004-2005), possession of a California commercial fishing license for at least 20 years, and a minimum of 10 landings with brail gear during one fishing season in a window period from January 1, 2000 through March 31, 2003. Only receipts that demonstrate catch aboard a vessel that does not already qualify for issuance of a transferable permit of any permit class are eligible. *Light Boat Permit:* There is not a non-transferable permit category.

MARKET SQUID FISHERY MANAGEMENT PLAN IMPLEMENTING REGULATIONS ADOPTED BY THE COMMISSION ON AUGUST 27, 2004 AND DECEMBER 3, 2004	
FISHERY CONTROL RULES	
J. Permit Fees	
	Establish an annual permit fee: Transferable Market Squid Vessel Permit: $2000 Non-transferable Market Squid Vessel Permit: $1000 Transferable Market Squid Brail Permit: $2000 Non-transferable Market Squid Brail Permit: $1000 Transferable Light Boat Permit: $600
K. Market Squid Vessel Permit Transfer	
	Establish full transferability (1-for-1) of market squid vessel permits based on comparable capacity (within 10%); establish transferability of market squid vessel permits to a vessel of larger capacity under a "2-for-1" permit retirement.
L. Market Squid Brail Permit Transfer	
	Establish full transferability (1-for-1) of market squid brail permits based on comparable capacity.
M. Market Squid Light Boat Permit Transfer	
	Establish full transferability (1-for-1) of light boat permits.
N. Transferability Fee	
	Establish a transfer fee of $500.
O. Experimental Market Squid Vessel Permits	
	Establish 3 experimental non-transferable market squid vessel permits.
P. Market Squid Fishery Regional Control Date	
	Do not establish a regional restricted access control date.
ECOLOGICAL CONCERNS	
Q. Harvest Replenishment/General Habitat Closure Areas	
	Do not set aside specific areas as harvest replenishment areas for market squid.
R. Area and Time Closures to Address Seabird Issues	
	Squid may not be taken using attracting lights in all waters of the Gulf of the Farallones National Marine Sanctuary (Sanctuary boundaries as defined on August 27, 2004) at any time.

Clarifying Changes to the Proposed Regulatory Text

The following non-substantive, technical or clarifying changes were made to the proposed regulatory text since the filing of the Amended Pre-Adoption Statement of Reasons dated September 20, 2004:

Subsections 53.01(s), 53.01(w), 149.1(i) and 149.3(b) – the term "Section" was replaced with the term "subsection" to more accurately reflect each reference.

Subsection 53.03 (a) – Market Squid FMP Project - the term "seasonal area closures" was modified to read only as "area closures" to more accurately reflect

the squid fishery closure actions taken by the Commission on August 27, 2004 to protect sensitive non-target species and habitat.

Subsection 149(a), 149(h), and 149.1(a) - Language of the final regulatory text was updated to reflect re-lettering. The notice contained reference to subsection 149(h) as the subsection defining the incidental allowance of two (2) tons. The text of that subsection is now found as subsection (g) of Section 149.

Proposed subsections (g) through (k) of Section 149 as noticed in the May 27, 2004 Second Amended ISOR of this rulemaking were re-lettered in the final regulatory text as subsections (f) through (j) because the Commission did not adopt proposed subsection (f); which would have specified daily trip limits for the squid fishery.

A clarifying addition to the final regulatory text of subsections 149(e), 149(g), 149(i) and 149(j) was made to the text noticed in the May 27, 2004 Second Amended ISOR of this rulemaking. It was clarified that experimental fishery permits issued pursuant to Section 149.3 would also be subject to the regulations described in each of the aforementioned subsections. It is a clarifying change only because the noticed regulatory text of Section 149.3 previously indicated that these permittees would be subject to all regulations of Section 149.

Office of Administrative Law's Notice ID # Z 04-1005-08 (Marine Protected Areas) concurrently proposes to add subsection (k) to Section 149, Title 14, CCR; which would specify that a Tidal Invertebrate Permit is not needed for the commercial take of squid. This (Market Squid) rulemaking package would incorporate additional changes in Section 149, Title 14, CCR, proposed by Office of Administrative Law's Notice ID # Z 04-1005-08 (Marine Protected Areas). Should Notice ID # Z 04-1005-08, be approved first, its proposed subsection (k) would be re-lettered subsection (f), until such time as this (Market Squid) rulemaking package is approved, when it will be subsequently re-lettered subsection (k).

Section 149.1 - In subsections (d) and (g) of Section 149.1 pertaining to the permit renewal late fee, the regulatory text states that Fish and Game Code Section 7852.2 is notwithstanding. The authority for establishing a $250 late fee is established in Fish and Game Code Sections 8428 and 7071. These Fish and Game Code Sections were added to the authority and reference listings for Section 149.1 in the final regulatory text.

Subsection 149.1(c)(1)(A) – The descriptor “Transferable” was added to describe the specific Market Squid Vessel Permit in the final regulatory text for clarity.

Subsection 149.1(c)(3)(A) – The descriptor “Transferable” was added to describe the specific Market Squid Brail Permit in the final regulatory text for clarity.

Subsection 149.1(c)(3)(C) – Minor grammatical changes were made in the final regulatory text for clarity and consistency with text contained in other subsections in Section 149.1.

Subsection 149.1(c)(6) – The phrase “at the time of issuance” was removed in the final regulatory text from the text proposed in the Amended Initial Statement of Reasons dated April 12, 2004 for clarity and accuracy. If a non-transferable permit must be placed on a replacement vessel pursuant to subsection 149.1(o)(3)(F), this transaction would not occur at the time of initial permit issuance. Therefore, regulatory text limiting the placement of a non-transferable permit on a vessel only to permits issued at the time of initial issuance would be erroneous.

Subsection 149.1(f)(2) – A technical clarification was made with regard to the status of a non-transferable permit upon death of a permittee. The permit is described as “null and void” in the final regulatory text rather than “expired.”

Subsection 149.1(h) – Renewal appeals – A technical clarification was made describing the appeals process for permit renewals that are denied by the Department. The department’s denial of a permit renewal may be appealed to the Commission within 60 days of the department issuing the written denial. The term “second denial” was replaced with “written decision.”

Subsection 149.1(l)(3) – Change of vessel ownership provisions for non-transferable permits – minor technical changes were made to the final regulatory text. If a vessel is permitted as a non-transferable vessel and is sold to a new owner, the non-transferable permit may not be transferred to the new owner. Sale of the vessel renders the permit “null and void” rather than “cancelled by the Department.”

Subsection 149.1(m)(4) was re-numbered from item (5) to item (4) in the final regulatory text, reflecting the fact that the Commission did not adopt the provision that would have set the capacity goal for the number of market squid vessel permits equal to the combined number of the capacity goals for market squid brail and light boat permits.

Subsection 149.1(p) – Transfer appeals – A technical clarification was made describing the appeals process for permit transfer requests that are denied by the Department. The department’s denial of a permit transfer may be appealed to the Commission within 60 days of the department issuing a written decision. The term “second denial” was replaced with “written decision.”

Subsection 149.1(q) – A grammatical correction was made to this subsection, which describes the process to upgrade a light boat permit to a brail permit. “Transferable Market Squid Light Boat Permits” was replaced with “Transferable Market Squid Light Boat Permit.” In subsection 149.1(q)(1), the descriptor

"Transferable" was added preceding "Market Squid Brail Permit" to clarify that individuals seeking the upgrade would be issued a transferable rather than a non-transferable brail permit. In subsection 149.1(q)(2), the regulatory text was clarified to specify that "Transferable Market Squid Light Boat" permittees are the permit class eligible to transfer permits for purposes of a brail permit upgrade.

Subsection 149.1(r) – Market Squid Brail Permit Upgrade Appeals – Minor grammatical changes were made to the final regulatory text of this subsection. The descriptor "Transferable" was added preceding both "Market Squid Light Boat Permit" and "Market Squid Brail Permit" for clarity to distinguish from non-transferable permit classes. Additionally, as with subsections (h) and (p) of Section 149.1, the term "second denial" was replaced with "written decision."

Statutes Made Inoperative Upon Adoption of the Market Squid FMP and Implementing Regulations

Fish and Game Code Section 8429.7 states that Sections 8420.5 to 8423.5, inclusive, and Sections 8426 and 8427 shall become inoperative upon the adoption by the Commission of a market squid fishery management plan and the adoption of implementing regulations pursuant to Section 8425, and are repealed six months thereafter.

Fish and Game Section 7852.2 becomes inoperative as is applies to commercial squid fishery permits, per authority of Fish and Game Code Section 8428. This section states that fees for commercial squid fishing permits shall be established by the Commission; and that the total revenues derived shall not exceed the Department's and the Commission's costs for managing the fishery. Further authority for making Section 7852.2 inoperative is provided in Fish and Game Code subsection 7071(b), which states that regulations that the Commission adopts to implement a fishery management plan may make inoperative any statute as it specifically pertains to that fishery. The statute further specifies that permit fees are included under this authority.

VI. Summary of Primary Considerations Raised in Support of or Opposition to the Proposed Actions and Reasons for Rejecting Those Considerations:

The attached draft Market Squid Fishery Management Plan (dated April 12, 2004) contains a summary of all comments received and the Department's responses to these comments from July 7, 2003 through February 1, 2004. See Table 1-1 on pages 4-1 through 4-32 of the document.

Public comments received in the Commission office after February 1, 2004 are included with the Final Statement of Reasons (Table 3, attached). Comments made at both the August 27 and December 3 adoption hearings are also included. (Table 3 includes Table 2 from the Pre-adoption Statement of Reasons dated July

19, 2004.)

VII. Location and Index of Rulemaking File:

A rulemaking file with attached file index is maintained at:
California Fish and Game Commission
1416 Ninth Street
Sacramento, California 95814

VIII. Location of Department Files:

Department of Fish and Game
1416 Ninth Street
Sacramento, California 95814

IX. Description of Reasonable Alternatives to Regulatory Action:

(a) Alternatives to Regulation Change: A substantial range of options have been provided in the scope of the proposed regulatory language to offer the Commission and public a suite of alternatives when deciding how to implement the Market Squid FMP. While additional alternatives may have been proposed to the Department or Commission since the Commission was granted management authority for squid fishery management in 1998, they were not considered feasible for inclusion in the Plan or implementing regulations at this time. Responses to those comments are provided in Section 4 of the Market Squid FMP – Responses to Comments Regarding the Preliminary Draft Market Squid FMP.

(b) No Change Alternative: Should the Commission select not to adopt the Market Squid FMP or implementing regulations, only existing fishery regulations and statues would continue to govern management of the resource. These measures are inadequate to ensure long term sustainability of the fishery and resource, and would be in conflict with direction given by the Legislature to adopt a fishery management plan and implementing regulations. The existing moratorium on permit issuance would continue with no provisions for permit transferability, and needed modifications to other existing fishery management regulations would not be implemented.

(c) Consideration of Alternatives: In view of information currently possessed, no reasonable alternative considered would be more effective in carrying out the purposes for which the regulation is proposed or would be as effective and less burdensome to the affected private persons than the proposed regulation.

X. Impact of Regulatory Action:

The potential for significant statewide adverse economic impacts that might result from the proposed regulatory action has been assessed, and the following determinations relative to the required statutory categories have been made:

(a) Significant Statewide Adverse Economic Impact Directly Affecting Businesses, Including the Ability of California Businesses to Compete With Businesses in Other States.

The Commission has made an initial determination that the adoption of the recommended regulations may result in adverse economic impacts directly affecting California's small businesses associated with the market squid fishery. However, the potential economic impacts would not affect the ability of California's small businesses to compete with businesses in other states.

Implementing restricted access fishery regulations and ensuing fleet reductions, could result in potential direct ex-vessel revenue losses as high as $3,047,071 fleet wide. This is based on averaged 5-year landings information. On an individual basis, these losses could range from $38,000 to $98,000 (before deducting costs of doing business) for each fisherman removed from the fishery. Details of these potential impacts are presented in the Market Squid Fishery Management Plan, dated July 7, 2003, Section 1, Table 3-21. Contact the Agency representative named herein for a complete analysis of the impacts.

Reducing the statewide seasonal harvest to levels ranging from 11,000 to 80,000 short tons, could result in potential ex-vessel revenue losses of $1,700,000 to $17,400,000 for the squid fleet statewide. Potential direct revenue losses to individual fishermen will depend on how many fishermen remained in the fishery, but could range from $7,400 to $117,500 per individual (before deducting costs of doing business).

An updated evaluation of adverse economic impacts is now available, and is included in the Market Squid Fishery Management Plan (dated April 12, 2004).

The regulations proposed would directly affect approximately 230 commercial market squid fishermen and light boat operators. The direct impacts to the private sector will depend on which of the proposed management measures and regulations are adopted.
There are three primary areas of the proposed regulations that may have significant economic impact to the businesses associated with the market squid fishery:

- Seasonal and regional catch limits; ranging from 22,000,000 to 250,000,000 pounds statewide (11,000 to 125,000 short tons), and 11,000,000 to 223,200,000 pounds regionally (5,500 to 111,600 short tons),
- Implementation of a Restricted Access Squid Fishery; no new permits would be issued and permit renewal is subject to eligibility criteria intended to reduce the fleet size from about 230 permittees to as many as 148 to 199 permittees,
- Changes to annual permit fees; ranging from $400 to $5,000.

Average market squid landings for calendar years 2001 and 2002 were 183,050,000 pounds statewide (91,525 short tons) at an ex-vessel value of about $20,800,000. Among the roughly 230 market squid permit holders, this represents potential individual revenues of approximately $90,400 annually (on average and before deducting costs of doing business). Reducing the statewide seasonal harvest to levels less than recent landings, at levels ranging from 22,000,000 to 160,000,000 pounds (11,000 to 80,000 short tons), would result in potential ex-vessel revenue losses of $1,700,000 to $17,400,000 for the squid fleet statewide. The majority of these impacts would occur in the Counties of Monterey, Santa Barbara, and Los Angeles, where most market squid landings are made. Potential revenue losses to individual fishermen would depend on how many fishermen remained in the fishery. Other proposed statewide seasonal levels of 236,000,000 and 250,000,000 pounds (118,000 and 125,000 short tons) would not present an economic impact to the fishery since these levels are above average catches in recent years.

Proposed regional catch limits, for the area North of Point Conception and area South of Point Conception, could impact local coastal communities disproportionately through reduced catch levels. The proposed 11,000,000 to 15,200,000 pound catch limits (5,500 to 7,600 short tons) for the North region and 131,000,000 to 233,000,000 pounds (65,500 to 111,600 short tons) for the South region potentially results in a much larger impact to fishermen in the North region. Recent landings information for the two regions (for calendar years 2001 and 2002 averaged), were about 75,200,000 pounds (37,600 short tons) for the North region and about 274,800,000 pounds (137,400 short tons) in the South annually. The potential loss in ex-vessel revenue for the North region fishermen ranges from $6.8 million to $7 million (an 80 percent to 85 percent reduction from recent landings revenues), and ranges from $5.8 to $16 million (a 19 percent to 52 percent reduction from recent landings revenues) for South region fishermen. However, since Northern landings were unusually high in calendar year 2002, these impact estimates are likely to be overstated.

Regulations that would establish a restricted access fishery work in tandem with proposed eligibility criteria to determine which fishermen will remain in

the fishery. Depending on the criteria adopted, the fleet of permittees may be reduced by 31 to 81 permits, in order to arrive at a fleet of 148 to 199 permittees. The proposed eligibility criteria are crafted to exclude fishermen who historically have had only marginal participation in the fishery; for example excluded fishermen may represent only 17 percent of the seasonal ex-vessel revenue generated by the entire fleet. Thus potential ex-vessel revenue losses to individual fishermen culled from the fishery, based on averaged 5-year landings information, could range from $38,000 to $98,000 per permittee (before deducting costs of doing business).

New fees may be stipulated under the proposed regulations, depending on which regulatory options are adopted. Currently, annual permit fees for market squid light boats and market squid fishermen are $400. The regulations propose new annual fees ranging from $400 to $5,000. Permit transfer fees (or upgrade fees) currently at $250 per transfer, may range from $250 to $1,000, depending on which regulations are adopted. The projected financial impact of the proposed permit fees to the average fisherman, calculated as the Present Value of permit fees paid over a 5-year time period, discounted at the 2002 Federal 5-year Treasury Bill rate of 3.82 percent, ranges from $1,800 to $22,400.

The proposed regulations may result in changes in seasonal market squid harvests statewide. Reducing the statewide seasonal harvest to levels less than recent landings, at levels ranging from 22,000,000 pounds to 160,000,000 pounds (11,000 to 80,000 short tons), would result in potential ex-vessel revenue losses of $1,700,000 to $17,400,000 for the squid fleet statewide. Extrapolating these potential revenue losses to the local economies, through the use of an output demand multiplier of 1.61, yields economic impact estimates of $2,700,000 to $28,000,000 in lost economic output demand statewide. Proposed statewide seasonal catch levels of 236,000,000 and 250,000,000 pounds statewide (118,000 and 125,000 short tons) would not present a statewide economic impact to the fishery since these levels are above average catches in recent years.

Statewide costs or economic impacts associated with implementing a restricted access fishery, and the ensuing loss of fishermen through permit reductions, are based on an estimated $3.7 million loss in ex-vessel revenue production capacity due to fleet reduction. Apportioning this $3.7 million among the respective local economies and using appropriate output demand multipliers, yields potential reduction of $6 million to $7.8 million statewide in economic demand output (this recognizes that each $1 of ex-vessel revenue generates $1.61 to $2.05 in economic activity for local economies). Further details on these economic impacts are presented in the April 12, 2004, Market Squid Fishery Management Plan, see Section 3, Item 1.1.3.

(b) Impact on the Creation or Elimination of Jobs Within the State, the Creation of New Businesses or the Elimination of Existing Businesses, or the Expansion of Businesses in California:

Regulations to establish a restricted access fishery and the associated eligibility criteria may result in loss of 31 to 81 market squid fishing jobs.

(c) Cost Impacts on a Representative Private Person or Business:

Reducing the statewide seasonal harvest to levels ranging from 11,000 to 80,000 short tons, could result in potential ex-vessel revenue losses of $1,700,000 to $17,400,000 for the squid fleet statewide. Potential direct revenue losses to individual fishermen will depend on how many fishermen remained in the fishery, but could range from $7,400 to $117,500 per individual (before deducting costs of doing business).

Implementing restricted access fishery regulations and ensuing fleet reductions, could result in potential direct ex-vessel revenue losses as high as $3,047,071 fleet wide. This is based on averaged 5-year landings information. On an individual basis, these losses could range from $38,000 to $98,000 (before deducting costs of doing business) for each fisherman removed from the fishery. Details of these potential impacts are presented in the Market Squid Fishery Management Plan, dated July 7, 2003, Section 1, Table 3-21. Contact the Agency representative named herein for a complete analysis of the impacts.

Other private person or business costs impacts that could arise form the proposed action are increases in market squid permit fees. Currently market squid permits fees are set at $400 annually, and depending on the regulations adopted could increase to as much as $5,000 annually.

(d) Costs or Savings to State Agencies or Costs/Savings in Federal Funding to the State: None

(e) Nondiscretionary Costs/Savings to Local Agencies: None

(f) Programs Mandated on Local Agencies or School Districts: None

(g) Costs Imposed on Any Local Agency or School District that is Required to be Reimbursed Under Part 7 (commencing with Section 17500) of Division 4: None

(h) Effect on Housing Costs: None

Updated Informative Digest/Policy Statement Overview

At its August 27, 2004 meeting in Morro Bay, the Commission adopted the Market Squid Fishery Management Plan, its implementing regulations, and certified the plan as the final environmental document. Management measures identified in the plan are designed to ensure sustainability of the squid fishery resource while reducing the potential for overfishing and other impacts. A restricted access program, which includes mechanisms to reduce the number of commercial squid permits, is a primary component of the plan.

While the Commission acted on most of the content of the proposed regulations at that meeting, it directed the Department to expand the proposed options relating to non-transferable permits. Furthermore, based on the motions made by the Commission, additional modifications were needed to some subsections of the proposed regulatory text (Subsection (g) of Section 149 , and Subsections (b),(c),(d),(g),(k) and (o) of Section 149.1). Those modifications were presented in the Amended Pre-adoption Statement of Reasons, dated September 20, 2004, and were noticed to the public on October 15. No substantive changes were made to the proposed language of the September 20, 2004 Amended Pre-adoption Statement.

The Commission acted at its second adoption hearing (its December 3, 2004 meeting in Monterey) to select initial issuance criteria for non-transferable permits, and to approve the changes needed to the regulatory text.

Regulations are proposed to implement a Market Squid Fishery Management Plan (Market Squid FMP, or Plan), including a market squid commercial fishery restricted access program, and to amend existing commercial squid fishing regulations adopted by the Fish and Game Commission (Commission) to manage the squid resource at a sustainable level. Fish and Game Code Section 8425 directs the Department of Fish and Game (Department) to develop, and the Commission to adopt, a Market Squid FMP in compliance with the Marine Life Management Act (MLMA) (Chap. 1052, Stats. 1998).

Each of the management alternatives included in the proposed regulatory amendments to Title 14, CCR, is described in the summary which follows.

Add Section 53.00, et seq. This proposed series of regulations serves to implement the Market Squid FMP, as follows:

Section 53.00 - Purpose and Scope. Following in the series of regulations established in Chapter 5.5 of Title 14, CCR, which implement fishery management plans adopted by the Commission pursuant to the Marine Life Management Act, this Section provides that regulations established in Article 4 are consistent with the goals and objectives of the Market Squid FMP. It also states that the Plan, in combination with other applicable state

and federal laws and regulations, governs management and regulation of market squid stocks and fisheries. The regulation further explains where specific squid regulations that will be adopted concurrently with adoption of the Plan may be found in the structure of Title 14.

At its August 27, 2004 meeting, the Commission adopted this section as proposed.

Section 53.01- Definitions. This Section serves to provide definitions that are specific to the Market Squid FMP. All definitions provided are consistent with those found in the general FMP definitions found in Section 50.01 of Title 14 as well as other provisions of state and federal fisheries laws. The specified approval date was updated to reflect extension of the Commission's plan adoption date.

At its August 27, 2004 meeting, the Commission adopted this section as proposed. The final regulatory language of subsection 53.01(m) reflects the adoption date (August 27, 2004) of the Market Squid FMP. Minor clarifying changes were made to the final regulatory text in subsections (s) and (w) of Section 53.01.

Section 53.02 - Process and Timing. This Section explains that management of squid stocks and fisheries will conform to the Market Squid FMP and other applicable state and federal laws and regulations, and that regulations may be adopted by the Commission in compliance with the Administrative Procedure Act to achieve intended management actions. The Department will provide the Commission information periodically upon which management decisions may be made, and the Director may establish an advisory committee to assist the department with development and review of fishery assessments, management options and proposals, and Plan amendments.

At its August 27, 2004 meeting, the Commission adopted this section as proposed.

Section 53.03 - Market Squid Fishery Management Plan (Market Squid FMP) Project. This Section serves to outline the proposed management actions which are presented in the Market Squid FMP, which constitute the "Proposed Project" of the Market Squid FMP, in fulfillment of CEQA requirements. This Section also provides that other management measures which are not included at this time as part of the proposed project or specifically detailed in the Market Squid FMP may be considered by the Commission for implementation at a later date, provided the action is consistent with the goals and objectives of the Market Squid FMP.

At its August 27, 2004 meeting, the Commission adopted this section. A minor modification was made to the proposed text of subsection (a) – the term "seasonal area closures" was modified to read only as "area closures" to more accurately reflect the squid fishery closure actions taken by the Commission on August 27th to protect sensitive non-target species and habitat.

149. Commercial Taking of Market Squid. This Section was modified in 2000 and 2002 based upon the Commission's adoption of interim regulations using management

authority from the Legislature to protect and manage the squid resource. Management measures adopted in these actions included enactment of weekend closures to provide for uninterrupted squid spawning throughout the state for two days per week, requirements to fill out logbooks of fishing activity, a limitation on the amount of light (wattage) which may be used for commercial squid fishing operations, a requirement to shield lights used for commercial squid fishing, and a statewide seasonal limit on the allowable catch of 125,000 short tons. There requirements are currently specified in subsections (a) through (e) of Title 14, CCR. Modifications, alternatives and additions to regulations in this Section are discussed below.

Section 149 Subsection (a) – Weekend Closures. Four regulatory options are provided for the Commission's consideration on this item; the first of which would only modify existing regulatory language to provide needed clarity on the scope of the regulation for enforcement purposes. The proposed modifications would clarify that commercial landings which are smaller than two tons are exempt from the closure in order to continue to provide an opportunity to land squid which may be taken as bycatch in fisheries where squid is not a target. Additionally, it is clarified that squid taken for live bait purposes on weekends pursuant to this Section shall only be sold as live bait.

The second option would repeal the weekend closure altogether.

The third option would maintain existing statewide weekend closures but provide for an exemption in the areas of the northern Channel Islands to allow fishing to continue 7 days per week, as some portion of the squid stock in that area would instead be protected in the newly-established marine protected areas.

The fourth option would maintain existing weekend closures in waters south of Point Conception, but the Commission could adjust the number of days per week open to fishing as well as the times of day or night that commercial squid fishing would be authorized in waters north of Point Conception. Furthermore, the Commission could enact an additional time closure for commercial squid fishing in waters of District 16 (southern Monterey Bay) between 9 a.m. and 6 p.m. on the days when fishing is authorized.

At its August 27, 2004 meeting, the Commission adopted proposed Option A – continuing closures from noon Friday to noon Sunday from the U.S.-Mexico border to the California-Oregon border. In addition, language of the final regulatory text was updated to reflect the re-lettering of proposed subsection 149(h) to subsection 149(g)

Section 149 Subsection (b) – Logbooks. As with weekend closure regulations in subsection (a), the Commission will take action at the adoption meeting to specify if existing logbook regulations shall be maintained and slightly modified for enforcement purposes, or if the measure shall be repealed. Proposed modifications to the existing language would update the permit designations to be consistent with the proposed commercial restricted access program and modify the revision dates of the logbook

forms which are referenced in the regulation. It would also specify that logbook records shall be transmitted to the Department on or before the 10th day of each month following the month that fishing activity occurred, a requirement consistent with existing regulatory language in Section 190, Title 14, CCR.

At its August 27, 2004 meeting, the Commission adopted proposed Option A – continuing current log book requirements.

Section 149 Subsection (c) – Wattage Limitation. The Commission will take action at the adoption meeting to specify if existing wattage regulations shall be eliminated, maintained at the current level, or replaced with a wattage limitation set at a value between the range of 15,000 to 30,000 watts. Other slight modifications are proposed to the existing regulatory language for technical clarification purposes.

At its August 27, 2004 meeting, the Commission adopted proposed Option A – continuing current wattage requirements.

Section 149 Subsection (d) – Light Shields. The Commission will determine if the current requirements shall be maintained status quo, if they should be modified to improve the effectiveness of the measure, or if they shall be repealed altogether. Department enforcement staff have indicated that the existing regulatory language is somewhat unclear with regard to the orientation of the lights directly downward; thus, the option to modify the requirements would add language which would also require that the lower edges of the shields be parallel to the deck of the vessel. The Department recognizes that this change to current practice could require that some light boat or vessel owners would need to substantially retrofit their shields in order to comply with the proposed regulatory change; therefore it would be incorrect to designate the proposed change as merely a non-substantive, technical or clarifying in nature; and therefore it is considered as a separate regulatory option.

At its August 27, 2004 meeting, the Commission adopted proposed Option B – modifying current light shield requirements such that the lower edges of the shields shall be parallel to the deck of the vessel.

Section 149 Subsection (e) – Seasonal Catch Limitation. The Commission has four options to select from in terms of specifying an overall limit each season on the commercial harvest of squid. In options that serve to modify existing regulatory language, the existing term of “seasonal harvest guideline” is proposed to be replaced with “seasonal catch limitation” in each option in order to maintain consistency with general fishery management plan definitions specified in Section 50.01, Title 14, CCR. Other clarifying language was included to acknowledge existing or proposed regulatory provisions in this Section. The options include A) maintain existing regulations for a statewide catch limit, while considering changes to the allowable volume from a range of 24,000 to 125,000 short tons, B) eliminate the existing provisions, C) use El Nino events to determine the allowable harvest level [11,000 short tons during an El Nino time period and 115,000 short tons during a non-El Nino time period], or D) establish the limits

regionally rather than statewide [5,500 to 27,800 short tons north of Point Conception and 65,500 to 111,600 short tons south of Point Conception]. Options C and D involve substantial new regulatory language.

At its August 27, 2004 meeting, the Commission adopted proposed Option A – continuing the requirements for a statewide catch limit, and set the statewide catch limit at 118,000 tons. In addition, a clarifying change was made stating that experimental fishery permits issued pursuant to Section 149.3 would also be subject to the regulations described in this subsection. It is a clarifying change only because the noticed regulatory text of Section 149.3 previously indicated that these permittees would be subject to all regulations of Section 149.

Section 149 Subsection (f) – Option to Add Daily Trip Limits. If adopted, these regulations would limit each squid landing to a specified tonnage level depending on the type of fishing gear used. Roundhaul (purse seine, lampara) landings would be subject to a daily trip limit ranging from 30 to 138 short tons per day, and a level of 15 short tons would be imposed for brail vessels.

The Commission did not adopt proposed subsection 149 (f), which would have specified daily trip limits for the squid fishery.

Section 149 Subsection (g) – Options to Add Seasonal Closure Areas for Seabird Protection and/or Harvest Replenishment Areas and/or General Habitat Closures. If adopted, these regulations would establish a closed season from February 1 through September 30 for squid fishing, or for squid fishing employing the use of lights, in specified areas at two or three of the northern Channel Islands and/or the Farallon Islands and/or all waters of the Gulf of the Farallones National Marine Sanctuary in order to provide seasonal protection for nesting seabirds. Each of the proposed closure areas extend outward at least one nautical mile from shore. These options were designed to provide various levels of protection to multiple seabird species which may have reduced, threatened, or endangered population levels. The seasonal closure end date was amended to provide the Commission a range of time periods from which it may select. The proposed closure period may now end on any date between September 30 and November 30.

Additionally, if adopted, a proposed regulation would prohibit the take of market squid for commercial purposes in waters less than 100 fathoms in depth contiguous to San Nicholas Island. This proposed option may provide a specific squid harvest replenishment area in a currently underutilized squid fishing area and would prevent expansion of the fishery into these waters.

Additionally, if adopted, proposed regulations would prohibit the take of market squid for commercial purposes in specified northern California waters for general habitat protection. These measures are designed to prevent squid fishery interactions in areas that have not been traditionally utilized for commercial squid fishing. In 2003, several boats began harvesting squid in waters well north of the traditional Monterey fishing

grounds, which is of concern to some biologists and other users of these areas. Particular issues that have been raised as matters of concern in these areas include the potential for bycatch of salmon in purse seine gear, potential for impact to seabirds from noise and lights, and the potential for interaction with marine mammals. Options to address these concerns include closing all waters to the commercial take of squid north of Pillar Point at any time, prohibiting the commercial take of squid in any waters of the Gulf of the Farallones National Marine Sanctuary, prohibiting the take of squid for commercial purposes in waters extending offshore one nautical mile from the mean high water mark of Southeast Farallon Island, Middle Farallon Island, North Farallon Island and Noon Day Rock, or prohibiting the take of squid for commercial purposes in District 10.

At the August 27, 2004 adoption hearing, the Commission moved to establish a closure to all squid fishing activity using lights in the Gulf of Farallones National Marine Sanctuary, with the boundaries of the Sanctuary being defined as those that are currently in effect. The action was taken to provide protection to seabird colonies at the Farallon Islands and Point Reyes, and was not intended as a seasonal closure nor a general habitat closure. Modification to the originally noticed regulatory text was needed to reflect these determinations. This modification was provided in the October 5, 2004 Continuation Notice and was adopted by the Commission at its December 3, 2004 meeting. In addition, language of the final regulatory text was updated to reflect re-lettering since the Commission did not adopt proposed subsection 149 (f).

Section 149 Subsection (h) –Allow for Incidental Take. This regulation would specify that it is unlawful to take, land, or possess in excess of two tons of squid per trip or per calendar day except as authorized under a specific permit designation or for purposes of live bait only. This amendment would serve to establish, in regulation, a statutory provision that otherwise would be repealed with adoption of the Market Squid FMP and implementing regulations pursuant to Fish and Game Code Section 8429.7.

At its August 27, 2004 meeting, the Commission adopted the proposed text allowing for incidental take of market squid. Language of the final regulatory text was updated to reflect the re-lettering of proposed subsection 149(h) to subsection 149(g). In addition, a clarifying change was made stating that experimental fishery permits issued pursuant to Section 149.3 would also be subject to the regulations described in this subsection. It is a clarifying change only because the noticed regulatory text of Section 149.3 previously indicated that these permittees would be subject to all regulations of Section 149.

Section 149 Subsection (i) –Specify Forfeiture Process. This amendment would also serve to establish, in regulation, a statutory provision in Section 8421 (h) that otherwise would be repealed with adoption of the Market Squid FMP and implementing regulations pursuant to Fish and Game Code Section 8429.7.

At its August 27, 2004 meeting, the Commission adopted the proposed text specifying the forfeiture process. In addition, language of the final regulatory text was updated to reflect re-lettering since the Commission did not adopt proposed subsection 149 (f). Minor clarifying changes were made to the final regulatory text of subsection (i) of Section 149.

Section 149 Subsection (j) –Clarify Authorized Use of Light to Aggregate Squid. This amendment would also serve to establish, in regulation, a statutory provision in Section 8423 (e) that otherwise would be repealed with adoption of the Market Squid FMP and implementing regulations pursuant to Fish and Game Code Section 8429.7.

At its August 27, 2004 meeting, the Commission adopted the proposed text clarifying authorized use of light to aggregate squid. Language of the final regulatory text was updated to reflect re-lettering since the Commission did not adopt proposed subsection 149 (f). In addition, a clarifying change was made stating that experimental fishery permits issued pursuant to Section 149.3 would also be subject to the regulations described in this subsection. It is a clarifying change only because the noticed regulatory text of Section 149.3 previously indicated that these permittees would be subject to all regulations of Section 149.

Section 149 Subsection (k) –Clarify to Whom Citations for Violations of This Section May Be Issued. The proposed regulations would include this subsection to clarify that citations for violations of this Section may be issued to the vessel operator, crewmembers, and/or the holder of a market squid permit issued pursuant to Section 149.1, Title 14, CCR.

At its August 27, 2004 meeting, the Commission adopted the proposed text clarifying to whom citations for violations may be issued. Language of the final regulatory text was updated to reflect re-lettering since the Commission did not adopt proposed subsection 149 (f). In addition, a clarifying change was made stating that experimental fishery permits issued pursuant to Section 149.3 would also be subject to the regulations described in this subsection. It is a clarifying change only because the noticed regulatory text of Section 149.3 previously indicated that these permittees would be subject to all regulations of Section 149.

Add Section 149.1, et seq. This proposed series of regulations serve to implement the commercial Market Squid Fishery Restricted Access Program, as follows below. The program and regulations are designed in accordance with the Commission's policy on Restricted Access Commercial Fisheries, and provides for a reduction in the fishing capacity of the market squid fleet and to allow for transfer of permits, which has been prohibited under the current statutory moratorium on permit issuance. The regulations, if adopted, would define and establish permits of different classes based on authorized geartypes, procedural requirements for permit issuance, fishery capacity goals, and specific mechanisms to achieve those goals through permit transferability and upgrades.

At its August 27, 2004 meeting, the Commission adopted proposed Section 149.1 to implement the commercial Market Squid Fishery Restricted Access Program. In subsections (d) and (g) of Section 149.1 pertaining to the permit renewal late fee, the regulatory text states that Fish and Game Code Section 7852.2 is notwithstanding. The authority for establishing a $250 late fee is established in Fish and Game Code Sections 8428 and 7071. These Fish and Game Code Sections were added to the authority and reference listings for Section 149.1 in the final regulatory text.

Section 149.1 Subsection (a) – Establish Permit Requirement to Fish Squid for Commercial Purposes. This proposed regulation states that on and after April 1, 2004, any vessel engaged in taking squid, landing squid, or attracting squid by light for commercial purposes, shall have a valid market squid permit issued to the owner of that vessel. The regulatory language was updated to reflect extension of the plan adoption date. April 1, 2005 is now proposed as the effective date for the permit requirement. A minor grammatical change was made to the proposed regulatory text for clarity.

At its August 27, 2004 meeting, the Commission adopted this proposed subsection. In addition, language of the final regulatory text was updated to reflect the re-lettering of proposed subsection 149(h) to subsection 149(g).

Section 149.1 Subsection (b) – Establish Permit Classes and Authorized Activities. The proposed subsection would designate up to three classes of commercial squid permits, to include Market Squid Vessel Permits, Market Squid Brail Permits, and Market Squid Light Boat Permits. Within each permit class, authorized gear types are specified. The regulation also allows permits to be specified as transferable or non-transferable, or both types of permits to be issued in each class. Only one market squid permit, regardless of the class of permit, may be issued per owner per vessel.

At the August 27, 2004 adoption hearing, the Commission moved to establish both transferable and non-transferable permit classes for Market Squid Vessel and Brail permits. The Commission also established that all Market Squid Light Boats that qualified for initial permit issuance would be issued transferable permits. The regulatory text of this subsection was amended for clarity and specificity with regard to the activities authorized under each class of permit. These modifications were provided in the October 5, 2004 Continuation Notice and were adopted by the Commission at its December 3, 2004 meeting.

Section 149.1 Subsection (c) – Establish Initial Permit Issuance Criteria. The proposed regulatory language specifies that permits are issued for fishing vessels based on either the vessel or an individual meeting the selected initial issuance criteria for each class of permit. The Commission may choose among several initial issuance criteria options that can result in transferable and/or non-transferable permit designations. Most proposed initial issuance criteria options require that the vessel owner be issued a current squid permit. The specified permit dates were updated to reflect extension of the plan adoption date.

The proposed language defining initial permit issuance criteria was clarified for each proposed permit class, as qualifying criteria may be based on either a vessel's catch history (determined from fish landing receipts made in the vessel's identification number) or an individual's catch history (determined from fish landing receipts made in the individual's identification number). Transferable permits may be issued based on a vessel's catch history, while criteria for non-transferable (20-year grandfather) permits are based upon an individual's personal catch history. It was further clarified that once a Transferable Market Squid Vessel Permit, Brail Permit, or Light Boat Permit has been issued for use on a vessel based on that vessel's catch history, individuals may not also use their personal catch history made aboard that vessel toward issuance of a non-transferable vessel or brail permit. This clarification was needed to prohibit the issuance of multiple permits based on catch history associated with a single vessel.

For vessel permits, initial issuance criteria are constructed upon levels of catch history ranging from 50 to 150 squid landings within a qualifying window period with any start date from January 1, 1990 through January 1, 2000, and any end date from November 12, 1999 through March 31, 2003.

The final text of subsection (c) of Section 149.1 required amendment once the Commission specified at the August 27, 2004 adoption hearing that in order to qualify for a future permit of any permit class, the owner must possess a permit for the 2004-2005 fishing year. Previous versions of the regulatory text allowed individuals to qualify for a non-transferable permit without holding a current permit. The language was further clarified to specify that during initial permit issuance, a permit must be placed only on a vessel that was licensed as either a market squid vessel or light boat in the 2004-05 fishing season, and which must also be the vessel upon which the qualifying catches were made. These modifications were provided in the October 5, 2004 Continuation Notice and were adopted by the Commission at its December 3, 2004 meeting.

At the August 27, 2004 adoption hearing, the Commission adopted the initial issuance criteria for a Transferable Market Squid Vessel Permit in subsection (c)(1) of Section 149.1: Possession of a current market squid vessel permit (2004-2005) and a minimum of 50 landings in window period January 1, 2000 through March 31, 2003. The descriptor "Transferable" was added to describe the specific Market Squid Vessel Permit in the final regulatory text of subsection 149.1(c)(1)(A) for clarity.

For brail permits, the Commission may consider a range of qualifying participation levels from 5 to 25 squid landings made with brail gear within a qualifying window period with any start date from January 1, 1990 through January 1, 2000, and any end date from November 12, 1999 through March 31, 2003.

At the August 27, 2004 adoption hearing, the Commission adopted the initial issuance criteria for a Transferable Market Squid Brail Permit in subsection (c)(3)

of Section 149.1: Possession of a current market squid vessel permit (2004-2005) and a minimum of 10 landings made with brail gear in window period January 1, 2000 through March 31, 2003. The descriptor "Transferable" was added to describe the specific Market Squid Vessel Permit in the final regulatory text of subsection 149.1(c)(3)(A) for clarity. In addition, minor grammatical changes were made in the final regulatory text of subsection 149.1(c)(3)(C) for clarity and consistency with text contained in other subsections in Section 149.1.

For light boat permits, initial issuance criteria based on landings are inappropriate, therefore this option is based on possessing a current market squid permit (vessel or light) and submission of one logbook within a qualifying time period spanning from January 1, 2000 to March 31, 2003.

At the August 27, 2004 adoption hearing, the Commission adopted the initial issuance criteria for a Transferable Market Squid Light Boat Permit in subsection (c)(5) of Section 149.1: Possession of a current market squid permit (either vessel or light for 2004-2005), and submission of one light boat log showing fishing activity on or prior to December 31, 2000.

Options are provided that include permit issuance criteria based on 10 to 50 squid landings in one single fishing season for 20-year California commercial fishermen (grandfathered individuals) pursuant to Fish and Game Code Section 8101. Other options for initial issuance criteria would not be based on prior catch history, and instead would require only that a squid permit have been held in one or more previous years.

The regulation further specifies that should non-transferable classes of permits be selected by the Commission for issuance, they may only be issued to individuals, and may not be issued to partnerships or corporations; although at the time of issuance, the permit may be issued for a vessel which is owned by a partnership or corporation. This provision allows for the non-transferable permit to expire when the permit holder dies, as the individual's personal fishing history was used to meet the initial issuance criteria.

Options for additional initial issuance criteria for non-transferable permits are proposed in the updated regulatory text. These options may be selected by the Commission in order to further limit the potential pool of non-transferable applicants due to the lengthy adoption process of the FMP. The Commission may now select to institute a window period during which the individual's catch history must have been made to qualify for a non-transferable vessel or brail permit. The proposed window period for transferable permits from [January 1, 1990 – January 1, 2000] through [November 12, 1999 – March 31, 2003] is proposed for consideration.

Additionally, if multiple individuals apply for issuance of a non-transferable permit with catch history from the same vessel, only the individual with the greatest number of landings or if applicable, the greatest number of landings during the window period, will qualify for issuance of a non-transferable permit.

An option was also added to require that the non-transferable permitholder be aboard the permitted vessel while the vessel is fishing under authority of the permit. This requirement would possibly curtail effort by vessels upon which non-transferable permits are placed.

Minor additional modifications were made to the proposed regulatory text of the subsection for clarity and consistency.

The text of subsection (c)(2) of Section 149.1 outlines the requirements for initial permit issuance for Non-Transferable Market Squid Vessel Permits. At its August 27, 2004 meeting, the Commission specified a requirement that individuals possess a 2004-2005 squid vessel permit in order to qualify for a future permit. In addition, the Commission requested the Department expand the range of qualifying catch criteria based on landings history. Non-Transferable permits were established by the Commission to provide an opportunity for 20-year California fishermen to continue in the squid fishery if they had participated in one or more prior years, pursuant to Section 8101 of the Fish and Game Code.

Additionally, the updated regulatory text will now allow the Commission to require a minimum of [20-75] landings in any one fishing season for non-transferable vessel permit issuance, and to select the years in which that fishing activity must have occurred. The Commission may require that the catches have been made in any single fishing season (April through March of the following year). Only landing receipts dated [between January 1, 1990 and March 31, 2003] or [between January 1, 1998 and March 31, 2003] or [before August 27, 2004] will be counted toward qualification. See Table 1 below for information on the number of anticipated qualifiers under each of these window period options.

Alternatively, the Commission may select initial issuance criteria for non-transferable vessel permits based on catch history that was made over a time period greater than a single season. The Commission may require a minimum of [20-150] landings at any time prior to August 27, 2004. See Table 2 below for information on the number of anticipated qualifiers.

Table 1. Estimated number of fishermen that may qualify for a non-transferable market squid vessel permit based on (1) the possession of an 04/05 market squid vessel permit, (2) the possession of a California Commercial Fishing License for at least 20 years, and (3) having made at least [20-75] landings during any one season as recorded by their fishing license identification number. Because the Department does not have precise information on 20-year fishermen, and because many vessels are owned by corporations rather than individuals, a range of estimates is provided. While the lowest value in the range reflects the number of individuals that the Department anticipates are 20-year fishermen, a maximum number of potential qualifiers (where the 20-year criteria is not considered) is provided for reference.

Number of Landings in a Single Season	I. 1/1/1998 through 3/31/2003	II. 1/1/1990 through 3/31/2003	III. Prior to 8/27/2004 (no window period)
20	6-12	10-17	14-23
33	2	6-11	7-15
40	2	4-8	4-14

50	2	3-6	4-11
75	1	1	1-2

Table 2. Estimated number of fishermen that may qualify for a non-transferable market squid vessel permit based on (1) the possession of an 04/05 market squid vessel permit, (2) the possession of a California Commercial Fishing License for at least 20 years, and (3) having made at least [20-150] total landings prior to August 27, 2004 as recorded by their fishing license identification number. Because the Department does not have precise information on 20-year fishermen, and because many vessels are owned by corporations rather than individuals, a range of estimates is provided. While the lowest value in the range reflects the number of individuals that the Department anticipates are 20-year fishermen, a maximum number of potential qualifiers (where the 20-year criteria is not considered) is provided for reference.

Total Number of Landings	Prior to 8/27/2004 (No Window Period)
20	18-30
33	12-25
40	11-21
50	11-20
75	7-14
100	7-12
125	5-12
150	3-9

The modified proposals for Non-Transferable Market Squid Vessel Permits in the regulatory text of subsection (c)(2) of Section 149.1 were provided in the October 5, 2004 Continuation Notice. At its December 3, 2004 meeting, the Commission adopted the initial issuance criteria for Nontransferable Market Squid Vessel Permits in subsection (c)(2) of Section 149.1: Possession of a current market squid vessel permit (2004-2005), possession of a California commercial fishing license for at least 20 years, and a minimum of 33 landings prior to August 27, 2004. Only receipts that demonstrate catch aboard a vessel that does not already qualify for issuance of a transferable permit of any permit class are eligible. Because the Commission directed the Department to require that a current permit would be required for qualification of 20-year grandfather permits, much of the final regulatory text of this subsection is more simplistic than originally proposed as there is no longer a need to otherwise limit the number of potential qualifiers, and therefore was substantially rewritten in the October 5, 2004 Continuation Notice.

The Commission did not adopt proposed subsection 149.1(c)(2)(F) which would have required that the non-transferable permitholder be aboard the permitted vessel while the vessel is fishing under authority of the permit.

Subsection (c)(4) of Proposed Section 149.1, Market Squid Fishery Restricted Access Program. The text of this subsection outlines the requirements for initial permit issuance for Non-Transferable Market Squid Brail Permits. Non-Transferable permits were established by the Commission to provide an opportunity for 20-year California fishermen to continue in the squid fishery if they had participated in one or more prior

years, pursuant to Section 8101 of the Fish and Game Code. Because the Commission specified a requirement that individuals possess a 2004-2005 squid vessel or light boat permit for qualification of 20-year grandfather permits, much of the proposed regulatory text of this subsection for brail permits was amended for consistency with the non-transferable vessel permit class. The revised regulatory text is simpler as there is no longer a need to establish a complex set of criteria that would limit the number of potential qualifiers.

However, because the Commission did adopt the specific qualifying catch history for this class of permit at the August 27, 2004 adoption hearing (10 brail landings in a season between January 1, 2000 and March 31, 2003), the proposed regulatory text reflects the actions taken, and the prior options were eliminated.

At its August 27, 2004 meeting, the Commission adopted some elements of the initial issuance criteria for Non-transferable Market Squid Brail Permits in the regulatory text of subsection (c)(4) of Section 149.1, while directing the Department to renotice other options for future adoption. The items adopted at its August 27, 2004 meeting included possession of a California commercial fishing license for at least 20 years, and a minimum of 10 landings with brail gear during one fishing season in a window period from January 1, 2000 through March 31, 2003.

The modified proposals were provided in the October 5, 2004 Continuation Notice. At its December 3, 2004 meeting, the Commission adopted the final initial issuance criteria to require possession of a current market squid vessel permit (2004-2005), and to specify that only receipts that demonstrate catch aboard a vessel that does not already qualify for issuance of a transferable permit of any permit class are eligible. Other changes were needed to the regulatory text, as noticed in the October 5 Continuation Notice, for clarity and consistency with subsection (c)(2) of Section 149.1.

The Commission did not adopt proposed subsection 149.1(c)(4)(F) which would have required that the non-transferable permitholder be aboard the permitted vessel while the vessel is fishing under authority of the permit.

At its August 27, 2004 meeting, the Commission adopted the proposed text of subsection (c)(6) of Section 149.1 regarding placement of non-transferable permits on vessels. The phrase "at the time of issuance" was removed in the final regulatory text from the text proposed in the Amended Initial Statement of Reasons dated April 12, 2004 for clarity and accuracy. If a non-transferable permit must be placed on a replacement vessel pursuant to subsection 149.1(o)(3)(F), this transaction would not occur at the time of initial permit issuance. Therefore, regulatory text limiting the placement of a non-transferable permit on a vessel only to permits issued at the time of initial issuance would be erroneous.

Section 149.1 Subsections (d) and (e) – Specify Application Deadlines for Initial Permit Issuance, and an Appeals Process. These proposed regulations specify that

all applications and permit fees for initial issuance of Market Squid Vessel Permits, Market Squid Brail Permits, and Market Squid Light Boat Permits must be submitted by June 30, 2004, and provide for a grace period through July 31, 2004 with a $250 late fee. Applications for initial permit issuance after this time period will be denied by the Department. Failure to impose deadlines on initial issuance could undermine the goals of the restricted access program since mechanisms to reduce fishing capacity designed as part of the program would likely be ineffective if new permits are continuously issued. Regulations also provide that any applicant who is denied initial issuance of any class of permit may appeal that denial to the Commission within 60 days of the denial. The initial issuance application deadline dates were extended by one year, which would result from a change to the April 1, 2005 effective date of the permit requirement. The change was needed to account for extension of the plan adoption date.

At its August 27, 2004 meeting, the Commission adopted the proposed changes to this subsection specifying application deadlines for initial permit issuance, and an appeals process.

The Department proposes the Commission approve an amendment to the adopted regulatory text in subsection (d) of Section 149.1 to specify that the application form number is FG 1315 (8/04), and it is incorporated by reference into the regulations. The form reference was not available at the time the prior notice was filed.

This modification was provided in the October 5, 2004 Continuation Notice and was adopted by the Commission at its December 3, 2004 meeting.

Section 149.1 Subsections (f), (g) and (h) – Specify Annual Permit Renewal Criteria, Deadlines and Appeals Process. These proposed regulations state that permits must be renewed annually, and may only be issued by the Department each year to those who held the same permit in the prior year. It also clarifies that upon the death of a non-transferable permit holder, the permit cannot be renewed. The proposed regulations state that renewal applications must be submitted by April 30 of each year, and provide for a grace period through May 31 of each year with a $250 late fee. Applications for permit renewal after this time period will be denied by the department and returned to the applicant. If the permittee misses the deadline, an appeals process is again defined. The specified permit renewal deadlines were updated to account for extension of the plan adoption date.

At its August 27, 2004 meeting, the Commission adopted the proposed changes to these subsections concerning Annual Permit Renewal Criteria, Deadlines and Appeals Process. A technical clarification was to the regulatory text of subsection 149.1(f)(2) with regard to the status of a non-transferable permit upon death of a permittee. The permit is described as "null and void" in the final regulatory text rather than "expired." A technical clarification was also made in subsection 149.1(h) describing the appeals process for permit renewals that are denied by the Department. The department's denial of a permit renewal may be appealed to the Commission within 60 days of the

department issuing the written denial. The term "second denial" was replaced with "written decision."

Subsection (g) of Proposed Section 149.1, Market Squid Fishery Restricted Access Program. The text of this subsection describes permit renewal application processes, requirements and deadlines. The Department proposes the Commission approve an amendment to the adopted regulatory text to specify that the renewal application form number is FG 1315 (8/04), and it is incorporated by reference into the regulations. The form reference was not available at the time the prior notice was filed.

This modification was provided in the October 5, 2004 Continuation Notice and was adopted by the Commission at its December 3, 2004 meeting.

Section 149.1 Subsection (i) – Fees. The proposed regulations reflect a range of permit, transfer and upgrade fees for the Commission's consideration. For each market squid permit, the Commission will select an annual fee from a range of $400 to $5000. This level may be set differently for each class of permit (i.e. vessel, brail or light; transferable or non-transferable). For permit transfers, both in cases where the vessel is transferred to a new owner, or if the permit is transferred to a replacement vessel, the Commission will select from a proposed fee range of $250-$1000 for the transaction. For each Market Squid Brail Permit Upgrade, the Commission will select a one-time fee from a range of $400 to $5000.

At its August 27, 2004 meeting, the Commission selected permit, transfer, and upgrade fees as follows:
Transferable Market Squid Vessel Permit: $2000
Non-transferable Market Squid Vessel Permit: $1000
Transferable Market Squid Brail Permit: $2000
Non-transferable Market Squid Brail Permit: $1000
Transferable Light Boat Permit: $600
Transfer Fee: $500
Market Squid Brail Upgrade Fee: $1500

Section 149.1 Subsection (j) – Permit Revocation, Suspension or Cancellation. The proposed subsection, if adopted, would specify that a permit can be revoked or suspended by the Commission under the following circumstances: a) if the permitholder used false information to qualify for the permit, b) if the permitholder violates commercial squid fishing regulations, or c) if any terms or conditions of the permit are violated.

At its August 27, 2004 meeting, the Commission adopted this subsection as proposed.

Section 149.1 Subsection (k) – Dissolution of Partnership or Corporation. For vessels which hold permits which are issued to partnerships or corporations, rather than individual vessel owners, the proposed regulation would require that the permitholder notify the Department of any dissolution of the partnership or corporation, and to

specify who the successor permitholder is so that the Department may reissue the permit in that name.

At its August 27, 2004 meeting, the Commission adopted this subsection as proposed. Additionally, at its December 3, 2004 meeting, the Commission adopted the proposed addition of a clarifying sentence to specify that change of ownership provisions defined in subsection 149.1(l) and transfer fees in subsection 149.1(i)(2) are applicable to this situation, as provided in the October 5, 2004 notice.

Section 149.1 Subsection (l) – Change of Vessel Ownership. The proposed regulations, if adopted, would require the Commission to set a fee from a range of $250-$1000 to be imposed in cases where a permitholder sells his permitted vessel to another owner, and chooses to transfer the market squid permit to the new vessel owner. Documentation requirements and procedures for completing the transaction are also provided. The proposed regulations clarify that non-transferable permits will be canceled upon the sale or transfer of ownership of the vessel.

At its August 27, 2004 meeting, the Commission adopted the proposed subsection and set the change of vessel ownership transfer fee at $500. In addition, minor technical changes were made to the final regulatory text of subsection 149.1(l)(3). If a vessel is permitted as a non-transferable vessel and is sold to a new owner, the non-transferable permit may not be transferred to the new owner. Sale of the vessel renders the permit "null and void" rather than "cancelled by the Department."

Section 149.1 Subsection (m) – Capacity Goals. This subsection establishes in regulation, the optimum number of vessels for each squid fishery permit class as selected by the Commission. These numbers form the basis from which other provisions of the restricted access program, such as permit transferability, are determined. If approved, the Commission will adopt a capacity goal for Market Squid Vessel Permits from a range of 10-104 permits, a capacity goal for Market Squid Brail Permits of 18 permits, and a capacity goal for Market Squid Light Boat Permits from a range of 10-104 permits. The proposed regulations also specify that the capacity goals for vessel permits shall equal the sum of the capacity goals for the brail and light boat permit classes.

At its August 27, 2004 meeting, the Commission adopted the proposed regulations, setting the capacity goal for market squid vessels that produces a moderately productive and specialized fleet [55 vessels, 18 brail and 34 light boats (these are the combined capacity goals for both Transferable and Non-Transferable permits of the same class)]. The Commission did not adopt proposed subsection 149.1(m)(4), which would have set the capacity goal for the number of market squid vessel permits equal to the combined number of the capacity goals for market squid brail and light boat permits, resulting in renumbering of proposed subsection 149.1(m)(5) to 149.1(m)(4).

Section 149.1 Subsection (n) – Gross Tonnage Endorsement. Proposed regulations in this subsection explain the criteria for defining or calculating the gross tonnage of a vessel for which a Market Squid Vessel Permit or a Market Squid Brail Permit is issued. The provisions provide consistency with federal regulations which are established for Coastal Pelagic Species fishery permits, and to provide a measure of comparable capacity for purposes of determining permit transferability.

At its August 27, 2004 meeting, the Commission adopted this subsection as proposed.

Section 149.1 Subsections (o) and (p) – Transfer of Permits to Replacement Vessels and Transfer Appeals Process. If adopted, these subsections would define criteria that would allow for transfer of a permit to a different vessel after August 31, 2004 as selected by the Commission from a wide range of options. The option recommended by the Department would limit permit transfers in these classes to vessels only of comparable capacity, consistent with transferability guidelines for federal Coastal Pelagic Species permits. Regulations would specify that two vessels in the vessel or brail permit classes are considered to be of comparable capacity if the gross tonnage of the replacement vessel is not in excess of ten percent greater than the gross tonnage of the originally permitted vessel. Other options include no permit transferability except in cases of major mechanical breakdown or loss of the vessel, and transferability of permits regardless of vessel capacity. An additional option provides for cases where a replacement vessel does not meet the 'comparable capacity' provisions, a "two-for-one" permit transfer (an additional permit must be relinquished) may be authorized. The effective date for permit transfers was updated to reflect extension of the plan adoption date.

Light boat permit transfer options include "one for one" permit transferability, or provisions for a "two-for-one" permit transfer if the number of permits issued is at a level above the capacity goal specified in subsection (m), and "one for one" if the number of permits issued is below the capacity goal.

Regulations also define documentation requirements and procedures for completing the permit transfer transactions, and provide that any applicant who is denied transfer of any permit may appeal that denial first to the Department and then to the Commission.

At its August 27, 2004 adoption hearing, the Commission adopted transfer provisions for Transferable Market Squid Vessel Permits and Market Squid Brail Permits that allow for these permits to be placed on vessels of comparable capacity (within 10 percent of the gross tonnage of the original vessel). Additionally, for Transferable Market Squid Vessel Permits, if the replacement vessel is not of comparable capacity, a permit may still be transferred to a replacement vessel with surrender of two permits that, in sum, add up to capacity that is comparable to the replacement vessel. The

Commission adopted transfer provisions for Transferable Market Squid Light Boat Permits that allow the permit to be transferred to another entity who is the owner of a replacement commercial fishing vessel. Modifications were made to the proposed regulatory text of this subsection to reflect the actions taken as well as to make technical corrections (text of subsections (o)(5) and (o)(6) was inadvertently included twice). Other text was added to clarify provisions related to estate transfers and to specify the transfer process for Non-Transferable Market Squid Vessel Permits and Non-Transferable Brail Permits to replacement vessels, as follows:

- In the event of death of the holder of a Transferable Market Squid Vessel Permit, Transferable Market Squid Brail Permit, or a Transferable Market Squid Light Boat Permit, the estate must apply for transfer of the permit to another entity within one year of the permitholder's death.
- A Non-Transferable Market Squid Vessel Permit or a Non-Transferable Market Squid Brail Permit may not be transferred to another owner or vessel, except in the event the permitted vessel is lost, stolen or destroyed, or has suffered a major mechanical breakdown, the permit may be placed on a replacement vessel of comparable capacity, with proof that the permitted vessel is lost, stolen, or destroyed in the form of a copy of the report filed with the United States Coast Guard or any other law enforcement agency. In the case of mechanical breakdown, the application shall include an estimate of the costs to repair the vessel from a marine surveyor or boat repair yard.

At its December 3, 2004 meeting, the Commission adopted the proposed changes provided in the October 5, 2004 notice. In addition, a technical clarification was made describing the appeals process for permit transfer requests that are denied by the Department. The department's denial of a permit transfer may be appealed to the Commission within 60 days of the department issuing a written decision. The term "second denial" was replaced with "written decision."

Section 149.1 Subsections (q) and (r) – Market Squid Brail Permit Upgrade, and Appeals Process. If adopted, these subsections would provide for a Market Squid Light Boat permittee to upgrade to a Market Squid Brail Permit with surrender of one to three additional Market Squid Light Boat Permits. This option will provide a mechanism to reduce the number of light boat permits, while providing an opportunity to acquire a Market Squid Brail Permit. Regulations also define documentation requirements and procedures for completing the transaction, and provide that any applicant who is denied upgrade of the permit may appeal that denial first to the Department and then to the Commission.

At its August 27, 2004 meeting, the Commission adopted the addition of these subsections, specifying that the purchase of a Transferable Market Squid Brail Permit by a permittee who holds a Transferable Market Squid Light Boat

Permit may occur with surrender of one additional Transferable Market Squid Light Boat Permit. A grammatical correction was made to subsection 149.1(q). "Transferable Market Squid Light Boat Permits" was replaced with "Transferable Market Squid Light Boat Permit." In subsection 149.1(q)(1), the descriptor "Transferable" was added preceding "Market Squid Brail Permit" to clarify that individuals seeking the upgrade would be issued a transferable rather than a non-transferable brail permit. In subsection 149.1(q)(2), the regulatory text was clarified to specify that "Transferable Market Squid Light Boat" permittees are the permit class eligible to transfer permits for purposes of a brail permit upgrade. Minor grammatical changes were made to the final regulatory text of subsection 149.1(r). The descriptor "Transferable" was added preceding both "Market Squid Light Boat Permit" and "Market Squid Brail Permit" for clarity to distinguish from non-transferable permit classes. Additionally, as with subsections (h) and (p) of Section 149.1, the term "second denial" was replaced with "written decision."

Add Section 149.2, Permits for Taking of Market Squid for Sale as Live Bait. If adopted, on and after April 1, 2005, any owner of a vessel which takes market squid for live bait purposes will be required to hold a Market Squid Live Bait Permit for that vessel. This regulatory option is provided to the Commission should they choose to initiate management of this currently-unregulated component of the squid fishery. The specified permit requirement date was extended by one year to account for extension of the plan adoption date. If adopted, the proposed live bait permit requirement would be effective on and after April 1, 2006.

The Commission did not adopt proposed Section 149.2, which would have required a permit for the sale of squid as live bait.

Add Section 149.3, Experimental Market Squid Vessel Permits.
If adopted, this provision would allow the commission to issue 1-5 Transferable or Non-Transferable Market Squid Vessel Permits to any individual for placement on any vessel for purposes of developing a squid fishery in areas previously not utilized for squid production. Individuals issued permits pursuant to this Section would be required to adhere to all commercial squid fishing regulations in Section 149, Title 14, CCR, and all terms and conditions for permits defined in Section 149.1, excepting initial issuance criteria defined in Section 149.1(c).

Two additional options were added to the proposed regulatory text of this Section for the Commission's consideration. In the event that the Commission selects the option that establishes a squid fishery closure for all waters north of Pillar Point, the Commission may adopt a provision exempting experimental fishery permit holders from this closure area only. An option is also included that would establish a maximum seasonal catch limitation of [2,000 – 5,000] tons by experimental fishery permittees.

At its August 27, 2004 meeting, the Commission adopted this subsection,

establishing three Experimental Non-transferable Market Squid Vessel Permits. Since the Commission did not adopt a squid fishery closure for all waters north of Pillar Point, an exemption from such a closure for experimental fishery permit holders was not necessary. The Commission did not adopt a maximum seasonal catch limitation for experimental fishery permittees. Minor technical clarifications were made to the final regulatory text.

Add Section 149.4, Market Squid Fishery Regional Control Date
If adopted, this provision would establish a control date to notify participants of intent to adopt a regional restricted access program for the squid fishery at a future date. A range of control date options [April 1, 1998 – October 17, 2003] is proposed for consideration. Fishery participation on or after this date may apply toward a permit for a specified geographic region under a future regional restricted access program for the market squid fishery if one is developed.

Fishery participation prior to the control date would not be used as a measure of participation to qualify for initial issuance of regional restricted access permits. Only participation on or after the control date may be used to determine eligibility in a future regional restricted access program. The port of landing of these catches or records of light boat activity would be used to determine eligibility in specific geographic areas.

Possession of any market squid vessel, brail, or light boat permit issued pursuant to Section 149.1, Title 14, CCR, would not guarantee issuance of a permit under any future squid regional restricted access program. Beginning with the fishing season immediately following adoption of a regional restricted access program, market squid fishery permits issued pursuant to Section 149.1 would be replaced with the appropriate regional permits that would be subject to specific conditions for issuance. Permits previously issued under Section 149.1 would be nullified and no longer subject to renewal provisions. The range of control date options was expanded to allow for selection of a control date between January 1, 1990 and August 27, 2004.

The Commission did not adopt proposed Section 149.4 which would have established a Regional Control date.

A summary of the actions taken at the two adoption hearings is provided in the following table, which will result in amendment of Section 149, Title 14, CCR, and addition of Sections 53.00 et seq, Section 149.1 and 149.3, Title 14, CCR.

MARKET SQUID FISHERY MANAGEMENT PLAN IMPLEMENTING REGULATIONS ADOPTED BY THE COMMISSION ON AUGUST 27, 2004 AND DECEMBER 3, 2004	
FISHERY CONTROL RULES	
A. Seasonal Statewide Catch Limitation	
	Establish a seasonal catch limitation of 118,000 tons.

MARKET SQUID FISHERY MANAGEMENT PLAN IMPLEMENTING REGULATIONS ADOPTED BY THE COMMISSION ON AUGUST 27, 2004 AND DECEMBER 3, 2004	
FISHERY CONTROL RULES	
B. Monitoring the Fishery using an Egg Escapement Method	
	Monitor the fishery through the egg escapement method at a threshold level required in the CPS FMP while pursuing a biomass estimate of market squid.
C. Daily Trip Limit for Market Squid Vessels and Brail Vessels	
	Do not establish daily trip limits.
D. Weekend Closures	
	Continue closures from noon Friday to noon Sunday from the U.S.-Mexico border to the California-Oregon border.
E. Monitoring Program	
	Continue existing squid monitoring programs (port sampling and logbooks).
F. Live Bait Fishery and Incidental Catch of Market Squid	
	Continue existing regulations that do not require a squid permit when fishing for live bait or for incidental take 2 tons or less.
G. Gear Restrictions	
	Maintain existing gear restrictions requiring light shields and specifying a maximum wattage (30,000 watts).
	Lower edges of the shields shall be parallel to the deck of the vessel.
RESTRICTED ACCESS PROGRAM	
H. Market Squid Fleet Capacity Goal	
	Establish a capacity goal for market squid vessels that produces a moderately productive and specialized fleet [55 vessels, 18 brail and 34 light boats (these are the combined capacity goals for both Transferable and Non-Transferable permits of the same class)].

MARKET SQUID FISHERY MANAGEMENT PLAN IMPLEMENTING REGULATIONS ADOPTED BY THE COMMISSION ON AUGUST 27, 2004 AND DECEMBER 3, 2004	
FISHERY CONTROL RULES	
I. Initial Issuance of Permits	
	Transferable Permits: *Market Squid Vessel Permit:* Possession of a current market squid vessel permit (2004-2005) and a minimum of 50 landings in window period January 1, 2000 through March 31, 2003; *Brail Permit:* Possession of a current market squid vessel permit (2004-2005) and a minimum of 10 landings made with brail gear in window period January 1, 2000 through March 31, 2003; *Light Boat Permit:* Possession of a current market squid permit (either vessel or light for 2004-2005), and submission of one light boat log demonstrating fishing activity on or before December 31, 2000. Non-Transferable Permits: *Market Squid Vessel Permit:* Possession of a current market squid vessel permit (2004-2005), possession of a California commercial fishing license for at least 20 years, and a minimum of 33 landings prior to August 27, 2004. Only receipts that demonstrate catch aboard a vessel that does not already qualify for issuance of a transferable permit of any permit class are eligible. *Brail Permit:* Possession of a current market squid vessel permit (2004-2005), possession of a California commercial fishing license for at least 20 years, and a minimum of 10 landings with brail gear during one fishing season in a window period from January 1, 2000 through March 31, 2003. Only receipts that demonstrate catch aboard a vessel that does not already qualify for issuance of a transferable permit of any permit class are eligible. *Light Boat Permit:* There is not a non-transferable permit category.
J. Permit Fees	
	Establish an annual permit fee: Transferable Market Squid Vessel Permit: $2000 Non-transferable Market Squid Vessel Permit: $1000 Transferable Market Squid Brail Permit: $2000 Non-transferable Market Squid Brail Permit: $1000 Transferable Light Boat Permit: $600
K. Market Squid Vessel Permit Transfer	
	Establish full transferability (1-for-1) of market squid vessel permits based on comparable capacity (within 10%); establish transferability of market squid vessel permits to a vessel of larger capacity under a "2-for-1" permit retirement.
L. Market Squid Brail Permit Transfer	
	Establish full transferability (1-for-1) of market squid brail permits based on comparable capacity.
M. Market Squid Light Boat Permit Transfer	
	Establish full transferability (1-for-1) of light boat permits.
N. Transferability Fee	
	Establish a transfer fee of $500.

MARKET SQUID FISHERY MANAGEMENT PLAN IMPLEMENTING REGULATIONS ADOPTED BY THE COMMISSION ON AUGUST 27, 2004 AND DECEMBER 3, 2004	
FISHERY CONTROL RULES	
O. Experimental Market Squid Vessel Permits	
	Establish 3 experimental non-transferable market squid vessel permits.
P. Market Squid Fishery Regional Control Date	
	Do not establish a regional restricted access control date.
ECOLOGICAL CONCERNS	
Q. Harvest Replenishment/General Habitat Closure Areas	
	Do not set aside specific areas as harvest replenishment areas for market squid.
R. Area and Time Closures to Address Seabird Issues	
	Squid may not be taken using attracting lights in all waters of the Gulf of the Farallones National Marine Sanctuary (Sanctuary boundaries as defined on August 27, 2004) at any time.

Forms **- The Commission has incorporated application forms (DFG 149a (09/01), DFG149b (09/01), and FG 1315 (08/04)) of this rulemaking by reference because it would be impractical to publish the forms in the California Code of Regulations due to the length of the forms and the fact that the forms are revised frequently. DFG 149a (09/01) and DFG149b (09/01) were available upon request from the Fish and Game Commission office from October 17, 2003 through December 3, 2004. FG 1315 (08/04) was available on request from the Fish and Game Commission office from October 15, 2004 through December 3, 2004.**

Concurrent Rulemaking **- Office of Administrative Law's Notice ID # Z 04-1005-08 (Marine Protected Areas) concurrently proposes to add subsection (k) to Section 149, Title 14, CCR; which would specify that a Tidal Invertebrate Permit is not needed for the commercial take of squid. This (Market Squid) rulemaking package would incorporate additional changes in Section 149, Title 14, CCR, proposed by Office of Administrative Law's Notice ID # Z 04-1005-08 (Marine Protected Areas). Should Notice ID # Z 04-1005-08, be approved first, its proposed subsection (k) would be re-lettered subsection (f), until such time as this (Market Squid) rulemaking package is approved, when it will be subsequently re-lettered subsection (k).**

1.1.3 California Code of Regulations (CCR) Title 14 Section 53.00 - Market Squid Fishery Management Plan

Article 4 of Chapter 5.5 of Subdivision 1 of Title 14, CCR is added to read:

Article 4. Market Squid Fishery Management Plan

Section 53.00 is added to Title 14, CCR, to read:

53.00. Purpose and Scope.

(a) This article implements the Market Squid Fishery Management Plan (Market Squid FMP) as adopted and amended by the California Fish and Game Commission (commission), consistent with the requirements of Part 1.7, commencing with Section 7050, and Article 9.7 of Chapter 2 of Part 3 of Division 6 of the Fish and Game Code (commencing with Section 8420). Regulations contained in Section 53.00 et seq. are consistent with the goals, objectives and procedures of the Market Squid FMP and applicable federal regulations for coastal pelagic species and the federal Coastal Pelagic Species Fishery Management Plan. These regulations, in combination with other applicable provisions of the Fish and Game Code, Title 14 of the California Code of Regulations, and federal regulations for coastal pelagic species, govern management and regulation of market squid stocks and fisheries.
(b) A regulation implementing this fishery management plan that is applicable to both sport and commercial fisheries is found in this Article. Regulations adopted by the commission specific to recreational take and use of market squid are included with ocean sport fishing regulations in Chapter 4, beginning with Section 27.00, Title 14, CCR. Regulations specific to commercial fishing for market squid are included in Chapter 6, beginning with Section 149, Title 14, CCR.
NOTE
Authority cited: Sections 7071 and 8425, Fish and Game Code. Reference: Sections 7070, 7071, 7075, 7078, 7083, 8420, 8425, and 8429.7, Fish and Game Code.

Section 53.01 is added to Title 14, CCR, to read:

53.01. Definitions.
(a) *Brail gear, dip nets or scoop nets* means any net attached to a rigid frame operated by hand or mechanical device deployed from the vessel to scoop fish or invertebrates.
(b) *Daily trip limit* means a routine management measure which may be used to limit take of squid on a per-vessel basis within a calendar day.
(c) *Drum seine* means a purse seine net which is stored, deployed and retrieved with the aid of a mechanized drum (reel) mounted on the stern of the vessel.
(d) *Egg escapement* means the number or proportion of a female squid's lifetime supply of eggs that she is able to deposit, on average, before being taken in the fishery.
(e) *Egg escapement method* means a management tool which may be used to determine whether the fleet is fishing above or below a predetermined sustainable level of exploitation. The method requires establishing a threshold value to ensure that an adequate number of eggs are deposited prior to harvest.
(f) *Fishing year or fishing season* under the Market Squid FMP means the period April 1 though March 31.
(g) *Fishery Control Rules* means specific management strategies such as seasonal catch limits, daily trip limits, area closures, time closures, and sustainable levels of egg escapement which provide for a sustainable market squid fishery.

(h) *Fleet capacity goal* means an optimal number of vessels where the number of vessels matches the available squid resource.
(i) *Forage* means the role of market squid in the food chain as a critical source of food for higher predators, including birds, fish and marine mammals.
(j) *Lampara* means a rectangular net constructed with graduated mesh sizes, a definite bunt (bag), and fitted with floats. It is laid out by the fishing vessel in a circle and closed
at least partially on the bottom by pulling the leadline in advance of the float line.
(k) *Light boat* means a vessel engaged in the commercial taking or attempting to take market squid which uses bright lights to aggregate squid for commercial purposes including live bait.
(l) *Market squid* means Loligo opalescens.
(m) *Market Squid Fishery Management Plan (Market Squid FMP)* means Chapters 1 through 5 of the Market Squid Fishery Management Plan approved by the Commission on [November 1, 2003 – April 1, 2004], hereby incorporated by reference.
(n) *National Marine Fisheries Service, NMFS or NOAA Fisheries* means the federal
fisheries management agency which is contained in the United States Department of Commerce.
(o) *Overfished* is defined at Fish and Game Code Section 97.5, and in the Market Squid FMP also means a condition that may exist when either the egg escapement threshold is not met, or catches of squid exceed any specified allowable level.
(p) *Overfishing* is defined at Fish and Game Code Section 98, and in the Market Squid FMP also may mean that harvests of squid are occurring at times when either the egg escapement threshold is not being met, or catches are exceeding specified allowable levels. These catches may not be sustainable.
(q) *PFMC or Council* means the Pacific Fishery Management Council established pursuant to the Magnuson-Stevens Fishery Conservation and Management Act.
(r) *Point of concern* means one or more of the following conditions affecting market squid that, if found or are expected to exist, may trigger the application or adjustment of one or more management measures by the commission:
(1) Catch is projected to significantly exceed the current seasonal catch limitation.
(2) Any adverse or significant change in the biological characteristics of the market squid (age composition, size composition, age at maturity, or recruitment) is discovered.
(3) An overfished condition exists or is imminent (defined as when the egg-escapement method threshold is not realized in two consecutive years).
(4) Any adverse or significant change in the availability of market squid as forage or in the status of a dependent species is discovered.
(5) An error in data or a change to an indicator of stock status is detected that requires adjustment to fishery control rules to ensure sustainable resource management.
(s) *Points of concern process* means a process authorizing the commission to apply or adjust fishery management measures at any time during the year based

on the confirmation of the existence of one or more resource-based points of concern identified in a fishery management plan pursuant Section 50.03 (a), Title 14, CCR.

(t) *Purse seine* means a rectangular net constructed with uniform mesh sizes, without a prominent bunt (bag), and fitted with floats. It is laid out with the end attached to a skiff while the deploying vessel encircles the squid. The end of the net is then brought up to the deploying vessel and is closed on the bottom by pulling a purse line (draw string) threaded through rings along the leadline, preventing the catch from escaping.

(u) *Round haul vessels* mean those that employ the use of lampara, purse seine, and drum seine net gear to commercially harvest squid.

(v) *Seasonal catch limitation* means an amount of allowable catch which may be taken within a designated geographic area in a fishing season, specified in short tons and excluding discard mortality. The attainment (or expected attainment) of this limit will cause closure of the directed commercial fishery as specified in regulation.

(w) *Tons* means short tons, and is the standard unit of weight for purposes of describing catches and limits for the market squid fishery, notwithstanding Section 50.00 (c), Title 14, CCR.

(x) *Vessel capacity* means the gross registered tonnage, as listed on a federal Coastal Pelagic Species permit or calculated from length, breadth and depth measurements provided on United States Coast Guard documentation papers.

(y) *Weekend closures* mean a routine management measure which may be used to prohibit take of market squid during certain days of a week.

(z) Definitions contained in Chapter 1, and Article 1 of Chapter 5.5, of Subdivision 1, Division 1, Title 14, CCR, and Chapters 1 and 2 of Division 0.5 of the Fish and Game Code apply to the market squid fishery in addition to definitions of this Section.

NOTE

Authority cited: Section 7071 and 8425, Fish and Game Code. Reference: Sections 7071, 7075, 7078, 7083, 7086, 8420, and 8425, Fish and Game Code.

Section 53.02 is added to Title 14, CCR, to read:

53.02. Process and Timing.

(a) Management of market squid stocks will conform to the goals, objectives, criteria, procedures, and Fishery Control Rule guidelines of the Market Squid FMP, and other applicable state and federal laws and regulations.

(b) Periodic monitoring and assessment of squid fisheries will be conducted, and, at a minimum, will include the collection and review of reported catches. The department will provide management recommendations to the commission as needed, and in-season if a need is identified.

(c) The director may establish and appoint members to an advisory committee to assist the department with development and review of fishery assessments, management options and proposals, and plan amendments.

(d) Management measures and actions may be developed, considered, and adopted in compliance with the Administrative Procedure Act and implemented at any time of year to achieve management plan goals and objectives, and may apply to any or all management areas, or portions of management areas at the discretion of the commission.

NOTE

Authority cited: Section 7071 and 8425, Fish and Game Code. Reference: Sections 7071, 7075, 7083, 7652, 8420 and 8425, Fish and Game Code.

Section 53.03 is added to Title 14, CCR, to read:

53.03. Market Squid Fishery Management Plan (Market Squid FMP) Project

(a) The Department's Recommended Proposed Project in the Market Squid FMP involves a combination of limitations on total harvest, regulation on the use of squid fishing gear (including lights), use of time closures to allow for periods of uninterrupted spawning, restricted access and other limits on the commercial fleet capacity, mechanisms to allow for adequate squid escapement, and seasonal area closures designed to minimize impact to sensitive non-target species and habitat. These management measures described in the Market Squid FMP will be utilized in managing the squid fishery toward meeting goals and objectives of the Market Squid FMP.

(b) Other management measures as described in the Market Squid FMP, including but not limited to vessel trip limits, squid replenishment areas, seasonal closures, and marine protected areas may be used as needed to achieve the goals and objectives of the Market Squid FMP.

(c) A fishery management measure may be adopted by the commission instead of, or in addition to, measures included in the adopted Market Squid FMP Project where specified in statute or state or federal regulation.

NOTE

Authority cited: Section 7071 and 8425, Fish and Game Code. Reference: Sections 7071, 7075, 7082, 7083, 8420 and 8425, Fish and Game Code.

1.1.4 CCR Title 14 Section 149.00 - Commercial Taking of Market Squid

Section 149, Title 14, CCR, is amended to read:

149. Commercial Taking of Market Squid.

(a) Fishing days. North of a westerly extension of the United States -- Republic of Mexico boundary line, market squid may not be taken for commercial purposes between 1200 hours (noon) on Friday and 1200 hours (noon) on Sunday of each week. This regulation applies to vessels catching squid or attracting squid with lights for the purpose of catching. This regulation does not apply to vessels pursuing taking squid for live-bait live bait purposes only or to fishing activities which result in squid landings taken pursuant to subsection (g) of this Section. Squid taken for live bait purposes pursuant to this Section shall only be sold as live bait.

(b) Records. Pursuant to Section 190 of these regulations, any person who possesses a valid market squid vessel permit Market Squid Vessel Permit, Market Squid Brail Permit, or Market Squid Light Boat Permit market squid light boat owners permit shall complete and submit an accurate record of his/her squid fishing/lighting activities on a form (Market Squid Vessel Logbook - DFG 149a (4/99) (9/01), or Market Squid Light Boat Logbook - DFG 149b (4/99) (9/01), which are incorporated by reference herein) provided by the department, as appropriate to the type of fishing activity. Logbook records shall be transmitted to the department on or before the 10th day of each month following the month that fishing activity occurred.

(c) Maximum Wattage. Each vessel fishing for squid or lighting for squid will shall utilize a total of no more than 30,000 watts of lights to attract squid at any time.

(d) Light Shields. Each vessel fishing for squid or lighting for squid will reduce the light scatter of its fishing operations by shielding the entire filament of each light used to attract squid and orienting the illumination directly downward, or providing for the illumination to be completely below the surface of the water. The lower edges of the shields shall be parallel to the deck of the vessel.

(e) Seasonal Harvest Guideline Catch Limitation. For the period from April 1 through March 31 of the following year, a total of not more than 125,000 118,000 short tons of market squid may be taken statewide by vessels permitted under Section 149.1 or 149.3, Title 14, CCR Section 8421 of the Fish and Game Code, with the fishery closure implemented as follows:

(1) The department shall estimate, from the current trend in landings, when the market squid harvest guideline catch limit will be reached, and will publicly announce the effective date of closure of the directed fishery on VHF/channel 16 between the hours of 10:00 p.m. and 12:00 a.m. (midnight). It shall be the responsibility of all operators of permitted market squid vessels to monitor VHF/channel 16 to determine when the harvest guideline catch limit is expected to be reached and the fishery closed. Any announcement issued or made by the department on VHF/channel 16 shall constitute official notice.

(2) Whenever the market squid harvest guideline catch limit has been reached, market squid may be taken for commercial purposes until April 1 through March 31 only pursuant to Section 8421(b) of the Fish and Game Code if the amount taken does not exceed two tons landed in a calendar day or if the squid taken is used for live bait only.

(f) Closed Times and Areas for Seabirds.

Market squid may not be taken for commercial purposes utilizing attracting lights in all waters of the Gulf of the Farallones National Marine Sanctuary. Boundaries of the Sanctuary are defined as those in effect on August 27, 2004, pursuant to Title 15, Code of Federal Regulations (CFR), Part 922, Subpart H. This regulation also applies to vessels pursuing squid for live bait purposes.

(g) Incidental Allowance. It is unlawful to take, land, or possess in excess of two tons of squid per trip or per calendar day except as authorized under a Market Squid Vessel Permit or a Market Squid Brail Permit as described in subsection 149.1(b) or Section 149.3, or for purposes of live bait only.

(h) Forfeiture. Squid landed or possessed in violation of the allowance specified in subsection (g) above shall be forfeited to the department by the signing of an official release of property form. The squid shall be sold or disposed of in a manner to be determined by the department. The proceeds from all sales shall be paid into the Fish and Game Preservation Fund.

(i) Use of Lights to Aggregate Squid. It is unlawful to attract squid by light except as authorized under permits described in Section 149.1(b) or Section 149.3. This regulation does not apply to seine skiffs of a permitted vessel, or to vessels pursuing squid for live bait purposes only.

(j) Citations for violations of this Section may be issued to the vessel operator, crewmembers, and/or the holder of a market squid permit issued pursuant to Section 149.1 or 149.3, Title 14, CCR.

NOTE:

Authority: Sections 7701, 7708, 7923, 8026, 8420.5, 8425 and 8429.5, Fish and Game Code. Reference: Sections 7701, 7708, 7923, 8026, 8420.5, 8425, 8429.5 and 8426 8429.7, Fish and Game Code.

Section 149.1, Title 14, CCR, is added to read:

149.1 Market Squid Fishery Restricted Access Program.

(a) Permit Required. On and after April 1, 2005, no person shall take, land, or attract squid by light for commercial purposes, except as provided in subsection 149(g), unless the owner of that vessel has a valid market squid permit for use on that vessel that has not been suspended or revoked.

(b) Classification of Permits and Permit Authorization.

(1) A Market Squid Vessel Permit authorizes the use of round haul gear, including purse seine, drum seine and lampara nets for commercial harvest. Use of brail gear, including dip and scoop nets, is also authorized. Lights may also be used as specified in regulation to aggregate squid for purposes of commercial harvest. No other gear is authorized under this permit to take or assist in the taking of market

squid for commercial purposes. Market Squid Vessel Permits are designated as either transferable or non-transferable as described in subsection (o) below.

(2) A Market Squid Brail Permit authorizes the use of brail gear including dip and scoop nets to take market squid for commercial purposes. Lights may also be used as specified in regulation to aggregate squid for purposes of commercial harvest. No other gear is authorized under this permit to take or assist in the taking of market squid for commercial purposes. Market Squid Brail Permits are designated as either transferable or non-transferable as described in subsection (o) below.

(3) A Market Squid Light Boat Permit authorizes only the use of lights as specified in regulation to aggregate squid for purposes of commercial harvest. No other gear is authorized under this permit to take or assist in the taking of market squid for commercial purposes. Market Squid Light Boat Permits are transferable as described in subsection (o) below.

(4) Only one market squid permit, regardless of the class of permit as described in subsections (b)(1), (2), and (3) above, may be issued per owner per vessel.

(c) Initial Issuance Criteria. Any person who is the registered owner of the vessel must provide current proof of vessel ownership at the time of application. Permits as described in subsection (b) shall be issued only to the following persons, partnerships or corporations based on qualifying criteria described in this subsection. Transferable permits shall be issued to owners where the vessel meets the specified initial issuance criteria for the class of permit. Non-transferable permits shall be issued only to individuals that meet the specified initial issuance criteria for the class of permit. During initial permit issuance, a permit must be placed only on a vessel that was licensed with a valid Market Squid Vessel Permit or a Market Squid Light Boat Owner's Permit in the 2004-05 permit year, and which must also be the vessel upon which the qualifying catches were made.

(1) Market Squid Vessel Permit – Transferable.

(A) A Transferable Market Squid Vessel Permit may be issued to an individual, partnership or corporation that is the owner of a commercial fishing vessel with a Market Squid Vessel Permit for the 2004-05 permit year that has been registered with the department pursuant to Fish and Game Code Section 7881 at the time of application, and

(B) the Market Squid Vessel Permit has not been suspended or revoked, and

(C) the vessel must have made at least 50 landings of market squid from January 1, 2000 through March 31, 2003 as documented by fish landing receipts submitted to the department in the vessel's name and identification number pursuant to Fish and Game Code Section 8046.

(D) Upon issuance of a transferable Market Squid Vessel Permit, additional squid fishery catch history associated with the vessel may not be used by any individual, partnership or corporation toward qualification for additional permits of any class.

(2) Market Squid Vessel Permit – Non-Transferable.

(A) A Non-Transferable Market Squid Vessel Permit may be issued to an individual that is the owner of a commercial fishing vessel with a Market Squid Vessel Permit for the 2004-05 permit year that has been registered with the

department pursuant to Fish and Game Code Section 7881 at the time of application, and

(B) the Market Squid Vessel Permit has not been suspended or revoked, and

(C) pursuant to Fish and Game Code Section 8101, the individual must have been licensed as a California commercial fisherman for at least 20 years at the time of application, and

(D) the individual has made at least 33 landings of market squid from the vessel licensed with a Market Squid Vessel Permit for the 2004-05 permit year as documented by fish landing receipts submitted to the department in the person's name and commercial fishing license identification number pursuant to Fish and Game Code Section 8046, prior to August 27, 2004. Only receipts that demonstrate catch aboard a vessel with a Market Squid Vessel Permit for the 2004-05 permit year that does not already qualify for issuance of a transferable Market Squid Vessel Permit under subsection (c)(1) of this section or a transferable Market Squid Brail Permit under subsection (c)(3) of this section or a transferable Market Squid Light Boat Permit under subsection (c)(5) of this section are valid for consideration.

(E) The department shall separately identify Non-Transferable Market Squid Vessel Permits issued under this section and those permits shall become null and void upon the death of the permit holder.

(3) Market Squid Brail Permit – Transferable.

(A) A Transferable Market Squid Brail Permit may be issued to an individual, partnership, or corporation that is the owner of a commercial fishing vessel that has been registered with the department pursuant to Fish and Game Code Section 7881 at the time of application, and

(B) have been issued a Market Squid Vessel Permit for the 2004-05 permit year for that vessel that has not been suspended or revoked, and

(C) the vessel must have made at least 10 landings of market squid with brail gear from January 1, 2000 through March 31, 2003 as documented by fish landing receipts submitted to the department in the vessel's name and identification number pursuant to Fish and Game Code Section 8046.

(D) Upon issuance of a transferable Market Squid Brail Permit, additional squid fishery catch history associated with the vessel may not be used by any individual, partnership or corporation toward qualification for additional permits of any class.

(4) Market Squid Brail Permit – Non- Transferable.

(A) A Non-Transferable Market Squid Brail Permit may be issued to an individual that is the owner of a commercial fishing vessel with a Market Squid Vessel Permit for the 2004-05 permit year that has been registered with the department pursuant to Fish and Game Code Section 7881 at the time of application, and

(B) the Market Squid Vessel Permit has not been suspended or revoked, and

(C) pursuant to Fish and Game Code Section 8101, the individual must have been licensed as a California commercial fisherman for at least 20 years at the time of application, and

(D) the individual has made at least 10 landings of market squid with brail gear from the vessel with a Market Squid Vessel Permit for the 2004-05 permit year as documented by fish landing receipts submitted to the department in the person's

name and commercial fishing license identification number pursuant to Fish and Game Code Section 8046, during any one permit year (April 1 through March 31 of the following year) from January 1, 2000 through March 31, 2003. Only receipts that demonstrate catch from a vessel with a Market Squid Vessel Permit for the 2004-05 permit year that does not already qualify for issuance of a transferable Market Squid Vessel Permit under subsection (c)(1) of this section or a transferable Market Squid Brail Permit under subsection (c)(3) of this section or a transferable Market Squid Light Boat Permit under subsection (c)(5) of this section are valid for consideration.

(E) The department shall separately identify Non-Transferable Market Squid Brail Permits issued under this section and those permits shall become null and void upon the death of the permit holder.

(5) Market Squid Light Boat Permit – Transferable.

(A) A Transferable Market Squid Light Boat Permit may be issued to an individual, partnership or corporation that is the owner of a commercial fishing vessel that has been registered with the department pursuant to Fish and Game Code Section 7881 at the time of application, and

(B) the individual, partnership or corporation must have been issued a Market Squid Vessel Permit or a Squid Light Boat Owner's Permit for the 2004-05 permit year for use on that vessel that has not been suspended or revoked, and

(C) the individual, partnership or corporation must have submitted to the department, pursuant to subsection 149(b) and Section 190, Title 14, CCR, at least one market squid light boat logbook form (DFG 149b) with fishing activity dated on or prior to December 31, 2000 for that vessel.

(6) Non-Transferable Market Squid Vessel Permits and Non-Transferable Market Squid Brail Permits may only be issued to individuals, and shall not be issued to partnerships or corporations, although the permit may be placed on a vessel which is owned by a partnership or corporation.

(d) Application Deadlines for Initial Permit Issuance. All applications [FG 1315 (8/04), incorporated by reference herein] and permit fees for initial issuance of Market Squid Vessel Permits, Market Squid Brail Permits, and Market Squid Light Boat Permits must be received by the department, or, if mailed, postmarked on or before June 30, 2005. Applications and permit fees for initial issuance of Market Squid Vessel Permits, Market Squid Brail Permits, and Market Squid Light Boat Permits received by the department, or, if mailed, postmarked from July 1 through July 31, 2005 will be assessed a $250 late fee, notwithstanding Fish and Game Code Section 7852.2. Applications and permit fees for initial issuance of Market Squid Vessel Permits, Market Squid Brail Permits, and Market Squid Light Boat Permits received by the department or postmarked after July 31, 2005 will be denied by the department and returned to the applicant.

(e) Initial Issuance Appeals. Any applicant who is denied initial issuance of a Market Squid Vessel Permit, Market Squid Brail Permit, or a Market Squid Light Boat Permit by the department pursuant to subsection (c) may appeal that denial to the commission in writing, describing the basis for the appeal. The appeal shall be received by the commission or, if mailed, postmarked within 60 days of the department's denial.

(f) Annual Permit Renewal.

(1) On and after April 1, 2006, Market Squid Vessel Permits, Market Squid Brail Permits and Market Squid Light Boat Permits will be issued annually by the department only to those persons who have held the same class of permit in the immediately preceding permit year.

(2) Upon the death of the individual to whom a Non-Transferable Market Squid Vessel Permit or Non-Transferable Market Squid Brail Permit is issued, the permit shall be considered null and void and permit renewal criteria specified in this subsection shall not apply.

(g) Application Deadlines for Annual Permit Renewal. All applications [FG 1315 (8/04), incorporated by reference herein] and permit fees for renewal of Market Squid Vessel Permits, Market Squid Brail Permits, and Market Squid Light Boat Permits must be received by the department, or, if mailed, postmarked on or before April 30 of each permit year. Applications and permit fees for renewal of Market Squid Vessel Permits, Market Squid Brail Permits, and Market Squid Light Boat Permits received by the department, or, if mailed, postmarked from May 1 through May 31 of each permit year will be assessed a $250 late fee, notwithstanding Fish and Game Code Section 7852.2. Applications and permit fees for renewal of Market Squid Vessel Permits, Market Squid Brail Permits, and Market Squid Light Boat Permits received by the department or postmarked after May 31 of each permit year will be denied by the department and returned to the applicant.

(h) Renewal Appeals. Any applicant who is denied renewal of a Market Squid Vessel Permit, Market Squid Brail Permit, or a Market Squid Light Boat Permit may appeal the denial to the department in writing describing the basis for the appeal. The appeal shall be received or, if mailed, postmarked no later than March 31 following the permit year in which the applicant last held a valid Market Squid Vessel Permit, Market Squid Brail Permit, or a Market Squid Light Boat Permit. The appeal shall be reviewed and decided by the department. The decision of the department may be appealed in writing to the commission within 60 days of the date of the department's written decision.

(i) Permit, Transfer and Upgrade Fees.

(1) The department shall charge an annual fee for a permit of each permit class as follows:

(A) Market Squid Vessel Permit – Transferable - two thousand dollars ($2,000).

(B) Market Squid Vessel Permit – Non-Transferable - one thousand dollars ($1,000).

(C) Market Squid Brail Permit – Transferable - two thousand dollars ($2,000).

(D) Market Squid Brail Permit – Non-Transferable - one thousand dollars ($1,000).

(E) Market Squid Light Boat Permit – Transferable - six hundred dollars ($600).

(2) The department shall charge a non-refundable fee of five hundred dollars ($500) for each permit transfer. If more than one permit is involved in the transfer based on provisions defined in subsection (o), a total of five hundred dollars ($500) dollars shall be charged for the transaction.

Subsection (i)(3) of Section 149.1 is added to read (renoticed on 22 March 2005):

(3) The department shall charge a non-refundable fee of one thousand five hundred dollars ($1,500) for each Market Squid Brail Permit Upgrade based on provisions defined in subsection (q).

(j) Permit Revocation, Suspension or Cancellation.

(1) Pursuant to Fish and Game Code Section 1052(b), a Market Squid Vessel Permit, Market Squid Brail Permit, or a Market Squid Light Boat Permit shall be revoked if false information is provided by the permittee to obtain or maintain the permit.

(2) A Market Squid Vessel Permit, Market Squid Brail Permit, or a Market Squid Light Boat Permit may be suspended, revoked, or cancelled by the commission upon conviction of a violation of regulations contained in Section 149, Title 14, CCR, or violation of the terms and conditions of the permit.

(k) Dissolution of Partnership or Corporation. If a transferable Market Squid Vessel Permit, Market Squid Brail Permit, or Market Squid Light Boat Permit is issued for a vessel that is owned by a bona fide partnership or corporation which becomes dissolved, the partnership or corporation shall notify the department of the name of the partner or shareholder who is the successor permitholder and the department shall reissue the permit to that partner or shareholder. Change of vessel ownership provisions defined in subsection (l) and transfer fees in subsection (i)(2) apply.

(l) Change of Vessel Ownership.

(1) If a transferable Market Squid Vessel Permit, Market Squid Brail Permit, or Market Squid Light Boat Permit is issued for a vessel that is owned by an individual or by a bona fide partnership or corporation, and the individual, bona fide partnership, or corporation transfers the title of ownership of the vessel to another entity, the original entity to which the permit is issued must notify the department of the change in ownership, and submit a non-refundable transfer fee of five hundred dollars ($500).

(2) Upon payment of fees, and surrender to the department of the original permit or permits, the department shall issue the applicable permit to the new owner of the vessel that is valid for the remainder of the fishing season. Gross tonnage endorsement provisions defined in subsection (n) below shall apply.

(3) Non-Transferable Market Squid Vessel Permits and Non-Transferable Market Squid Brail Permits which are issued to individuals shall not be transferred to a new owner. Sale or transfer of ownership of a vessel that is authorized to fish under a non-transferable market squid permit shall render the permit null and void.

(m) Capacity Goals.

(1) The capacity goal for transferable and non-transferable Market Squid Vessel Permits is 55.

(2) The capacity goal for transferable and non-transferable Market Squid Brail Permits is 18.

(3) The capacity goal for transferable Market Squid Light Boat Permits is 34.

(4) Should the number of Market Squid Vessel Permits, Market Squid Brail Permits, or Market Squid Light Boat Permits issued by the department fall below the capacity goal for that permit class, the commission may prescribe criteria for

issuance of additional permits of that class, which may include but is not limited to previous issuance of market squid vessel, brail or light boat permits, market squid catch or market squid logbook histories.

(n) Gross Tonnage Endorsement. Each Market Squid Vessel Permit or Market Squid Brail Permit shall be endorsed with the gross tonnage at the time of initial issuance. Any vessel owner transferring a Market Squid Vessel Permit or Market Squid Brail Permit shall also provide gross tonnage information for the replacement vessel as described below.

(1)The gross tonnage shall be determined as follows:

(A) If the owner of the vessel holds a Federal Coastal Pelagic Species Permit issued by the National Marine Fisheries Service for that vessel, the owner of the vessel shall submit a copy of the vessel owner's current valid Federal Coastal Pelagic Species Permit with the vessel's endorsed gross tonnage.

(B) If the owner of the vessel does not hold a Federal Coastal Pelagic Species Permit for the vessel, the gross tonnage will be determined by multiplying the length (L), breadth (B), and depth (D) of the vessel by 0.0067. Records of length, breadth, and depth used for determining gross tonnage will be those recorded on the vessel's United States Coast Guard documentation paper.

(2) The gross tonnage endorsement will remain in effect for the lifetime of each permit, regardless of the gross tonnage of a vessel to which it was transferred.

(3) In cases where a permit is transferred to a vessel with a smaller gross tonnage, the original gross tonnage endorsement will remain, and excess gross tonnage cannot be split out from the original permit endorsement for any purpose.

(4) In cases where two or more permits are transferred to a replacement vessel pursuant to guidelines in subsection (o), the replacement vessel shall be issued a transferable permit which reflects a gross tonnage endorsement which is recorded as either the sum of the gross tonnage endorsements from the original vessels, or the gross tonnage of the replacement vessel, whichever of the two values is less.

(o) Transfer of Permits to Replacement Vessels.

(1) Conditions for permit transferability as defined in this subsection shall provide the mechanism for achieving the capacity goals defined in subsection (m) of this Section over time.

(2) Definitions of Comparable Capacity.

(A) For purposes of permit transferability described in this subsection, two vessels are of comparable capacity if the gross tonnage, as defined in subsection (n) of this Section, of the replacement vessel is not in excess of ten percent greater than the gross tonnage of the originally permitted vessel [the replacement vessel's gross tonnage must be less than (the gross tonnage of the original vessel) plus (0.1 multiplied by the gross tonnage of the original vessel)].

(B) A replacement vessel shall be considered of comparable capacity in cases of permit transfers where the gross tonnage of the original vessel exceeds the gross tonnage of the replacement vessel by any amount. Gross tonnage endorsement provisions for the replacement vessel defined in subsection (n) shall apply.

(3) After August 31, 2005 the following conditions for transferability of permits to replacement vessels will be in effect for permits in each class as described:

(A) The owner of a vessel with a valid Transferable Market Squid Vessel Permit may transfer the permit to another person who is the owner of a replacement commercial fishing vessel of comparable capacity as defined in this subsection.
(B) If transfer is sought of a Transferable Market Squid Vessel Permit for a replacement commercial fishing vessel which is not of comparable capacity as defined in this subsection, one additional valid Transferable Market Squid Vessel Permit shall be transferred and surrendered to the department at the time of the transfer. Market Squid Vessel Permit transfers are not authorized in cases where the gross tonnage of the replacement vessel is not of comparable capacity to the sum of the gross tonnages of the two original vessels as defined above.
(C) A Transferable Market Squid Brail Permit issued to an individual, partnership or corporation may be transferred to another entity who is the owner of a replacement commercial fishing vessel of comparable capacity as defined in this subsection.
(D) A Transferable Market Squid Light Boat Permit issued to an individual, partnership or corporation may be transferred to another entity who is the owner of a replacement commercial fishing vessel.
(E) In the event of death of the holder of a Transferable Market Squid Vessel Permit, Transferable Market Squid Brail Permit, or a Transferable Market Squid Light Boat Permit, the estate must apply for transfer of the permit to another entity within one year of the permitholder's death.
(F) A Non-Transferable Market Squid Vessel Permit or a Non-Transferable Market Squid Brail Permit issued to an individual may not be transferred to another entity, but in the event the permitted vessel is lost, stolen or destroyed, or has suffered a major mechanical breakdown, the permit may be placed on a replacement vessel of comparable capacity as defined in subsection (m). A notarized, written request for transfer must be submitted, along with proof that the permitted vessel is lost, stolen, or destroyed in the form of a copy of the report filed with the United States Coast Guard or any other law enforcement agency or fire department investigating the loss. In the case of mechanical breakdown, the request shall include an estimate of the costs to repair the vessel from a marine surveyor or boat repair yard. The department shall not issue a permit for a replacement vessel pursuant to this subsection if the permitted vessel was reported lost, stolen, destroyed, or damaged for fraudulent purposes.
(4) The applicant for transfer must be the owner of a replacement commercial fishing vessel that has been registered with the department pursuant to Fish and Game Code Section 7881 at the time of application.
(5) A written request for transfer of a market squid permit of any class shall be submitted to the department by the owner of the replacement vessel in the form of a notarized letter, accompanied by the nonrefundable transfer fee and shall include a copy of the permit or permits which are being considered for transfer, current proof of vessel ownership, and gross tonnage information as described in subsection (n), if applicable.
(6) Any market squid permit holder intending to transfer a permit shall submit a notarized letter to the department setting forth the conditions of the sale, and shall

specify that the terms of the transfer as documented by the replacement vessel owner are valid and true.

(7) Upon determining that the applicant is qualified to transfer the permit to a replacement vessel, payment of all fees, and surrender to the department of the original permit or permits, the department shall issue the applicable permit to the owner of the replacement vessel that is valid for the remainder of the fishing season. Gross tonnage endorsement provisions defined in subsection (n) above shall apply.

(8) At the time the permit transfer is complete, vessels previously authorized to fish under conditions of a surrendered permit shall not take or attract squid for commercial purposes unless otherwise authorized in regulation or statute.

(p) Transfer Appeals. Any applicant who is denied transfer of a Market Squid Vessel Permit, Market Squid Brail Permit, or a Market Squid Light Boat Permit may appeal the denial to the department in writing describing the basis for the appeal. The appeal shall be received or, if mailed, postmarked within 60 days of the date of the department's denial. The appeal shall be reviewed and decided by the department. The decision of the department may be appealed in writing to the commission within 60 days of the date of the department's written decision.

Subsection (q) of Section 149.1 is added to read (renoticed on 22 March 2005):

(q) Market Squid Brail Permit Upgrade. Purchase of a Transferable Market Squid Brail Permit by a permittee who holds a Transferable Market Squid Light Boat Permit may occur with surrender of ~~(one-three) additional~~ the Transferable Market Squid Light Boat ~~Permits~~ Permit.

(1) An application for upgrade to a Market Squid Brail Permit shall be submitted to the department by the market squid light boat permittee in the form of a notarized letter, and shall include a copy of the ~~[permit] *or* [permits]~~ permit which ~~are~~ is being sought for surrender, current proof of vessel ownership, and gross tonnage information as described in subsection (n).

~~(2) Any market squid permit holder intending to transfer a permit shall submit a notarized letter to the department setting forth the conditions of the transfer, and shall specify that the terms of the transfer as documented by the vessel owner seeking the upgrade are valid and true.~~

~~(3)~~ (2) Upon determining that the applicant is qualified to upgrade the permit, payment of all fees, and surrender to the department of the original ~~permits~~ permit, the department shall issue the replacement permit that is valid for the remainder of the fishing season. Gross tonnage endorsement provisions defined in subsection (n) above shall apply.

~~(4) At the time the permit upgrade is complete, vessels previously authorized to fish under conditions of a surrendered permit shall not take or attract squid for commercial purposes unless otherwise authorized in regulation or statute.~~

Subsection (r) of Section 149.1 is added to read (renoticed on 22 March 2005):

(r) Market Squid Brail Permit Upgrade Appeals. Any applicant who is denied upgrade of a Transferable Market Squid Light Boat Permit to a Transferable Market Squid Brail Permit may appeal the denial to the department in writing

describing the basis for the appeal. The appeal shall be received or, if mailed, postmarked within 60 days of the date of the department's denial. The appeal shall be reviewed and decided by the department. The decision of the department may be appealed in writing to the commission within 60 days of the date of the department's written decision.

NOTE:

Authority: Sections 7071, 7078, 7923, 8026, 8425, 8428 and 8429.5, Fish and Game Code. Reference: Sections 7050, 7071, 7701, 7708, 7923, 8026, 8081, 8425, 8428, 8429.5 and 8429.7, Fish and Game Code.

Section 149.3, Title 14, CCR, is added to read:

149.3 Experimental Market Squid Vessel Permits

(a) The commission may issue 3 Non-Transferable Market Squid Vessel Permits as described in Section 149.1 to any individual for placement on any vessel for purposes of developing a squid fishery in areas previously not utilized for squid production.

(b) Excepting initial issuance provisions defined in Section 149.1(c), terms and conditions of Section 149.1 apply in entirety to permits issued pursuant to this Section.

(c) Individuals issued permits pursuant to this Section are subject to all commercial squid fishing regulations defined in Section 149, Title 14, CCR.

(d) Market Squid Vessel Permits issued pursuant to this Section may be suspended, revoked, or cancelled by the commission upon conviction of a violation of regulations contained in Section 149, Title 14, CCR, or violation of the terms and conditions of the permit.

NOTE:

Authority cited: Sections 7071 and 8425, Fish and Game Code. Reference: Sections 7070, 7071, 7075, 7078, 7083

Section 4:

Response to Public Comment on the

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Section 4
Response to Public Comment on
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1.1 Comments and Department Responses in the Final Statement of Reasons for Regulatory Action (dated 15 December 2004)

Table 1-1 Summary of public comment and responses presented in the Final Statement of Reasons for Regulatory Action (revised 22 March 2005).

Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Robert Zuanich, Executive Director, Purse Seine Vessel Owners Association (PSVOA)	letter dated 27 August 2004 (similar to comment in letter dated 4 May 2004)	C-1. The PSVOA supports criteria for initial issuance that qualifies persons possessing a current valid permit and who made at least 50 landings between 1 January 1990, to 31 March 2003, or who fall under the 20 year grandfather provision.	Based on industry recommendations and the need to reduce the current market squid fleet size, the Commission chose the following criteria for the initial issuance of transferable market squid vessel permits: (1) made at least 50 landings during the window period 1 January 2000 – 31 March 2003, and (2) the possession of a current 04/05 market squid vessel permit. For the issuance of non-transferable market squid vessel permits, the Commission chose the following criteria: (1) made at least 33 landings with no window period, (2) the possession of a current 04/05 market squid vessel permit, and (3) the possession of a California Commercial Fishing License for at least 20 years.

Table 1-1 Summary of public comment and responses presented in the Final Statement of Reasons for Regulatory Action (revised 22 March 2005).			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Robert Zuanich, Executive Director, PSVOA	letter dated 27 August 2004 (similar to comment in letter dated 4 May 2004)	C-2. The PSVOA proposes that a reduced number of vessel permits and ultimate capacity goal be implemented over a 3-5 year period utilizing the following: (1) permit holders may move to larger capacity vessels, which will require ownership of a second permit and absorption of potential latent permits, (2) establish a relatively high permit fee that will discourage ownership for speculative purposes, (3) impose ongoing landing requirements as condition of renewing the permit, and (4) re-evaluate the limited entry program in 2007 to determine if the program is achieving capacity goal objectives.	(1) Based on the initial issuance criteria the Commission selected (see C-1) and a capacity goal of 55 market squid vessels, the Commission adopted the Department's recommendation of Option K.3, which establishes full transferability of market squid vessel permits based on comparable capacity (within 10 percent) and also establishes transferability of market squid vessel permits to a vessel of larger capacity under a "2 for 1" permit retirement. Option K.3 will prevent an increase in fleet capacity while allowing new vessels to enter the fishery. It will also provide for an orderly fishery, promote conservation among fishery participants, and maintain the long-term economic viability of the fishery. (2) While the Commission could have selected an annual permit fee between $400 and $5,000 to cover the FMP's anticipated annual implementation cost of $954,000, it balanced the financial needs of the Department against the impact to commercial fishermen and set the annual fees for vessel permits at: (1) $2,000 for transferable market squid vessel permits, and (2) $1,000 for non-transferable market squid vessel permits. (3) The regulations did not provide an option within restricted access that would impose ongoing landing requirements as a condition of renewing a permit. The Department did not support this concept because it would encourage fishing effort that may not otherwise happen. (4) It is the Commission's policy that each restricted access program be reviewed at least every four years, and if appropriate, revised to ensure that it continues to meet the objectives of the State and the fishery participants. The MLMA requires a review of each marine fishery every four years. (FGC §7065(a).)

Table 1-1 Summary of public comment and responses presented in the Final Statement of Reasons for Regulatory Action (revised 22 March 2005).			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Robert Zuanich, Executive Director, PSVOA	letter dated 27 August 2004 (similar to comment in letter dated 4 May 2004)	C-3. PSVOA maintains that permits established under either criterion (see C-1) should be fully transferable; however, this approach does not accelerate an ultimate capacity goal. For this reason, PSVOA would support an alternative that made grandfathered permits non-transferable.	See response to C-1 and C-2(1).
Robert Zuanich, Executive Director, PSVOA	letter dated 27 August 2004 (similar to comment in letter dated 4 May 2004)	C-4. PSVOA supports the DFG limited entry criteria for light boat permits provided that criteria is supplemented to provide for an equal number of vessel and light boat permits. Therefore, current vessel permit holders who do not qualify for a vessel permit on or after 1 April 2004, should qualify for a light boat permit based on total landings between 1 January 1990, and 31 December 2002.	The Commission adopted a market squid vessel capacity goal of 55 and a brail capacity goal of 18 for both transferable and non-transferable permits. The Commission also adopted a capacity goal of 34 for transferable light boat permits. This will allow a moderately productive and specialized fleet and would be less disruptive in terms of displacing vessels from the fishery and, thus, reduce impacts on fishing communities. PSVOA's recommendation for "supplemental vessels" was outside the scope of the regulatory options provided for the Commission's consideration. Moreover, the Department proposed only the use of logbook records to demonstrate participation in the fishery by light boats, given that light boats do not actually land fish unless it is by brail.

Table 1-1 Summary of public comment and responses presented in the Final Statement of Reasons for Regulatory Action (revised 22 March 2005).			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Robert Zuanich, Executive Director, PSVOA	letter dated 27 August 2004 (similar to comment in letter dated 4 May 2004)	C-5. PSVOA supports an 118,000 seasonal catch limit based on a recent three year average catch.	The Commission adopted a seasonal catch limit of 118,000 short tons (Option A.2) but directed the Department to re-evaluate the catch limit in two years because of concerns for the lack of knowledge regarding squid stock abundance. Although there is little information to indicate whether the fishery is or is not sustainable at the higher catch levels experienced since the mid-1990's, as a precautionary measure, it is prudent not to allow landings to expand beyond present levels without better methods to assess the status of the resource. Regional catch limits were not adopted by the Commission for two reasons. First the smaller fishery in the northern region is not preempted by the catch in the southern region so continuing with a statewide limit does not create a "race for fish". The northern fishery typically harvests squid from April through September while the southern fishery does not begin catching squid until October. Second, from a biological perspective, squid harvested in the northern and southern fisheries are identical. No scientific information to date suggests that squid from southern and northern fisheries are from genetically distinct stocks. Their lengths, weights, and sex ratios are similar between regions. Although spawning peaks are at different times of the year for these regions, the temperature and depth of egg deposition is comparable between regions.
Robert Zuanich, Executive Director, PSVOA	letter dated 27 August 2004 (similar to comment in letter dated 4 May 2004)	C-6. PSVOA supports trip limits to improve quality, price stability, and capacity goal objectives. If not imposed in the initial MSFMP, then it should be a focus item for the Advisory Committee.	The Commission chose not to establish daily trip limits at this time. The Department did not recommend the establishment of daily trip limits because the seasonal harvest limit had not been taken in recent years; therefore, there was not a race between vessels to land the allowable limit in as short of time as possible. Furthermore, fish processors implement their own trip limits as needed to regulate the amount of squid delivered per day.

Table 1-1 Summary of public comment and responses presented in the Final Statement of Reasons for Regulatory Action (revised 22 March 2005).			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Robert Zuanich, Executive Director, PSVOA	letter dated 27 August 2004 (similar to comment in letter dated 4 May 2004)	C-7. PSVOA supports continued statewide closure of the fishery from noon Friday to noon Sunday.	The Commission chose to continue closures from noon Friday to noon Sunday from the U.S.-Mexico border to the California-Oregon border. The statewide weekend closure is an environmentally protective, precautionary measure to provide spawning squid at least two consecutive nights each week respite from fishing pressure.
Robert Zuanich, Executive Director, PSVOA	letter dated 27 August 2004 (similar to comment in letter dated 4 May 2004)	C-8. PSVOA opposes the setting aside of additional areas for harvest replenishment. Current and potential new set asides under the Marine Life Protection Act, weekend closures, and further restriction of vessel permits will provide ample resource protection.	The Commission decided to leave general habitat and harvest replenishment closures to the MPA process under the MLPA; however, they did choose to establish a seabird closure restricting the use of attracting lights for commercial purposes in any waters off the Gulf of the Farallones National Marine sanctuary as currently described/defined on 27 August 2004. The 12 MPAs at the northern Channel Islands include known commercial squid fishing sites at Santa Barbara, Anacapa, Santa Cruz, and Santa Rosa islands. Approximately 14-19 percent of prior Southern California squid catches were in areas that are now permanently off-limits to squid fishing. In addition to the closures at the northern Channel Islands, commercial fishermen are not allowed to fish in state designated ecological reserves using roundhaul nets. Several existing reserves are known to be market squid spawning sites (e.g., Carmel Bay Ecological reserve, Point Lobos Ecological reserve, northeast side of Santa Catalina Island, and Santa Monica Bay); all serve as harvest replenishment areas for market squid.
Robert Zuanich, Executive Director, PSVOA	letter dated 27 August 2004 (similar to comment in letter dated 4 May 2004)	C-9. PSVOA supports relatively high and uniform fees to reach capacity goal objectives and fund necessary DFG research.	See response to C-2(2).

Table 1-1 Summary of public comment and responses presented in the Final Statement of Reasons for Regulatory Action (revised 22 March 2005).			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Robert Zuanich, Executive Director, PSVOA	letter dated 27 August 2004 (similar to comment in letter dated 4 May 2004)	C-10. PSVOA does not believe that the Department's options adequately address the issue of gear restrictions. They maintain that vessels could utilize more environmentally benign fishing gear without sacrificing efficiency or productivity, and the issue should be a focus item for the Advisory Committee.	Comment noted. FGC §8606 provides for the development and testing of experimental gear independent of this FMP. Net restrictions do not clearly address a specific management need or goal and would be very program-intensive to enforce. The combination of MPAs, weekend closures, a seasonal catch limit, and a restricted access program is more effective in minimizing fishery impacts, resulting in reduced fishing effort on specific spawning aggregations and in other sensitive locations. Also, the Department is generally reluctant to recommend or develop a management measure without identifying an anticipated benefit of such a measure. However, the advisory committee is the correct entity for future evaluation of such a comment.
Robert Zuanich, Executive Director, PSVOA	letter dated 27 August 2004 (similar to comment in letter dated 4 May 2004)	C-11. PSVOA supports establishment of a broad based advisory committee which could work in concert with the PFMC advisory committee for other coastal pelagic species.	The Commission adopted the establishment of one advisory committee for the squid fishery, which includes scientific, environmental, and industry representatives.
Ernest S. Pagan, market squid light boat operator	verbal testimony provided to Commission dated 4 May 2004 (similar to comment in letter dated 3 May 2004)	C-12. Does not support a qualifying time period for light boat permits of January 1, 2000, to December 31, 2002. The window period for limited entry should be extended to include new participants.	Taking into consideration the need to reduce the current market squid fleet size, the Commission chose the following criteria for the initial issuance of transferable market squid light boat permits: (1) submitted at least one market squid light boat logbook from dated on or prior to December 31, 2000, and (2) the possession of a current 04/05 market squid vessel permit.
Ernest S. Pagan, market squid light boat operator	verbal testimony provided to Commission dated 4 May 2004 (similar to comment in letter dated 3 May 2004)	C-13. The proposed permit fee of $5,000 is too high especially for those vessel types with limited landing capability.	See response to C-2(2).

Table 1-1 Summary of public comment and responses presented in the Final Statement of Reasons for Regulatory Action (revised 22 March 2005).			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Ernest S. Pagan, market squid light boat operator	verbal testimony provided to Commission dated 4 May 2004	C-14. Supports Option A.6, which does not set a seasonal catch limitation.	See response to C-5.
Diane Pleschner-Steele, California Wetfish Producers Association (CWPA)	verbal testimony provided to Commission dated 4 May 2004	C-15. Supports the goals and objectives of the MSFMP.	Comment noted.
Diane Pleschner-Steele, CWPA	verbal testimony provided to Commission dated 4 May 2004	C-16. Does not support the proposed permit fee of $5,000 because the money will not go towards squid research.	See response to C-2(2).
Diane Pleschner-Steele, CWPA	verbal testimony provided to Commission dated 4 May 2004	C-17. Does not support the general habitat closure north of Pillar Point (Option Q.3) because the mobile nature of the squid resource requires flexibility for the fishermen.	See responses to C-8.
Donald Brockman, California Squid Fishermen's Association	verbal testimony provided to Commission dated 27 August 2004 (similar to verbal testimony provided at the San Pedro Special Hearing dated 13 August 2004 and to Commission dated 4 May 2004)	C-18. Does not support the proposed permit fee of $5,000 because it would be a hardship to fishermen. Would support a permit fee of around $1,000 and an increase in the landing tax.	Changing landing taxes requires legislative action. Also, see response to C-2(2).

Table 1-1 Summary of public comment and responses presented in the Final Statement of Reasons for Regulatory Action (revised 22 March 2005).			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Donald Brockman, California Squid Fishermen's Association	verbal testimony provided to Commission dated 27 August 2004 (similar to verbal testimony provided at the San Pedro Special Hearing dated 13 August 2004 and to Commission dated 4 May 2004)	C-19. Does not support additional harvest replenishment and area and time closures.	See responses to C-8.
David Couch, San Diego fisherman	verbal testimony provided to Commission dated 4 May 2004	C-20. Author's comment mirrors C-18.	See response to C-2(2).
David Couch, San Diego fisherman	verbal testimony provided to Commission dated 4 May 2004	C-21. Does not support Department's preferred alternative, Option K.3, which establishes transferability of market squid permits to a vessel of larger capacity under a "2 for 1" permit retirement.	See response to C-2(1).
Frank J. Hestor, PhD, consultant to California Wetfish Producers Association (CWPA)	verbal testimony provided to Commission dated 4 May 2004 (similar to comment in letter dated 22 April 2004)	C-22. At this time, supports the combination of the proposed cap on landings, at the level recommended by the Department, and continued monitoring of egg escapement.	See response to C-5. The Commission chose to monitor the fishery through the egg escapement method while pursuing a biomass estimate of market squid at an egg escapement threshold level required in the CPS FMP.

Table 1-1 Summary of public comment and responses presented in the Final Statement of Reasons for Regulatory Action (revised 22 March 2005).			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Frank J. Hestor, PhD, consultant to California Wetfish Producers Association (CWPA)	verbal testimony provided to Commission dated 4 May 2004 (similar to comment in letter dated 22 April 2004)	C-23. Does not support the general habitat closure north of Pillar Point (Option Q.3) because (1) squid is only one of a complex mix of forage animals; therefore, there is ample forage available despite the growth of the squid fishery in recent years and (2) the economic impact of the preferred option could be greater than the FMP suggests because the use of a long-term average of landings from north of Pillar Point down-weights the value of the recent catch.	See response to C-8. (1) As part of the 1997 Legislation enacted to protect the market squid resource, the Department was directed to determine where there are areas, if any, that should be declared harvest replenishment areas. Harvest replenishment and general habitat closures provide for specific areas where no squid fishing can occur and provide areas of uninterrupted spawning. In addition, general habitat closures are intended to prevent squid fishery interactions in areas that have not been traditionally utilized for commercial squid fishing and where there is the potential for interactions with non-targeted species such as salmon, seabirds, and marine mammals. (2) The speaker is correct that the value of recent catch is down-weighed when an average over many years is taken. However, if catches occurred in only one of the past six years in any magnitude, it is not reasonable to expect that a vessel would come to rely on the ability to make that catch in the future. Department catch data indicate that catches in 2003 north of the Monterey area were anomalous and unprecedented. While it is possible they may be repeated in some future years, the Department considered this loss in terms of future opportunity for expansion into these areas, rather than a loss of an area that has been historically productive.

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Frank J. Hestor, PhD, consultant to California Wetfish Producers Association (CWPA)	verbal testimony provided to Commission dated 4 May 2004 (similar to comment in letter dated 22 April 2004)	C-24. Does not support the Department's preferred alternative, Option R.4., which establishes area and time closures restricting the use of attracting lights around Anacapa and Santa Barbara islands from February through September, because the need for this action is not well supported by published literature.	See response to C-8. Option R was selected as a recommended precaution by the Department considering the best scientific information that was available without substantially delaying the preparation of the plan. (FGC § 7072(b).) However, as recognized by the market squid legislation, information on this resource is limited, and the FMP addresses this with a research and monitoring component. As knowledge increases or additional management needs become apparent, the FMP will allow the Commission to react quickly to changes in the status of the resource or the fishery. The Department also supports efforts by other agencies or researchers to measure noise and other activities to determine if the squid fishery is impacting seabird colonies in the Channel Islands.
Frank Bertoni, commercial fisherman	verbal testimony provided to Commission 27 August 2004 (similar to comment in letters dated 22 April 2004 and 2 June 2004)	C-25. Does not support the Department's preferred alternative, Option Q.3, which closes the waters north of Pillar Point to commercial squid fishing.	See responses to C-8 and C-23.
Frank Bertoni, commercial fisherman	letter dated 2 June 2004 (similar to comment in letter dated 22 April 2004)	C-26. Does not support the proposed permit fee of $5,000 because it eliminates the small market squid fishermen. Instead, the author would like to increase the squid landing fee from $3.75 per ton to $20.00 plus per ton.	See response to C-2(2).
Frank Bertoni, commercial fisherman	letter dated 2 June 2004 (similar to comment in letter dated 22 April 2004)	C-27. Does not support restricted access.	Comment noted. The possibility of a restricted access program was contemplated by the Legislature in the market squid legislation, as well as in the MLMA. (FGC §§7082(b), 8420(e), 8426(c).)

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Hannah Nevins, seabird biologist	letter dated 4 May 2004	C-28. Supports Option A.3, which establishes regional season catch limitations based on a multi-year recent average catch for each region, especially if it takes into consideration an environmentally-dependent model, such as based on upwelling indices or sea surface temperatures. The preferred option (Option A.2) does not take into account environmental variability. Would like to modify the tonnage limit by consumption estimates for marine birds and mammals.	See response to C-5. Based on the best scientific information, Option A.2 takes into account the level of fishing effort and ecological factors, including, but not limited to, the species' role in the marine ecosystem and oceanic conditions. (FGC §§7050(b)(5), 7072(b), 8425(a).) The Department supports a harvest policy which assumes that the stock is above B_{MSY} because available data indicate that squid continue to serve as a primary source of forage even at times when the fishery is also utilizing the resource. For example, because squid continue to comprise a substantial portion of the diet of California sea lions during times that the fishery is landing high volumes of squid, there is no evidence to indicate that the squid resource is limited and not fulfilling its role as a forage item even during the heaviest times of fishery utilization. Therefore, it does not appear that any adjustment to the allowable catch level is needed to quantitatively reserve some amount of the resource for use as forage until there is a viable estimate of the squid population size and a viable estimate of the total amount of squid consumed by predators.
Hannah Nevins, seabird biologist	letter dated 4 May 2004	C-29. Supports the establishment of a fishery observer program to document potential effects on sensitive wildlife, particularly marine birds and mammals.	Currently, vessel owners or operators in the California purse seine fisheries are subject to the federal observer program under the Marine Mammal Protection Act (MMPA) and the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA). In June 2004, vessel owners and operators received notice from NMFS stating that a mandatory observer program had been instated. Under this program, observers will collect data on the interactions between California purse seine fishing gear and protected species, particularly marine mammals, sea turtles, and sea birds as well as target and non-target fish species.

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Hannah Nevins, seabird biologist	letter dated 4 May 2004	C-30. (1) There should be a limit to the number of light boats per seiner, or (2) the total wattage should account for all boats within a given time.	(1) The Commission adopted a market squid vessel capacity goal of 55 and a brail capacity goal of 18 for both transferable and non-transferable permits. The Commission also adopted a capacity goal of 34 for transferable light boat permits. This will allow a moderately productive and specialized fleet and would be less disruptive in terms of displacing vessels from the fishery and, thus, reduce impacts on fishing communities. (2) Limiting the total wattage emitted by the fleet at any given time is not feasible as a management measure. Outside of weekend closure and proposed seasonal closure restrictions, the Department does not specify when or how many vessels may engage in squid fishing or lighting at a particular time, nor is there any reasonable way to track such information.
Hannah Nevins, seabird biologist	letter dated 4 May 2004	C-31. Replenishment areas should be set aside in southern, central and northern California. (1) Establish replenishment areas within known spawning areas, and (2) establish replenishment areas that are also important for marine bird and mammal foraging (i.e. northern Monterey Bay, Gulf of the Farallones).	See response to C-8.

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Hannah Nevins, seabird biologist	letter dated 4 May 2004	C-32. None of the proposed alternatives offer uniform protection to all sensitive seabird nesting habitats. Option R.4 should be extended to include a buffer zone (one nm) applied to all seabird colonies, including the Channel Islands, Big Sur, Gulf of the Farallones, and Pt. Reyes. The time of closure should also be extended to 30 November to avoid potential light-related mortality of fledgling chicks and adult ashy storm-petrels (Option R.10).	See response to C-8. The seasonal closures were designed to provide various levels of protection to multiple seabird species which may have reduced, threatened, or endangered population levels. The Department did not provide a specific option that would close all the seabird colonies of the Channel Islands or an option that would close Big Sur; however, if new information becomes available, additional closures (or openings) can be considered.
Daniel L. Williams, commercial fisherman	verbal testimony provided to Commission dated 27 August 2004 (similar to comment in letter dated 7 June 2004)	C-33. Currently, there is a need for light boats in the fishery because many of the seiners do not have a light boat to work with to their consternation. As a full-time fisherman for the past 24 years, the author would like to see a similar non-transferable or transferable permit option for the light boat permit.	See response to C-30(1). Taking into consideration the need to reduce the current market squid fleet size, the Commission chose the following criteria for the initial issuance of a non-transferable market squid brail permit: (1) have been a California Commercial Fishermen for at least 20 years, and (2) made at least 10 brail landings in a single fishing season between 1 January 2000, and 31 March 2003. Under the 20-year fishermen provision, landing data maintained by the Department is an appropriate basis for documenting fishery participation (FGC § 8101). Because the Department cannot verify historical participation by an individual in the squid light boat fishery before 1999 by evaluating landing receipts, there was no provision in the restricted access options to issue 20-year fishermen non-transferable light boat owner permits. At this time, light boat logs are the only uniform method available to the Department for evaluating prior performance in the light boat fishery.

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David W. Tibbles, commercial fisherman	letter dated 11 May 2004	C-34. Would like clarification on the initial issuance of market squid vessel permits based on the 20-year fishermen provision.	Based on industry recommendations and the need to reduce the current market squid fleet size, the Commission chose the following criteria for the issuance of a non-transferable market squid vessel permit: (1) made at least 33 landings with no window period, (2) the possession of a current 04/05 market squid vessel permit, and (3) the possession of a California Commercial Fishing License for at least 20 years.
Richie Aiello, vessel owner	verbal testimony provided at the Monterey Special Hearing dated 23 July 2004	C-35. Monterey boats were forced to fish other areas due to the large number of vessels fishing in such a small area. They historically looked above Pigeon Pt, but they normally did not have to fish the area.	Comment noted.
Richie Aiello, vessel owner	verbal testimony provided at the Monterey Special Hearing dated 23 July 2004	C- 36. Many bought permits as real estate with no intention of fishing.	Comment noted.
Orlando Amoroso, President, Southern California Commercial Fishing Association (SCCFA)	verbal testimony provided to Commission dated 27 August 27 (similar to verbal testimony provided at the Monterey Special Hearing dated 23 July 2004)	C-37. Need clear grandfather criteria. Would also like to see a list of the qualifying boats and a list of proposed grandfather boats.	See response to C-33 and C-34. The Department cannot release the names of fishermen who would qualify for the restricted access program because public disclosure of the names is prohibited under Fish and Game Code section 8022(a).
Joe Capuccio, processor	verbal testimony provided at the Monterey Special Hearing dated 23 July 2004	C-38. There will be a federal observer program soon. Use their information as a supplement to documented research.	Comment noted. The observer data will be made available to the Department and, if applicable, will be used for future management and research needs. Also, see response to C-29.

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Joe Capuccio, processor	verbal testimony provided at the Monterey Special Hearing dated 23 July 2004	C-39. There are fewer boats fishing now than when the MSFMP began. Times are different and new rules should apply.	Comment noted.
Joe Capuccio, processor	verbal testimony provided at the Monterey Special Hearing dated 23 July 2004	C-40. Increased fees will cripple small boats and allow for large corporate owned boats to take over.	See response to C-2(2).
Joe Capuccio, processor	verbal testimony provided at the Monterey Special Hearing dated 23 July 2004	C-41. Wants to know if anyone has considered the impacts of an exploding marine mammal population on squid.	Comment noted. The best available data indicate that squid continue to serve as a primary source of forage even at times when the fishery is also utilizing the resource. Squid comprise a substantial portion of the diet of California sea lions during times that the fishery is landing high volumes of squid. There is no evidence to indicate that the squid resource is limited and not fulfilling its role as a forage item even as sea lion populations continue to grow at a rate of approximately 5 percent per year. The Department acknowledges that squid is an important source of prey for many species as identified in the Predator/Prey relationship section (Section 2.1.6) of the MSFMP.
David Crabbe, vessel owner and representative for the Monterey squid fleet	verbal testimony provided to Commission dated 27 August 27 (similar to verbal testimony provided at the Monterey Special Hearing dated 23 July 2004)	C-42. Proposes the following qualifying period for initial issuance of market squid vessel permits: made at least 50 landings between January 2000 and March 2003 and hold a 04/05 market squid permit.	See response to C-1.
David Crabbe, vessel owner and representative for the Monterey squid fleet	verbal testimony provided at the Monterey Special Hearing dated 23 July 2004	C-43. There should be an appeals process. This will allow markets to keep most of their boats, and current active boats would qualify.	Initial issuance appeals are provided for in the regulations (Section 149.1(e), Title 14, CCR).

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David Crabbe, vessel owner and representative for the Monterey squid fleet	verbal testimony provided at the Monterey Special Hearing dated 23 July 2004	C-44. Proposed $5,000 fee is too high. This will increase overhead costs, create hardship, and eliminate boats.	See response to C-2(2).
David Crabbe, vessel owner and representative for the Monterey squid fleet	verbal testimony provided at the Monterey Special Hearing dated 23 July 2004	C-45. The proposed weekend closure (District 16) (Option D.5) is to give fishermen and processors a break, which prevents 24 hour fishing activity. The proposal was not conceived as a conservation measure.	See response to C-7.
David Crabbe, vessel owner and representative for the Monterey squid fleet	verbal testimony provided to Commission dated 27 August 2004 (similar to verbal testimony provided at the San Pedro Special Hearing dated 16 August 2004 [presented by Don Brockman])	C-46. Does not support the closure north of Pillar Point (Option Q.3). Fishermen are willing to fish around the Farallon Islands with no lights.	See responses to C-8 and C-23.
Ernest Pagan, market squid light boat operator	verbal testimony provided at the Monterey Special Hearing dated 23 July 2004	C-47. Have a 60-year age exemption to get permit if don't qualify under initial issuance.	The Commission chose to use prior participation in the squid fishery instead of age as criteria for the initial issuance of squid permits. However, provisions of FGC §8101 specify that any licensed 20-year California Commercial fisherman is eligible to participate in the first year of a newly established limited entry program provided there is demonstration of one season of prior participation in the fishery. Also, see responses to C-33 and C-34.
Ernest Pagan, market squid light boat operator	verbal testimony provided at the Monterey Special Hearing dated 23 July 2004	C-48. Wants to know how the grandfather clause will work for light boats that fished prior to when logs were required.	See response to C-33.

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Diane Pleschner-Steele, CWPA	verbal testimony provided at the Monterey Special Hearing dated 23 July 2004	C-49. Closure options should be based upon evidence.	Comment noted. The Harvest Replenishment/General Closure Areas (Option Q) and the Area and Time Closures to Address Seabird Issues (Option R) were presented in the FMP using the best scientific information that was available without substantially delaying the preparation of the plan. (FGC § 7072(b).) However, as recognized by the market squid legislation, information on this resource is limited, and the FMP addresses this with a research and monitoring component. As knowledge increases or additional management needs become apparent, the FMP will allow the Commission to react quickly to changes in the status of the resource or the fishery. Also, see response to C-8.
Diane Pleschner-Steele, CWPA	verbal testimony provided at the Monterey Special Hearing dated 23 July 2004	C-50. Fishermen and processors can't agree on fleet size. Fishermen want fewer boats and processors want more boats. Processors would like around 70 vessels with a limited number of grandfather permits.	See response to C-1 and C-2(1).
William J. Sydeman, Director Marine Ecology Division, PRBO Conservation Science	e-mail dated 6 August 2004	C-51. The cap (118,000 tons) proposed by the Department (Option A.2) is biased high because it reflects catch during three very productive years (1999-2002). The use of a limited time series to estimate LTPY is a flawed approach. Therefore, the squid fishery must be managed adaptively by establishing seasonal catch limitations based on environmental conditions.	See response to C-5. The Department agrees that it would be ideal to base the catch limit on environmental conditions (i.e., El Niño) to prevent overfishing. However, current scientific modeling cannot reliably predict either environmental conditions or their effect on living marine organisms. El Niño Southern Oscillations (ENSO) events are a highly variable phenomenon, lasting from 12-18 months, and the time between events ranges from two to seven years. In addition, the strength of the warming events varies greatly from event to event. Limiting the fishery based on an unpredictable phenomenon would likely have no impact on the resource because the low availability of squid significantly reduces fishing effort.

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William J. Sydeman, Director Marine Ecology Division, PRBO Conservation Science	e-mail dated 6 August 2004	C-52. The Department's preferred Option Q.3 closes the fishery north of Pillar Point. This is appropriate to protect the ecosystem of the Gulf of the Farallones/Cordell Bank National Marine Sanctuaries but places great pressure on squid resources of the southern California Bight.	See responses to C-8 and C-23.
Julie A. Thayer, Ph.D. candidate, Marine Ecology Division, PRBO Conservation Science	letter dated 12 August 2004	C-53. Author's comment mirrors C-51.	See response to C-51.
Julie A. Thayer, Ph.D. candidate, Marine Ecology Division, PRBO Conservation Science	letter dated 12 August 2004	C-54. Squid are central prey for marine birds and mammals as well as for recreationally and commercially valuable predatory fish populations in the California Current System. As mandated by the Marine Life Management Act and Magnuson-Stevens act, management of the market squid fishery must be based on an ecosystem perspective. This means that the needs of ecologically dependent species must be taken into account when setting fishery quotas and producing other regulatory actions.	See responses to C-5, C-8, and C-41.

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Julie A. Thayer, Ph.D. candidate, Marine Ecology Division, PRBO Conservation Science	letter dated 12 August 2004	C-55. Supports Option E.1, which continues the existing squid monitoring program. Additionally, recommends a monitoring program for non-target species to assess ecological consequences of implemented regulations.	Taking into consideration the need to monitor the fishery to improve the development of management models, the Commission decided to maintain the current port sampling and logbook requirements.
Julie A. Thayer, Ph.D. candidate, Marine Ecology Division, PRBO Conservation Science	letter dated 12 August 2004	C-56. Supports Option B.1, which monitors the fishery through the egg escapement methods while pursuing a biomass estimate of market squid at an egg escapement threshold level required in the CPS FMP.	The Commission chose to monitor the fishery through the egg escapement method while pursuing a biomass estimate of market squid at an egg escapement threshold level required in the CPS FMP.
Julie A. Thayer, Ph.D. candidate, Marine Ecology Division, PRBO Conservation Science	letter dated 12 August 2004	C-57. Supports Option D.4, which maintains statewide weekend closures and extends the range of closure to include additional days and/or times for areas north of Point Conception.	See response to C-7.
Julie A. Thayer, Ph.D. candidate, Marine Ecology Division, PRBO Conservation Science	letter dated 12 August 2004	C-58. Supports Option F.2, which establishes a permit for the taking of market squid as live bait.	Because the volume of squid taken as live bait is small, the Commission did not adopt the establishment of a live-bait permit at this time.

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Julie A. Thayer, Ph.D. candidate, Marine Ecology Division, PRBO Conservation Science	letter dated 12 August 2004	C-59. Supports gear restrictions that would set a wattage limitation of 15,000 watts for vessels fishing for squid and lighting for squid. Also supports Option G.4, which would establish gear restrictions that state that each vessel fishing for squid and lighting for squid will utilize shielding that will reduce the light scatter of its fishing operations by shielding the entire filament of each light used to attract squid and orient the illumination directly downward or provide for the illumination to be completely below the surface of the water.	The Commission felt that the current wattage levels (30,000 watts) were adequate for bird protection; however, they did adopt Option G.4, which requires the lower edges of the light shields to be parallel to the deck. This will help reduce light scatter that may have a negative impact on seabirds or coastal communities.
Julie A. Thayer, Ph.D. candidate, Marine Ecology Division, PRBO Conservation Science	letter dated 12 August 2004	C-60. Supports Option H.3, which establishes a capacity goal for market squid vessels that produces a moderately productive and specialized fleet.	See response to C-30(1).
Julie A. Thayer, Ph.D. candidate, Marine Ecology Division, PRBO Conservation Science	letter dated 12 August 2004	C-61. Supports the adoption of both Option Q.2, which closes all waters within depths of 100 fathoms around San Nicolas Island, and Option Q.4, which states that squid may not be taken for commercial purposed in any waters of the Gulf of the Farallones National Marine Sanctuary.	See responses to C-8.

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Julie A. Thayer, Ph.D. candidate, Marine Ecology Division, PRBO Conservation Science	letter dated 12 August 2004	C-62. Supports Option R.2, which establishes area and time closures restricting squid fishing around Anacapa and Santa Barbara Islands from 1 February through 30 September (1 nm closure), in addition to an extra provision that establishes area and time closures restricting squid fishing around major seabird colonies in the Monterey Bay National Marine Sanctuary from 1 February through 30 September (1 nm closure), including Año Nuevo Island.	See responses to C-8. Area and time closures restricting squid fishing around major seabird colonies in the Monterey Bay National Marine Sanctuary and around Año Nuevo Island were not included in the range of regulation options that were under consideration by the Commission.
Donald Brockman, California Squid Fishermen's Association	verbal testimony provided at the San Pedro Special Hearing dated 13 August 2004	C-63. Supports the fishermen's alternative plan of 50 deliveries from 1 January 2000, through 31 March 2003. Also feels that the brail criteria should also be from 1 January 2000, through 31 March 2003 with 5 to 10 deliveries.	See response to C-1. Taking into consideration the need to reduce the current market squid fleet size, the Commission chose the following criteria for the initial issuance of a transferable market squid brail permit: (1) the possession of a current 04/05 market squid permit and (2) made at least 10 landings with brail gear between 1 January 2000, and 31March 2003.
Donald Brockman, California Squid Fishermen's Association	verbal testimony provided to Commission dated 27 August 2004 (similar to verbal testimony provided at the San Pedro Special Hearing dated 13 August 2004)	C-64. Supports Option A.2, which established a statewide quota of 118,000 tons.	See response to C-5.
Donald Brockman, California Squid Fishermen's Association	verbal testimony provided at the San Pedro Special Hearing dated 13 August 2004	C-65. Supports Option G.1, which maintains existing gear option regarding shields and wattage (30,000 watts).	See response to C-59.

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Peter Divona, Long Beach processor	verbal testimony provided at the San Pedro Special Hearing dated 13 August 2004	C-66. Author's comments mirror C-63.	See response to C-63.
Peter Divona, Long Beach processor	verbal testimony provided at the San Pedro Special Hearing dated 13 August 2004	C-67. Author's comments mirror C-44	See response to C-2(2).
Rich Ashley, market squid vessel operator	verbal testimony provided at the San Pedro Special Hearing dated 13 August 2004	C-68. Author's comments mirror C-63.	See response to C-63.

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Chris Mobley, Channel Islands National Marine Sanctuary (CINMS)	letter dated 16 August 2004	C-69. The Sanctuary is concerned that the Department's preferred option (Option A.2) of 118,000 tons is not "risk-neutral" and has the potential for adverse stock and environmental effects. They believe that a more prudent approach would be to use a more representative time frame for setting a catch limit, on the order of the last 10 years of catch which includes dramatic environmental conditions and the rapid expansion of the fishery. Therefore, they support Option A.1, which establishes a seasonal catch limitation of 80,000 tons, to better protect the integrity of the marine ecosystem in the Sanctuary and the long-term sustainability of the fishery.	See response to C-5. The Department acknowledges that squid are data-poor; however, the stock appears robust enough to withstand high levels of landings because the market squid fishery can support landings of greater than 100,000 tons in multiple seasons (1999-2002). This is likely due to specific reproductive characteristics of squid, for which there is scientific information. The short lifespan of market squid coupled with the existence of multiple cohorts within a year suggests that the spawning biomass undergoes continuous recruitment. Therefore, a default control rule of 1.0, which assumes that the stock is above the average spawning biomass (BMSY), rather than the lower value of 0.67 (Option A.1), which assumes that the stock is above the minimum stock size threshold (MSST) but below BMSY, is most likely appropriate for this species. However, to give forewarning of any over-harvest, Option A.2 will also be applied in conjunction with monitoring the fishery through the egg escapement method. In addition, the combination of MPAs, weekend closures, and a restricted access program will minimize resource impacts by reducing fishing effort on specific spawning aggregations and in other sensitive locations.
Chris Mobley, CINMS	letter dated 16 August 2004	C-70. Supports the Department's preferred option (Option D.1) for continuation of the weekend closures, including the Sanctuary waters.	See response to C-7.

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Chris Mobley, CINMS	letter dated 16 August 2004	C-71. Supports continued squid monitoring to improve the development of management models and provide a better understanding of squid population dynamics. The Sanctuary also recommends that the Department in collaboration with the squid industry, academia and agency partners such as the Sanctuary, enhance fishery-independent monitoring	See response to C-55. Comment noted. The MLMA supports collaboration with the fishing industry, other agencies, and academia (FGC sections 7050(b), 7056(k), and 7059(a).).
Chris Mobley, CINMS	letter dated 16 August 2004	C-72. Supports the continuation of existing gear restriction on light wattage and shielding (Option G.1)	See response to C-59.
Chris Mobley, CINMS	letter dated 16 August 2004	C-73. Supports the establishment of a capacity goal; however, the goal should be commensurate with the catch limitation and based on the Sanctuary's recommendation for a lower catch limit the capacity target would have to be recalculated.	See response to C-30(1).

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Chris Mobley, CINMS	letter dated 16 August 2004	C-74. Supports Option R.1, which establishes area and time closures restricting squid fishing around Anacapa, Santa Barbara, and San Miguel Islands from 1 February through 30 September (1 nm). In addition, the Sanctuary recommends consideration of year round closures at the above islands given the seasonal variability among species and from year to year due to natural causes (i.e. El Nino Events).	See response to C-24.
Orlando Amoroso, SCCFA	verbal testimony provided to Commission dated 27 August 27 (similar to comment in letter dated 23 August 2004)	C-75. Recommends a compromise that would accept the Monterey proposal as written (50 landings, 1/1/2000-3/31/2003 window period) without excluding those historic fishermen that have already qualified for initial issuance under the Department's preferred position (50 landings, 1/1/1990-11/12/1999 window period).	See response to C-1.

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Orlando Amoroso, SCCFA	letter dated 23 August 2004	C-76. Supports a grandfather clause that is based not so much on "how many" but "how fair". The association is sympathetic to the needs of those fishermen that have pioneered and contributed to the success of the squid fishery…but may miss initial issuance of transferable permits due to extreme circumstances or factors beyond their control.	Comment noted. For the issuance of non-transferable market squid vessel permits, the Commission chose the following criteria: (1) made at least 33 landings with no window period, (2) the possession of a current 04/05 market squid vessel permit, and (3) the possession of a California Commercial Fishing License for at least 20 years. These criteria are intended to include those historical fishermen who have shown historical participation in the fishery both by landings and have maintained permits. Fishermen may also appeal exclusion from initial issuance. Appeals are provided for in the regulations (Section 149.1(e), Title 14, CCR).
Orlando Amoroso, SCCFA	verbal testimony provided to Commission dated 27 August 27 (similar to comment in letter dated 23 August 2004)	C-77. Supports a permit fee of $400.	See response to C-2(2).
Michael J. Bovovina, purse seine vessel owner	letter received 23 August 2004	C-78. Supports a 20-year window period from 1984 through 2004 for initial issuance.	See response to C-1.
Michael J. Bovovina, purse seine vessel owner	letter received 23 August 2004	C-79. All permits should be transferable.	See response to C-2(1). The Commission decided on non-transferable permits for 20-year fishermen because they wanted to provide an opportunity for fishermen who have had a history in the squid fishery but did not fish at the level that was required for a transferable squid permit to continue to do so.
Sean Hastings, CINMS	verbal testimony provided to Commission dated 27 August 2004	C-80. Author's comment mirror C-69.	See response to C-5.

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Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Sean Hastings, CINMS	verbal testimony provided to Commission dated 27 August 2004	C-81. Author's comment mirror C-70.	See response to C-7.
Sean Hastings, CINMS	verbal testimony provided to Commission dated 27 August 2004	C-82. Author's comment mirror C-71.	See response to C-71.
Sean Hastings, CINMS	verbal testimony provided to Commission dated 27 August 2004	C-83. Author's comment mirror C-72.	See response to C-59.
Sean Hastings, CINMS	verbal testimony provided to Commission dated 27 August 2004	C-84. Author's comment mirror C-73.	See response to C-30(1).
Sean Hastings, CINMS	verbal testimony provided to Commission dated 27 August 2004	C-85. Author's comment mirror C-74.	See response to C-24.
Kate Wing, NRDC	verbal testimony provided to Commission dated 27 August 2004	C-86. Does not like the MSY approach for squid because the Restrepo, et al (1998) guidelines were established for longer lived species. Would rather see squid managed by egg escapement and time and area closures coupled with a catch limitation that is not fixed.	See responses to C-5, C-8, C-56, and C-69.

Table 1-1 Summary of public comment and responses presented in the Final Statement of Reasons for Regulatory Action (revised 22 March 2005).			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Kate Wing, NRDC	verbal testimony provided to Commission dated 27 August 2004	C-87. The MSY option is not consistent with current law (MLMA) because there is no optimum yield (OY) calculation in the plan.	See responses to C-5 and C-69. The MLMA states that the primary fishery management goal is sustainability and, in the case of a fishery managed on the basis of MSY, that OY is only an objective. (FGC 7056(a).). Where, as here, there is insufficient knowledge to calculate MSY, proxies can be used for both MSY and OY. As uncertainty decreases about the status of stocks and their response to fishing pressure, less or more precautionary management measures can be adopted. This approach to risk management reduces the chance of inadvertent overfishing when little is known about the status of a stock.
Karen Reyna, The Ocean Conservancy	verbal testimony provided to Commission dated 27 August 2004	C-88. The catch limitation recommended by the Department (Option A.2) is too high. Would rather see Option A.1 used as a calculator with the catch limitation set year to year.	See responses to C-5 and C-69.
Karen Reyna, The Ocean Conservancy	verbal testimony provided to Commission dated 27 August 2004	C-89. Supports a maximum wattage limitation of 15,000 watts.	See response to C-59.
Karen Reyna, The Ocean Conservancy	verbal testimony provided to Commission dated 27 August 2004	C-90. Does not support such a large area closure for District 10. Does support an area closure for the Gulf of Farallons only if a lower catch limitation is chosen coupled with other area closures around the Channel Islands.	See response to C-8.
Zeke Grader, Executive Director PCFFA	verbal testimony provided to Commission dated 27 August 2004	C-91. Supports a catch limitation of 100,000 tons, with area quotas of 1,000 tons (for an experimental fishery) above Pt. Arena and 99,000 tons for the remainder of California.	See response to C-5.

Table 1-1 Summary of public comment and responses presented in the Final Statement of Reasons for Regulatory Action (revised 22 March 2005).			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Zeke Grader, Executive Director PCFFA	verbal testimony provided to Commission dated 27 August 2004	C-92. Supports limited entry (55 vessel permits/52 light boat permits) with 2 to 3 permits for a north coast experimental fishery.	See response to C-30(1). The Commission decided to establish up to three non-transferable experimental gear fisher permits because of testimony from fishermen who would like to establish squid fisheries in non-traditional areas.
Zeke Grader, Executive Director PCFFA	verbal testimony provided to Commission dated 27 August 2004	C-93. Would like to keep permit fees between $1,000 and $2,500 and would also like to increase the landing tax.	See response to C-2(2).
Zeke Grader, Executive Director PCFFA	verbal testimony provided to Commission dated 27 August 2004	C-94. Supports a four day fishery for District 10 and 16, Monday 1200-Friday 1200.	See response to C-7.
Zeke Grader, Executive Director PCFFA	verbal testimony provided to Commission dated 27 August 2004	C-95. Supports the establishment of areas closed to squid vessels using attracting lights around the Farallons and/or Pt. Reyes (2 nm closure).	See response to C-8.
Zeke Grader, Executive Director PCFFA	verbal testimony provided to Commission dated 27 August 2004	C-96. Author's comments mirror C-59.	See response to C-59.
Zeke Grader, Executive Director PCFFA	verbal testimony provided to Commission dated 27 August 2004	C-97. Supports a 40 ton trip limit.	See response to C-6.

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Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Diane Pleschner-Steele, CWPA	verbal testimony provided to Commission dated 27 August 2004	C-98. Supports Option A.2, which would establish a catch limitation of 118,000 tons, because (1) the catch limitation is based on the best available science, (2) squid are found coast-wide, (3) squid are genetically homogenous, (4) females show evidence of spawning at least once before catch, and (4) El Nino is unpredictable and the resource has shown to manage itself during this event.	See response to C-5.
Diane Pleschner-Steele, CWPA	verbal testimony provided to Commission dated 27 August 2004	C-99. Does not support additional area and time closures because many fishing spots are already closed by the MPA's.	See responses to C-8.
David Crabbe, vessel owner and representative for the Monterey squid fleet	verbal testimony provided to Commission dated 27 August 2004	C-100. Supports a District 16 closure from 1200 Friday - 1200 Monday.	See response to C-7.
David Crabbe, vessel owner and representative for the Monterey squid fleet	verbal testimony provided to Commission dated 27 August 2004	C-101. Supports a catch limitation of 100,000 tons.	See response to C-5.
Kathy and Steve Fosmark, commercial fishers	verbal testimony provided to Commission dated 27 August 2004	C-102. Wants grandfather qualifications to allow current permit holders with no landing qualifications.	See responses to C-33 and C-34.

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Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Pete Dupuy, commercial fishermen	verbal testimony provided to Commission dated 27 August 2004	C-103. For the grandfather clause, would like the Commission to consider the following criteria (1) holds a current 04/05 market squid permit, (2) made a minimum of 40 landings prior to 27 August 2004, and (3) has had a CFL for at least 20 years.	See response to C-34.
Mike McHenry, commercial fisherman	verbal testimony provided to Commission dated 27 August 2004	C-104. Would like to see District 10 left open for squid fishing.	The Commission did not close District 10.
Terrance Mines, market squid light boat operator	verbal testimony provided to Commission dated 27 August 2004	C-105. Does not support weekend closures. With all the closures, would like to be able to fish weekends.	See response to C-7.
Terrance Mines, market squid light boat operator	verbal testimony provided to Commission dated 27 August 2004	C-106. The permit fees are too high.	See response to C-2(2).
Terrance Mines, market squid light boat operator	verbal testimony provided to Commission dated 27 August 2004	C-107. Author's comment mirrors C-79.	See response to C-79.
Dan Yoakum, San Francisco Roe on Kelp Advisor	verbal testimony provided to Commission dated 27 August 2004 (similar to comment in letter dated 25 February 2004)	C-108. Supports an experimental fishery (5 transferable permits) and would like to establish a squid fishery in Fort. Bragg	See response to C-92.
Dan Yoakum, San Francisco Roe on Kelp Advisor	verbal testimony provided to Commission dated 27 August 2004	C-109. Author's comment mirrors C-25.	See responses to C-8.

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Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Dan Yoakum, San Francisco Roe on Kelp Advisor	verbal testimony provided to Commission dated 27 August 2004 (similar to comment in letter dated 25 February 2004)	C-110. Author's comment mirrors C-89.	See response to C-59.
Dan Yoakum, San Francisco Roe on Kelp Advisor	verbal testimony provided to Commission dated 27 August 2004 (similar to comment in letter dated 25 February 2004)	C-111. Keep all existing squid permits; however, permits should be issued to squid fishermen by region with the Fort Bragg region being defined with the northern boundary approximately at Cape Mendocino and the southern boundary with three possibilities: Pt. Reyes, Gualala, or Pt. Arena.	The Commission had the option of continuing the current permit program under the moratorium. However, that alternative was not adopted because it is not in accordance with the intent of the legislation to protect the resource and manage the fishery at a level that sustains healthy squid populations, taking into account the level of fishing effort and ecological factors, including, but not limited to, the species' role in the marine ecosystem and oceanic conditions. Commission also had the option of moving toward regional management for the fishery by adopting two specific regulatory provisions, regional catch limits and a regional control date. Neither of these options was adopted by the Commission because the Commission determined that regional management is not necessary at this time to effectively manage the fishery.
Frank Mateljan, representative for Tri Marine International Inc.	verbal testimony provided to Commission dated 27 August 2004	C-112. Does not support area and time closures.	See responses to C-8.
Frank Mateljan, representative for Tri Marine International Inc.	verbal testimony provided to Commission dated 27 August 2004	C-113. Does not support squid catch limitations because industry and resource is resilient.	See response to C-5.
Tim Sullivan, commercial fisherman	verbal testimony provided to Commission dated 27 August 2004	C-114. Supports the establishment of areas closed to squid vessels using attracting lights around the Farallons and/or Pt. Reyes. Does not support Option Q.3, which closes squid fishing north of Pillar Point.	See responses to C-8 and C-23.

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Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Tim Sullivan, commercial fisherman	verbal testimony provided to Commission dated 27 August 2004	C-115. Author's comment mirrors C-89.	See response to C-59.
Tim Sullivan, commercial fisherman	verbal testimony provided to Commission dated 27 August 2004	C-116. Supports the Department's initial issuance criteria for market vessel permits (possession of a current market squid vessel permit and made at least 50 landings between 1/1/1990-11/12/1999).	See response to C-1.
Dan Yoakum, San Francisco Roe on Kelp Advisor	letter dated 25 February 2004	C-117. Each permitee should be limited to an annual catch not to exceed 1,000 tons. This would distribute the allowable quota evenly to each permitee and there would be less chance of over harvesting individual spawns.	Comment noted. The Commission chose not to establish daily trip limits which would function similar to an annual limit. The Department did not recommend the establishment of daily trip limits because the seasonal harvest limit had not been taken in recent years; therefore, there was not a race between vessels to land the allowable limit in as short of time as possible. Furthermore, fish processors implement their own trip limits as needed to regulate the amount of squid delivered per day.
Dan Yoakum, San Francisco Roe on Kelp Advisor	letter dated 25 February 2004	C-118. Landings should not exceed 30 tons per vessel in a 24-hour period in an effort to conserve biomass in a specific area.	See responses to C-6 and C-117.
Dan Yoakum, San Francisco Roe on Kelp Advisor	letter dated 25 February 2004	C-119. The seine net depth should be no more than the ocean depth in which it is deployed. This is to prevent the seine net from scraping the ocean floor.	See response to C-10.
Dan Yoakum, San Francisco Roe on Kelp Advisor	letter dated 25 February 2004	C-120. Provisions should be made for observer's to access the squid fishery.	See responses to C-29.
Dan Yoakum, San Francisco Roe on Kelp Advisor	letter dated 25 February 2004	C-121. Advisors should be established for the proposed Fort Bragg region.	See response to C-11.

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Dan Yoakum, San Francisco Roe on Kelp Advisor	letter dated 25 February 2004	C-122. The landing tax should be increased to support enforcement and resource research on an equal balance. This would be preferable, coupled with a tolerable permit fee, to lower the burden on smaller operations.	See response to C-2(2).
Dan Yoakum, San Francisco Roe on Kelp Advisor	letter dated 25 February 2004	C-123. The Department should eventually allow for two permits to be attached to one vessel in order to reduce fleet size.	See response to C-2(1).
Kate Falkner signed for Russel E. Galipeau, Jr., Superintendent , Channel Islands National Park	letter dated 3 August 2004	C-124. Does not consider the suggested quota of 118,000 to be "risk neutral". They recommend that the State adopt the 80,000 ton limit (Option A.1) as an interim step to using an adaptive, in-season management system based on egg escapement monitoring.	See responses to C-5, C-56, and C-69.
Kate Falkner signed for Russel E. Galipeau, Jr., Superintendent , Channel Islands National Park	letter dated 3 August 2004	C-125. Supports continued monitoring for the squid fishery and egg escapement because monitoring is important for tracking and understanding the impacts from this fishery and the status of populations.	See response to C-56.
Kate Falkner signed for Russel E. Galipeau, Jr., Superintendent , Channel Islands National Park	letter dated 3 August 2004	C-126. Supports limiting the fleet size because it is important to the natural resources and to the economics of the individual fishermen not to overcapitalize this fishery.	See responses to C-1, C-12, C-30(1), and C-33.

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Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Kate Falkner signed for Russel E. Galipeau, Jr., Superintendent , Channel Islands National Park	letter dated 3 August 2004	C-127. Agree with the recommendation of the MSFMP Peer Review Panel that a) a fixed annual quota be treated as a transitional management took and b) this fixed annual quota be split by region at Point Conception.	See response to C-5.
Kate Falkner signed for Russel E. Galipeau, Jr., Superintendent , Channel Islands National Park	letter dated 3 August 2004	C-128. An observer program is needed to document fishery interactions with wildlife, monitor by-catch, and independently verify the data reported through other sources.	See response to C-29.
Kate Falkner signed for Russel E. Galipeau, Jr., Superintendent , Channel Islands National Park	letter dated 3 August 2004	C-129. Supports weekend closures for the purpose of giving spawning aggregations a rest and want to be sure that the islands are included in the weekend closures.	See response to C-7.
Kate Falkner signed for Russel E. Galipeau, Jr., Superintendent , Channel Islands National Park	letter dated 3 August 2004	C-130. Recommends that live bait operations be included in the squid catcher vessel permit system. Also, recommends that expanded data collection from the live bait fishery is needed.	See response to C-58.

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Kate Falkner signed for Russel E. Galipeau, Jr., Superintendent , Channel Islands National Park	letter dated 3 August 2004	C-131. Encourages the Commission to support research into the effects of light on seabirds and other organisms. In the interim, they support Option G.4, which would establish gear restrictions for each vessel fishing for squid and light for squid that will utilize shielding that will reduce the light scatter of its fishing operations by shielding the entire filament of each light used to attract squid and orient the illumination directly downward, or provide for the illumination to be completely below the surface of the water. This option should be further reviewed in three years after further study into alternative gear to reduce light.	See response to C-59. Comment noted. The MSFMP does have a research and monitoring component. However, the Department also supports efforts by other agencies or researchers to determine if the squid fishery is impacting seabird colonies at the Channel Islands.
Kate Falkner signed for Russel E. Galipeau, Jr., Superintendent , Channel Islands National Park	letter dated 3 August 2004	C-132. Supports establishing area and time closures restricting squid fishing around Anacapa, Santa Barbara, and San Miguel Islands (1 nm). They also strongly recommend expansion of seasonal closures to the entire year to protect both seabird and pinniped populations present throughout the year.	See response to C-8.
Senator Wesley Chesbro, State Senator, Second District	letter dated 25 August 2004	C-133. Supports a small squid fishery north of Pt. Reyes.	See response to C-92.

Table 1-1 Summary of public comment and responses presented in the Final Statement of Reasons for Regulatory Action (revised 22 March 2005).			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Assembly Member Patty Berg, Chair, Joint Committee on Fisheries and Aquaculture	letter dated 20 August 2004	C-134. Supports a small squid fishery off the north coast and would like to see the Commission issue some experimental permits.	See response to C-92.
Kate Wing, NRDC	letter dated 29 September 2004	C-135. Would like to Commission to reconsider the seasonal closures at Anacapa and Santa Barbara Islands under the MSFMP (Option R.4) at their October meeting and vote to adopt them.	See response to C-8.
Craig S. Harrison, Vice Chair for Conservation, Pacific Seabird Group	letter dated 7 October 2004	C-136. Would like the Commission to reconsider the closures at Anacapa and Santa Barbara Isands at their October meeting. Closures should be year-round because breeding birds of several seabird species, including the California Brown Pelican and Ashy Storm-Petral, are present throughout the year.	See response to C-8.
John Duffy, speaking on behalf of Pete Dupuy, Jimmy Bunn, and John Gibbs	verbal testimony provided to Commission on 21 October 2004	C-137. Supports Table 2, Option 3 (no window period, at least 40 total landings, and has a 04/05 market squid vessel permit) for the issuance of non-transferable market squid vessel permits.	See response to C-34.
John Gibbs, purse seine owner and operator	verbal testimony provided to Commission on 21 October 2004	C-138. For the issuance of non-transferable market squid vessel permits, would like a reasonable criteria from Table 2 to be adopted.	See response to C-34.

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Speaker/ Organization	Comment Format	Summary of Comment	Department Response
James Bunn, purse seine owner and operator	verbal testimony provided to Commission on 21 October 2004 and letter dated 2 December 2003	C-139. Disappointed with the Commissions decision to adopt the following criteria for the initial issuance of transferable vessel permits: (1) window period of 1 January 2000 – 31 March 2003 (2) possession of a 04/05 market squid vessel permit. (3) Does not understand why a person with a strong history in the squid fishery will be given a non-transferable permit instead of a transferable permit just because he has not been recently active in the fishery.	Comment noted. The initial issuance criteria for transferable and non-transferable market squid vessel permits was selected by the Commission based on industry recommendations and the need to reduce the current fleet size.
Zeke Grader, Executive Director PCFFA	verbal testimony provided to Commission on 21 October 2004	C-140. It was never the intent of the initial (Sher) legislation to eliminate those people who have been in the squid fishery for many years.	Comment noted. The initial issuance criteria for transferable and non-transferable market squid vessel permits was selected by the Commission based on industry recommendations and the need to reduce the current fleet size. The intent of the market squid statute was to examine the unregulated squid fishery to ensure the sustainability of the landings that had been recorded.
Shaye Wolf, PhD candidate from University of California, Santa Cruz	verbal testimony provided to Commission on 21 October 2004	C-141. Would like the Commission to consider closures around the Channel Islands that would prevent night squid fishing during the seabird breeding season.	See response to C-8.
Joe Alfieri, light boat owner and operator	letter dated 19 November 2004	C-142. Would like the Commission to choose more than one option regarding the issuance of non-transferable market squid vessel permits.	See response to C-34.

Table 1-1 Summary of public comment and responses presented in the Final Statement of Reasons for Regulatory Action (revised 22 March 2005).			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Byron D. Sher, State Senator, 11th District	letter dated 22 October 2004	C-143. Would like the Commission to take regulatory action—in time for the start of the 2005 squid fishing season—to lower the excessively high catch levels, adopt area closures recommended by DFG, and to revise the permit qualifying criteria it previously adopted.	See responses to C-1, C-2(2), C-5, and C-8.
Orlando Amoroso, President, Southern California Commercial Fishing Association (SCCFA)	verbal testimony provided to Commission on 3 December 2004 (similar to letter dated 30 November 2004	C-144. For the issuance of a non-transferable vessel permit, San Pedro and Monterey support 150 landings prior to 27 August 2004, possession of a current California market squid permit, and 20 years of operational experience with a California commercial fishing license (last option on Table 2 as provided by DFG).	See response to C-34.
James Bunn, purse seine owner and operator	letter dated 1 December 2004	C-145. To qualify for a grandfather permit, candidates must meet the following criteria: (1) permitte must currently own a vessel, (2) permitee must currently have a 2004/05 squid fishing permit, and (3) permitee has recorded 33 landings in a lifetime of fishing.	See response to C-34.

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Speaker/ Organization	Comment Format	Summary of Comment	Department Response
John Duffy, speaking on behalf of Pet Dupuy, Jimmy Bunn, and John Gibbs	verbal testimony provided to Commission on 3 December 2004	C-146. Supports the following criteria for the issuance of a non-transferable market squid vessel permit: (1) possession of a current market squid vessel permit, (2) at least 20 years of California commercial fishing licenses, and (3) made at least 33 landings with no window period.	See response to C-34.
David Crabbe, vessel owner and representative for the Monterey squid fleet	verbal testimony provided to Commission on 3 December 2004	C-147. Author's comment mirrors C-144.	See response to C-34.
John Coloni, squid fisherman	verbal testimony provided to Commission on 3 December 2004	C-148. Would like to see a transferable grandfather permit.	Comment noted. The Commission had the option to make the 20-year fishermen permits (FGC § 8101) transferable at the 27 August 2004 meeting. However, taking into consideration the need to reduce the current market squid fleet size, the Commission chose the non-transferable alternative for both market squid and brail vessels.
John Gibbs, purse seine owner and operator	verbal testimony provided to Commission on 3 December 2004	C-149. Author's comment mirrors C-145.	See response to C-34.
Paul Weakland	verbal testimony provided to Commission on 3 December 2004	C-150. Opposes closures at the Farrallon Islands.	See response to C-8.
Two Declarations signed by 29 squid vessel owners and operators	declarations provided to Commission on 3 December 2004	C-151. Authors' comments mirror C-145.	See response to C-34.
Frank Bertoni F/V Santina	Letter dated 22 April 2004 (#2)	C-152 Appears to oppose the proposed restricted access program.	See response to C-27.

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Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Frank Bertoni	Letter dated 16 June 2004	C-153 Would not oppose closure north of Pillar Point if: Certain measures were adopted and placed on fleet, area closures modified, new objective is added to plan, and research conducted for measurable stand for light emissions.	Comment noted. See responses to C-8 and C-23 regarding Pillar Point, to C-30(2) regarding wattage, and C-29 and C-55 regarding research. As recognized by the market squid legislation, information on this resource is limited, and the FMP addresses this with a research and monitoring component. As knowledge increases or additional management needs become apparent, the FMP will allow the Commission to react quickly to changes in the status of the resource or the fishery. The Department supports efforts by other agencies or researchers to measure light and noise and other activities to determine if the squid fishery is impacting seabird colonies. The Commission decided to leave general habitat closures to the MPA process; however, they did choose to establish an area closure restricting the use of attracting lights for commercial purposes in any waters off the Gulf of the Farallons National Marine sanctuary as currently described/defined on 27 August 2004.
Don Brockman	Undated letter	C-154 Opposes fee of $5,000; suggests fee of $1,000 as more reasonable.	See response to C-2(2).
Don Brockman	Undated letter	C-155 Opposes closures related to bird areas. States there is no science that proves squid fishing harms the birds.	See responses to C-8 and C-49.
Don Brockman	Undated letter	C-156 Supports Department's recommendation of 118,000 ton.	See response to C-5.
Don Brockman	Undated letter	C-157 Supports Department's recommendation of 30,000 watts.	See response to C-59.

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Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Don Brockman	Undated letter	C-158 Supports the fishermen's alternative plan of fifty deliveries from January 1, 2000 through March 31, 2003 and brail criteria in the same time frame with 5-10 deliveries.	See responses to C-1 and C-63.
Don Brockman	Undated letter	C-159 Supports grandfather clause with criteria of having a current squid permit, having a commercial fishing license for the last 20 years, and having made 50 landings in this time frame. Also feels it is unfair to require grandfather permittees to be on boats for the permits to be valid.	Comment noted. See responses to C-1 and C-34 The Commission agreed and decided not to require that 20-year fishermen be required to be on boats for the permits to be valid.
David Crabbe Buccaneer Fishing	Letter dated 20 August 2004	C-160 Recommends a qualifying window period for limited entry from January 1, 2000 through March 31, 2003; 50 deliveries during the window period; and have a valid 2004-2005 market squid permit.	See response to C-1.
David Crabbe Buccaneer Fishing	Letter dated 20 August 2004	C-161 Supports allowing squid industry north of Pillar Point and support a policy that prohibits use of squid lights in the vicinity of the Farallon Islands or other nocturnal bird nesting habitat….We urge you to wait until there is some clear scientific evidence of a conflict before unduly limiting the flexibility of the fishery to operate.	See responses to C-8, C-19 and C-23.

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Speaker/ Organization	Comment Format	Summary of Comment	Department Response
David Crabbe Buccaneer Fishing	Letter dated 20 August 2004	C-162 Oppose increasing the permit fee from $400 to $5,000 but support a minimal increase in the landing fee… (this means fees) would exceed $11,000 a year. This would pose a significant financial hardship to smaller boats.	See response to C-2(2).
David Crabbe Buccaneer Fishing	Letter dated 20 August 2004	C-163 For District 16 only, we support a four-day fish week rather than the current five-day fish week….begin at noon on Monday and close at noon on Friday.	See response to C-7. In addition, it is unnecessary to further restrict the fishery in this district to a four-day week because adequate spawning protection is provided with two days of closures.
David Crabbe Buccaneer Fishing	Letter dated 24 August 2004	C-164 Proposed giving up the opportunity to fish at night in exchange for an ability to continue fishing where squid appear north of Pillar Point…there is no documented evidence to date that squid fishing harms birds.	See responses to C-8, C-23 and C-49.
John Duffy	Letter dated 16 November 2004	C-165 (Request) that, for the non-transferable market squid vessel permits issued pursuant to Section *108, you adopt the second most liberal option in Table 2: Possession of a current permit; and having made at least 33 landings prior to August 27, 2004.	See response to C-34.

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Speaker/ Organization	Comment Format	Summary of Comment	Department Response
John Duffy	Letter dated 16 November 2004	C-166 Critical misstatement in Notice. The April 2004 Draft Market Squid Fishery Management Plan says the number of permits may be reduced by 31 to 81 permits but the "Regulations to establish a restricted access fishery and the associated eligibility criteria may result in the loss of 31 to 81 market squid fishing JOBS. [emphasis added]". Each permit provides direct employment for between 6 and 11 fishermen…the number of people who could be put out of work really ranges from somewhere between 186 and 891.	See response to C-2(1) The comment is correct that each market squid permit represents some level of employment opportunity for one or more individuals. However, due to the seasonality of most fisheries, and variability from year to year, most market squid fishermen and crew participate in multiple fisheries throughout the year. Interviews conducted by UC SeaGrant with squid vessel skippers reveals that they consistently rely on other fisheries, which may represent 40 percent to 80 percent of their total annual fishing revenue. Thus, while the squid fishery provides skipper and crew seasonal employment during the year, other fisheries may supplement or even dominate their fishing pursuits in the remainder of the year. Recognizing this seasonal movement of capital and labor between fisheries, and the inherent difficulties in assigning employment levels due solely to squid, the Department and Commission have adopted the use of employment assessment models developed by the federal government. These models, prepared by the US Department of Commerce's Bureau of Economic Analysis, project industry sector employment impacts as a product of overall change in the industry Final Demand Output (expressed in dollars). Thus for an anticipated change in ex-vessel revenue, we can calculate the associated change in full-time employment (jobs) for that industry group by using the federal Regional Input-Output Modeling System. As presented in the Draft Market Squid Fishery Management Plan document (for 1 April 2004), Table 3-22, the five-season average landings value for the Non-qualifiers was estimated at $3,047,071. Based on this landings value, analyses were done using the Input-Output Model to arrive at the employment impact of 72 full-time jobs which is within the range of projected employment impacts originally presented in the Standard Form 399 Economic Impact Section: 30 - 80 jobs eliminated.

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John Duffy	Written comments provided at 3 December 2004 Commission meeting	C-167 Preferred option: possession of a current market squid vessel permit; at least 20 years of California commercial fishing licenses; and at least 33 landings, with no window period.	See response to C-34.
John Duffy	Written comments provided at 3 December 2004 Commission meeting	C-168 Same comment as C-166 above.	See responses to C-2(1) and C-166
Pete Dupuy	Letter dated 23 August 2004	C-169 In favor of qualifying criteria as follows: 2004-2005 squid permit 40 cumulative landings, and 20+ years with a California Fish and Game license.	See response to C-34.
Pete Dupuy	Written comments provided at 6 August 2004 Commission meeting	C-170 Capacity goals, and therefore, the qualification criteria being used to attain those goals are NOT rigorously determined by sound, valid science.	See responses to C-2(1), C-2(4), and C-4. The Department used the best available information upon which to determine the number of qualifiers. An extensive analysis of the market squid fleet capacity goal, including the methodologies used, is provided in Appendix C of the MSFMP.
Pete Dupuy	Written comments provided at 6 August 2004 Commission meeting	C-171 Recommends combination of two options: at least 10 landings and possession of a current squid permit.	Comment noted. See response to C-34.

Table 1-1 Summary of public comment and responses presented in the Final Statement of Reasons for Regulatory Action (revised 22 March 2005).			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Pete Dupuy	Written comments provided at 6 August 2004 Commission meeting	C-172 Recommends adoption of the alternative language to subsection 149.1 (b) and 149.1 (c) that would retain the current moratorium program and require only the possession of a market squid permit in EITHER the 2004-2005 or 1998-1999 permit year.	Comment noted. See response to C-34.
John T. Evich	Letter dated 23 August 2004	C-173 Opposes limiting participation years from January 1, 2000 to March 31, 2003 and supports the use of years of January 1990 forward.	See response to C-1.
Kathy and Steve Fosmark F/V Seeadler	Letter dated 19 August 2004	C-174 Opposes qualifying those who don't have a permit or own a commercial boat.	See response to C-34.
Kathy Fosmark F/V Seeadler	Letter dated 20 December 2003	C-175 Proposes that those who remain in this fishery could reimburse fees paid over the years to the eliminated (fishermen).	The initial issuance criteria for transferable market squid vessel permits was selected by the Commission based on industry recommendations and the need to reduce the current fleet size. It is consistent with the Commission's restricted access policy. Participation in the moratorium squid fishery did not guarantee inclusion in the restricted access program and reimbursement of fees is outside the scope of the proposed regulations.
Steve Fosmark F/V Seeadler	Letter dated 9 February 2001	C-176 Opposes requirement to have thirty-three landings to qualify.	See response to C-34.
Steve Fosmark F/V Seeadler	Letter dated 9 February 2001	C-177 Supports Option 2 (full transferability).	See response to C-2. Option K.3 was adopted which includes full transferability.
Kathy Fosmark Vice President Fishermen's Association of Moss Landing	Letter dated 1 October 2000	C-178 Support for Fish and Game Code Section 8101 (grandfather clause).	Comment noted.

Table 1-1 Summary of public comment and responses presented in the Final Statement of Reasons for Regulatory Action (revised 22 March 2005).			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
John Gibbs F/V New Horizon	Letter dated 16 August 2004	C-179 Allow the number of 20 year grandfather squid fishermen who hold a current 2004-2005 market squid permit that want to continue fishing and allow this small number of active fishermen to continue their fishing efforts.	See response to C-34.
Keneth Jones F/V Trejo	Letter dated 20 August 2004	C-180 Permits should go to people who are actively in the fishery to make a living.	See response to C-34
Kenneth Jones F/V Trejo	Letter dated 20 August 2004	C-181 A large increase in the permit fee is unnecessary and would create another hardship on a business that has enough of them.	See response to C-2(2).
Jere Melo, Mayor City of Fort Bragg	Letter dated 10 August 2004	C-182 Request that (options adopted) consider that commercial fishing in (Fort Bragg) area has suffered substantial losses. Retention of this small fishery is important to the local economy.	See responses to C-5 and C-111.
Jere Melo, Mayor City of Fort Bragg	Letter dated 10 August 2004	C-183 Request that the Commission consider an alternate fee schedule for small, local fisheries.	See response to C-2(2).
Jere Melo, Mayor City of Fort Bragg	Letter dated 10 August 2004	C-184 Urges the Commission to adopt some form of "experimental market squid vessel permit.	See response to C-92.

Table 1-1 Summary of public comment and responses presented in the Final Statement of Reasons for Regulatory Action (revised 22 March 2005).			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Jere Melo, Mayor City of Fort Bragg	Letter dated 10 August 2004	C-185 Opposes closure of all market squid fishing north of Pillar Point; provide for an exemption based on the "experimental permit" concept.	See responses to C-8, C-23 and C-92.
James Larson, Attorney Noyo Harbor District	Letter dated 25 October 2003	C-186 Appears to oppose creation of a restricted access fishery.	See response to C-27.
James Caito Vice President Caito Fisheries, Inc.	Letter dated 4 December 2003	C-187 Appears to oppose creation of a restricted access fishery.	See response to C-27.
Diane Pleschner-Steel	E-mail dated 20 August 2004	C-188 Supports recent-year (2000-2003) window period for limited entry and criteria for 50 landings within the window period	See response to C-1.
Diane Pleschner-Steel	E-mail dated 20 August 2004	C-189 Supports criteria of possession of a commercial fishing permit for 20 years and possession of a 2004-05 squid permit.	See response to C-1.

Table 1-1 Summary of public comment and responses presented in the Final Statement of Reasons for Regulatory Action (revised 22 March 2005).			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Diane Pleschner-Steel	E-mail dated 20 August 2004	C-190 Disagrees with Department's new recommendation to prohibit "corporations".	Comment noted. The Commission agreed and decided not to require that 20-year fishermen be required to be on boats for the permits to be valid. Criteria for non-transferable (20-year grandfather) permits are based upon an individual's personal catch history, whereas transferable permits may be issued based on a vessel's catch history. Once a Transferable Market Squid Vessel Permit, Brail Permit, or Light Boat Permit has been issued for use on a vessel based on that vessel's catch history, individuals may not also use their personal catch history made aboard that vessel toward issuance of a non-transferable vessel or brail permit. This clarification was needed to prohibit the issuance of multiple permits based on catch history associated with a single vessel which would undermine the goals of the restricted access program.
Diane Pleschner-Steel	E-mail dated 20 August 2004	C-191 Opposes $5,000 permit fees which fishermen can't afford.	See response to C-2(2).
Karen Reyna The Ocean Conservancy and Kate Wing Natural Resources Defense Council	Letter dated 19 August 2004	C-192 Request the Commission to reject the Department's preferred option of an 118,000 mt limit (Option A.2).	See responses to C-5 and C-69.

Table 1-1 Summary of public comment and responses presented in the Final Statement of Reasons for Regulatory Action (revised 22 March 2005).			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Karen Reyna The Ocean Conservancy and Kate Wing Natural Resources Defense Council	Letter dated 19 August 2004	C-193 The MSFMP makes no allowances for annual or in-season changes to the catch level.	The Commission chose to establish a seasonal catch limitation based on recent average catch and the assumption that squid biomass is above average spawning biomass (currently set at 118,000 tons) to be reviewed in two years. The MSFMP framework is a multi-year management plan that describes the processes by which the fishery will be managed, including when, how, and within what limits regulatory changes will be made, and the ranges of the resulting impacts. Pre-season and in-season adjustments to regulations may be made without FMP amendment by implementing the procedures and provisions established in the FMP framework. Instead of providing a fixed set of management measures to implement at one point in time, the FMP framework establishes mechanisms to adjust the management of the fishery to meet changing circumstances over a longer period. This may be accomplished through annual adjustments of seasons, quotas, etc., or through in-season adjustments needed in response to factors that cannot be precisely anticipated during a review process. Framework adjustments may be implemented more quickly than FMP amendments, allowing for more timely management response and providing for adaptive management. In the adopted regulations (Section 53.02, Title 14, CCR), periodic monitoring and assessment of squid fisheries will be conducted, and, if needed, the Department will provide management recommendations to the Commission.

Table 1-1 Summary of public comment and responses presented in the Final Statement of Reasons for Regulatory Action (revised 22 March 2005).			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Karen Reyna The Ocean Conservancy and Kate Wing Natural Resources Defense Council	Letter dated 19 August 2004	C-194 No evidence is provided that the area (north of Pillar Point) includes large expanses of known squid spawning habitat.	Market squid range as far north as southern Alaska. Although there is limited fisheries independent data, juveniles have been collected throughout most of the proposed closure area suggesting that spawning does occur within that area (see Figure 2-4 in MSFMP). General habitat closures are designed to prevent squid fishery interactions in areas that have not been traditionally utilized for commercial squid fishing (hence, no landings data). These areas could also serve as potential harvest replenishment areas.
Karen Reyna The Ocean Conservancy and Kate Wing Natural Resources Defense Council	Letter dated 19 August 2004	C-195 If Department and Commission believe it is appropriate to manage squid based on MSY, then it must choose Option A.1.	See responses to C-5, C-69, and C-87.
Karen Reyna The Ocean Conservancy and Kate Wing Natural Resources Defense Council	Letter dated 19 August 2004	C-196 No fixed catch level should be set in the MSFMP itself.	Comment noted. The Commission chose to establish a seasonal catch limitation based on recent average catch and the assumption that squid biomass is above average spawning biomass to be reviewed in two years.
Karen Reyna The Ocean Conservancy and Kate Wing Natural Resources Defense Council	Letter dated 19 August 2004	C-197 Support for Options B.1 D.4 E.1 F.2 G.3 G.4 H.3 Q.2 Q.4 R.5	Comment noted. B.1: See responses to C-5, C-8, C-56 and C-69. D.4: See response to C-7. E.1: See response to C-55. F.2: See response to C-58. G.3: See response to C-59. G.4: See response to C-59. H.3: See response to C-4 Q.2: See response to C-8. Q.4: See response to C-8. R.5: See responses to C-8 and C-24.

Table 1-1 Summary of public comment and responses presented in the Final Statement of Reasons for Regulatory Action (revised 22 March 2005).			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Michael R. Thompson Newport Landing Sportfishing	Letter dated 10 July 2004	C-198 Opposes permit fee structure preferred by the Department ($5,000); the fees should be tiered according to potential gross revenue for the type of permit; a light boat operator's permit fee should be only 20 percent of the fee for a Market Squid Vessel Permit.	See response to C-2(2).
Dan Williams F/V Oojpi	Letter dated 21 August 2004	C-199 There is no 20 year grandfather option for light boats.	See response to C-33.
Mike Weynands F/V Julie Celeste	Letter FAXed 23 August 2004	C-200 The $5,000 proposed market squid renewal fee is unjustifiable.	See response to C-2(2).
Mike Weynands F/V Julie Celeste	Letter FAXed 23 August 2004	C-201 The proposed closure of squid fishing north of Pillar Point is ridiculous. There is no biological data to justify the closure of a fishery that has little impact on the environment or biomass.	See responses to C-8, C-23 and C-49.
Gordon King Owner-operator commercial fishing vessel	Letter FAXed 1 Jan 1995; date stamped 27 August 2004	C-202 Proposes that everyone who has a permit now should be allowed to keep (permit) and be allowed to sell their investment.	See response to C-27.
Exceller Fisheries, Inc.	Letter dated 23 August 2004	C-203 Supports initial issuance criteria window period from 1 January 1990 through 12 November 1999.	See response to C-34.

Table 1-1 Summary of public comment and responses presented in the Final Statement of Reasons for Regulatory Action (revised 22 March 2005).			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Byron D. Sher Senator, 11th District	Letter dated 1 December 2003	C-204 Concern that the Commission may be considering adoption of regulations that would be independent of the management plan requirements of SB 209. Requests adoption of a squid FMP until the Department provides a revised plan for public and Commission consideration.	The Commission did not consider adoption of the draft MSFMP or the implementing regulations at its 5 December 2003 meeting. Instead, the Commission requested that the Department amend the draft MSFMP and add additional alternatives as recommended by public testimony at the meeting. These alternatives were incorporated in the revised draft MSFMP that was released for public review 10 April 2004 and presented to the Commission for its consideration at its 4 May 2004 meeting.
Diane Pleschner-Steele California Wetfish Producers Association (CWPA)	Letter dated 24 April 2004	C-205 Opposes recommended H.3 capacity goal. Can support a capacity goal as low as 52 vessels if active grandfathered permits raises the total active fleet to at least 65-75 vessels.	Comment noted. Under the Commission's adopted restricted access program, 68 vessels will qualify under the initial issuance criteria, and an additional 12-25 vessels may qualify under the grandfather clause.
Diane Pleschner-Steele (CWPA)	Letter dated 24 April 2004	C-206 Opposes permit fees of $5,000,	See response to C-2(2).
Diane Pleschner-Steele (CWPA)	Letter dated 24 April 2004	C-207 CQPA suggests the Commission consider the potential value of establishing a framework to authorize experimental permits on a case-by-case basis.	See response to C-92.
Diane Pleschner-Steele (CWPA)	Letter dated 24 April 2004	C-208 Support efforts by Monterey fishermen and the environmental community to seek a compromise solution in the area north of Pillar Point.	See responses to C-8 and C-23.
Diane Pleschner-Steele (CWPA)	Letter dated 24 April 2004	C-209 Requests that squid scientists be added to the existing complement of SFAC members.	See response to C-11.

Table 1-1 Summary of public comment and responses presented in the Final Statement of Reasons for Regulatory Action (revised 22 March 2005).			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Diane Pleschner-Steele California Wetfish Producers Association (CWPA)	Letter dated 5 December 2003 (Attachment to letter dated 24 April 2004)	C-210 Questions the DFG recommendation for additional seasonal closures around Santa Barbara and Anacapa Islands to protect seabirds.	See response to C-24.
Diane Pleschner-Steele (CWPA)	Letter dated 5 December 2003 (Attachment to letter dated 24 April 2004)	C-211 Advocate for a management program that retains flexibility for the fishery to operate while ensuring sufficient spawning biomass through egg escapement.	See responses to C-5 and C-22.
Diane Pleschner-Steele (CWPA)	Letter dated 5 December 2003 (Attachment to letter dated 24 April 2004)	C-212 Support an active fleet in the 65-75 vessel range.	See response to C-205.
Diane Pleschner-Steele (CWPA)	Letter dated 5 December 2003 (Attachment to letter dated 24 April 2004)	C-213 Supports the fishermen's request to establish the highest possible qualification criteria on grandfathered permits (e.g. 50 landings).	See response to C-1.
Diane Pleschner-Steele (CWPA)	Letter dated 5 December 2003 (Attachment to letter dated 24 April 2004)	C-214 Concern over the Department's recommendation for a $5,000 permit fee.	See response to C-2(2).
Diane Pleschner-Steele (CWPA)	Letter dated 5 December 2003 (Attachment to letter dated 24 April 2004)	C-215 Regarding experimental permits or permits in northern CA: we recommend that such permits be approved conditional on a mandatory research component evaluating the extent of local squid spawning grounds; be non-transferable; counted in addition to the capacity goal.	See responses to C-10 and C-92.

Table 1-1 Summary of public comment and responses presented in the Final Statement of Reasons for Regulatory Action (revised 22 March 2005).			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Diane Pleschner-Steele (CWPA)	Letter dated 5 December 2003 (Attachment to letter dated 24 April 2004)	C-216 Suggest the control period (April 1, 1999 – October 17, 2003) be expanded.	See response to C-1.
Diane Pleschner-Steele California Wetfish Producers Association	Letter dated 28 November 2003 (Attachment to letter dated 24 April 2004)	Comments are same as those in letter dated 5 December 2003.	See responses to C-210 through C-216.
Diane Pleschner-Steele California Wetfish Producers Association	Letter dated 20 October 2003 (Attachment to letter dated 24 April 2004)	Comments are same as those in letter dated 20 October 2003 in Market Squid Fishery Management Plan.	See responses in Draft Market Squid Fishery Management Plan dated 12 April 2004 Section 4 Table 1.
Diane Pleschner-Steele California Wetfish Producers Association (CWPA)	Letter dated 23 July 2004	C-217 Supports the DFG preferred alternative (Option A.2) 118,000 ton seasonal maximum cap.	See response to C-5.
Diane Pleschner-Steele (CWPA)	Letter dated 23 July 2004	C-218 Cannot support the Department's recent recommendation (Option Q.3) for a blanket prohibition on the commercial harvest of squid north of Pillar Point.	See responses to C-8 and C-23.
Diane Pleschner-Steele California Wetfish Producers Association (CWPA)	Letter dated 23 July 2004	C-219 The ($5,000) fee is unaffordable to the squid fleet and proposes a research program as an "in-kind" contribution to reduce DFG budget requirements and reduce permit fees accordingly.	See responses to C-2(2), C-71 and C-131.

Table 1-1 Summary of public comment and responses presented in the Final Statement of Reasons for Regulatory Action (revised 22 March 2005).			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Diane Pleschner-Steele (CWPA)	Letter dated 23 July 2004	C-220 Support for an initial issuance number of vessels in the 65-75 boat range…window period of 1/1/2000 – 3/31/2003 and 50 landings would qualify 64 vessels.	See response to C-1.
Diane Pleschner-Steele (CWPA)	Letter dated 23 July 2004	C-221 Supports DFG's recommendation-do not establish a regional restrictive access control date at this time.	See response to C-5.
Diane Pleschner-Steele California Wetfish Producers Association (CWPA)	Letter dated 13 August 2004	C-222 Concern over the Department's recommendation that all permit fees be set at $5,000…suggest an "in-kind" research program.	See responses to C-2(2), C-71 and C-131.
Diane Pleschner-Steele (CWPA)	Letter dated 13 August 2004	C-223 Cannot support the Department's recent recommendation (Option Q.3) for a blanket prohibition on the commercial harvest of squid north of Pillar Point.	See responses to C-8 and C-23.
Diane Pleschner-Steele (CWPA)	Letter dated 13 August 2004	C-224 Support for an initial issuance number of vessels in the 65-75 boat range…window period of 1/1/2000 – 3/31/2003 and 50 landings would qualify 64 vessels.	See response to C-1.
Diane Pleschner-Steele (CWPA)	Letter dated 13 August 2004	C-225 Supports DFG's recommendation-do not establish a regional restrictive access control date at this time.	See response to C-5.

Table 1-1 Summary of public comment and responses presented in the Final Statement of Reasons for Regulatory Action (revised 22 March 2005).			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Diane Pleschner-Steele California Wetfish Producers Association (CWPA)	Letter dated 20 August 2004	C-226 Supports Option A-2, 118,000 ton seasonal maximum cap.	See response to C-5.
Diane Pleschner-Steele (CWPA)	Letter dated 20 August 2004	C-227 Support for an initial issuance number of vessels in the 65-75 boat range…window period of 1/1/2000 – 3/31/2003 and 50 landings would qualify 64 vessels.	See response to C-1.
Diane Pleschner-Steele (CWPA)	Letter dated 20 August 2004	C-228 Supports the following qualification criteria for grandfather permits: California commercial fishing permit for 20 years, possession of 2004-05 market squid permit, a prescribed number of landings. Opposed to DFG's recommendation to prohibit family corporations from qualifying for a grandfather permit.	See responses to C-1, C-34 and C-190
Diane Pleschner-Steele (CWPA)	Letter dated 20 August 2004	C-229 Fishermen support DFG's recommended capacity goal of 52 vessels…with a squid fleeting numbering 65-75 active vessels	See response to C-1.
Diane Pleschner-Steele (CWPA)	Letter dated 20 August 2004	C-230 Concern over the Department's recommendation that all permit fees be set at $5,000…suggest an "in-kind" research program.	See responses to C-2(2), C-71 and C-131.

Table 1-1 Summary of public comment and responses presented in the Final Statement of Reasons for Regulatory Action (revised 22 March 2005).			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Diane Pleschner-Steele (CWPA)	Letter dated 20 August 2004	C-231 Support DFG's preferred alternative D.1 – Continue closures from noon Friday to noon Sunday statewide.	See response to C-7.
Diane Pleschner-Steele (CWPA)	Letter dated 20 August 2004	C-232 Supports DFG's recommendation of Option R.4 – Area and time closures to address seabird issues.	See response to C-8.
Diane Pleschner-Steele (CWPA)	Letter dated 20 August 2004	C-233 Opposes DFG's recommendation of Option Q.3 – Harvest replenishment areas.	See responses to C-8 and C-23.
Diane Pleschner-Steele (CWPA)	Letter dated 20 August 2004	C-234 Supports DFG's preferred alternative E.1, monitoring with port sampling and logbooks.	See response to C-55.
Diane Pleschner-Steele (CWPA)	Letter dated 20 August 2004	C-235 Supports DFG's recommendation to maintain existing gear restrictions (30,000 watts)	See response to C-59.
Diane Pleschner-Steele (CWPA)	Letter dated 20 August 2004	C-236 Supports Department's recommendation to continue the existing regulations on live baiting fishing or incidental catch.	See response to C-58.
Diane Pleschner-Steele (CWPA)	Letter dated 20 August 2004	C-237 Supports DFG's preferred alternative, B.1-monitoring through egg escapement.	See response to C-22.
Diane Pleschner-Steele (CWPA)	Letter dated 20 August 2004	C-238 Support DFG's preferred alternative C.2 – do not establish trip limits.	See response to C-6.

Table 1-1 Summary of public comment and responses presented in the Final Statement of Reasons for Regulatory Action (revised 22 March 2005).			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Diane Pleschner-Steele (CWPA)	Letter dated 20 August 2004	C-239 Support DFG's Option O.3, do not establish experimental market squid permits.	See responses to C-5 and C-92.
Diane Pleschner-Steele (CWPA)	Letter dated 20 August 2004	C-240 Supports DFG's recommendation, do not establish a regional restrictive access control date at this time.	See response to C-5.
Diane Pleschner-Steele (CWPA)	Letter dated 20 August 2004	C-241 Squid scientists should be added to the existing complement of SFAC.	See response to C-11.
Gerry McChesney, seabird biologist with US Fish and Wildlife	Letter dated 4 December 2003, similar to verbal testimony presented 3 December 2004	C-242 Current lighting requirement should be modified to clarify language and increase enforcement capabilities	See response to C-59
Gerry McChesney, seabird biologist with US Fish and Wildlife	Letter dated 4 December 2003, similar to verbal testimony presented 3 December 2004	C-243 Market squid fishery needs an observer program to record levels of fishery interaction with seabirds and other natural resources	See response to C-29
Gerry McChesney, seabird biologist with US Fish and Wildlife	Letter dated 4 December 2003, similar to verbal testimony presented 3 December 2004	C-244 Research is needed to reduce light levels, including alternative fishing methods	See response to C-131. The MLMA supports collaboration with the fishing industry, other agencies, and academia (FGC sections 7050(b), 7056(k), and 7059(a).).
Zeke Grader, Executive Director PCFFA	Letter to Commission dated 24 October 2003	C-245 Supports a north coast experimental fishery, which is: (1) limited to 5 years and a quota of 150 tons per year, (2) not more than 5 permits, (3) no light boats permitted, (4) Department could suspend the fishery if salmon take observed.	Because the Commission did not close the area north of Pillar Point to the squid fishery, they decided to establish up to three non-transferable experimental gear fisher permits for the north coast. (1) see response C-5, (2) see response C-92, (3) see response C-8, (4) Comment noted. The Department shares the concern with regard to the potential for bycatch of salmon as well as seabird interactions and will continue to monitor for fishery interactions.

Table 1-1 Summary of public comment and responses presented in the Final Statement of Reasons for Regulatory Action (revised 22 March 2005).			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
William J. Sydeman, Director Marine Ecology Division, PRBO Conservation Science	E mail dated 8 November 2003	C-246 Supports a closure around the Farallon Islands, including: (1) that the Farallon Islands be closed to squid fishing year-round, (2) that removal of squid biomass is inconsistent with MLMA, (3) other management authorities have banned fishing for forage species. This would aid in maintaining large, productive, diverse, and economically-valuable fisheries in CA.	The Commission decided to leave general habitat and harvest replenishment closures to the MPA process under the MLPA; however, they did choose to establish a year-round seabird closure restricting the use of attracting lights for commercial purposes in any waters off the Gulf of the Farallones National Marine sanctuary as currently described/defined on 27 August 2004. (1) see response C-8, C-23, (2) The MSFMP is consistent with both the MLMA and the market squid legislation and presented a reasonable range of management options for Commission consideration. These options were developed using the best scientific information that is available without substantially delaying the preparation of the plan. (FGC § 7072(b).) However, as recognized by the market squid legislation, information on this resource is limited, and the FMP addresses this with a research and monitoring component. As knowledge increases or additional management needs become apparent, the FMP will allow the Commission to react quickly to changes in the status of the resource or the fishery. This adaptive management feature is contemplated in the MLMA (§§ 90.1, 7056(g)), and the FMP allows for future amendments as necessary (§7087). (3) Comment noted. The squid fishery has existed in California for over 100 years and is currently the most economically valuable fishery in the State and has existed with other fisheries that rely on squid as forage.

1.2 Comments and Department Responses to Draft Market Squid Fishery Management Plan (Released for Public Review 12 April 2004)

1.2.1 Comments received from 19 July 2004 through 27 August 2004

Summary of Public Comment on Proposed Addition of 53.00 et seq, 149.1, 149.2, 149.3, and 149.4,And Amendment of Section 149, Title 14, CCR;
Re: Market Squid Fishery Management Plan (MSFMP)
19 July 2004 through 27 August 2004

Table 1-2 Summary of public comment received from 19 July 2004 through 27 August 2004.

Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Robert Zuanich, Executive Director, Purse Seine Vessel Owners Association (PSVOA)	letter dated 27 August 2004 (similar to comment in letter dated 4 May 2004)	C-1. The PSVOA supports criteria for initial issuance that qualifies persons possessing a current valid permit and who made at least 50 landings between January 1, 1990, to March 31, 2003, or who fall under the 20 year grandfather provision.	Taking into consideration the need to reduce the current market squid fleet size, the Commission chose the following criteria for the initial issuance of transferable market squid vessel permits: (1) made at least 50 landings during the window period January 1, 2000 – March 31, 2003, and (2) the possession of a current 04/05 market squid vessel permit. Regarding non-transferable market squid vessel permits, the Commission directed the Department to publish a continuation notice of intent to provide additional alternatives and amendments to the proposed commercial squid fishery regulations [Section 149.1(c)(2), Title 14, CCR]. The new option for a non-transferable market squid vessel permit includes the following criteria: (1) the possession of an 04/05 market squid vessel permit, (2) the possession of a California Commercial Fishing License for at least 20 years, and (3) made at least [20-75] landings during any one season within the window periods listed. An alternative is also presented with the following criteria: (1) the possession of an 04/05 market squid vessel permit, (2) the possession of a California Commercial Fishing License for at least 20 years, and (3) made at least [20-150] total landings prior to August 27, 2004. The Commission will consider adoption of the non-transferable permits on December 3, 2004.

Table 1-2 Summary of public comment received from 19 July 2004 through 27 August 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Robert Zuanich, Executive Director, PSVOA	letter dated 27 August 2004 (similar to comment in letter dated 4 May 2004)	C-2. The PSVOA proposes that a reduced number of vessel permits and ultimate capacity goal be implemented over a 3-5 year period utilizing the following: (1) permit holders may move to larger capacity vessels, which will require ownership of a second permit and absorption of potential latent permits, (2) establish a relatively high permit fee that will discourage ownership for speculative purposes, (3) impose ongoing landing requirements as condition of renewing the permit, and (4) re-evaluate the limited entry program in 2007 to determine if the program is achieving capacity goal objectives.	(1) Based on the initial issuance criteria the Commission selected (see C-1) and a capacity goal of 55 market squid vessels, the Commission adopted the Department's recommendation of Option K.3, which establishes full transferability of market squid vessel permits based on comparable capacity (within 10%) and also establishes transferability of market squid vessel permits to a vessel of larger capacity under a "2 for 1" permit retirement. Option K.3 will prevent an increase in fleet capacity while allowing new vessels to enter the fishery. It will also provide for an orderly fishery, promote conservation among fishery participants, and maintain the long-term economic viability of the fishery. 2) While the Commission could have selected an annual permit fee between $400 and $5,000 for each permit to cover the FMP's anticipated annual implementation cost of $954,000, it balanced the financial needs of the Department against the impact to commercial fishermen and set the annual fees for vessel permits at: (1) $2,000 for transferable market squid vessel permits, and (2) $1,000 for non-transferable market squid vessel permits. (3) The regulations did not provide an option within restricted access that would impose ongoing landing requirements as a condition of renewing a permit. The Department did not support this concept because it would encourage fishing effort that may not otherwise happen. (4) It is the Commission's policy that each restricted access program be reviewed at least every four years, and if appropriate, revised to ensure that it continues to meet the objectives of the State and the fishery participants. The MLMA requires a review of each marine fishery every four years. (FGC §7065(a).)

Table 1-2 Summary of public comment received from 19 July 2004 through 27 August 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Robert Zuanich, Executive Director, PSVOA	letter dated 27 August 2004 (similar to comment in letter dated 4 May 2004)	C-3. PSVOA maintains that permits established under either criterion (see C-1) should be fully transferable; however, this approach does not accelerate an ultimate capacity goal. For this reason, PSVOA would support an alternative that made grandfathered permits non-transferable.	See response to C-1 and C-2(1).
Robert Zuanich, Executive Director, PSVOA	letter dated 27 August 2004 (similar to comment in letter dated 4 May 2004)	C-4. PSVOA supports the DFG limited entry criteria for light boat permits provided that criteria is supplemented to provide for an equal number of vessel and light boat permits. Therefore, current vessel permit holders who do not qualify for a vessel permit on or after April 1, 2004, should qualify for a light boat permit based on total landings between January 1, 1990, and December 31, 2002.	The Commission adopted a market squid vessel capacity goal of 55 for both transferable and non-transferable permits. The Commission also adopted the capacity goal for light boat and brail permits to be combined to equal the capacity goal for vessel permits and to maintain the approximate 1:1 ratio of vessels to light boats. This will allow a moderately productive and specialized fleet and would be less disruptive in terms of displacing vessels from the fishery and, thus, reduce impacts on fishing communities. PSVOA's recommendation for "supplemental vessels" was outside the scope of the regulatory options provided for the Commission's consideration. Moreover, the Department proposed only the use of logbook records to demonstrate participation in the fishery by light boats, given that light boats do not actually land fish unless it is by brail.
Robert Zuanich, Executive Director, PSVOA	letter dated 27 August 2004 (similar to comment in letter dated 4 May 2004)	C-5. PSVOA supports an 118,000 seasonal catch limited based on a recent three year average catch.	The Commission adopted a seasonal catch limit of 118,000 short tons but directed the Department to re-evaluate the catch limit in two years because of concerns for the lack of knowledge regarding squid stock abundance.

Table 1-2 Summary of public comment received from 19 July 2004 through 27 August 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Robert Zuanich, Executive Director, PSVOA	letter dated 27 August 2004 (similar to comment in letter dated 4 May 2004)	C-6. PSVOA supports trip limits to improve quality, price stability, and capacity goal objectives. If not imposed in the initial MSFMP, then it should be a focus item for the Advisory Committee.	The Commission chose not to establish daily trip limits at this time. The Department did not recommend the establishment of daily trip limits because the seasonal harvest limit had not been taken in recent years; therefore, there was not a race between vessels to land the allowable limit in as short of time as possible. Furthermore, fish processors implement their own trip limits as needed to regulate the amount of squid delivered per day.
Robert Zuanich, Executive Director, PSVOA	letter dated 27 August 2004 (similar to comment in letter dated 4 May 2004)	C-7. PSVOA supports continued statewide closure of the fishery from noon Friday to noon Sunday.	The Commission chose to continue closures from noon Friday to noon Sunday from the U.S.-Mexico border to the California-Oregon border. The statewide weekend closure is an environmentally protective, precautionary measure to provide spawning squid at least two consecutive nights each week respite from fishing pressure.
Robert Zuanich, Executive Director, PSVOA	letter dated 27 August 2004 (similar to comment in letter dated 4 May 2004)	C-8. PSVOA opposes the setting aside of additional areas for harvest replenishment. Current and potential new set asides under the Marine Life Protection Act, weekend closures, and further restriction of vessel permits will provide ample resource protection.	The Commission decided to leave general habitat and seabird closures to the MPA process; however, they did choose to establish an area closure restricting the use of attracting lights for commercial purposes in any waters off the Gulf of the Farallones National Marine sanctuary as currently described/defined on August 27, 2004.
Robert Zuanich, Executive Director, PSVOA	letter dated 27 August 2004 (similar to comment in letter dated 4 May 2004)	C-9. PSVOA supports relatively high and uniform fees to reach capacity goal objectives and fund necessary DFG research.	See response to C-2(2).

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Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Robert Zuanich, Executive Director, PSVOA	letter dated 27 August 2004 (similar to comment in letter dated 4 May 2004)	C-10. PSVOA does not believe that the Department's options adequately address the issue of gear restrictions. They maintain that vessels could utilize more environmentally benign fishing gear without sacrificing efficiency or productivity, and the issue should be a focus item for the Advisory Committee.	FGC 8606 provides for the development and testing of experimental gear independent of this FMP. Net restrictions do not clearly address a specific management need or goal and would be very program-intensive to enforce. The combination of MPAs, weekend closures, a seasonal catch limit, and a restricted access program is more effective in minimizing fishery impacts, resulting in reduced fishing effort on specific spawning aggregations and in other sensitive locations. Also, the Department is generally reluctant to recommend or develop a management measure without identifying an anticipated benefit of such a measure. However, the advisory committee is the correct entity for future evaluation of such a comment.
Robert Zuanich, Executive Director, PSVOA	letter dated 27 August 2004 (similar to comment in letter dated 4 May 2004)	C-11. PSVOA supports establishment of a broad based advisory committee which could work in concert with the PFMC advisory committee for other coastal pelagic species.	The Commission adopted the establishment of one advisory committee for the squid fishery, which includes scientific, environmental, and industry representatives.
Ernest S. Pagan, market squid light boat operator	verbal testimony provided to Commission dated 4 May 2004 (similar to comment in letter dated 3 May 2004)	C-12. Does not support a qualifying time period for light boat permits of January 1, 2000, to December 31, 2002. The window period for limited entry should be extended to include new participants.	Taking into consideration the need to reduce the current market squid fleet size, the Commission chose the following criteria for the initial issuance of transferable market squid light boat permits: (1) submitted at least one market squid light boat logbook from dated on or prior to December 31, 2000, and (2) the possession of a current 04/05 market squid vessel permit.
Ernest S. Pagan, market squid light boat operator	verbal testimony provided to Commission dated 4 May 2004 (similar to comment in letter dated 3 May 2004)	C-13. The proposed permit fee of $5,000 is too high especially for those vessel types with limited landing capability.	See response to C-2(2).

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Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Ernest S. Pagan, market squid light boat operator	verbal testimony provided to Commission dated 4 May 2004	C-14. Supports Option A.6, which does not set a seasonal catch limitation.	See response to C-5.
Diane Pleschner-Steele, California Wetfish Producers Association (CWPA)	verbal testimony provided to Commission dated 4 May 2004	C-15. Supports the goals and objectives of the MSFMP.	Comment noted.
Diane Pleschner-Steele, CWPA	verbal testimony provided to Commission dated 4 May 2004	C-16. Does not support the proposed permit fee of $5,000 because the money will not go towards squid research.	See response to C-2(2).
Diane Pleschner-Steele, CWPA	verbal testimony provided to Commission dated 4 May 2004	C-17. Does not support the general habitat closure north of Pillar Point (Option Q.3) because the mobile nature of the squid resource requires flexibility for the fishermen.	See response to C-8.
Donald Brockman, California Squid Fishermen's Association	verbal testimony provided to Commission dated 27 August 2004 (similar to verbal testimony provided at the San Pedro Special Hearing dated 13 August 2004 and to Commission dated 4 May 2004)	C-18. Does not support the proposed permit fee of $5,000 because it would be a hardship to fishermen. Would support a permit fee of around $1,000 and an increase in the landing tax.	See response to C-2(2).

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Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Donald Brockman, California Squid Fishermen's Association	verbal testimony provided to Commission dated 27 August 2004 (similar to verbal testimony provided at the San Pedro Special Hearing dated 13 August 2004 and to Commission dated 4 May 2004)	C-19. Does not support additional harvest replenishment and area and time closures.	See response to C-8
David Couch, San Diego fisherman	verbal testimony provided to Commission dated 4 May 2004	C-20. Author's comment mirrors C-18.	See response to C-2(2).
David Couch, San Diego fisherman	verbal testimony provided to Commission dated 4 May 2004	C-21. Does not support Department's preferred alternative, Option K.3, which establishes transferability of market squid permits to a vessel of larger capacity under a "2 for 1" permit retirement.	See response to C-2(1).
Frank J. Hestor, PhD, consultant to California Wetfish Producers Association (CWPA)	verbal testimony provided to Commission dated 4 May 2004 (similar to comment in letter dated 22 April 2004)	C-22. At this time, supports the combination of the proposed cap on landings, at the level recommended by the Department, and continued monitoring of egg escapement.	See response to C-5. The Commission chose to monitor the fishery through the egg escapement method while pursuing a biomass estimate of market squid at an egg escapement threshold level required in the CPS FMP.

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Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Frank J. Hestor, PhD, consultant to California Wetfish Producers Association (CWPA)	verbal testimony provided to Commission dated 4 May 2004 (similar to comment in letter dated 22 April 2004)	C-23. Does not support the general habitat closure north of Pillar Point (Option Q.3) because (1) squid is only one of a complex mix of forage animals; therefore, there is ample forage available despite the growth of the squid fishery in recent years and (2) the economic impact of the preferred option could be greater than the FMP suggests because the use of a long-term average of landings from north of Pillar Point down-weights the value of the recent catch.	See response to C-8. (1) As part of the 1997 Legislation enacted to protect the market squid resource, the Department was directed to determine where there are areas, if any, that should be declared harvest replenishment areas. Harvest replenishment and general habitat closures provide for specific areas where no squid fishing can occur and provide areas of uninterrupted spawning. In addition, general habitat closures are intended to prevent squid fishery interactions in areas that have not been traditionally utilized for commercial squid fishing and where there is the potential for interactions with non-targeted species such as salmon, seabirds, and marine mammals. (2) The speaker is correct that the value of recent catch is down-weighed when an average over many years is taken. However, if catches occurred in only one of the past six years in any magnitude, it is not reasonable to expect that a vessel would come to rely on the ability to make that catch in the future. Department catch data indicate that catches in 2003 north of the Monterey area were anomalous and unprecedented. While it is possible they may be repeated in some future years, the Department considered this loss in terms of future opportunity for expansion into these areas, rather than a loss of an area that has been historically productive.

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Frank J. Hestor, PhD, consultant to California Wetfish Producers Association (CWPA)	verbal testimony provided to Commission dated 4 May 2004 (similar to comment in letter dated 22 April 2004)	C-24. Does not support the Department's preferred alternative, Option R.4., which establishes area and time closures restricting the use of attracting lights around Anacapa and Santa Barbara islands from February through September, because the need for this action is not well supported by published literature.	See response to C-8. Option R was selected as a recommended precaution by the Department considering the best scientific information that was available without substantially delaying the preparation of the plan. (FGC § 7072(b).) However, as recognized by the market squid legislation, information on this resource is limited, and the FMP addresses this with a research and monitoring component. As knowledge increases or additional management needs become apparent, the FMP will allow the Commission to react quickly to changes in the status of the resource or the fishery. The Department also supports efforts by other agencies or researchers to measure noise and other activities to determine if the squid fishery is impacting seabird colonies in the Channel Islands.
Frank Bertoni, commercial fisherman	verbal testimony provided to Commission 27 August 2004 (similar to comment in letters dated 22 April 2004 and 2 June 2004)	C-25. Does not support the Department's preferred alternative, Option Q.3, which closes the waters north of Pillar Point to commercial squid fishing.	See response to C-8.
Frank Bertoni, commercial fisherman	letter dated 2 June 2004 (similar to comment in letter dated 22 April 2004)	C-26. Does not support the proposed permit fee of $5,000 because it eliminates the small market squid fishermen. Instead, the author would like to increase the squid landing fee from $3.75 per ton to $20.00 plus per ton.	See response to C-2(2).
Frank Bertoni, commercial fisherman	letter dated 2 June 2004 (similar to comment in letter dated 22 April 2004)	C-27. Does not support restricted access.	The possibility of a restricted access program was contemplated by the Legislature in the market squid legislation, as well as in the MLMA. (FGC §§7082(b), 8420(e), 8426(c).)

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Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Hannah Nevins, seabird biologist	letter dated 4 May 2004	C-28. Supports Option A.3, which establishes regional season catch limitations based on a multi-year recent average catch for each region, especially if it takes into consideration an environmentally-dependent model, such as based on upwelling indices or sea surface temperatures. The preferred option (Option A.2) does not take into account environmental variability. Would like to modify the tonnage limit by consumption estimates for marine birds and mammals.	See response to C-5.
Hannah Nevins, seabird biologist	letter dated 4 May 2004	C-29. Supports the establishment of a fishery observer program to document potential effects on sensitive wildlife, particularly marine birds and mammals.	Currently, vessel owners or operators in the California purse seine fisheries are subject to the federal observer program under the Marine Mammal Protection Act (MMPA) and the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA). In June 2004, vessel owners and operators received notice from NMFS stating that a mandatory observer program had been instated. Under this program, observers will collect data on the interactions between California purse seine fishing gear and protected species, particularly marine mammals, sea turtles, and sea birds as well as target and non-target fish species.

Table 1-2 Summary of public comment received from 19 July 2004 through 27 August 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Hannah Nevins, seabird biologist	letter dated 4 May 2004	C-30. (1) There should be a limit to the number of light boats per seiner, or (2) the total wattage should account for all boats within a given time.	(1) The Commission adopted a market squid vessel capacity goal of 55 for both transferable and non-transferable permits. The Commission also adopted the capacity goal for light boat and brail permits to be combined to equal the capacity goal for vessel permits and to maintain the approximate 1:1 ratio of vessels to light boats. This will allow a moderately productive and specialized fleet and would be less disruptive in terms of displacing vessels from the fishery and, thus, reduce impacts on fishing communities. (2) Limiting the total wattage emitted by the fleet at any given time is not feasible as a management measure. Outside of weekend closure and proposed seasonal closure restrictions, the Department does not specify when or how many vessels may engage in squid fishing or lighting at a particular time, nor is there any reasonable way to track such information.
Hannah Nevins, seabird biologist	letter dated 4 May 2004	C-31. Replenishment areas should be set aside in southern, central and northern California. (1) Establish replenishment areas within known spawning areas, and (2) establish replenishment areas that are also important for marine bird and mammal foraging (i.e. northern Monterey Bay, Gulf of the Farallones).	See response to C-8. The 12 MPAs at the northern Channel Islands include known commercial squid fishing sites at Santa Barbara, Anacapa, Santa Cruz, and Santa Rosa islands. Approximately 14-19 percent of prior Southern California squid catches were in areas that are now permanently off-limits to squid fishing. In addition to the closures at the northern Channel Islands, commercial fishermen are not allowed to fish in state designated ecological reserves using roundhaul nets. Several existing reserves are known to be market squid spawning sites (e.g., Carmel Bay Ecological reserve, Point Lobos Ecological reserve, northeast side of Santa Catalina Island, and Santa Monica Bay); all serve as harvest replenishment areas for market squid.

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Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Hannah Nevins, seabird biologist	letter dated 4 May 2004	C-32. None of the proposed alternatives offer uniform protection to all sensitive seabird nesting habitats. Option R.4 should be extended to include a buffer zone (one nm) applied to all seabird colonies, including the Channel Islands, Big Sur, Gulf of the Farallones, and Pt. Reyes. The time of closure should also be extended to 30 November to avoid potential light-related mortality of fledgling chicks and adult ashy storm-petrels (Option R.10).	See response to C-8. The seasonal closures were designed to provide various levels of protection to multiple seabird species which may have reduced, threatened, or endangered population levels. While the Department did not provide a specific option that would close all the seabird colonies of the Channel Islands, or an option that would close Big Sur, the Department's bird staff made decisions on which colony areas were most sensitive and thereby most deserving of seasonal closure protection. If new information becomes available, addition closures (or openings) can be considered.

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Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Daniel L. Williams, commercial fisherman	verbal testimony provided to Commission dated 27 August 2004 (similar to comment in letter dated 7 June 2004)	C-33. Currently, there is a need for light boats in the fishery because many of the seiners do not have a light boat to work with to their consternation. As a full-time fisherman for the past 24 years, the author would like to see a similar non-transferable or transferable permit option for the light boat permit.	See response to C-30(1). Taking into consideration the need to reduce the current market squid fleet size, the Commission chose the following criteria for the initial issuance of a non-transferable market squid brail permit: (1) have been a California Commercial Fishermen for at least 20 years, and (2) made at least 10 brail landings in a single fishing season between January 1, 2000, and March 31, 2000. However, since the Commission directed the Department to publish a continuation notice of intent to provide additional alternatives and amendments to the proposed commercial squid fishery regulations [Section 149.1(c)(2), Title 14, CCR], the Department will also re-notice the non-transferable market squid brail permit criteria to make consistent with the non-transferable market vessel permit criteria Under the 20-year fishermen provision, landing data maintained by the Department is an appropriate basis for documenting fishery participation (FGC § 8101). Because the Department cannot verify historical participation by an individual in the squid light boat fishery before 1999 by evaluating landing receipts, there was no provision in the restricted access options to issue 20-year fishermen non-transferable light boat owner permits. At this time, light boat logs are the only uniform method available to the Department for evaluating prior performance in the light boat fishery.

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Speaker/ Organization	Comment Format	Summary of Comment	Department Response
David W. Tibbles, commercial fisherman	letter dated 11 May 2004	C-34. Would like clarification on the initial issuance of market squid vessel permits based on the 20-year fishermen provision.	During the August 27, 2004 Commission meeting, the Commission directed the Department to publish a continuation notice of intent to provide additional alternatives and amendments to the proposed commercial squid fishery regulations [Section 149.1(c)(2), Title 14, CCR]. The new option for a non-transferable market squid vessel permit includes the following criteria: (1) the possession of an 04/05 market squid vessel permit, (2) the possession of a California Commercial Fishing License for at least 20 years, and (3) made at least [20-75] landings during any one season within the window periods listed. An alternative is also presented with the following criteria: (1) the possession of an 04/05 market squid vessel permit, (2) the possession of a California Commercial Fishing License for at least 20 years, and (3) made at least [20-150] total landings prior to August 27, 2004.
Richie Aiello, vessel owner	verbal testimony provided at the Monterey Special Hearing dated 23 July 2004	C-35. Monterey boats were forced to fish other areas due to the large number of vessels fishing in such a small area. They historically looked above Pigeon Pt, but they normally did not have to fish the area.	Comment noted.
Richie Aiello, vessel owner	verbal testimony provided at the Monterey Special Hearing dated 23 July 2004	C- 36. Many bought permits as real estate with no intention of fishing.	Comment noted.
Orlando Amoroso, President, Southern California Commercial Fishing Association (SCCFA)	verbal testimony provided to Commission dated 27 August 27 (similar to verbal testimony provided at the Monterey Special Hearing dated 23 July 2004)	C-37. Need clear grandfather criteria. Would also like to see a list of the qualifying boats and a list of proposed grandfather boats.	See response to C-33 and C-34. The Department cannot release the names of fishermen who would qualify for the restricted access program because public disclosure of the names is prohibited under Fish and Game Code section 8022(a).

Table 1-2 Summary of public comment received from 19 July 2004 through 27 August 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Joe Capuccio, processor	verbal testimony provided at the Monterey Special Hearing dated 23 July 2004	C-38. There will be a federal observer program soon. Use their information as a supplement to documented research.	The observer data will be made available to the Department and, if applicable, will be used for future management and research needs. Also, see response to C-29.
Joe Capuccio, processor	verbal testimony provided at the Monterey Special Hearing dated 23 July 2004	C-39. There are fewer boats fishing now than when the MSFMP began. Times are different and new rules should apply.	Comment noted.
Joe Capuccio, processor	verbal testimony provided at the Monterey Special Hearing dated 23 July 2004	C-40. Increased fees will cripple small boats and allow for large corporate owned boats to take over.	See response to C-2(2).
Joe Capuccio, processor	verbal testimony provided at the Monterey Special Hearing dated 23 July 2004	C-41. Wants to know if anyone has considered the impacts of an exploding marine mammal population on squid.	The best available data indicate that squid continue to serve as a primary source of forage even at times when the fishery is also utilizing the resource. Squid comprise a substantial portion of the diet of California sea lions during times that the fishery is landing high volumes of squid, there is no evidence to indicate that the squid resource is limited, and not fulfilling its role as a forage item even as sea lion populations continue to grow at a rate of approximately 5% per year. The Department acknowledges that squid is an important source of prey for many species as identified in the Predator/Prey relationship section (Section 2.1.6) of the MSFMP.
David Crabbe, vessel owner and representative for the Monterey squid fleet	verbal testimony provided to Commission dated 27 August 27 (similar to verbal testimony provided at the Monterey Special Hearing dated 23 July 2004)	C-42. Proposes the following qualifying period for initial issuance of market squid vessel permits: made at least 50 landings between January 2000 and March 2003 and hold a 04/05 market squid permit.	See response to C-1.

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Speaker/ Organization	Comment Format	Summary of Comment	Department Response
David Crabbe, vessel owner and representative for the Monterey squid fleet	verbal testimony provided at the Monterey Special Hearing dated 23 July 2004	C-43. There should be an appeals process. This will allow markets to keep most of their boats, and current active boats would qualify.	Initial issuance appeals are provided for in the regulations (Section 149.1(e), Title 14, CCR).
David Crabbe, vessel owner and representative for the Monterey squid fleet	verbal testimony provided at the Monterey Special Hearing dated 23 July 2004	C-44. Proposed $5,000 fee is too high. This will increase overhead costs, create hardship, and eliminate boats.	See response to C-2(2).
David Crabbe, vessel owner and representative for the Monterey squid fleet	verbal testimony provided at the Monterey Special Hearing dated 23 July 2004	C-45. The proposed weekend closure (District 16) (Option D.5) is to give fishermen and processors a break, which prevents 24 hour fishing activity. The proposal was not conceived as a conservation measure.	See response to C-7.
David Crabbe, vessel owner and representative for the Monterey squid fleet	verbal testimony provided to Commission dated 27 August 2004 (similar to verbal testimony provided at the San Pedro Special Hearing dated 16 August 2004 [presented by Don Brockman])	C-46. Does not support the closure north of Pillar Point (Option Q.3). Fishermen are willing to fish around the Farallon Islands with no lights.	See response to C-8.
Ernest Pagan, market squid light boat operator	verbal testimony provided at the Monterey Special Hearing dated 23 July 2004	C-47. Have a 60-year age exemption to get permit if don't qualify under initial issuance.	The regulations did have an option within restricted access that would give fishermen a squid vessel permit based on just age alone. The Department did not support this concept because it would encourage fishing effort that may not otherwise happen. Also, see response to C-33 and C-34.
Ernest Pagan, market squid light boat operator	verbal testimony provided at the Monterey Special Hearing dated 23 July 2004	C-48. Wants to know how the grandfather clause will work for light boats that fished prior to when logs were required.	See response to C-33.

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Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Diane Pleschner-Steele, CWPA	verbal testimony provided at the Monterey Special Hearing dated 23 July 2004	C-49. Closure options should be based upon evidence.	The Harvest Replenishment/General Closure Areas (Option Q) and the Area and Time Closures to Address Seabird Issues (Option R) were presented in the FMP using the best scientific information that was available without substantially delaying the preparation of the plan. (FGC § 7072(b).) However, as recognized by the market squid legislation, information on this resource is limited, and the FMP addresses this with a research and monitoring component. As knowledge increases or additional management needs become apparent, the FMP will allow the Commission to react quickly to changes in the status of the resource or the fishery. Also, see response to C-8.
Diane Pleschner-Steele, CWPA	verbal testimony provided at the Monterey Special Hearing dated 23 July 2004	C-50. Fishermen and processors can't agree on fleet size. Fishermen want fewer boats and processors want more boats. Processors would like around 70 vessels with a limited number of grandfather permits.	See response to C-1 and C-2(1).
William J. Sydeman, Director Marine Ecology Division, PRBO Conservation Science	e-mail dated 6 August 2004	C-51. The cap (118,000 tons) proposed by the Department (Option A.2) is biased high because it reflects catch during three very productive years (1999-2002). The use of a limited time series to estimate LTPY is a flawed approach. Therefore, the squid fishery must be managed adaptively by establishing seasonal catch limitations based on environmental conditions.	See response to C-5. The Department agrees that it would be ideal to base the catch limit on environmental conditions (i.e., El Niño) to prevent overfishing. However, environmental conditions are near-impossible to predict as well as their effects on living marine populations. El Niño Southern Oscillations (ENSO) events are a highly variable phenomenon, lasting from 12-18 months, and the time between events ranges from two to seven years. In addition, the strength of the warming events varies greatly from event to event. Limiting the fishery based on an unpredictable phenomenon would likely have no impact on the resource because the low availability of squid significantly reduces fishing effort.

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Speaker/ Organization	Comment Format	Summary of Comment	Department Response
William J. Sydeman, Director Marine Ecology Division, PRBO Conservation Science	e-mail dated 6 August 2004	C-52. The Department's preferred Option Q.3 closes the fishery north of Pillar Point. This is appropriate to protect the ecosystem of the Gulf of the Farallones/Cordell Bank National Marine Sanctuaries but places great pressure on squid resources of the southern California Bight.	See response to C-8.
Julie A. Thayer, Ph.D. candidate, Marine Ecology Division, PRBO Conservation Science	letter dated 12 August 2004	C-53. Author's comment mirrors C-51.	See response to C-51.
Julie A. Thayer, Ph.D. candidate, Marine Ecology Division, PRBO Conservation Science	letter dated 12 August 2004	C-54. Squid are central prey for marine birds and mammals as well as for recreationally and commercially valuable predatory fish populations in the California Current System. As mandated by the Marine Life Management Act and Magnuson-Stevens act, management of the market squid fishery must be based on an ecosystem perspective. This means that the needs of ecologically dependent species must be taken into account when setting fishery quotas and producing other regulatory actions.	See response to C-5, C-8, and C-41.

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Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Julie A. Thayer, Ph.D. candidate, Marine Ecology Division, PRBO Conservation Science	letter dated 12 August 2004	C-55. Supports Option E.1, which continues the existing squid monitoring program. Additionally, recommends a monitoring program for non-target species to assess ecological consequences of implemented regulations.	Taking into consideration the need to monitor the fishery to improve the development of management models, the Commission decided to maintain the current port sampling and logbook requirements.
Julie A. Thayer, Ph.D. candidate, Marine Ecology Division, PRBO Conservation Science	letter dated 12 August 2004	C-56. Supports Option B.1, which monitors the fishery through the egg escapement methods while pursuing a biomass estimate of market squid at an egg escapement threshold level required in the CPS FMP.	The Commission chose to monitor the fishery through the egg escapement method while pursuing a biomass estimate of market squid at an egg escapement threshold level required in the CPS FMP.
Julie A. Thayer, Ph.D. candidate, Marine Ecology Division, PRBO Conservation Science	letter dated 12 August 2004	C-57. Supports Option D.4, which maintains statewide weekend closures and extends the range of closure to include additional days and/or times for areas north of Point Conception.	See response to C-7.
Julie A. Thayer, Ph.D. candidate, Marine Ecology Division, PRBO Conservation Science	letter dated 12 August 2004	C-58. Supports Option F.2, which establishes a permit for the taking of market squid as live bait.	Because the volume of squid taken as live bait is small, the Commission did not adopt the establishment of a live-bait permit at this time.

Table 1-2 Summary of public comment received from 19 July 2004 through 27 August 2004.			
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Julie A. Thayer, Ph.D. candidate, Marine Ecology Division, PRBO Conservation Science	letter dated 12 August 2004	C-59. Supports gear restrictions that would set a wattage limitation of 15,000 watts for vessels fishing for squid and lighting for squid. Also supports Option G.4, which would establish gear restrictions that state that each vessel fishing for squid and lighting for squid will utilize shielding that will reduce the light scatter of its fishing operations by shielding the entire filament of each light used to attract squid and orient the illumination directly downward or provide for the illumination to be completely below the surface of the water.	The Commission decided to maintain the current wattage requirements (30,000 watts); however, they chose to require the lower edges of the light shields to be parallel to the dock (Option G.4).
Julie A. Thayer, Ph.D. candidate, Marine Ecology Division, PRBO Conservation Science	letter dated 12 August 2004	C-60. Supports Option H.3, which establishes a capacity goal for market squid vessels that produces a moderately productive and specialized fleet.	See response to C-30(1).
Julie A. Thayer, Ph.D. candidate, Marine Ecology Division, PRBO Conservation Science	letter dated 12 August 2004	C-61. Supports the adoption of both Option Q.2, which closes all waters within depths of 100 fathoms around San Nicolas Island, and Option Q.4, which states that squid may not be taken for commercial purposed in any waters of the Gulf of the Farallones National Marine Sanctuary.	See responses to C-8.

Table 1-2 Summary of public comment received from 19 July 2004 through 27 August 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Julie A. Thayer, Ph.D. candidate, Marine Ecology Division, PRBO Conservation Science	letter dated 12 August 2004	C-62. Supports Option R.2, which establishes area and time closures restricting squid fishing around Anacapa and Santa Barbara Islands from 1 February through 30 September (1 nm closure), in addition to an extra provision that establishes area and time closures restricting squid fishing around major seabird colonies in the Monterey Bay National Marine Sanctuary from 1 February through 30 September (1 nm closure), including Año Nuevo Island.	See response to C-8. Area and time closures restricting squid fishing around major seabird colonies in the Monterey Bay National Marine Sanctuary and around Año Nuevo Island were not included in the range of regulation options that were under consideration by the Commission.
Donald Brockman, California Squid Fishermen's Association	verbal testimony provided at the San Pedro Special Hearing dated 13 August 2004	C-63. Supports the fishermen's alternative plan of 50 delivers from January 1, 2000, through March 31, 2003. Also feels that the brail criteria should also be from January 1, 2000, through March 31, 2003 with 5 to 10 deliveries.	See response to C-1. Taking into consideration the need to reduce the current market squid fleet size, the Commission chose the following criteria for the initial issuance of a non-transferable market squid brail permit: (1) have been a California Commercial Fishermen for at least 20 years, and (2) made at least 10 brail landings in a single fishing season between January 1, 2000, and March 31, 2000. However, since the Commission directed the Department to publish a continuation notice of intent to provide additional alternatives and amendments to the proposed commercial squid fishery regulations [Section 149.1(c)(2), Title 14, CCR], the Department will also re-notice the non-transferable market squid brail permit criteria to make consistent with the non-transferable market vessel permit criteria.

Table 1-2 Summary of public comment received from 19 July 2004 through 27 August 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Donald Brockman, California Squid Fishermen's Association	verbal testimony provided to Commission dated 27 August 2004 (similar to verbal testimony provided at the San Pedro Special Hearing dated 13 August 2004)	C-64. Supports Option A.2, which established a statewide quota of 118,000 tons.	See response to C-5.
Donald Brockman, California Squid Fishermen's Association	verbal testimony provided at the San Pedro Special Hearing dated 13 August 2004	C-65. Supports Option G.1, which maintains existing gear option regarding shields and wattage (30,000 watts).	See response to C-59.
Peter Divona, Long Beach processor	verbal testimony provided at the San Pedro Special Hearing dated 13 August 2004	C-66. Author's comments mirror C-63.	See response to C-63.
Peter Divona, Long Beach processor	verbal testimony provided at the San Pedro Special Hearing dated 13 August 2004	C-67. Author's comments mirror C-44	See response to C-2(2).
Rich Ashley, market squid vessel operator	verbal testimony provided at the San Pedro Special Hearing dated 13 August 2004	C-66. Author's comments mirror C-63.	See response to C-63.

Table 1-2 Summary of public comment received from 19 July 2004 through 27 August 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Chris Mobley, Channel Islands National Marine Sanctuary (CINMS)	letter dated 16 August 2004	C-67. The Sanctuary is concerned that the Department's preferred option (Option A.2) of 118,000 tons is not "risk-neutral" and has the potential for adverse stock and environmental effects. They believe that a more prudent approach would be to use a more representative time frame for setting a catch limit, on the order of the last 10 years of catch which includes dramatic environmental conditions and the rapid expansion of the fishery. Therefore, they support Option A.1, which establishes a seasonal catch limitation of 80,000 tons, to better protect the integrity of the marine ecosystem in the Sanctuary and the long-term sustainability of the fishery.	See response to C-5.
Chris Mobley, CINMS	letter dated 16 August 2004	C-68. Supports the Department's preferred option (Option D.1) for continuation of the weekend closures, including the Sanctuary waters.	See response to C-7.

Table 1-2 Summary of public comment received from 19 July 2004 through 27 August 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Chris Mobley, CINMS	letter dated 16 August 2004	C-69. Supports continued squid monitoring to improve the development of management models and provide a better understanding of squid population dynamics. The Sanctuary also recommends that the Department in collaboration with the squid industry, academia and agency partners such as the Sanctuary, enhance fishery-independent monitoring	See response to C-55. The Department supports research collaboration with the fishing industry, other agencies, and academia.
Chris Mobley, CINMS	letter dated 16 August 2004	C-70. Supports the continuation of existing gear restriction on light wattage and shielding (Option G.1)	See response to C-59.
Chris Mobley, CINMS	letter dated 16 August 2004	C-71. Supports the establishment of a capacity goal; however, the goal should be commensurate with the catch limitation and based on the Sanctuary's recommendation for a lower catch limit the capacity target would have to be recalculated.	See response to C-30(1).

Table 1-2 Summary of public comment received from 19 July 2004 through 27 August 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Chris Mobley, CINMS	letter dated 16 August 2004	C-72. Supports Option R.1, which establishes area and time closures restricting squid fishing around Anacapa, Santa Barbara, and San Miguel Islands from 1 February through 30 September (1 nm). In addition, the Sanctuary recommends consideration of year round closures at the above islands given the seasonal variability among species and from year to year due to natural causes (i.e. El Nino Events).	See response to C-24.
Orlando Amoroso, SCCFA	verbal testimony provided to Commission dated 27 August 27 (similar to comment in letter dated 23 August 2004)	C-73. Recommends a compromise that would accept the Monterey proposal as written (50 landings, 1/1/2000-3/31/2003 window period) without excluding those historic fishermen that have already qualified for initial issuance under the Department's preferred position (50 landings, 1/1/1990-11/12/1999 window period).	See response to C-1.
Orlando Amoroso, SCCFA	letter dated 23 August 2004	C-74. Supports a grandfather clause that is based not so much on "how many" but "how fair". The association is sympathetic to the needs of those fishermen that have pioneered and contributed to the success of the squid fishery…but may miss initial issuance of transferable permits due to extreme circumstances or factors beyond their control.	See response to C-33 and C-34.

Table 1-2 Summary of public comment received from 19 July 2004 through 27 August 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Orlando Amoroso, SCCFA	verbal testimony provided to Commission dated 27 August 27 (similar to comment in letter dated 23 August 2004)	C-75. Supports a permit fee of $400.	See response to C-2(2).
Michael J. Bovovina, purse seine vessel owner	letter received 23 August 2004	C-76. Supports a 20-year window period from 1984 through 2004 for initial issuance.	See response to C-1.
Michael J. Bovovina, purse seine vessel owner	letter received 23 August 2004	C-77. All permits should be transferable.	See response to C-2(1). By not allowing transferable permits, the attrition of the fleet would be more rapid; however, it will likely not meet the practical needs of working vessels and can have implications for vessel safety. Transferable permits would promote conservation among fishery participants, provide for an orderly fishery, and maintain long-term economic viability of the fishery.
Sean Hastings, CINMS	verbal testimony provided to Commission dated 27 August 2004	C-78. Author's comment mirror C-67.	See response to C-5.
Sean Hastings, CINMS	verbal testimony provided to Commission dated 27 August 2004	C-79. Author's comment mirror C-68.	See response to C-7.
Sean Hastings, CINMS	verbal testimony provided to Commission dated 27 August 2004	C-80. Author's comment mirror C-69.	See response to C-69.
Sean Hastings, CINMS	verbal testimony provided to Commission dated 27 August 2004	C-81. Author's comment mirror C-70.	See response to C-59.
Sean Hastings, CINMS	verbal testimony provided to Commission dated 27 August 2004	C-82. Author's comment mirror C-71.	See response to C-30(1).

Table 1-2 Summary of public comment received from 19 July 2004 through 27 August 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Sean Hastings, CINMS	verbal testimony provided to Commission dated 27 August 2004	C-83. Author's comment mirror C-72.	See response to C-24.
Kate Wing, NRDC	verbal testimony provided to Commission dated 27 August 2004	C-84. Does not like the MSY approach for squid because the Restrepo, et al (1998) guidelines were established for longer lived species. Would rather see squid managed by egg escapement and time and area closures coupled with a catch limitation that is not fixed.	See response to C-5, C-8, and C-56.
Kate Wing, NRDC	verbal testimony provided to Commission dated 27 August 2004	C-85. The MSY option is not consistent with current law (MLMA) because there is no optimum yield (OY) calculation in the plan.	See response to C-5.
Karen Reyna, The Ocean Conservancy	verbal testimony provided to Commission dated 27 August 2004	C-86. The catch limitation recommended by the Department (Option A.2) is too high. Would rather see Option A.1 used as a calculator with the catch limitation set year to year.	See response to C-5.
Karen Reyna, The Ocean Conservancy	verbal testimony provided to Commission dated 27 August 2004	C-87. Supports a maximum wattage limitation of 15,000 watts.	See response to C-59.
Karen Reyna, The Ocean Conservancy	verbal testimony provided to Commission dated 27 August 2004	C-88. Does not support such a large area closure for District 10. Does support an area closure for the Gulf of Farallons only if a lower catch limitation is chosen coupled with other area closures around the Channel Islands.	See responses to C-8.

Table 1-2 Summary of public comment received from 19 July 2004 through 27 August 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Zeke Grader, Executive Director PCFFA	verbal testimony provided to Commission dated 27 August 2004	C-89. Supports a catch limitation of 100,000 tons, with area quotas of 1,000 tons (for an experimental fishery) above Pt. Arena and 99,000 tons for the remainder of California.	See response to C-5. Area quotas were not included in the range of regulatory options that were under consideration by the Commission.
Zeke Grader, Executive Director PCFFA	verbal testimony provided to Commission dated 27 August 2004	C-90. Supports limited entry (55 vessel permits/52 light boat permits) with 2 to 3 permits for a north coast experimental fishery.	See response to C-30(1). Because the Commission did not close the area north of Pillar Point to the squid fishery, they decided to establish up to three non-transferable experimental gear fisher permits for the north coast.
Zeke Grader, Executive Director PCFFA	verbal testimony provided to Commission dated 27 August 2004	C-91. Would like to keep permit fees between $1,000 and $2,500 and would also like to increase the landing tax.	See response to C-2(2).
Zeke Grader, Executive Director PCFFA	verbal testimony provided to Commission dated 27 August 2004	C-92. Supports a four day fishery for District 10 and 16, Monday 1200-Friday 1200.	See response to C-7.
Zeke Grader, Executive Director PCFFA	verbal testimony provided to Commission dated 27 August 2004	C-93. Supports the establishment of areas closed to squid vessels using attracting lights around the Farallons and/or Pt. Reyes (2 nm closure).	See response to C-8.
Zeke Grader, Executive Director PCFFA	verbal testimony provided to Commission dated 27 August 2004	C-94. Author's comments mirror C-59.	See response to C-59.
Zeke Grader, Executive Director PCFFA	verbal testimony provided to Commission dated 27 August 2004	C-95. Supports a 40 ton trip limit.	See response to C-6.

Table 1-2 Summary of public comment received from 19 July 2004 through 27 August 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Diane Pleschner-Steele, CWPA	verbal testimony provided to Commission dated 27 August 2004	C-96. Supports Option A.2, which would establish a catch limitation of 118,000 tons, because (1) the catch limitation is based on the best available science, (2) squid are found coast-wide, (3) squid are genetically homogenous, (4) females show evidence of spawning at least once before catch, and (4) El Nino is unpredictable and the resource has shown to manage itself during this event.	See response to C-5.
Diane Pleschner-Steele, CWPA	verbal testimony provided to Commission dated 27 August 2004	C-97. Does not support additional area and time closures because many fishing spots are already closed by the MPA's.	See response to C-8.
David Crabbe, vessel owner and representative for the Monterey squid fleet	verbal testimony provided to Commission dated 27 August 2004	C-98. Supports a District 16 closure from 1200 Friday - 1200 Monday.	See response to C-7.
David Crabbe, vessel owner and representative for the Monterey squid fleet	verbal testimony provided to Commission dated 27 August 2004	C-99. Supports a catch limitation of 100,000 tons.	See response to C-5.
Kathy and Steve Fosmark, commercial fishers	verbal testimony provided to Commission dated 27 August 2004	C-100. Wants grandfather qualifications to allow current permit holders with no landing qualifications.	See response to C-33 and C-34.

Table 1-2 Summary of public comment received from 19 July 2004 through 27 August 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Pete Dupuy, commercial fishermen	verbal testimony provided to Commission dated 27 August 2004	C-101. For the grandfather clause, would like the Commission to consider the following criteria (1) holds a current 04/05 market squid permit, (2) made a minimum of 40 landings prior to August 27, 2004, and (3) has had a CFL for at least 20 years.	See response to C-34.
Mike McHenry, commercial fisherman	verbal testimony provided to Commission dated 27 August 2004	C-102. Would like to see District 10 left open for squid fishing.	See responses to C-8.
Terrance Mines, market squid light boat operator	verbal testimony provided to Commission dated 27 August 2004	C-103. Does not support weekend closures. With all the closures, would like to be able to fish weekends.	See response to C-7. The statewide weekend closure is an environmentally protective, precautionary measure to provide spawning squid at least two consecutive nights each week respite from fishing pressure. Eliminating weekend closures might increase fishing pressure despite disproportionately at various times during the season.
Terrance Mines, market squid light boat operator	verbal testimony provided to Commission dated 27 August 2004	C-104. The permit fees are too high.	See response to C-2(2).
Terrance Mines, market squid light boat operator	verbal testimony provided to Commission dated 27 August 2004	C-105. Author's comment mirrors C-77.	See response to C-77.
Dan Yoakum, San Francisco Roe on Kelp Advisor	verbal testimony provided to Commission dated 27 August 2004 (similar to comment in letter dated 25 February 2004)	C-106. Supports an experimental fishery (5 transferable permits) and would like to establish a squid fishery in Fort. Bragg	See response to C-90.

Table 1-2 Summary of public comment received from 19 July 2004 through 27 August 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Dan Yoakum, San Francisco Roe on Kelp Advisor	verbal testimony provided to Commission dated 27 August 2004	C-107. Author's comment mirrors C-25.	See response to C-8.
Dan Yoakum, San Francisco Roe on Kelp Advisor	verbal testimony provided to Commission dated 27 August 2004 (similar to comment in letter dated 25 February 2004)	C-108. Author's comment mirrors C-87.	See response to C-59.
Dan Yoakum, San Francisco Roe on Kelp Advisor	verbal testimony provided to Commission dated 27 August 2004 (similar to comment in letter dated 25 February 2004)	C-109. Keep all existing squid permits; however, permits should be issued to squid fishermen by region with the Fort Bragg region being defined with the northern boundary approximately at Cape Mendocino and the southern boundary with three possibilities: Pt. Reyes, Gualala, or Pt. Arena.	See response to C-1, C-12, and C-33. A regional restricted access program was not included in the range of regulation options that were under consideration by the Commission.
Frank Mateljan, representative for Tri Marine International Inc.	verbal testimony provided to Commission dated 27 August 2004	C-110. Does not support area and time closures.	See response to C-8.
Frank Mateljan, representative for Tri Marine International Inc.	verbal testimony provided to Commission dated 27 August 2004	C-111. Does not support squid catch limitations because industry and resource is resilient.	See response to C-5.
Tim Sullivan, commercial fisherman	verbal testimony provided to Commission dated 27 August 2004	C-112. Supports the establishment of areas closed to squid vessels using attracting lights around the Farallons and/or Pt. Reyes. Does not support Option Q.3, which closes squid fishing north of Pillar Point.	See responses to C-8.

Table 1-2 Summary of public comment received from 19 July 2004 through 27 August 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Tim Sullivan, commercial fisherman	verbal testimony provided to Commission dated 27 August 2004	C-113. Author's comment mirrors C-87.	See response to C-59.
Tim Sullivan, commercial fisherman	verbal testimony provided to Commission dated 27 August 2004	C-114. Supports the Department's initial issuance criteria for market vessel permits (possession of a current market squid vessel permit and made at least 50 landings between 1/1/1990-11/12/1999).	See response to C-1.
Kate Falkner signed for Russel E. Galipeau, Jr., Superintendent , Channel Islands National Park	letter dated 3 August 2004	C-115. Does not consider the suggested quota of 118,000 to be "risk neutral". They recommend that the State adopt the 80,000 ton limit (Option A.1) as an interim step to using an adaptive, in-season management system based on egg escapement monitoring.	See response to C-5 and C-56.
Kate Falkner signed for Russel E. Galipeau, Jr., Superintendent , Channel Islands National Park	letter dated 3 August 2004	C-116. Supports continued monitoring for the squid fishery and egg escapement because monitoring is important for tracking and understanding the impacts from this fishery and the status of populations.	See response to C-56.
Kate Falkner signed for Russel E. Galipeau, Jr., Superintendent , Channel Islands National Park	letter dated 3 August 2004	C-117. Supports limiting the fleet size because it is important to the natural resources and to the economics of the individual fishermen not to overcapitalize this fishery.	See response to C-1, C-12, C-30(1), and C-33.

Table 1-2 Summary of public comment received from 19 July 2004 through 27 August 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Kate Falkner signed for Russel E. Galipeau, Jr., Superintendent , Channel Islands National Park	letter dated 3 August 2004	C-118. Agree with the recommendation of the MSFMP Peer Review Panel that a) a fixed annual quota be treated as a transitional management took and b) this fixed annual quota be spit by region at Point Conception.	See response to C-5.
Kate Falkner signed for Russel E. Galipeau, Jr., Superintendent , Channel Islands National Park	letter dated 3 August 2004	C-119. An observer program is needed to document fishery interactions with wildlife, monitor by-catch, and independently verify the data reported through other sources.	See response to C-29.
Kate Falkner signed for Russel E. Galipeau, Jr., Superintendent , Channel Islands National Park	letter dated 3 August 2004	C-120. Supports weekend closures for the purpose of giving spawning aggregations a rest and want to be sure that the islands are included in the weekend closures.	See response to C-7.
Kate Falkner signed for Russel E. Galipeau, Jr., Superintendent , Channel Islands National Park	letter dated 3 August 2004	C-121. Recommends that live bait operations be included in the squid catcher vessel permit system. Also, recommends that expanded data collection from the live bait fishery is needed.	See response to C-58. The volume of squid taken as live bait is small; however, bait logs would provide information about the impact of this industry on the resource and it is recommended that the current voluntary live bait logs be modified to include market squid. These logs will be evaluated to verify that squid remains a minor component of the live bait industry.

Table 1-2 Summary of public comment received from 19 July 2004 through 27 August 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Kate Falkner signed for Russel E. Galipeau, Jr., Superintendent , Channel Islands National Park	letter dated 3 August 2004	C-122. Encourages the Commission to support research into the effects of light on seabirds and other organisms. In the interim, they support Option G.4, which would establish gear restrictions for each vessel fishing for squid and light for squid that will utilize shielding that will reduce the light scatter of its fishing operations by shielding the entire filament of each light used to attract squid and orient the illumination directly downward, or provide for the illumination to be completely below the surface of the water. This option should be further reviewed in three years after further study into alternative gear to reduce light.	See response to C-59. The MSFMP does have a research and monitoring component. However, the Department also supports efforts by other agencies or researchers to determine if the squid fishery is impacting seabird colonies at the Channel Islands.
Kate Falkner signed for Russel E. Galipeau, Jr., Superintendent , Channel Islands National Park	letter dated 3 August 2004	C-123. Supports establishing area and time closures restricting squid fishing around Anacapa, Santa Barbara, and San Miguel Islands (1 nm). They also strongly recommend expansion of seasonal closures to the entire year to protect both seabird and pinniped populations present throughout the year.	See response to C-8.

1.2.2 Comments received from 1 February 2004 through 19 July 2004

Summary of Public Comment on Proposed Addition of 53.00 et seq, 149.1, 149.2, 149.3, and 149.4, And Amendment of Section 149, Title 14, CCR; Re: Market Squid Fishery Management Plan (MSFMP, dated 12 April 2004)
1 February 2004 through 19 July 2004

Table 1-3 Summary of public comment received from 1 February 2004 through 19 July 2004.

Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Robert Zuanich, Executive Director, Purse Seine Vessel Owners Association (PSVOA)	letter dated 4 May 2004	C-1. The PSVOA supports criteria for initial issuance that qualifies persons possessing a current valid permit and who made at least 50 landings between January 1, 1990, to December 31, 2002, or who fall under the 20 year grandfather provision.	Comment noted. The Commission may select from a reasonable range of regulatory options for the initial issuance of permits (Option I.1) or may continue with the current moratorium (Option I.2) The Department, however, is recommending a slightly more restrictive criterion for initial issuance of 50 landings between January 1, 1990 and November 12, 1999.
Robert Zuanich, Executive Director, PSVOA	letter dated 4 May 2004	C-2. The PSVOA proposes that a reduced number of vessel permits and ultimate capacity goal be implemented over a 3-5 year period utilizing the following: (1) permit holders may move to larger capacity vessels, which will require ownership of a second permit and absorption of potential latent permits, (2) establish a relatively high permit fee that will discourage ownership for speculative purposes, (3) impose ongoing landing requirements as condition of renewing the permit, and (4) re-evaluate the limited entry program in 2007 to determine if the program is achieving capacity goal objectives.	(1) The Commission may select from a range of options for the transferability of a squid permit (vessel, light boat, and brail) based on other determinations within the MSFMP, including capacity goal and initial limited entry permit issuance criteria. The Department is recommending Option K.3 which would establish full transferability of market squid vessel permits based on comparable capacity (within 10%) and would also establish transferability of market squid vessel permits to a vessel of larger capacity under a "2 for 1" permit retirement. 2) The Commission may select from a wide range of annual permit fees ($400-$5,000) based on the costs to manage the market squid fishery. Also, see response to C-9. (3) Rejected. Currently, the regulations do not have an option within restricted access that would impose ongoing landing requirements as a condition of renewing a permit. The Department does not support this concept because it would encourage fishing effort that may not otherwise happen. (4) Comment noted. It is the Commission's policy that each restricted access program be reviewed at least every four years, and if appropriate, revised to ensure that it continues to meet the objectives of the State and the fishery participants. The MLMA requires a review of each marine fishery every four years. (FGC §7065(a).)

Table 1-3 Summary of public comment received from 1 February 2004 through 19 July 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Robert Zuanich, Executive Director, PSVOA	letter dated 4 May 2004	C-3. PSVOA maintains that permits established under either criterion (see C-1) should be fully transferable; however, this approach does not accelerate an ultimate capacity goal. For this reason, PSVOA would support an alternative that made grandfathered permits non-transferable.	Comment noted. See response to C-2 (1). The comment expresses the Association's support for the Department's preferred alternative that would designate grandfathered permits as non-transferable.
Robert Zuanich, Executive Director, PSVOA	letter dated 4 May 2004	C-4. PSVOA supports the DFG limited entry criteria for light boat permits provided that criteria is supplemented to provide for an equal number of vessel and light boat permits. Therefore, current vessel permit holders who do not qualify for a vessel permit on or after April 1, 2004, should qualify for a light boat permit based on total landings between January 1, 1990, and December 31, 2002.	Comment noted. The Department is proposing that the capacity goal for light boat and brail permits be combined to equal the capacity goal for vessel permits and to maintain the approximate 1:1 ratio of vessels to light boats. The Department anticipates 55 light and brail boats to qualify for initial permit issuance against the 52-boat goal and is recommending that light boats only be transferable at the ratio of 2:1 until the capacity goal is reached at which time light boat permits may be transferred freely. PSVOA's recommendation for "supplemental vessels" is outside the scope of the regulatory options provided for the Commission's consideration. Moreover, the Department has proposed only the use of logbook records to demonstrate participation in the fishery by light boats, given that light boats do not actually land fish unless it is by brail.
Robert Zuanich, Executive Director, PSVOA	letter dated 4 May 2004	C-5. PSVOA supports an 118,000 seasonal catch limited based on a recent three year average catch.	Comment noted. The comment expresses the Association's support for the Department's preferred Option A.2.
Robert Zuanich, Executive Director, PSVOA	letter dated 4 May 2004	C-6. PSVOA supports trip limits to improve quality, price stability, and capacity goal objectives. If not imposed in the initial MSFMP, then it should be a focus item for the Advisory Committee.	Comment noted. The Commission may select from a range of options for the initial issuance of permits based on the degree of productivity and specialization that they deem reasonable. In addition, the Commission can choose not to establish daily trip limits (Option C.2), or they can establish a daily trip limit ranging from 30-138 tons daily for market squid vessels and 15 tons for brail vessels (Option C.1). The Department, however, is not recommending the establishment of daily trip limits at this time because the seasonal harvest limit has not been taken in recent years; therefore, there is not a race between vessels to land the allowable limit in as short of time as possible. Furthermore, fish processors implement their own trip limits as needed to regulate the amount of squid delivered per day.

Table 1-3 Summary of public comment received from 1 February 2004 through 19 July 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Robert Zuanich, Executive Director, PSVOA	letter dated 4 May 2004	C-7. PSVOA supports continued statewide closure of the fishery from noon Friday to noon Sunday.	Comment noted. The comment expresses the Associations' support for the Department's preferred Option D.1.
Robert Zuanich, Executive Director, PSVOA	letter dated 4 May 2004	C-8. PSVOA opposes the setting aside of additional areas for harvest replenishment. Current and potential new set asides under the Marine Life Protection Act, weekend closures, and further restriction of vessel permits will provide ample resource protection.	Comment noted. The Commission may select from a range of options that offer seasonal closure areas for seabird protection (Option R), harvest replenishment areas, and/or general habitat closures (Option Q). The seasonal closure options were designed to provide various levels of protection to multiple seabird species which may have reduced, threatened, or endangered population levels. The general habitat closures are designed to prevent squid fishery interactions in areas that have not been traditionally utilized for commercial squid fishing. These areas would also serve as harvest replenishment areas. The Department is recommending a general habitat closure north of Pillar Point to the Oregon border and area and time closures restricting the use of attracting lights around Anacapa and Santa Barbara islands from February through September (one nm closure). These closures will provide for the sustainability of the resource, reduces the potential for interactions with non-target species, and offers protection to at least 12 nesting bird species, including one endangered, one candidate/threatened, and three state species of special concern.

Table 1-3 Summary of public comment received from 1 February 2004 through 19 July 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Robert Zuanich, Executive Director, PSVOA	letter dated 4 May 2004	C-9. PSVOA supports relatively high and uniform fees to reach capacity goal objectives and fund necessary DFG research.	Comment noted. The Commission may select from a reasonable range of annual permit fees ($400-$5,000) based on the costs to manage the market squid fishery. The Department recommends that all permit fees be set at $5,000, regardless of permit class (Option J.1). By law, permit fees cannot exceed the cost of managing the market squid fishery (FGC §8428.). The current baseline cost for maintaining existing Department programs that deal directly with market squid research, monitoring, enforcement, and license sales exceeds $954,000 annually. Under the Department's preferred option for initial issuance, the number of permits issued for all permit classes would be 124. At a fee of $5,000, this would generate a total of $620,000. Since this fee is less than the costs to monitor the fishery, other sources of revenue will be necessary to supplement the program. Although some revenue is generated from taxes levied on squid landings ($3.80 per ton), the source of funding is variable and dependent entirely on the success of the fishery year-to-year.
Robert Zuanich, Executive Director, PSVOA	letter dated 4 May 2004	C-10. PSVOA does not believe that the Department's options adequately address the issue of gear restrictions. They maintain that vessels could utilize more environmentally benign fishing gear without sacrificing efficiency or productivity, and the issue should be a focus item for the Advisory Committee.	Disagree. Net restrictions do not clearly address a specific management need or goal and would be very program-intensive to enforce. The combination of MPAs, weekend closures, a seasonal catch limit, and a restricted access program is more effective in minimizing fishery impacts, resulting in reduced fishing effort on specific spawning aggregations and in other sensitive locations. Also, the Department is generally reluctant to recommend or develop a management measure without identifying an anticipated benefit of such a measure. However, the advisory committee is the correct entity for future evaluation of such a comment.
Robert Zuanich, Executive Director, PSVOA	letter dated 4 May 2004	C-11. PSVOA supports establishment of a broad based advisory committee which could work in concert with the PFMC advisory committee for other coastal pelagic species.	Comment noted. The comment expresses the Association's support for the Department's preferred Option S.1.

Table 1-3 Summary of public comment received from 1 February 2004 through 19 July 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Ernest S. Pagan, market squid light boat operator	letter dated 3 May 2004 and verbal testimony provided to Commission dated 4 May 2004	C-12. Does not support a qualifying time period for light boat permits of January 1, 2000, to December 31, 2002. The window period for limited entry should be extended to include new participants.	Comment noted. The Commission may select any window period start date from June 1, 2000 to any end date from December 31, 2000, through March 31, 2003. The specified permit dates were updated to reflect the extension of the MSFMP's adoption date.
Ernest S. Pagan, market squid light boat operator	letter dated 3 May 2004 and verbal testimony provided to Commission dated 4 May 2004	C-13. The proposed permit fee of $5,000 is too high especially for those vessel types with limited landing capability.	See response to C-9.
Ernest S. Pagan, market squid light boat operator	verbal testimony provided to Commission dated 4 May 2004	C-14. Supports Option A.6, which does not set a seasonal catch limitation.	Comment noted. The Commission may choose a seasonal catch limit of 24,000 to 125,000 tons depending on the precautionary level they deem reasonable. They may also choose not to establish a season catch limitation. Although there is little information to indicate whether the fishery is or is not sustainable at the higher catch levels experienced since the mid-1990's, as a precautionary measure, it is prudent not to allow landings to expand beyond present levels without better methods to assess the status of the resource. Given the number of currently permitted squid vessels and significant excess capacity in the fleet, dramatic increases in catch could occur in a short time frame unless a safeguard is in place. In the proposed regulations (Section 53.02, Title 14, CCR), periodic monitoring and assessment of squid fisheries will be conducted, and if needed, the Department will provide management recommendations to the Commission.
Diane Pleschner-Steele, California Wetfish Producers Association (CWPA)	verbal testimony provided to Commission dated 4 May 2004	C-15. Supports the goals and objectives of the MSFMP.	Comment noted.
Diane Pleschner-Steele, CWPA	verbal testimony provided to Commission dated 4 May 2004	C-16. Does not support the proposed permit fee of $5,000 because the money will not go towards squid research.	See response to C-9.

Table 1-3 Summary of public comment received from 1 February 2004 through 19 July 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Diane Pleschner-Steele, CWPA	verbal testimony provided to Commission dated 4 May 2004	C-17. Does not support the general habitat closure north of Pillar Point (Option Q.3) because the mobile nature of the squid resource requires flexibility for the fishermen.	Comment noted. The Commission may select from a range of options that offer harvest replenishment areas and/or general habitat closures (Option Q). The general habitat closures were designed to prevent squid fishery interactions in areas that have not been traditionally utilized for commercial squid fishing. These areas would also serve as harvest replenishment areas. The Department is recommending that the area north of Pillar Point be closed to commercial squid fishing because of the Department's concern with regard to seabird interactions and the potential for bycatch of salmon. In addition, marine mammals, primarily pinnipeds, have always been associated with the squid fishery, especially when the fishery occurs near haul-out sites. This general habitat closure area would include part of Monterey Bay National Marine Sanctuary, the Gulf of the Farallones National Marine Sanctuary, Cordell Bank National Marine Sanctuary, and the Farallon Islands, a National Wildlife Refuge. The Farallon Islands are home to one of the largest and most diverse seabird colonies in the continental U.S. They provide critical nesting habitat for twelve species of seabirds. They also provide breeding habitat for five species of pinniped, including the Steller sea lion which is listed as threatened under the Federal ESA. The creation of this large general habitat closure area should maintain current forage reserves for seabirds, marine mammals, and other marine species that consume squid. In addition, any possible seabird or marine mammal interactions or bycatch problems associated with the fishery would not occur in this area.
Donald Brockman, California Squid Fishermen's Association	verbal testimony provided to Commission dated 4 May 2004	C-18. Does not support the proposed permit fee of $5,000 because it would be a hardship to fishermen.	See response to C-9.
Donald Brockman, California Squid Fishermen's Association	verbal testimony provided to Commission dated 4 May 2004	C-19. Does not support additional harvest replenishment and area and time closures.	See response to C-8
David Couch, San Diego fisherman	verbal testimony provided to Commission dated 4 May 2004	C-20. Author's comment mirrors C-18.	See response to C-9.

Table 1-3 Summary of public comment received from 1 February 2004 through 19 July 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
David Couch, San Diego fisherman	verbal testimony provided to Commission dated 4 May 2004	C-21. Does not support Department's preferred alternative, Option K.3, which establishes transferability of market squid permits to a vessel of larger capacity under a "2 for 1" permit retirement.	Comment noted. The Commission may select from range of options for the transferability of a squid permit (vessel, light boat, and brail). Transfer provisions are closely tied to issues such as capacity goal and initial limited entry permit issuance criteria. The Commission will consider the need to impose mechanisms designed to achieve the capacity goals, such as transferability and permit fees based in part upon how quickly they wish to attain those goals The proposed Option K.3 will prevent an increase in fleet capacity while allowing new vessels to enter the fishery. The transferability options will also provide for an orderly fishery, promote conservation among fishery participants, and maintain the long-term economic viability of the fishery. However, the Commission may elect to allow permit transfers to vessels of any size on a 1-for-1 basis. The Department's preferred alternative is also consistent with the federal CPS FMP.
Frank J. Hestor, PhD, consultant to California Wetfish Producers Association (CWPA)	letter dated 22 April 2004 and verbal testimony provided to Commission dated 4 May 2004	C-22. At this time, supports the combination of the proposed cap on landings, at the level recommended by the Department, and continued monitoring of egg escapement.	Comment noted. The comment expresses the author's support for the Department's preferred Options A.2 and B.1.

Table 1-3 Summary of public comment received from 1 February 2004 through 19 July 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Frank J. Hestor, PhD, consultant to California Wetfish Producers Association (CWPA)	letter dated 22 April 2004 and verbal testimony provided to Commission dated 4 May 2004	C-23. Does not support the general habitat closure north of Pillar Point (Option Q.3) because (1) squid is only one of a complex mix of forage animals; therefore, there is ample forage available despite the growth of the squid fishery in recent years and (2) the economic impact of the preferred option could be greater than the FMP suggests because the use of a long-term average of landings from north of Pillar Point down-weights the value of the recent catch.	Comment noted. The Commission may select from a range of options that offer seasonal closure areas for seabird protection (Option R), harvest replenishment areas, and/or general habitat closures (Option Q). (1) As part of the 1997 Legislation enacted to protect the market squid resource, the Department was directed to determine where there are areas, if any, that should be declared harvest replenishment areas. Harvest replenishment and general habitat closures provide for specific areas where no squid fishing can occur and provide areas of uninterrupted spawning. In addition, general habitat closures are intended to prevent squid fishery interactions in areas that have not been traditionally utilized for commercial squid fishing and where there is the potential for interactions with non-targeted species such as salmon, seabirds, and marine mammals. Implementation of the general habitat closure in all waters north of Pillar Point would eliminate any direct and indirect market squid fishery impacts to the ecosystem. (2) Comment noted. The speaker is correct that the value of recent catch is down-weighed when an average over many years is taken. However, if catches occurred in only one of the past six years in any magnitude, it is not reasonable to expect that a vessel would come to rely on the ability to make that catch in the future. Department catch data indicate that catches in 2003 north of the Monterey area were anomalous and unprecedented. While it is possible they may be repeated in some future years, the Department considers this loss in terms of future opportunity for expansion into these areas, rather than a loss of an area that has been historically productive.

Table 1-3 Summary of public comment received from 1 February 2004 through 19 July 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Frank J. Hestor, PhD, consultant to California Wetfish Producers Association (CWPA)	letter dated 22 April 2004 and verbal testimony provided to Commission dated 4 May 2004	C-24. Does not support the Department's preferred alternative, Option R.4., which establishes area and time closures restricting the use of attracting lights around Anacapa and Santa Barbara islands from February through September, because the need for this action is not well supported by published literature.	Comment noted. The Commission may select from a range of options that offer seasonal closure areas for seabird protection (Option R), harvest replenishment areas, and/or general habitat closures (Option Q). Option R was selected as a recommended precaution considering the best scientific information that is available without substantially delaying the preparation of the plan. (FGC § 7072(b).) However, as recognized by the market squid legislation, information on this resource is limited, and the FMP addresses this with a research and monitoring component. As knowledge increases or additional management needs become apparent, the FMP will allow the Commission to react quickly to changes in the status of the resource or the fishery. If Option 4 is chosen, the Department recommends monitoring the fishery through the evaluation of squid fishing logbooks to determine where the fishery is concentrated after implementation. The Department also supports efforts by other agencies or researchers to measure noise and other activities to determine if the squid fishery is impacting seabird colonies in the Channel Islands.
Frank Bertoni, commercial fisherman	letters dated 22 April 2004 and 2 June 2004	C-25. Does not support the Department's preferred alternative, Option Q.3, which closes the waters north of Pillar Point to commercial squid fishing.	See response to C-8.
Frank Bertoni, commercial fisherman	letters dated 22 April 2004 and 2 June 2004	C-26. Does not support the proposed permit fee of $5,000 because it eliminates the small market squid fishermen. Instead, the author would like to increase the squid landing fee from $3.75 per ton to $20.00 plus per ton.	See response to C-9
Frank Bertoni, commercial fisherman	letters dated 22 April 2004 and 2 June 2004	C-27. Does not support restricted access.	Comment noted. The possibility of a restricted access program was contemplated by the Legislature in the market squid legislation, as well as in the MLMA. (FGC §§7082(b), 8420(e), 8426(c).)

Table 1-3 Summary of public comment received from 1 February 2004 through 19 July 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Hannah Nevins, seabird biologist	letter dated 4 May 2004	C-28. Supports Option A.3, which establishes regional season catch limitations based on a multi-year recent average catch for each region, especially if it takes into consideration an environmentally-dependent model, such as based on upwelling indices or sea surface temperatures. The preferred option (Option A.2) does not take into account environmental variability. Would like to modify the tonnage limit by consumption estimates for marine birds and mammals.	Comment noted. Based on the best scientific information or other relevant information that can be obtained without substantially delaying the FMP, the preferred Option A.2 takes into account the level of fishing effort and ecological factors, including, but not limited to, the species' role in the marine ecosystem and oceanic conditions. (FGC §§7050(b)(5), 7072(b), 8425(a).) The Department supports a harvest policy which assumes that the stock is above B_{MSY} because available data indicate that squid continue to serve as a primary source of forage even at times when the fishery is also utilizing the resource. For example, because squid continue to comprise a substantial portion of the diet of California sea lions during times that the fishery is landing high volumes of squid, there is no evidence to indicate that the squid resource is limited and not fulfilling its role as a forage item even during the heaviest times of fishery utilization. Therefore, it does not appear that any adjustment to the allowable catch level is needed to quantitatively reserve some amount of the resource for use as forage until there is a viable estimate of the squid population size and a viable estimate of the total amount of squid consumed by predators. Additionally, regulatory options are available to the Commission for their consideration that would prevent fishing activity in some places where squid are suspected to serve an important forage role.
Hannah Nevins, seabird biologist	letter dated 4 May 2004	C-29. Supports the establishment of a fishery observer program to document potential effects on sensitive wildlife, particularly marine birds and mammals.	Comment noted. Currently, vessel owners or operators in the California purse seine fisheries are subject to the federal observer program under the Marine Mammal Protection Act (MMPA) and the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA). In June 2004, vessel owners and operators received notice from NMFS stating that a mandatory observer program has been instated. Under this program, observers will collect data on the interactions between California purse seine fishing gear and protected species, particularly marine mammals, sea turtles, and sea birds as well as target and non-target fish species.

Table 1-3 Summary of public comment received from 1 February 2004 through 19 July 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Hannah Nevins, seabird biologist	letter dated 4 May 2004	C-30. (1) There should be a limit to the number of light boats per seiner, or (2) the total wattage should account for all boats within a given time.	(1) Comment noted. The Department's preferred Option H.3 would set the capacity goal for both market squid vessel permits and market squid light boat owner permits at 52. Because brail vessels function largely as light boats and the goal of the plan is to match the number of light boats to the number of market squid vessel permits, brail vessel permits would be part of the total light boat capacity goal of 52 vessels. Therefore, there would be a one-to-one ratio between purse seine vessels and light boats. Also, see response to C-4. (2) Reject. Limiting the total wattage emitted by the fleet at any given time is not feasible as a management measure. Outside of weekend closure and proposed seasonal closure restrictions, the Department does not specify when or how many vessels may engage in squid fishing or lighting at a particular time, nor is there any reasonable way to track such information.
Hannah Nevins, seabird biologist	letter dated 4 May 2004	C-31. Replenishment areas should be set aside in southern, central and northern California. (1)Establish replenishment areas within known spawning areas, and (2) establish replenishment areas that are also important for marine bird and mammal foraging (i.e. northern Monterey Bay, Gulf of the Farallones).	Comment noted. The 12 MPAs at the northern Channel Islands include known commercial squid fishing sites at Santa Barbara, Anacapa, Santa Cruz, and Santa Rosa islands. Approximately 14-19 percent of prior Southern California squid catches were in areas that are now permanently off-limits to squid fishing. In addition to the closures at the northern Channel Islands, commercial fishermen are not allowed to fish in state designated ecological reserves using roundhaul nets. Several existing reserves are known to be market squid spawning sites (e.g., Carmel Bay Ecological reserve, Point Lobos Ecological reserve, northeast side of Santa Catalina Island, and Santa Monica Bay; all serve as harvest replenishment areas for market squid. In addition to the MPAs, the Department also provides options (under Seasonal Closure Areas for Seabird Protection, Option R, and/or Harvest replenishment Areas and/or General Habitat Closures, Option Q) that would, if adopted, prohibit the take of market squid for commercial purposes in specified northern California waters. The Department proposes that all waters north of Pillar Point be designated as a general habitat closure area year round (Option Q.3); this option would include part of the Monterey Bay National Sanctuary, the Gulf of the Farallones National Marine Sanctuary, Cordell Bank National Marine Sanctuary, and the Farallon Islands, a national refuge. Also, see responses to C-23 and C-24.

Table 1-3 Summary of public comment received from 1 February 2004 through 19 July 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Hannah Nevins, seabird biologist	letter dated 4 May 2004	C-32. None of the proposed alternatives offer uniform protection to all sensitive seabird nesting habitats. Option R.4 should be extended to include a buffer zone (one nm) applied to all seabird colonies, including the Channel Islands, Big Sur, Gulf of the Farallones, and Pt. Reyes. The time of closure should also be extended to 30 November to avoid potential light-related mortality of fledgling chicks and adult ashy storm-petrel (Option R.10).	Comment noted. The Commission may choose from a range of options that offer seasonal closure areas for seabird protection (Option R). The seasonal closures were designed to provide various levels of protection to multiple seabird species which may have reduced, threatened, or endangered population levels. While the Department does not provide a specific option that would close all the seabird colonies of the Channel Islands, or an option that would close Big Sur, the Department's bird staff made decisions on which colony areas were most sensitive and thereby most deserving of seasonal closure protection. If new information becomes available, addition closures (or openings) can be considered. Also, see response to C-24. As for Option R.10, the Department believes that the general habitat closure proposed from Pillar Point to the Oregon border (preferred Option Q.3) would satisfy the need to proposing additional protection for nesting seabirds at the Farallon Islands.

Table 1-3 Summary of public comment received from 1 February 2004 through 19 July 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Daniel L. Williams, commercial fisherman	letter dated 7 June 2004	C-33. Currently, there is a need for light boats in the fishery because many of the seiners do not have a light boat to work with to their consternation. As a full-time fisherman for the past 24 years, the author would like to see a similar non-transferable or transferable permit option for the light boat permit.	Comment noted. Under the Department's preferred Option H.3, the capacity goal for both market squid vessel permits and market squid light boat owner permits would be set at 52. Because brail vessels function largely as light boats and the goal of the plan is to match the number of light boats to the number of market squid vessel permits, brail vessel permits would be part of the total light boat capacity goal of 52 vessels. The Commission has the option to consider 20-year fishermen as part of the brail permit program, which would authorize a 20-year non-transferable permit holder to serve as a light boat. Under the 20-year fishermen provision, landing data maintained by the Department is an appropriate basis for documenting fishery participation (FGC § 8101). Because the Department cannot verify historical participation by an individual in the squid light boat fishery before 1999 by evaluating landing receipts, there is no provision in the restricted access options to issue 20-year fishermen non-transferable light boat owner permits. If the Commission feels the proposed light boat qualification criteria is too stringent, it may select a more recent window period end-date that would allow additional participants in the fishery. At this time, light boat logs are the only uniform method available to the Department for evaluating prior performance in the light boat fishery.

Table 1-3 Summary of public comment received from 1 February 2004 through 19 July 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
David W. Tibbles, commercial fisherman	letter dated 11 May 2004	C-34. Would like clarification on the initial issuance of market squid vessel permits based on the 20-year fishermen provision.	In the proposed regulations (Section 149.1, Title 14, CCR), the Commission may designate that 20 year qualifiers be non-transferable based on the following criteria: (1) consistent with Fish and Game Code Section 8101, the individual must have been licensed as a California commercial fisherman for at least 20 years at the time of application and (2) has a minimum number of landing of market squid during any one license year from [January 1, 1990 – January 1, 2000] through [November 12, 1999 – March 31, 2003]. Only receipts that demonstrate catch aboard a vessel that does not already qualify for issuance of a transferable Market Squid Vessel Permit are eligible. Only one individual may qualify per vessel, even if multiple individuals meet the specified requirements. The individual with the greatest number of landings aboard the vessel is eligible for qualification. The Commission may also elect to require that the vessel may engage in commercial squid fishing activity as authorized by the permit only when the permit holder is aboard the vessel (designated operators are not permitted).
Dan Yoakum, San Francisco Roe on Kelp Advisor	letter dated 25 February 2004	C-35. Each permitee should be limited to an annual catch not to exceed 1,000 tons. This would distribute the allowable quota evenly to each permitee and there would be less chance of over harvesting individual spawns.	Annual catch limitations were not included in the range of regulatory options that were under consideration by the Commission.
Dan Yoakum, San Francisco Roe on Kelp Advisor	letter dated 25 February 2004	C-36. Landings should not exceed 30 tons per vessel in a 24-hour period in an effort to conserve biomass in a specific area.	See response to C-35.
Dan Yoakum, San Francisco Roe on Kelp Advisor	letter dated 25 February 2004	C-37. The seine net depth should be no more than the ocean depth in which it is deployed. This is to prevent the seine net from scraping the ocean floor.	Net restrictions were not included in the range of regulatory options that were under consideration by the Commission.

Table 1-3 Summary of public comment received from 1 February 2004 through 19 July 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Dan Yoakum, San Francisco Roe on Kelp Advisor	letter dated 25 February 2004	C-38. Provisions should be made for observer's to access the squid fishery.	Currently, vessel owners or operators in the California purse seine fisheries are subject to the federal observer program under the Marine Mammal Protection Act (MMPA) and the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA). In June 2004, vessel owners and operators received notice from NMFS stating that a mandatory observer program had been instated. Under this program, observers will collect data on the interactions between California purse seine fishing gear and protected species, particularly marine mammals, sea turtles, and sea birds as well as target and non-target fish species.
Dan Yoakum, San Francisco Roe on Kelp Advisor	letter dated 25 February 2004	C-39. Advisors should be established for the proposed Fort Bragg region.	The Commission adopted the establishment of one advisory committee for the squid fishery, which includes scientific, environmental, and industry representatives.
Dan Yoakum, San Francisco Roe on Kelp Advisor	letter dated 25 February 2004	C-40. The landing tax should be increased to support enforcement and resource research on an equal balance. This would be preferable, coupled with a tolerable permit fee, to lower the burden on smaller operations.	Comment noted. By law, permit fees cannot exceed the cost of managing the market squid fishery (FGC §8428.). The current baseline cost for maintaining existing Department programs that deal directly with market squid research, monitoring, enforcement, and license sales exceeds $954,000 annually. Under the Department's preferred option for initial issuance, the number of permits issued for all permit classes would be 124. At a fee of $5,000, this would generate a total of $620,000. Since this fee is less than the costs to monitor the fishery, other sources of revenue will be necessary to supplement the program. Although some revenue is generated from taxes levied on squid landings ($3.80 per ton), the source of funding is variable and dependent entirely on the success of the fishery year-to-year.

Table 1-3 Summary of public comment received from 1 February 2004 through 19 July 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Dan Yoakum, San Francisco Roe on Kelp Advisor	letter dated 25 February 2004	C-41. The Department should eventually allow for two permits to be attached to one vessel in order to reduce fleet size.	The Commission may select from a range of options for the transferability of a squid permit (vessel, light boat, and brail) based on other determinations within the MSFMP, including capacity goal and initial limited entry permit issuance criteria. The Department is recommending Option K.3 which would establish full transferability of market squid vessel permits based on comparable capacity (within 10%) and would also establish transferability of market squid vessel permits to a vessel of larger capacity under a "2 for 1" permit retirement.

1.3 Comments and Department Responses to Draft Market Squid Fishery Management Plan (Released for Public Review 7 July 2003)

Summary of Public Comment on Proposed Addition of 53.00 et seq, 149.1, 149.2, 149.3, and 149.4,And Amendment of Section 149, Title 14, CCR;
Re: Market Squid Fishery Management Plan (MSFMP)
7 July 2003 through 1 February 2004

Table 1-4 Summary of public comment received from 7 July 2003 through 1 February 2004.

Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Kate Wing, NRDC	verbal testimony provided to Commission dated 1 August 2003.	C-1. The MSFMP is not sufficient as a CEQA document.	Disagree. The Environmental Document (ED) contained in Section 2 of the MSFMP adequately analyzes the potential environmental impacts of the preferred option, and is functionally equivalent to an EIR pursuant to CEQA. The ED presents for public review and comment the extent to which adoption and implementation of the proposed MSFMP may result in potentially significant adverse environmental impacts, and supports the conclusion that any such impacts will be reduced to a level below significance by the conservation and management measures. (FGC § 7084.)
Karen Reyna, The Ocean Conservancy	verbal testimony provided to Commission dated 1 August 2003.	C-2. Concerned about document being inadequate and that some options are incomplete.	Disagree. See response to C-1. The MSFMP is consistent with both the MLMA and the market squid legislation, and presents a reasonable range of management options for Commission consideration. These options were developed using the best scientific information that is available without substantially delaying the preparation of the plan. (FGC § 7072(b).) However, as recognized by the market squid legislation, information on this resource is limited, and the FMP addresses this with a research and monitoring component. As knowledge increases or additional management needs become apparent, the FMP will allow the Commission to react quickly to changes in the status of the resource or the fishery. This adaptive management feature is contemplated in the MLMA (§§ 90.1, 7056(g)), and the FMP allows for future amendments as necessary (§7087).

Table 1-4 Summary of public comment received from 7 July 2003 through 1 February 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Kate Wing and Karen Garrison, NRDC	letter dated 31October 2003	C-3. The NRDC would like the Department to adopt a definition of "significant effect" that is consistent with CEQA and will allow a substantive analysis of mitigation and avoidance options. They believe that a more productive approach would be to identify the possible environmental effects that are of concern to the Department and the public as significant and then analyze and articulate how these concerns are addressed under the various alternatives.	Disagree. See response to C-1. The MSFMP is consistent with the MLMA and contains an adequate environmental impact analysis for each management option. Significance criteria can be found in Section 2 of the MSFMP, the ED, Chapter 4
Zeke Grader, Executive Director PCFFA	verbal testimony provided to Commission dated 1 August 2003.	C-4. Would like a provision for at least a couple of experimental permits to take a look at the area north of Point Reyes or Point Arena. Believes that there may be three squid populations.	Comment noted. The Commission may adopt a range of options allowing the issuance of one to five transferable or non-transferable permits for the purpose of developing a squid fishery in areas previously not utilized for squid production (proposed Section 149.3, Title 14, CCR). This option was added based on the request made of the Commission by Mr. Grader. However, pursuant to FGC § 8606, the purpose of an experimental gear permit is to encourage the development of new types of fishing gear and new methods of using existing gear. The fact that a fisherman wishes to exploit a hitherto unfished area may not be grounds for the issuance of an experimental gear permit by the Commission.

Table 1-4 Summary of public comment received from 7 July 2003 through 1 February 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Kate Wing and Karen Garrison, NRDC	letter dated 31 October 2003	C-5. The NRDC recommends that the Department require an experimental permit for any boat fishing north of a line at Pillar Point. They also recommend the experimental permit section be revised to mirror state and federal guidelines for experimental fishing permits by limiting permits to one year only, with a cap on renewals, and requiring permittees to carry observers. Experimental permits should also not be transferable, regardless of the conditions chosen for standard permits.	Comment noted. The Commission has the option to designate any experimental permits as non-transferable, should they select to adopt the experimental permit option. Because any experimental permits are issued directly by the Commission, any additional criteria could be added at the Commission's discretion as a special condition of the permit. Additionally, the Department has added options Q and R (under Seasonal Closure Areas for Seabird Protection and/or Harvest Replenishment Areas and/or General Habitat Closures) that would, if adopted, prohibit the take of market squid for commercial purposes in specified northern California waters. These options are intended to protect marine species from direct and indirect squid fishery interactions in areas that have not been traditionally utilized for commercial squid fishing.
Kate Wing and Karen Garrison, NRDC	letter dated 31 October 2003	C-6. The MSFMP should explicitly state that the goals and objectives of the MLMA are the goals and objectives of the FMP and are of equal importance to the more specific goals that follow. They also believe that it may be appropriate to reference the MLMA by name in the regulations rather than using the blanket phrase "other applicable state laws".	Comment noted. The market squid legislation explicitly requires that the fishery be managed in accordance with the MLMA. (FGC § 8425(b).) However, regarding the regulations, there are many other applicable state laws beyond the MLMA that commercial and sport fishermen must abide by while taking or pursuing squid.

Table 1-4 Summary of public comment received from 7 July 2003 through 1 February 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Zeke Grader, Executive Director, Pacific Coast Federation of Fishermen's Associations (PCFFA)	verbal testimony provided to Commission dated 1 August 2003	C-7. There should be regional management for the different geographical areas (northern and southern fisheries).	Comment noted. Regional management was added as Option A.3. While it is not the preferred option, the Commission may move toward regional management for the fishery by adopting two specific regulatory provisions using regional management over the long term. First, they may select the option of adopting catch limitations which are regional for northern and southern California fisheries. Second, the Commission may adopt a regional control date for purposes of developing a future regional restricted access commercial fishery program.
Donald Brockman, Southern California Light Boat Operators	verbal testimony provided to Commission dated 1 August 2003 and verbal testimony provided to Commission dated 5 December 2003	C-8. Author's comment mirrors C-7.	See response to C-7.
Bob Strickland, United Anglers of California	letter dated 20 August 2003 (presented at the 21 August 2003 marine subcommittee meeting)	C-9. Author's comment mirrors C-7.	See response to C-7.

Table 1-4 Summary of public comment received from 7 July 2003 through 1 February 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Karen Reyna, The Ocean Conservancy	letter dated 30 July 2003 and verbal testimony provided to Commission dated 1 August 2003	C-10. Squid do not have a stock assessment; considered data-poor. The preferred option (Option A.2) assumes that biomass is above maximum sustainable yield, but there is no data to support or deny assumption.	Comment noted. The Commission has a range of seasonal catch limitations from 24,000 tons to 125,000 tons available for their consideration (Option A), and may apply whatever precautionary level they deem reasonable. The Department agrees that squid are data-poor, and the market squid legislation clearly contemplates addressing this problem (FGC §8426). However, because the market squid fishery can support landings of greater than 100,000 tons in multiple seasons (1999-2002), the stock appears robust enough to withstand high levels of landings. This is likely due to specific reproductive characteristics of squid, for which there is scientific information. The short lifespan of market squid coupled with the existence of multiple cohorts within a year suggests that the spawning biomass undergoes continuous recruitment. Therefore, a default control rule of 1.0, which assumes that the stock is above the average spawning biomass (B_{MSY}), rather than the lower value of 0.67 (Option A.1), which assumes that the stock is above the minimum stock size threshold (MSST) but below B_{MSY}, is most likely appropriate for this species. The Department further recommends that the preferred option be applied to the fishery in conjunction with monitoring the fishery through the egg escapement method, which would give forewarning of any overharvest, and that any seasonal catch limit be reviewed periodically.
Karen Reyna, The Ocean Conservancy	letter dated 30 July 2003 and verbal testimony provided to Commission dated 1 August 2003	C-11. There is no reduction in average catch based on socioeconomic or biological considerations.	Disagree. Both socioeconomic and biological considerations were taken into account for all options. Preferred Option A.2 will not cause significant economic impacts to businesses and is considered a "risk-neutral" approach to long-term sustainability.

Table 1-4 Summary of public comment received from 7 July 2003 through 1 February 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Karen Reyna, The Ocean Conservancy	letter dated 30 July 2003 and verbal testimony provided to Commission dated 1 August 2003	C-12. The proposed project should endorse regional management based on Monterey landings for 2002/2003 and 2003/2004 seasons.	Disagree. Establishing separate regional catch limits is not warranted at this time for two reasons. First, the smaller fishery in the northern region is not preempted by the catch in the southern region, so continuing with a statewide limit does not create a "race for fish." The northern fishery typically harvests squid from April through September while the southern fishery does not begin catching squid until October. Because the squid season begins 1 April, the northern (smaller) fishery would not be impacted by a statewide quota. Second, from a biological perspective, squid harvested in the northern and southern fisheries are identical. No scientific information to date suggests that squid from southern and northern fisheries are from genetically distinct stocks. The lengths, weights and sex ratios are similar between regions. Although spawning peaks are at different times of the year for these regions, the temperature and depth of egg deposition is comparable between regions. If additional biological evidence indicates that there are two distinct biological stocks of squid, regional landings catch limits can be revisited. However, a regional catch limitation (Option A.3) and a regional control date (Option P.1) are included in the regulatory options presented to the Commission for their consideration.

Table 1-4 Summary of public comment received from 7 July 2003 through 1 February 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Karen Reyna, The Ocean Conservancy	letter dated 30 July 2003 and verbal testimony provided to Commission dated 1 August 2003	C-13. The preferred option (Option A.2) does not take into account the importance of squid in the ecosystem. Squid are food for many species of birds, marine mammals, and fish (rockfish and lingcod), but the environmental analysis does not mention all species of fish that feed on squid.	Comment noted. Based on the best scientific information or other relevant information that can be obtained without substantially delaying the FMP, preferred Option A.2 takes into account the level of fishing effort and ecological factors, including, but not limited to, the species' role in the marine ecosystem and oceanic conditions. (FGC §§ 7050(b)(5), 7072(b), 8425(a).) While the Department supports a harvest policy which assumes that the stock is above B_{MSY} (see response to C-10), available data indicate that squid continue to serve as a primary source of forage even at times when the fishery is also utilizing the resource. As an example, because squid continue to comprise a substantial portion of the diet of California sea lions during times that the fishery is landing high volumes of squid, there is no evidence to indicate that the squid resource is limited, and not fulfilling its role as a forage item. Therefore, it does not appear that any adjustment to the allowable catch level is needed to quantitatively reserve some amount of the resource for use as forage until there is a viable estimate of the squid population size, and a viable estimate of the total amount of squid consumed by predators. However, the Department acknowledges that squid is an important source of prey for many species; therefore, the Predator/Prey relationship section (Section 2.1.6) of the MSFMP now includes an extended analysis of squid as forage for other species of birds, marine mammals, and fish and an analysis of squid as predators. Additionally, regulatory options are also now available to the Commission for their consideration that would prevent fishing activity in some places where squid are suspected to serve an important forage role.

Table 1-4 Summary of public comment received from 7 July 2003 through 1 February 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Karen Reyna, The Ocean Conservancy	verbal testimony provided to Commission dated 1 August 2003	C-14. The Department should include a new option in the MSFMP that combines Option A.3 and the concept of Option A.1.	Agree. The Commission may select from a wide range of regional catch limitations (see Table 3-6) based on the precautionary level they deem reasonable.
Bob Strickland, United Anglers of California	verbal testimony provided to Commission dated 1 August 2003	C-15. Would like to know, under Option A.2, what the total tons taken would be if the bait fishery was included. He is concerned about the amount of squid taken from environment.	Comment noted. Estimates of tonnage and value are not available because the sale of live bait in California is not documented by landing receipts as is the case for the market landings of squid (FGC §8041 (c). However, the volume of squid taken as live bait is believed to be small in relation to the overall fishery.
Bob Strickland, United Anglers of California	letter dated 20 August 2003 (presented at the 21 August 2003 marine subcommittee meeting)	C-16. The United Anglers of California believe that the proposed maximum take of 118,000 tons (Option A.2) is too high.	See response to C-10.
Dan Yoakum, San Francisco Roe on Kelp Advisor	letter dated 16 September 2003	C-17. The author recommends a three-ton limit for open access with a cap per region to equalize opportunity.	Disagree. The two-ton incidental allowance was determined by the market squid legislation to be adequate for non-directed or small-scale fishery operations. (FGC §8421(b).) Promoting open-access opportunity directly conflicts with the goal of an orderly and sustainable fishery. The possibility of a restricted access program was contemplated by the Legislature in the market squid legislation, as well as in the MLMA and in the Commission's Restricted Access Policy. (FGC §§ 7082(b), 8420(e), 8426(c).)

Table 1-4 Summary of public comment received from 7 July 2003 through 1 February 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Diane Pleschner-Steele, California Wetfish Producers Association (CWPA)	letter dated 20 October 2003	C-18. The CWPA supports the Department's preferred alternative of 118,000 tons (Option A.2) because a maximum catch limitation at or near the upper bound of recent fishery performance allows optimum yield to be achieved in times of squid abundance, while preventing unbridled expansion. They also state that the preferred alternative will enhance the fishery's ability to maintain flexibility and foster economic stability and enhanced profitability during times of squid abundance.	Comment noted. The comment expresses support for the Department's preferred Option A.2.
Kate Wing and Karen Garrison, NRDC	letter dated 31 October 2003	C-19. The NRDC believes that the statewide catch level of 125,000 tons is too high and does not reflect the ecosystem importance of squid or the large gaps in our knowledge.	Comment noted. The Commission may choose a seasonal catch limit of 24,000 to 125,000 tons depending on the precautionary level they deem reasonable. The Department's preferred Option A.2 establishes a seasonal catch limitation of 118,000 short tons. See related response to C-10.
Kate Wing and Karen Garrison, NRDC	letter dated 31 October 2003	C-20. The NRDC is unclear on the text that refers to a "recent three-year average" as the 117,833 ton figure because it does not include the 2002-2003 season.	Disagree. The 2002-2003 season was not included in the "recent three-year" average because the data was preliminary and did not reflect the actual amount of squid that was landed during the season. The current revision includes the 2002-2003 season in its analysis.

Table 1-4 Summary of public comment received from 7 July 2003 through 1 February 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Kate Wing and Karen Garrison, NRDC	letter dated 31 October 2003	C-21. The NRDC supports the new regulations that would establish control dates for regional restricted access (Option P.1) and reinstate the 12-hour closure for Monterey (Option D.4).	Comment noted. The Commission may establish a control date for regional restricted access (Option P.1) (proposed Section 149.4, Title 14, CCR). In addition, the Commission may choose from a reasonable range of options regarding additional closure periods for the fishery north of Point Conception (Option D.4). These include an option to extend the current closure of the fishery in that area which is closed from noon on Friday to noon on Sunday. (FGC § 8420.5.) Another option establishes 12-hour closure periods on open fishing days in waters north of Point Conception.
Diane Pleschner-Steele, CWPA	letter dated 20 October 2003.	C-22. The CWPA supports the Department's preferred alternative (Option B.1), which monitors the fishery through the egg escapement method while pursuing a biomass estimate of market squid at an egg escapement threshold level required in the CPS FMP. They also support the 30 percent egg escapement model threshold and state that it is an appropriate proxy in the absence of better information.	Comment noted. The comment expresses support for the Department's preferred Option B.1.

Table 1-4 Summary of public comment received from 7 July 2003 through 1 February 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Dan Yoakum, San Francisco Roe on Kelp Advisor, and Frank Bertoni, commercial fisherman	letters dated 16 September 2003 and 12 November 2003 and verbal testimony provided to Commission dated 5 December 2003	C-23. The Department should have boat limits based on years (500 to 1,000 ton per year boat limit) and days (30 to 50 ton per day boat limit) to protect individual spawning areas.	Comment noted. The Department has not included any options for individual annual quotas for vessels at this time. As indicated in the Commission's formal Restricted Access Policy, individual fishery quotas raise complex, controversial issues that would further slow implementation of this regime without substantively contributing to its present management effectiveness. Seasonal catch limitations (Option A.2) and daily trip limits (Option C. 1) are two alternatives available to the Commission to limit the catch, and are less program intensive. Weekend closures (Option D.1) and a restricted access program (Option H.2) also serve to reduce fishing effort on specific spawning aggregations and locations. Currently, the majority of landings are driven by market orders, if either market squid vessels or brail vessels improve their harvesting capability, establishing a daily trip limit should be reviewed if it is not adopted at this time.
Diane Pleschner-Steele, CWPA	letter dated 20 October 2003	C-24. The CWPA supports the Department's preferred alternative (Option C.2), which does not establish trip limits, because squid daily harvest is generally self-limited by market orders set by processors.	Comment noted. The comment expresses support for the Department's preferred Option C.2. However, if either market squid vessels or brail vessels improve their harvesting capability, establishing a daily trip limit should be reviewed if it is not adopted at this time.
Dan Yoakum, San Francisco Roe on Kelp Advisor	letter dated 16 September 2003 and verbal testimony provided to Commission dated 5 December 2003	C-25. There should be weekend closures in southern California but no closures in northern California because weather slows the catch naturally.	Disagree. The statewide weekend closure is a more environmentally protective, precautionary measure to provide spawning squid at least two consecutive nights each week respite from fishing pressure. Eliminating weekend closures might increase fishing pressure despite poor weather conditions in northern California. However, the Commission has the option to eliminate the current weekend closure provision in the scope of options presented (Option D.2).

Table 1-4 Summary of public comment received from 7 July 2003 through 1 February 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Diane Pleschner-Steele, CWPA	letter dated 20 October 2003	C-26. The CWPA supports the Department's preferred alternative (Option D.1), which continues closures from noon Friday to noon Sunday statewide. They state that time closures are generally preferable to reductions in harvest opportunity through quota or "max cap" (seasonal catch limitation) restriction.	Comment noted. The comment expresses support for the Department's preferred Option D.1.
Diane Pleschner-Steele, CWPA	letter dated 20 October 2003	C-27. The CWPA supports the Department's preferred alternative (Option E.1), which continues the existing monitoring programs.	Comment noted. The comment expresses support for the Department's preferred Option E.1.
Diane Pleschner-Steele, CWPA	letter dated 20 October 2003	C-28. The CWPA supports the Department's preferred alternative (Option F.1), which continues regulations that do not require squid permits when fishing for live bait or incidental take of 2 tons or less. However, several CWPA members believe that everyone who harvests the squid resource should bear some financial responsibility for management costs.	Comment noted. The comment expresses support for the Department's preferred Option F.1.

Table 1-4 Summary of public comment received from 7 July 2003 through 1 February 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Kate Wing and Karen Garrison, NRDC	letter dated 31 October 2003	C-29. They recommend that the Commission adopt a permit system for the live bait fishery, and they support the proposed regulations (Sec. 149.2).	Comment noted. Preferred Option F.1 would continue existing regulations that do not require a squid permit when fishing for live bait or incidental take of 2 tons or less. Option F.2 would establish a permit for taking of market squid as live bait. The Department is recommending Option F.1 because it is consistent with the market squid legislation (FGC § 8421(b) and permitting of this comparatively small component of the fishery is not presently indicated.
Kate Wing and Karen Garrison, NRDC	letter dated 31 October 2003	C-30. The NRDC strongly disagrees with the Department's preferred alternative (Option Q.1), which does not set aside additional areas specifically for harvest replenishment, because of the uncertainty surrounding squid populations	Agree. The Department is now proposing that the waters north of Pillar Point be designated as a general habitat closure area (Option Q.3). The Commission may choose from a reasonable range of options that offer seasonal closure areas for seabird protection (Option R), harvest replenishment areas, and/or general habitat closures (Option Q). The seasonal closure options were designed to provide various levels of protection to multiple seabird species which may have reduced, threatened, or endangered population levels. The general habitat closures are designed to prevent squid fishery interactions in areas that have not been traditionally utilized for commercial squid fishing. These areas would also serve as de facto harvest replenishment areas.

Table 1-4 Summary of public comment received from 7 July 2003 through 1 February 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Kate Wing and Karen Garrison, NRDC	letter dated 31 October 2003	C-31. The NRDC supports closing the area around the Farallon Islands to protect seabirds and marine mammals. They would also like the language in the MSFMP to include an expansion of the harvest replenishment zone section to discuss other types of closures and the rationales for them.	Agree. The Department proposes that the waters north of Pillar Point be designated as a general habitat closure area (Option Q.3). The Commission may choose from a reasonable range of options that offer seasonal closure areas for seabird protection (Option R), harvest replenishment areas, and/or general habitat closures (Option Q). The seasonal closure options were designed to provide various levels of protection to multiple seabird species which may have reduced, threatened, or endangered population levels. The general habitat closures are designed to prevent squid fishery interactions in areas that have not been traditionally utilized for commercial squid fishing. These areas would also serve as de facto harvest replenishment areas.
Diane Pleschner-Steele, CWPA	letter dated 20 October 2003	C-32. The CWPA supports the Department's preferred alternative (Option Q.1), which does not set aside additional areas specifically for harvest replenishment of market squid. They feel that the squid resource is already well protected by other existing time and area closures and by implementing a reasonable harvest limit.	Disagree. In the current version of the MSFMP, the Department has changed its preferred alternative from Option Q.1 to Q.3. The Department proposes that the waters north of Pillar Point be designated as a general habitat closure area (Option Q.3). The Commission may choose from a reasonable range of options that offer seasonal closure areas for seabird protection (Option R), harvest replenishment areas, and/or general habitat closures (Option Q). The seasonal closure options were designed to provide various levels of protection to multiple seabird species which may have reduced, threatened, or endangered population levels. The general habitat closures are designed to prevent squid fishery interactions in areas that have not been traditionally utilized for commercial squid fishing. These areas would also serve as de facto harvest replenishment areas.

Table 1-4 Summary of public comment received from 7 July 2003 through 1 February 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Diane Pleschner-Steele, CWPA	letter dated 20 October 2003	C-33. Processors have agreed to support the 52 vessel capacity goal (Option H.3) with the understanding that a limited number of additional active vessels would also qualify under the grandfather clause. However, they believe that the 52 vessel capacity goal should be a considered a conservative estimate. Processors believe that a fleet number of 65-75 active vessels, including a combination of limited-entry transferable permits plus active grandfathered vessels, would provide sufficient product to insure that all markets would have an equitable opportunity to obtain squid.	Comment noted. The comment expresses support for the Department's preferred Option H.3.
Karen Reyna, The Ocean Conservancy	verbal testimony provided to the Commission dated 1 August 2003	C-34. The Department should have an option that deals with regional management in restricted access.	See response to C-7.
Dan Yoakum, San Francisco Roe on Kelp Advisor, and Frank Bertoni, commercial fisherman	letters dated 16 September 2003 and 12 November 2003 and verbal testimony provided to Commission dated 5 December 2003	C-35. Author's comment mirrors C-34.	See response to C-7.

Table 1-4 Summary of public comment received from 7 July 2003 through 1 February 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Dan Yoakum, San Francisco Roe on Kelp Advisor	letter dated 16 September 2003	C-36. The Department should eventually allow for two permits to be attached to one vessel in order to reduce fleet size.	Comment noted. The proposed restricted access program provides two mechanisms to reduce the current fleet size without substantially disrupting the current squid fleet. First, the preferred option (Option I.1) would allow permit issuance only to vessels with specified levels of prior catch history. These permits would be transferable to vessels of similar capacity. Second, where transfer is sought to a vessel of greater capacity, the transfer would require that two permits be attached to a single vessel. This "two for one" transfer mechanism should lead to a gradual reduction in the fleet size over time.
Dan Yoakum, San Francisco Roe on Kelp Advisor	letter dated 16 September 2003	C-37. Leave existing permits and allow for a northern California permit issuance coupled with a two year landing requirement of 10 to 15 landings of four tons each.	Comment noted. The Commission may continue the current permit moratorium (Option I.2) but that would not achieve the desired reduction in fleet size. Establishing a separate northern California permit program which would require 10-15 landings as a condition of renewal is not consistent with the goals or objectives of the MSFMP, as this would serve to increase fishing effort in areas of northern California that previously have not sustained a great deal of commercial squid fishing pressure. The Department is not recommending expansion of the fishery into unutilized areas due to forage concerns and the potential for adverse environmental impacts to marine living resources (Option Q.3); rather, it is recommending a reduction in the current fleet size to increase productivity within the existing fishery.
Frank Bertoni, commercial fisherman	letter dated 15 September 2003	C-38. The author opposes the proposed restricted access regulations and would prefer to limit the catch per vessel rather than limit the number of vessels.	Comment noted. The Commission may select from a range of options for the initial issuance of permits based on the degree of productivity and specialization that they deem reasonable. The Commission has the option of continuing the current moratorium (Option I.2). In addition, the Commission can choose not to establish daily trip limits (Option C.2), or they can establish a daily trip limit ranging from 30-138 tons daily for market squid vessels and 15 tons for brail vessels (Option C.1).

Table 1-4 Summary of public comment received from 7 July 2003 through 1 February 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Diane Pleschner-Steele	CWPA, letter dated 20 October 2003	C-39. CWPA members would like to update the initial issuance criteria to specify 50 (or some number) landings in the last three fishing seasons. They believe that the number of initial qualifiers in today's active fleet would be equal to or fewer than 71 vessels.	Comment noted. At its December 16, 2003 special meeting, the Commission authorized the Department to publish a continuation notice of intent to provide additional alternatives and amendments to the proposed commercial squid fishery regulations including extending the Initial Issuance window period to March 31, 2003 (currently January 1, 1990-December 31, 2002) [Section 149.1(c)(3), Title 14, CCR]. The original range of catch history dates and volumes reflect the options presented to the Commission in the Draft MSFMP in August 2003. In developing those options, the Department prepared a reasonable range of window period and catch criteria options.
John Wilkes, squid light boat operator	email dated 21 October 2003	C-40. The author suggests that to qualify for a market squid light boat owner permit one must have returned one log book in during the proposed qualifying period with his or her person named as the operator. He also suggests that light boat operators be involved in the grandfather clause action.	Comment noted. The Commission has the option to consider 20-year fishermen as part of the light boat fleet. However, market squid vessel permits are issued only to the vessel owner and cannot be issued to the light boat operator. As for the 20-year fishermen provision, landing data maintained by the Department is an appropriate basis for documenting fishery participation (FGC § 8101). Because the Department cannot verify historical participation of a light boat, there is no provision in the restricted access options to issue 20-year fishermen non-transferable light boat owner permits.
Dan Yoakum, San Francisco Roe on Kelp Advisor	letter dated 16 September 2003	C-41. Recommends a temporary permit fee of $2,500 for residents, a $5,000 out-of-state fee, and a $5,000 transfer fee.	Disagree. The Commission may choose to establish an annual permit fee ranging from $400 to $5,000 based on the estimated cost to manage the fishery (Option J.1) (also see response C-43). The Commission may select a permit transferability fee between $250 and $1,000 (Option N.1 or N.2). An option to establish a $5,000 transfer fee and a different out-of-state permit fee is not commensurate with the goal of setting a fee appropriate to the management needs of the resource. Temporary permit fees would not be a viable option as permits are issued on an annual basis.

Table 1-4 Summary of public comment received from 7 July 2003 through 1 February 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Bob Strickland, United Anglers of California	letter dated 20 August 2003 which was presented at the 21 August 2003 marine subcommittee meeting	C-42. The United Anglers would like the permit fees raised to $5,000 because they do not want the market squid fishery's management fees to be taken from other sources	Agree. The comment expresses support for the Department's preferred Option J.1. The Commission may select from a wide range of annual permit fees ($400-$5,000) based on the costs to manage the market squid fishery.
Diane Pleschner-Steele, CWPA	letter dated 20 October 2003	C-43. The CWPA opposes the Department's recommendation that all permit fees be set at $5,000 regardless of permit class. They propose that permit fees be reduced to a level sufficient to fund administration and enforcement of the squid fishery in line with permit fees for other fisheries.	Disagree. By law, permit fees cannot exceed the cost of managing the market squid fishery (FGC § 8428.). The current baseline cost for maintaining existing Department programs that deal directly with market squid research, monitoring, enforcement, and license sales exceeds $954,000 annually. Under the Department's preferred option, the number of permits issued would be 124 transferable and 20-year fishermen nontransferable permits issued. At a fee of $5,000, this would generate a total of $620,000. Since this fee is less than the total fishery management costs, other sources of revenue will be necessary to supplement the program. Although some revenue is generated from taxes levied on squid landings ($3.80 per ton), the source of funding is variable and dependent entirely on the success of the fishery year-to-year.
Diane Pleschner-Steele, CWPA	letter dated 20 October 2003	C-44. The CWPA supports the Department's preferred alternative (Option K.3), which proposes a one for one transferability of vessel permits based on comparable capacity and 2 for 1 permit retirement for transfer to larger capacity vessels.	Comment noted. The comment expresses support for the Department's preferred Option K.3.

Table 1-4 Summary of public comment received from 7 July 2003 through 1 February 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Diane Pleschner-Steele, CWPA	letter dated 20 October 2003	C-45. Based on communications with fishermen, the CPWA supports the Department's preferred alternative (Option L.3), which establishes full transferability of market squid brail permits based on comparable capacity.	Comment noted. The comment expresses support for the Department's preferred Option L.3.
Diane Pleschner-Steele, CWPA	letter dated 20 October 2003	C-46. Based on communications with fishermen, the CPWA supports the Department's preferred alternative (Option M.3), which establishes full transferability of light boat permits with a 2 for 1 permit retirement until the capacity goal is reached.	Comment noted. The comment expresses the Association's support for Option M.3, the Department's preferred alternative.
Diane Pleschner-Steele, CWPA	letter dated 20 October 2003	C-47. Based on communications with fishermen, the CPWA supports the Department's preferred alternative (Option N.1), which recommends a transfer fee set at $1,000.	Comment noted. The comment expresses support for the Department's preferred Option N.1.
Dan Yoakum, San Francisco Roe on Kelp Advisor, and Frank Bertoni, commercial fisherman	letters dated 16 September 2003, 12 November 2003	C-48. Recommends that the net depth be restricted to less than three fathoms and net size be no deeper than 17 fathoms and no longer than 150 fathoms to protect squid eggs.	Disagree. Net restrictions do not clearly address a specific management need or goal, and would be very program-intensive to enforce. The combination of MPAs, weekend closures, a seasonal catch limit, and a restricted access program is more effective in minimizing fishery impacts, resulting in reduced fishing effort on specific spawning aggregations and in other sensitive locations.

Table 1-4 Summary of public comment received from 7 July 2003 through 1 February 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Dan Yoakum, San Francisco Roe on Kelp Advisor	letter dated 16 September 2003	C-49. Recommends that light boats not be allowed in northern California.	Disagree. There is currently a ban on the use of light boats in District 10 (FGC§8399.1(a)). For other areas of northern California, the Department has no information at this time justifying a ban on light boats. The Commission can choose from several options regarding wattage limitation (15,000-30,000) (Option G.3) and light shields (maintain, modify, or eliminate current requirements)(Option G.4).
Diane Pleschner-Steele, CWPA	letter dated 20 October 2003	C-50. The CWPA supports the Department's preferred alternative (Option P.4) which establishes area and time closure areas restricting the use of attracting lights around Anacapa and Santa Barbara islands from February through September (one nm closure). However, they encourage the Commission to authorize additional research on the perceived impacts of lights and the squid fishery on seabird populations at such time as a collaborative proposal for such field research is developed.	Comment noted. The comment expresses support for the Department's preferred Option P.4.
Dan Yoakum, San Francisco Roe on Kelp Advisor	letter dated 16 September 2003 and verbal testimony provided to Commission dated 5 December 2003	C-51. The regions should have separate advisors to address each region's individual concerns.	Comment noted. The MLMA contemplates a collaborative process involving fishery participants and other interested parties, but does not mandate a particular format. The Commission may choose to establish one or two committees, or none. In order to provide a unified forum to facilitate the discussion of issues and the exchange of information, the Department recommends a single squid fishery advisory committee comprised of industry, science, and environmental community members of not more than 12 individuals (Option S.1).

Table 1-4 Summary of public comment received from 7 July 2003 through 1 February 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Diane Pleschner-Steele, CWPA	letter dated 20 October 2003	C-52. The CWPA agrees with the one-committee concept with the caveat that squid scientists be added to the existing compliment of SFAC members.	Comment noted. The comment expresses support for the Department's preferred Option Q.1.
Kate Wing and Karen Garrison, NRDC	letter dated 31 October 2003	C-53. The NRDC would like to see the data from the Channel Islands CEQA document be included in describing squid spawning grounds inside the MPAs.	Agree. The Department will incorporate data presented in the Channel Islands MPA Environmental Document as part of the description of spawning grounds inside the MPAs (see Section 1, page 1-149).
Dan Yoakum, San Francisco Roe on Kelp Advisor, and Frank Bertoni, commercial fisherman	letter dated 12 November 2003	C-54. Landings should not exceed 30 tons per vessel in a 24-hour period in an effort to conserve biomass in a specific area.	See response C-23.
Dan Yoakum, San Francisco Roe on Kelp Advisor, and Frank Bertoni, commercial fisherman	letter dated 12 November 2003 and verbal testimony provided to Commission dated 5 December 2003	C-55. Advisors should be established for the proposed Fort Bragg region.	See response C-51.
Dan Yoakum, San Francisco Roe on Kelp Advisor, and Frank Bertoni, commercial fisherman	letter dated 12 November 2003	C-56. A provision should be made for observers to access the squid fishery. The MSFMP could be amended to include an effective means to monitor the activity relative to this development in order to solve problems that may arise.	An observer program would be a component of research and monitoring contemplated in the market squid legislation. (FGC 8426(c).) A future observer program is recommended in Section 2 of the Environmental Document. The CA squid purse seine fishery is currently listed as a Category II fishery by NOAA Fisheries. Under this provision of the Marine Mammal Protection Act, observers can be requested at any time.

Table 1-4 Summary of public comment received from 7 July 2003 through 1 February 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Dan Yoakum, San Francisco Roe on Kelp Advisor, and Frank Bertoni, commercial fisherman	letter dated 12 November 2003	C-57. Catch vessels should be allowed no more than 15,000 watts each.	Comment noted. The Commission can choose from several options regarding wattage limitation (15,000-30,000) (Option G.3) and light shields (maintain, modify, or eliminate current requirements) (Option G.4).
Rober Zuanich, Executive Director, Purse Seine Vessel Owners Association (PSVOA)	letter dated 5 December 2003	C-58. The PSVOA supports criteria for initial issuance that qualifies persons possessing a current valid permit and who made at least 50 landings between January 1, 1990, to December 31, 2002, or who fall under the 20-year fishermen provision.	Comment noted. The Commission may select from a reasonable range of regulatory options for the initial issuance of permits (Option I.1) or may continue the current moratorium (Option I.2).
Rober Zuanich, Executive Director, PSVOA	letter dated 5 December 2003	C-59. The PSVOA proposes that a reduced number of permits and ultimate capacity goal be implemented over a 3-5 year period utilizing the following: (1) permit holders may move to larger capacity vessels, which will require ownership of a second permit and absorption of potential latent permits, (2) establish a relatively high permit fee that will discourage ownership for speculative purposes, (3) impose ongoing landing requirements as condition of renewing the permit, and (4) re-evaluate the limited entry program in 2007 to determine if the program is achieving capacity goal objectives.	(1) Comment noted. The Commission may select from a reasonable range of options for the transferability of a squid permit (vessel, light boat, and brail) based on other determinations within the MSFMP, including capacity goal and initial limited entry permit issuance criteria. (2) Comment noted. The Commission may select from a wide range of annual permit fees ($400-$5,000) based on the costs to manage the market squid fishery. (3) Comment noted. Currently, the regulations do not have an option within restricted access that impose ongoing landing requirements as a condition of renewing a permit. (4) Comment noted. It is the Commission's policy that each restricted access program be reviewed at least every four years, and if appropriate, revised to ensure that it continues to meet the objectives of the State and the fishery participants. The MLMA requires a review of each marine fishery every four years. (FGC §7065(a).)

Table 1-4 Summary of public comment received from 7 July 2003 through 1 February 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Rober Zuanich, Executive Director, PSVOA	letter dated 5 December 2003	C-60. PSVOA maintains that permits established under either criterion (see C-58) should be fully transferable; however, this approach does not accelerate an ultimate capacity goal. For this reason, PSVOA would support an alternative that made grandfathered permits non-transferable.	Comment noted. The comment expresses support for the Department's preferred Option K.3.
Rober Zuanich, Executive Director, PSVOA	letter dated 5 December 2003	C-61. PSVOA supports the Department's limited entry criteria for light boat permits provided that criteria is supplemented to provide for an equal number of vessel and light boat permits. Therefore, current vessel permit holders who do not qualify for a vessel permit on or after April 1, 2004, should qualify for a light boat permit based on total landings between January 1, 1990, and December 31, 2002.	Comment noted. Although the number of light boat permits issued under the initial issuance criteria is less than the number of vessel permits, the proposed transferability option for light boat owners permits (Option M.3) provides a mechanism to achieve the proposed capacity goal. Also, because brail vessels function largely as light boats, market squid brail permits would be part of the total light boat capacity goal of 52 vessels.
Rober Zuanich, Executive Director, PSVOA	letter dated 5 December 2003	C-62. PSVOA supports an 118,000 seasonal catch limited based on a recent three year average catch.	Comment noted. The comment expresses support for the Department's preferred Option A.2.
Rober Zuanich, Executive Director, PSVOA	letter dated 5 December 2003	C-63. PSVOA supports trip limits to improve quality, price stability, and capacity goal objectives. If not imposed in the initial MSFMP, then it should be a focus item for the Advisory Committee.	See response to C-38.
Rober Zuanich, Executive Director, PSVOA	letter dated 5 December 2003	C-64. PSVOA supports continued statewide closure of the fishery from noon Friday to noon Sunday.	Comment noted. The comment expresses support for the Department's preferred Option D.1.

Table 1-4 Summary of public comment received from 7 July 2003 through 1 February 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Rober Zuanich, Executive Director, PSVOA	letter dated 5 December 2003	C-65. PSVOA opposes the setting aside of additional areas for harvest replenishment. Current and potential new set asides under the MLPA, weekend closures, and further restriction of vessel permits will provide ample resource protection.	Comment noted. See response to C-30.
Rober Zuanich, Executive Director, PSVOA	letter dated 5 December 2003	C-66. PSVOA supports relatively high and uniform fees to reach capacity goal objectives and fund necessary Department research.	Comment noted. The Commission may select from a reasonable range of annual permit fees ($400-$5,000) based on the costs to manage the market squid fishery. The Department recommends that all permit fees be set at $5,000, regardless of permit class (Option J.1). See also response to C-43.
Rober Zuanich, Executive Director, PSVOA	letter dated 5 December 2003	C-67. PSVOA maintains that vessels could utilize more environmentally benign fishing gear without sacrificing efficiency or productivity. This issue should be a focus item for the Advisory Committee.	See response to C-48.
Rober Zuanich, Executive Director, PSVOA	letter dated 5 December 2003	C-68. PSVOA supports establishment of a broad based advisory committee which could work in concert with the PFMC advisory committee for other coastal pelagic species.	Comment noted. The comment expresses support for the Department's preferred Option S.1.

Table 1-4 Summary of public comment received from 7 July 2003 through 1 February 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Ernest S. Pagan, market squid light boat operator	letter dated 2 December 2003	C-69. Permits should not be transferable.	Comment noted. The Commission may select from a reasonable range of options for the transferability of vessel, brail, and light boat market squid permits (Options K, L, and M). By not allowing transferable permits, the attrition of the fleet would be more rapid; however, it will likely not meet the practical needs of working vessels and can have implications for vessel safety. Transferable permits would promote conservation among fishery participants, provide for an orderly fishery, and maintain long-term economic viability of the fishery.
Ernest S. Pagan, market squid light boat operator	letter dated 2 December 2003	C-70. The moratorium should be extended another year.	Comment noted. The Legislature contemplated the moratorium only as an interim measure, to be succeeded by active management pursuant to the MLMA. (FGC §8425(b).)
Ernest S. Pagan, market squid light boat operator	letter dated 2 December 2003 and verbal testimony provided to Commission dated 5 December 2003	C-71. Does not support closures north of Pillar Point.	See response to C-32.
Ernest S. Pagan, market squid light boat operator	letter dated 2 December 2003 and verbal testimony provided to Commission dated 5 December 2003	C-72. Catch history should not be recognized under the initial issuance criteria.	Disagree. The Commission may select from a reasonable range of options for the initial issuance of permits or may continue the current moratorium. However, not recognizing catch history under initial issuance criteria does not meet the capacity goal for the squid fleet and would contribute to excess vessel capacity, which is inconsistent with both the MLMA objective of providing for an orderly fishery or maintaining the long-term economic viability of the squid fishery as well as the Commission's Policy on Restrict Access Commercial Fisheries.

Table 1-4 Summary of public comment received from 7 July 2003 through 1 February 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Ernest S. Pagan, market squid light boat operator	letter dated 2 December 2003 and verbal testimony provided to Commission dated 5 December 2003	C-73. Permit fees should not be set at $5,000.	See response to C-43.
William J Douros, Superintendent, Monterey Bay National Marine Sanctuary	letter dated 10 October 2003	C-74. The preferred option of 118,000 tons is derived from the average of the previous three years when a larger, more representative data set was available. The Sanctuary recommends that both a more representative time frame be considered, and that the average for such a period be reduced by a percentage that reflects the lack of a reliable biomass estimate.	See response to C-10.

Table 1-4 Summary of public comment received from 7 July 2003 through 1 February 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
William J Douros, Superintendent, Monterey Bay National marine Sanctuary	letter dated 10 October 2003	C-75. The Sanctuary supports Option A.1, which sets the catch limit at 80,000 tons, as this will be more likely to ensure the health of both the marine ecosystem and one of the region's most profitable fisheries. The Sanctuary believes that setting the harvest limit at a record high is not sufficiently risk averse giving the paucity of information available or the importance of squid to the ecosystem. As very little is known about the relationship between the stock size and recruitment levels, allowing for only 30% escapement is inadequate for managing such a significant forage species.	See responses to C-10 and C-13.
William J Douros, Superintendent, Monterey Bay National marine Sanctuary	letter dated 10 October 2003	C-76. The Sanctuary suggests that the biological and economic feasibility of the limited entry program is premised on an overestimate of annual catch rates. The preferred alternative includes an inflated level of capacity and should be reduced to be commensurate with a lower catch rate.	Disagree. The MSFMP is consistent with both the MLMA and the Commission's restricted access policy. The capacity goals are not anticipated to adversely impact on the sustainability of the resource. Instead, the capacity goal options (Option H.1, H.2, H.3, and H.4) were designed to provide for an orderly and sustainable fishery and to maintain the long-term economic viability of the fishery. At the current time, the market squid fishery has excess harvesting capacity that will lead to a decline in economic efficiency. While an optimal fleet size (Option H.1) would be very small compared with the status quo, the Department recognized that a moderately productive and specialized fleet (Option H.2 and H.3) would be less disruptive in terms of displacing vessels from the fishery and, thus, reduce impacts on fishing communities.

Table 1-4 Summary of public comment received from 7 July 2003 through 1 February 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Terrence Mines, commercial fisherman	letter dated 27 November 2003	C-77. Does not support the Department preferred alternative regarding initial issuance of permits (Option I.1), specifically the initial issuance criteria for market squid brail permits.	Comment noted. The Department's preferred initial issuance criteria for market squid brail permits (Option I.1) was based on an analysis of landings information that indicates that current squid permittees who have actively participated in the brail fishery have done so by making an average of 10 landings per season from 1981 to 1999. The Commission may select from a range of landings (5-25) in a window period (range between 1/1/90-11/12/99 and 1/1/90-12/31/02) based on the degree of productivity and specialization that they would like the fleet to have.
Terrence Mines, commercial fisherman	letter dated 27 November 2003	C-78. Would like to be able to fish for squid seven days a week.	Disagree. The statewide weekend closure is an environmentally protective precautionary measure to provide spawning squid at least two consecutive nights each week respite from fishing pressure. However, the Commission has the option to eliminate the current weekend closure provision in the scope of options presented (Option D.2).
Kathy and Steve Fosmark, commercial fishers	letter dated 4 December 2003	C-79. Do not support restricted access.	Comment noted. The possibility of a restricted access program was contemplated by the Legislature in the market squid legislation, as well as in the MLMA. (FGC §§ 7082(b), 8420(e), 8426(c).)
Kathy and Steve Fosmark, commercial fishers	letter dated 4 December 2003	C-80. Do not support closing the area north of Pillar Point to squid fishing because squid are pelagic and may move for reasons beyond our control.	See response to C-32.

Table 1-4 Summary of public comment received from 7 July 2003 through 1 February 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Frank Bertoni, commercial fisherman	letter dated 17 November 2003	C-81. The MSFMP does nothing to protect spawning squid as the current fishery targets squid at their prime spawning state.	Disagree. Currently, the fishery only targets squid during spawning events in limited geographical areas. Fisheries independent data suggests that squid distribution is widespread and that fishing does not occur in all areas of distribution. The data also suggests that not all spawning grounds are targeted. Historical evidence gathered from research surveys along the west coast, as well as recent catch data, suggests that the squid biomass may be very large at times and distributed widely along the entire west coast. In addition, the combination of MPAs, general habitat closures, weekend closures, a seasonal catch limit, and a restricted access program will minimize resource impacts, by reducing fishing effort on specific spawning aggregations and in other sensitive locations.
Gerry McChesney, seabird biologist with US Fish and Wildlife	verbal testimony provided to Commission dated 5 December 2003	C-82. Does not recommend removing the Channel Islands from weekend closures.	Comment noted. Option D.3 is not the Department's preferred option. However, the Commission may choose from a range of options regarding weekend closures depending on the level of protection it deems reasonable.
Gerry McChesney, seabird biologist with US Fish and Wildlife	verbal testimony provided to Commission dated 5 December 2003	C-83. Supports wattage limitations but is unclear as to how these reductions will help the squid resource.	Comment noted. The gear restriction is intended to reduce fishery interactions with nesting seabirds and disturbance to coastal communities. The Commission can choose from a reasonable range of options regarding wattage limitation (15,000-30,000) (Option G.3) and light shields (maintain, modify, or eliminate current requirements) (Option G.4).
Gerry McChesney, seabird biologist with US Fish and Wildlife	verbal testimony provided to Commission dated 5 December 2003	C-84. Supports closures around San Miguel, Anacapa, and Santa Barbara Islands; however, he recommends that the time closure be extended through November 30.	Comment noted. The Commission may choose from a reasonable range of options that offer seasonal closure areas for seabird protection, harvest replenishment areas, and/or general habitat closures. The option to extend the time closure around San Miguel, Anacapa, and Santa Barbara Islands was added based on the request made of the Commission by Mr. McChesney (Options R.10 and R.11).

Table 1-4 Summary of public comment received from 7 July 2003 through 1 February 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Gerry McChesney, seabird biologist with US Fish and Wildlife	verbal testimony provided to Commission dated 5 December 2003	C-85. Would like the one nm closures around Santa Barbara Island to include Sutil Island; would also like the one nm closures around San Miguel to include Castle Rock and Prince Island.	Comment noted. The one nm closures presented under Option R (area and time closures to address seabird issues) include Sutil Island. Prince Island is within a designated MPA, while Castle Rock is in close proximity to two MPAs.
Russel Bradley, Point Reyes Bird Observatory	verbal testimony provided to Commission dated 5 December 2003	C-86. Recommends that there should be area closures restricting squid fishing in all waters of the Gulf of the Farallones National Marine Sanctuary.	Comment noted. The Department has added options (under Seasonal Closure Areas for Seabird Protection, Option R, and/or Harvest Replenishment Areas and/or General Habitat Closures, Option Q) that would, if adopted, prohibit the take of market squid for commercial purposes in specified northern California waters. The Department proposes that the waters north of Pillar Point be designated as a general habitat closure area year round (Option Q.3). These options are intended to protect living marine resources from direct and indirect squid fishery interactions in areas that have not been traditionally utilized for commercial squid fishing. Options include closing all waters to the commercial take of squid north of Pillar Point at any time, prohibiting the commercial take of squid in any waters of the Gulf of the Farallones National Marine Sanctuary, prohibiting the take of squid for commercial purposes in waters extending offshore one nautical mile from the mean high water mark of Southeast Farallon Island, Middle Farallon Island, North Farallon Island and Noon Day Rock, or prohibiting the take of squid for commercial purposes in District 10.
Joelle Buffa, US Fish and Wildlife	verbal testimony provided to Commission dated 5 December 2003	C-87. Recommends that there should be area closures restricting the use of lights, including deck lights, within one nm of the Farrallon Islands breeding colonies.	See responses to C-30 and C-86.

Table 1-4 Summary of public comment received from 7 July 2003 through 1 February 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Joelle Buffa, US Fish and Wildlife	verbal testimony provided to Commission dated 5 December 2003	C-88. Recommends that there should be area closures restricting the use of lights within one nm of Pillar Point.	See responses to C-30 and C-86.
Joelle Buffa, US Fish and Wildlife	verbal testimony provided to Commission dated 5 December 2003	C-89. Recommends that the Farallon Islands be closed to squid fishing year-round.	See responses to C-30 and C-86.
Kate Wing, NRDC	verbal testimony provided to Commission dated 5 December 2003	C-90. Would like the Department to extend the season closures around the Farallon Islands for seabird protection from September 30 to November 30.	See responses to C-30 and C-86.
Kate Wing, NRDC	verbal testimony provided to Commission dated 5 December 2003	C-91. Would like the Department to add an area closure that would include waters extending offshore one nm from the mean water mark north of Pillar Point.	See responses to C-30 and C-86.
Heather Monroe, West Coast Seafood Processors Association	verbal testimony provided to Commission dated 5 December 2003	C-92. Would like the Department to include an option under the initial issuance of permits (Option I.1) that extends the window period to March 31, 2003.	Comment noted. The Department has added the new window period of 1/1/90 through 3/31/03 to Table 3-16 listed under initial issuance of permits (Option I.1)
Donald Brockman, California Squid Fishermen's Association	verbal testimony provided to Commission dated 5 December 2003	C-93. Opposes the setting aside of additional areas for seabird protection. Believes that the MPAs will provide enough protection to the seabird populations.	Comment noted. The Commission may choose from a reasonable range of options that offer seasonal closure areas for seabird protection, harvest replenishment areas, and/or general habitat closures. They may also chose not to establish additional area and time closures in regards to seabird issues.
Donald Brockman, California Squid Fishermen's Association	verbal testimony provided to Commission dated 5 December 2003	C-94. Supports a season catch limitation of 118,000 tons.	Comment noted. The comment expresses support for the Department's preferred Option A.2.

Table 1-4 Summary of public comment received from 7 July 2003 through 1 February 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Donald Brockman, California Squid Fishermen's Association	verbal testimony provided to Commission dated 5 December 2003	C-95. Supports the Department's recommendation for limited entry.	The comment expresses support the Department's preferred Option I.1.
Donald Brockman, California Squid Fishermen's Association	verbal testimony provided to Commission dated 5 December 2003	C-96. Opposes the Department's recommendation that all permit feels be set at $5,000 regardless of permit class. Would support a $1,000 fee, however, and suggests that the Department could raise the squid tax instead of increasing the permit fee.	See response to C-43
Donald Brockman, California Squid Fishermen's Association	verbal testimony provided to Commission dated 5 December 2003	C-97. Does not support a wattage limitation set at a value of 15,000 watts; however, would be willing to support a wattage limitation set at a value between 20,000 and 25,000 watts.	Comment noted. The Commission can choose from several options regarding wattage limitation (15,000-30,000) and light shields (maintain, modify, or eliminate current requirements).
Dan Yoakum, San Francisco Roe on Kelp Advisor	verbal testimony provided to Commission dated 5 December 2003	C-98. Supports experimental permits (Option O) and would like to see two permits issued for the area from Point Reyes to Mendocino and three permits issued for the area from Eureka to Crescent City.	See response to C-4.
Dan Yoakum, San Francisco Roe on Kelp Advisor	verbal testimony provided to Commission dated 5 December 2003	C-99. Supports Option A.5 which maintains the existing season catch limitation of 125,000 tons.	Comment Noted. The Commission may choose a seasonal catch limit of 24,000 to 125,000 tons depending on the precautionary level they deem reasonable.
Dan Yoakum, San Francisco Roe on Kelp Advisor	verbal testimony provided to Commission dated 5 December 2003	C-100. Supports closures.	Comment noted. See response to C-30.

Table 1-4 Summary of public comment received from 7 July 2003 through 1 February 2004.			
Speaker/ Organization	Comment Format	Summary of Comment	Department Response
Jim Bassler, commercial fisherman	verbal testimony provided to Commission dated 5 December 2003	C-101. Supports experimental permits.	See response to C-4.
Karen Reyna, The Ocean Conservancy	verbal testimony provided to Commission dated 5 December 2003	C-102. Supports regional management and would like to see an additional management area added.	See response to C-7.
Paul Weakland, dive boat operator	verbal testimony provided to Commission dated 5 December 2003	C-103. Does not support closures around the Farallon Islands.	See response to C-93.