

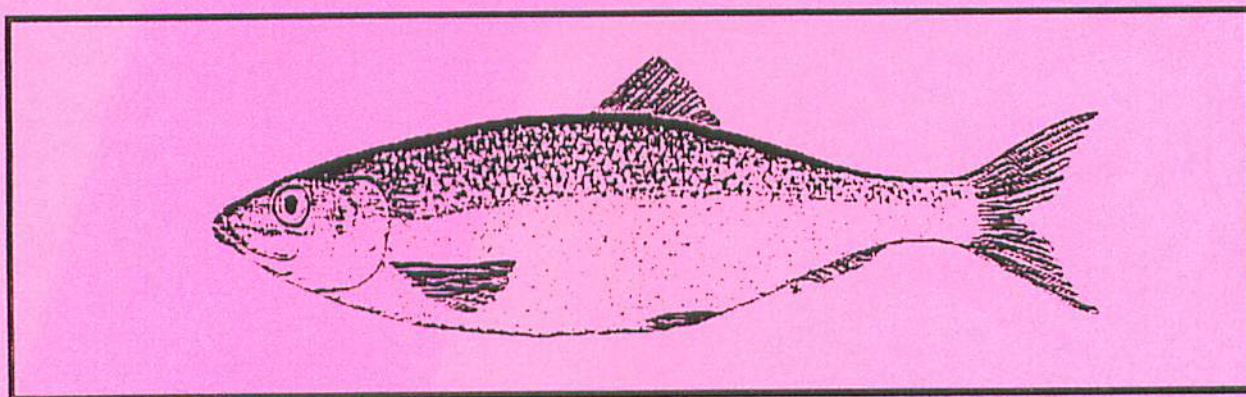
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FINAL

SUPPLEMENTAL ENVIRONMENTAL DOCUMENT

**PACIFIC HERRING
COMMERCIAL FISHING REGULATIONS**

(Sections 163, 163.5, and 164, Title 14, California Code of Regulations)



**2002
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF FISH AND GAME**

**FINAL SUPPLEMENTAL ENVIROMENTAL DOCUMENT
PACIFIC HERRING COMMERCIAL FISHING REGULATIONS**

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SUMMARY

S.1 Introduction

This Final Supplemental Environmental Document (FSED) to the Final Environmental Document (FED), Pacific Herring Commercial Fishing Regulations, 1998, provides the review and analysis required by California Environmental Quality Act (CEQA) Guidelines to assist the California Fish and Game Commission (Commission) in regulating the commercial harvest of Pacific herring throughout the State's ocean and estuarine waters. Specifically, the FSED reviews and evaluates proposed regulatory changes for the 2002-03 fishing season, supplementing, and in some cases replacing, aspects of the proposed project described in the 1998 FED and the Final Supplemental Environmental documents of 1999, 2000, and 2001. A Notice of Preparation (NOP) and public scoping meetings were used to identify and incorporate concerns and recommendations of the public, resource and regulatory agencies, and the fishing industry into the review and analysis of the proposed changes contained in these documents.

The FSED includes seven chapters. Chapter 1 discusses the authorities and responsibilities under which the FSED was developed and describes its intended use. Chapter 2 describes the proposed project and alternatives for regulating the commercial harvest of herring. Chapter 3 describes the existing environment where California herring fisheries occur. Chapter 4 addresses the impacts of the proposed project and cumulative effects. Chapter 5 describes the impacts of the alternatives to the proposed project. Chapter 6 identifies consultations with other agencies, professionals, and the public. Chapter 7 responds to comments received on the Draft Supplemental Environmental Document. References used throughout this FSED are listed in the Literature Cited section.

The proposed project has been selected as the preferred alternative based on the analysis of this FSED. The proposed project is identified as the preferred alternative because it provides a set of regulations most likely to achieve the State's CEQA policy with respect to the conservation, sustainability, maintenance, and utilization of the Pacific herring resource.

S.2 Proposed Project

The proposed project is a body of recommended regulations governing the commercial harvest of herring-for-roe products, the harvest of herring eggs-on-kelp, and the harvest of herring as fresh fish, for bait, and pet food. The proposed project takes the form of recommendations for continuation, amendment, or change to an existing body of regulations in effect since November 1, 2001 [(Sections 163, 163.5, and 164, Title 14, California Code of Regulations (CCR))].

The proposed regulatory changes will establish fishing quotas for San Francisco and Tomales bays for the 2002-03 herring fishing season, based on the most recent assessments of the spawning populations in these locations. Previously established quotas for Humboldt Bay and Crescent City Harbor fisheries are not affected by these regulatory changes. The proposed changes recommended by this document also include provisions for the continued experimental use of a 2-inch mesh size for gill nets used in the roe herring fishery in Tomales Bay, for the 2002-03 season only. Other changes relating to the Department of Fish and Game's (Department) proposed commercial herring season dates for the 2002-03 season, permit suspensions, and minor editorial changes are recommended to improve the clarity of the regulations or provide for the efficient harvest and orderly conduct of the fishery and for the protection of the resource.

The specific regulatory changes recommended for the 2002-03 season will:

(1) provide for a 3,540-ton quota for San Francisco Bay (10% of the 35,400-ton estimated spawning biomass for the 2001-02 season) and set the dates of the roe herring fisheries in San Francisco Bay from 5:00 p.m. on Sunday, December 1, 2002 to noon on Friday, December 20, 2002 ("DH" gill net platoon only), and from 5:00 p.m. on Sunday, January 5, 2003 to noon on Friday, March 14, 2003; (2) provide an initial 300-ton fishing quota (4.1% of the 2001-02 estimated spawning biomass of 7,243 tons) for Tomales Bay with provisions to increase the quota in season if escapement goals are achieved by February 15, 2003; (3) set the dates of the roe herring fishery in Tomales Bay from 5:00 p.m. on Sunday, December 29, 2002 until noon on Tuesday, December 31, 2002, and from noon on Sunday, January 5, 2003

net used or possessed in the roe fishery in Tomales Bay, for the 2002-03 season only, shall be no less than 2 inches or greater than 2 ½ inches; (5) correct existing latitude/longitude coordinates for position references, and add latitude/longitude coordinates to existing position references that do not provide associated coordinates; (6) clarify that the violation points assigned for failure of a permittee to be aboard the vessel during herring fishing operations also apply to a permittee's Department-authorized temporary substitute; (7) revise the individual quota provisions for permittees participating in a mesh size study in San Francisco Bay to 0.5% of the sac roe quota for each platoon to which a permittee is assigned; (8) increase the maximum number of permittees that may participate in a mesh size study in San Francisco Bay from three to six; (9) transfer 10 tons of quota from the underutilized herring fresh fish fishery to the gill net fishery for use in a gill net mesh size study, for the 2002-03 season only; and 10) make minor regulatory editorial revisions.

S.3 Project Alternatives

Three alternatives are considered in this FSED. These alternatives include: (1) a no-fishery alternative; (2) using regulations established by Commission action; and (3) establishing individual vessel quotas for gill net vessels in the roe herring fishery. Refer to Section 2.4, Project Alternatives, and Chapter 6, Analysis of Alternatives, of the FED, for a thorough description of alternatives and analysis of their impacts.

S.4 Existing Environment

The environments most likely to be affected by the regulatory revisions outlined in this FSED are San Francisco Bay and Tomales Bay. Although the proposed project consists primarily of regulatory changes for San Francisco Bay and Tomales Bay fisheries, the existing environment potentially affected by the proposed project and alternatives also includes the open ocean and other bays in which herring occur. Herring fisheries also occur in the Crescent City Harbor area, Humboldt Bay, and the open ocean, primarily within Monterey Bay. Refer to Section 3.3, Specific Biological and Environmental Descriptions of the FED, for a thorough description of these environments and Chapter 3 of this document

for a description of the environmental setting for these areas.

S.5 Environmental Impacts

S.5.1 Proposed Project

An analysis of the potential impacts of the proposed project described by this FSED did not identify any new potential impacts that are not analyzed in the FED. Several areas of potential concern were identified in the FED. The FED identified the area with the highest potential for adverse impacts associated with the proposed regulatory changes as the San Francisco Bay area, which supports the largest roe herring fishery in the State. The following localized, short-term, and less than significant impacts were identified in the FED for several areas of potential concern including: (1) boat and vehicle traffic circulation; (2) water and air quality; (3) housing and utilities; (4) geology, scenic quality, recreation; and (5) noise. The FED found biological impacts to have the greatest potential for significant environmental impact, but found these impacts to be localized, short-term, and less than significant, with mitigation provided by the current management strategy and Department conducted herring population monitoring. Refer to Chapter 4 of the FED for a thorough environmental impact analysis of the proposed project. Any adverse impacts associated with the regulatory changes proposed by this FSED are addressed within this document.

S.5.2 Alternatives

The alternatives proposed in this FSED are the same as those described in the FED. A thorough analysis of the impacts of these alternatives is provided in Chapter 6 of the FED. A summary of impacts associated with these alternatives is provided below.

Alternative 1 (no fishery)

Localized, short-term, and less than significant impacts to vessel and vehicle traffic circulation, water quality, air quality, housing and utilities, scenic quality, recreational opportunities, and noise levels identified for the proposed project would be eliminated or redistributed in an unpredictable manner.

Potential biological impacts associated with a no fishery alternative include an increased rate of natural mortality, the potential for deterioration in the condition of the

herring population as it reaches carrying capacity, and potential impacts to other species that compete with herring for food resources. Although this would be a natural process, adverse temporary impacts would nonetheless be associated with this alternative.

Alternative 2 (existing regulations)

In most regards, the environmental impacts associated with this alternative would be comparable to those of the proposed project. Although this alternative does provide for an adjustment of quotas and season dates, it does not address certain fishery-related problems considered in amendments or changes to existing regulations. The existing regulation alternative would maintain the herring fishery regulations as amended through 2002 (see FSED, 2001) and would not provide for the consistent management of the State's resources.

Alternative 3 (individual vessel quota)

As addressed in detail within the FED, individual vessel quotas, rather than the platoon-based quota system currently used in the roe herring gill net fishery, would exacerbate impacts due to longer actual fishing seasons. However, these impacts are still expected to be short-term, localized, and less than significant for most environmental categories.

Wastage of resource could result from sorting catches to remove males from the catch or discarding unripe fish to achieve higher roe content, and therefore, higher ex-vessel prices.

However, the competition between permittees for a share of the quota is greatly lessened under an individual quota system and may result in fewer nets likely to be lost, thus reducing impacts from "ghost" net fishing as explained in Section 4.2.6.1 of the FED.

S.5.3 Cumulative

An analysis of the cumulative impacts of the proposed project revealed no additional impacts to those addressed in the FED. The proposed regulatory changes addressed by this FSED are for the existing an ongoing project and that no regulatory changes proposed herein alter the potential for or the existing cumulative impacts. An analysis of cumulative impacts is provided in Chapter 5 of the FED.

A variety of factors have the capacity to influence Pacific herring population status in California in addition to the proposed project including: (1) biological events; (2) competitive

interactions with other pelagic fish and fisheries; (3) oceanographic events; (4) habitat loss; and (5) water quality. However, as with potential impacts from the on-going commercial harvest of herring, continued monitoring of the herring resource and oceanographic conditions should herald any trends long before the stock's reproductive potential is jeopardized.

S.6 Areas of Controversy

The following areas of controversy have been identified regarding commercial herring fishing during three public scoping meetings held on January 19, 2002 in Belmont, April 4, 2002 in Sausalito and Bodega Bay. In addition, areas of controversy were identified during the Director's Herring Advisory Committee Meeting on March 27, 2002, and prior fishing seasons:

1. Potential interactions between marine mammals and commercial fishing activities;
2. Importance of herring as a forage species for sea birds, marine mammals, and other fishes;
3. Inadequate knowledge of the resource;
4. Errors in stock assessment;
5. Insufficient management resources;
6. Potential impact of unforeseen events or catastrophes (e.g., oil spills, chemical spills).
7. Noise generated by commercial fishing activities along the Marin County waterfront.

Item numbers 1 through 6 of these areas of controversy are addressed in detail within Chapter 5 of the FED. Item 7 is discussed in detail within Chapter 3 of this FSED.

S.7 Issues to be Resolved

At issue is whether or not to provide for commercial fishing as an element of herring management in California. If commercial herring fishing is authorized, decisions are needed

to specify the areas, seasons, fishing quotas and other appropriate special conditions under which fishing operations may be conducted. As discussed, one aspect of managing this and other fishery resources is the understanding that a no project alternative is considered a management tool. This document, the 1998 FED, the 1999 FSED, the 2000 FSED, and the 2001 FSED include a review and discussion of the proposed project as well as alternatives.

Chapter 1. INTRODUCTION

1.1 Background

This Final Supplemental Environmental Document (FSED) presents the review and analysis necessary to aid the California Fish and Game Commission (Commission) in taking action to regulate the commercial harvest of herring in California. It was prepared by the Department of Fish and Game (Department) following the California Environmental Quality Act (CEQA) Guidelines. The project being considered is the proposed changes to the regulations for the 2002-03 California Pacific herring commercial fishing season.

This FSED was prepared as a supplement to: (1) the Final Environmental Document (FED), Pacific Herring Commercial Fishing Regulations, certified by the Commission in August 1998; (2) the Final Supplemental Environmental Document (FSED), certified by the Commission in August 1999; and (3) the FSED, certified by the Commission in August 2001. The FED outlines the full proposed project, consisting of the operation and management of California's Pacific herring commercial fishery.

The FSED of 1999, 2000, and 2001 provided for the revisions of the proposed project contained in the FED and regulatory revisions necessary for the conductance of the 1999-2000, 2000-2001, and 2001-02 Pacific herring commercial fishing seasons, respectively. This FSED supplements these documents and provides revisions to the regulations for the 2002-03 Pacific herring commercial fishing season.

The Department and Commission hold the public trust for managing the State's wildlife populations, including herring. That responsibility is fulfilled by a staff of experts in marine resource management and enforcement issues related to California's herring resource.

The knowledge and training represented by that expertise qualifies them to perform the review and analysis of the proposed revisions of the commercial herring harvest regulations that are contained in this document.

1.2 The Functional Equivalent

CEQA requires all public agencies in the State to evaluate the environmental impacts of projects that they approve or carry out. A Final Environmental Document for Pacific Herring Commercial Fishing Regulations was certified by the Commission on August 28, 1998. Section 1.2 of the FED provides an explanation of how the FED satisfies the required environmental assessment as mandated by CEQA. A new FED is required: 1) when subsequent changes are proposed in the project requiring important revisions of the previous FED due to new significant environmental impacts not considered in a previous FED; or 2) when new information of substantial importance to the project becomes available (CEQA Guidelines Section 15162, Public Resources Code Section 21166).

The CEQA lead agency may choose to prepare a supplement to a FED instead of a new FED if only minor additions or changes are necessary to make the previous FED adequately apply to the project in the changed situation. This supplement to the FED need only contain the information necessary to make the previous FED adequate for the project as revised. The draft supplemental document is given the same notice and public review given to a draft environmental document, and may be circulated by itself without the previous FED.

When the agency decides whether to approve the project, the decision-making body considers the previous FED as revised by the supplemental environmental document (CEQA Guidelines Section 15163). A Notice of Preparation (NOP) for this DSED was circulated to interested parties on April 17, 2002. Following its release, a 45-day public comment period for the DSED ended August 2, 2002, as explained in the enclosed Notice of Availability (NOA).

This FSED is the fourth Supplemental Environmental Document (SED) to the FED prepared by the Department. The first FSED was certified by the Commission in August 1999; the second FSED was certified by the Commission in August 2000, and the third FSED was certified by the Commission in August 2001. As provided for by CEQA, the Department will continue to use this method of revising Sections 163, 163.5, and 164, Title 14, CCR for a period of approximately five to seven years. After this period, or sooner if deemed necessary, the Department will prepare a new environmental document.

1.3 Scoping Process

The Department invited interested parties to an in-season public meeting held on January 19, 2002 in Belmont, a Director's Herring Advisory Committee (DHAC)¹ Meeting on March 27, 2002 in Sausalito, and two public meetings on April 4, 2002, one in Sausalito and the other in Bodega Bay, to receive input on the proposed project and the content of the DSED. The Department also distributed a NOP to interested parties on April 17, 2002. This provided an opportunity for the concerns of responsible agencies and citizens to be addressed in the DSED.

1.4 Report Availability

This FSED is available at the Fish and Game Commission Office in Sacramento, and Department Marine Region offices.

1.5 Authorities and Responsibilities

The California State Legislature formulates the laws and policies regulating the management of fish and wildlife in California. It is the policy of the State to ensure the conservation, sustainable use, and where feasible, the restoration of California's living marine resources for the benefit of all the citizens of the State [Section 7050, California Fish and Game Code (Fish and Game Code)]. It is also the State's policy 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 (Section 1700, Fish and Game Code, Appendix 1 of FED).

The Legislature provides further policy direction regarding herring management in Sections 8550 through 8559, Fish and Game Code; provided in (Appendix 1 of FED). The State Legislature delegated authority to the Commission, whose members are appointed by

¹ The DHAC consists of 13 representatives from the herring fishery, including buyers and fishermen. They are appointed by the Director and serve at his or her pleasure.

the Governor, to regulate the commercial harvest and possession of Pacific herring (Section 8553, Fish and Game Code). The remaining code sections provide for a limited entry fishery and require periodic review of regulations and policies.

The Commission holds public meetings at its discretion to consider and adopt revisions to these regulations. Recommendations and comments from the Department, other agencies and the public are typically received at two public meetings each year prior to the Pacific herring commercial fishing season. These meetings were held for the 2002-03 season on June 20, 2002 in South Lake Tahoe and August 2, 2002 in San Luis Obispo.

The authority to prepare a supplemental environmental document is given in Section 21166 of the Public Resources Code.

Chapter 2. PROJECT DESCRIPTION

2.1 Project Objectives

The proposed project, as defined in the Final Environmental Document (FED) certified by the Commission on August 28, 1998 is the regulation of Pacific herring fisheries under the State's jurisdiction. The regulations are considered for inclusion in the California Code of Regulations (CCR) to implement the State's policies for managing the commercial use of Pacific herring (Sections 163, 163.5, and 164, Title 14, CCR). The proposed project and alternatives addressed in this Final Supplemental Environmental Document (FSED) take the form of recommendations for amendment or change to the existing body of regulations. The recommendations and alternatives are based on biological assessments of existing stock conditions and comments received from interested individuals, commercial fishermen, and from the Director's Herring Advisory Committee (DHAC). The California Fish and Game Commission (Commission), whose members are appointed by the Governor, has legislatively-delegated authority to act on these recommendations.

Project objectives include (not ordered by priority):

- Maintaining healthy Pacific herring stocks in California;
- Controlling commercial harvest of Pacific herring to maintain a sustainable fishery;
- Providing sufficient Pacific herring to conserve living resources of the ocean that utilize herring as a food source; and
- Providing sufficient Pacific herring to support recreational take.

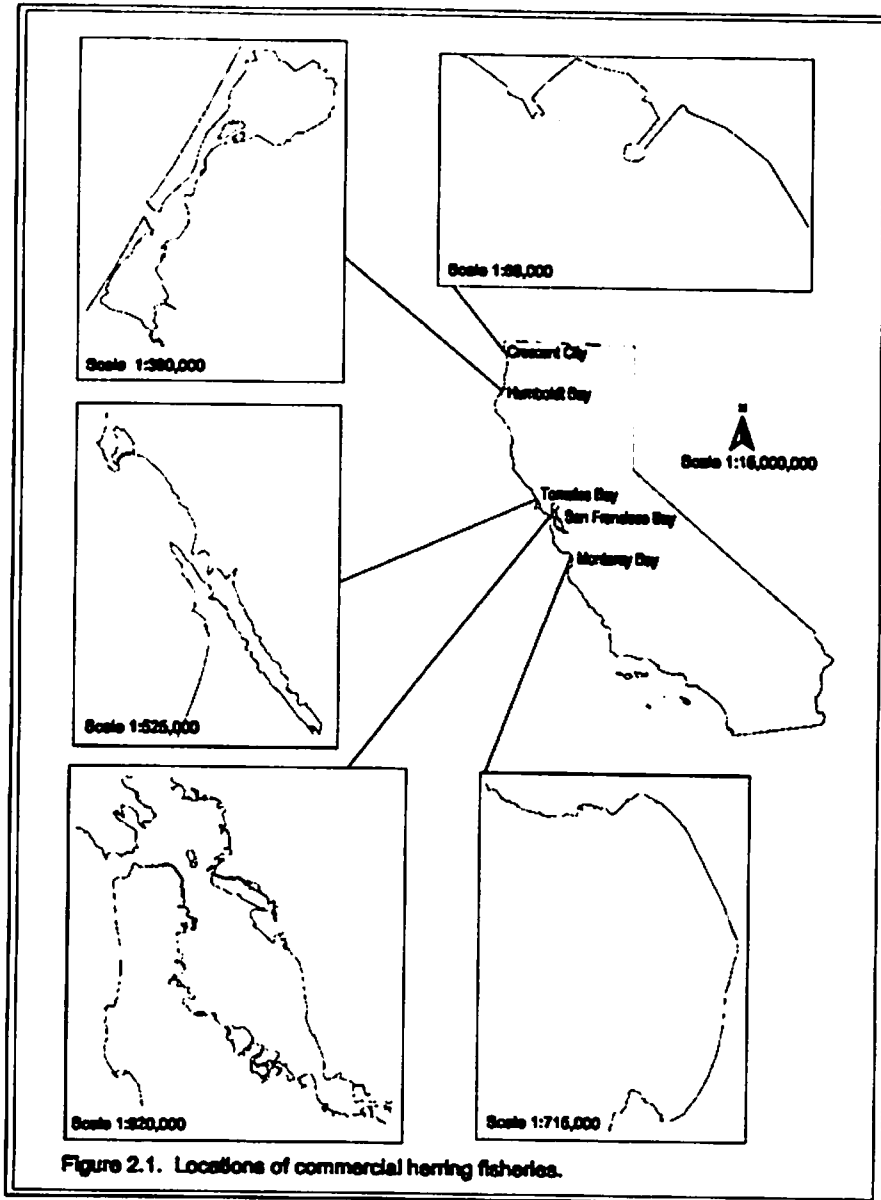
Under existing law, herring may be taken for commercial purposes only under a revocable permit, subject to such regulations as the Commission shall prescribe (Section 8550 Fish and Game Code, Appendix 1, FED). Current regulations specify permit qualifications, permit validation requirements, permit limitations, permit areas, seasons, fishing quotas, gear restrictions, and landing and monitoring requirements.

The proposed project addressed by this FED consists of amendments and changes

to existing regulations for the 2002-03 commercial herring fishing season. The proposed project adjusts fishing quotas by area and gear type. Quota recommendations for San Francisco Bay and Tomales Bay are primarily based on the most recent assessments by the Department of Fish and Game (Department) of the size of the spawning populations of herring in those areas. Other proposed amendments and changes are intended to improve the efficient and orderly conduct of herring fisheries and the management of herring stocks.

2.2 Project Locations

Permits have been issued for commercial herring fishing in five geographically distinct areas of the ocean and estuarine waters under the jurisdiction of the State of California (Figure 2.1). Many of the regulations considered by this document are specific to an area and type of fishing operation. This section describes each area in which regulatory changes are proposed, including current commercial fisheries for herring, and proposed seasons, quotas, and geographical restrictions for those fisheries. A complete description of commercial herring fishing areas is provided in Section 2.2 of the FED. The environmental setting for each geographical fishing area is detailed in Section 3.3 of the FED.



2.2.1 San Francisco Bay

The proposed Department commercial herring fishing dates and quotas by location are as follows:

2.2.1.1 Roe Herring Fishery

Season: 5:00 p.m. on December 1, 2002 at 5 p.m. until noon on December 20, 2002, and 5:00 p.m. on January 5, 2003 until noon on March 14, 2003.

Note: Herring fishing is not permitted from noon on Friday through 5:00 p.m. on Sunday (Section 163 (h)(5), Title 14, CCR).

Gill net permittees (DH) December 1-6, December 8-13, December 15-20, and, if necessary, after other platoons have reached their quotas, until the DH quota is reached or the last day of the season.

Gill net permittees (Even #) January 5-10, January 19-24, February 2-7, February 16-21, and March 2-7.

Gill net permittees (Odd #) January 12-17, January 26-31, February 9-14, February, 23-28, March 9-14.

Quota: 3,520 tons

Note: The overall quota for the herring roe fishery will be reduced by transfers to the herring eggs-on-kelp fishery.

Area: Waters of Districts 12 and 13 and that portion of District 11 lying south of a line extending from Peninsula Point (the most southerly extremity of Belvedere Island) to the easternmost point of the Sausalito ferry dock.

1) Regulations prohibit the setting or operating of nets within 300 feet of the following piers and recreation areas: Berkeley Pier, Paradise Pier, and San Francisco Municipal Pier between the foot of Hyde Street and Van Ness Avenue, Pier 7 (San Francisco), Candlestick Point State Recreation Area, the jetties in Horseshoe Bay, and the fishing pier at Fort Baker. Regulations also prohibit the setting or operating of nets within 70 feet of Mission Rock Pier.

2) Regulations prohibit the setting or operating of nets in Belvedere Cove north of a line drawn from the tip of Peninsula Point to the tip of Elephant Rock. Regulations also prohibit the setting or operating of gill nets from November 15 through February 15 in the area bounded by a line drawn from the middle anchorage of the western section of the Oakland Bay Bridge (Tower C) to the Lash Terminal buoy #5 to the easternmost point at Hunter's Point (Point Avisadero), from Point Avisadero to the Y "A"

buoy to Alameda NAS entrance buoy #1 (entrance to Alameda Carrier Channel) to the Oakland Harbor Bar Channel buoy #1, and then from the first Bar Channel buoy to Tower C of the Bay Bridge.

2.2.1.2 Herring Eggs-on-Kelp (HEOK) Fishery

Season: December 1, 2001 to March 31, 2002

Quota: An individual quota of 1.8 tons for transferred gill net permits, and an individual quota of 6.2 tons for transferred "CH" permits.

Note: The combined quota for harvest of herring eggs on kelp depends on the number of "CH" and gill net permits transferred to the herring eggs on kelp fishery.

Area: Waters of Districts 11, 12, and 13, and that portion of District 2 known as Richardson Bay.

Note: The area open to the herring eggs-on-kelp fishery is further restricted. Rafts and lines may not be placed in any waters or areas otherwise closed or restricted to the use of herring gill net operations, except the areas known as Belvedere Cove and Richardson Bay or except where written permission is granted by the owners or controlling agency (e.g., Navy, Coast Guard). When rafts or lines are placed in Belvedere Cove or Richardson Bay, they must be tied to a permanent structure (e.g. pier or dock).

2.2.1.3 Fresh Fish Market Fishery (not for roe purposes): San Francisco Bay

Season: November 2 through November 15, 2002 and April 1 through October 31, 2003.

Quota: 20 tons, except that for the 2002-03 season, 10 tons may be transferred for the San Francisco Bay gill net mesh size study.

Note: No permittee may take or possess herring except in the amount specified on a current daily market order, not to exceed 500 pounds, from a licensed fish dealer.

Area: Same as the roe herring fishery.

2.2.2 Tomales Bay

The proposed Department commercial herring fishing dates and quotas by location are as follows:

2.2.2.1 Roe Herring Fishery

Season: 5:00 p.m. on Sunday, December 29, 2002 until noon on Tuesday, December 31, 2002, and from 5:00 p.m. on Sunday, January 5, 2003, to noon on Friday, March 7, 2003.

Note: Herring fishing is not permitted from noon on Friday through 5:00 p.m. on Sunday (Section 163 (h)(5), Title 14, CCR).

Quota: The total take of herring for roe purposes shall not exceed 300 tons for the season. However, if spawning escapement reaches or exceeds 3,000 tons prior to February 15, 2003, the quota shall be increased as follows: 1) If the spawning escapement is more than 3,000 tons, the total take of herring shall not exceed 400 tons for the season; 2) If the spawning escapement is more than 4,000 tons, the total take of herring shall not exceed 500 tons for the season.

Area: Tomales Bay includes the waters of District 10 lying south of a line drawn west 252° magnetic, from the western tip of Tom's Point to the opposite shore.

2.2.2.2 Fresh Fish Market Fishery (not for roe purposes) Tomales Bay

Season: November 2 through November 15, 2002 and April 1 through October 31, 2003.

Quota: 10 tons

Note: No permittee may take or possess herring except in the amount specified on a current daily market order, not to exceed 500 pounds, from a licensed fish dealer.

Area: Same as roe fishery.

2.3 Project Characteristics

The proposed project recommends continuation of the existing regulations as modified by changes discussed below for San Francisco and Tomales bays. No modifications are proposed for Crescent City, Humboldt Bay, and open ocean herring

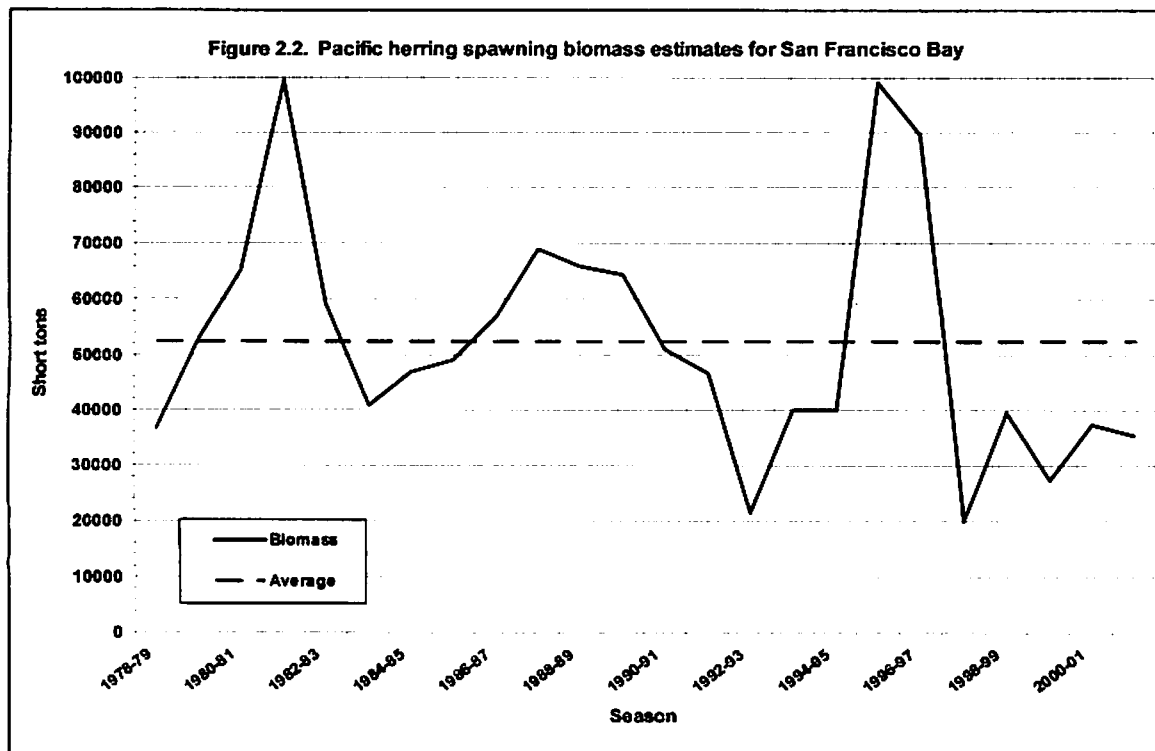
fisheries. These regulations, as amended, will assist in the control of the commercial harvest of herring at a level that meets the state's policy with respect to the use of aquatic resources. This section states the specific purpose of the regulations and summarizes the factual basis for the regulation.

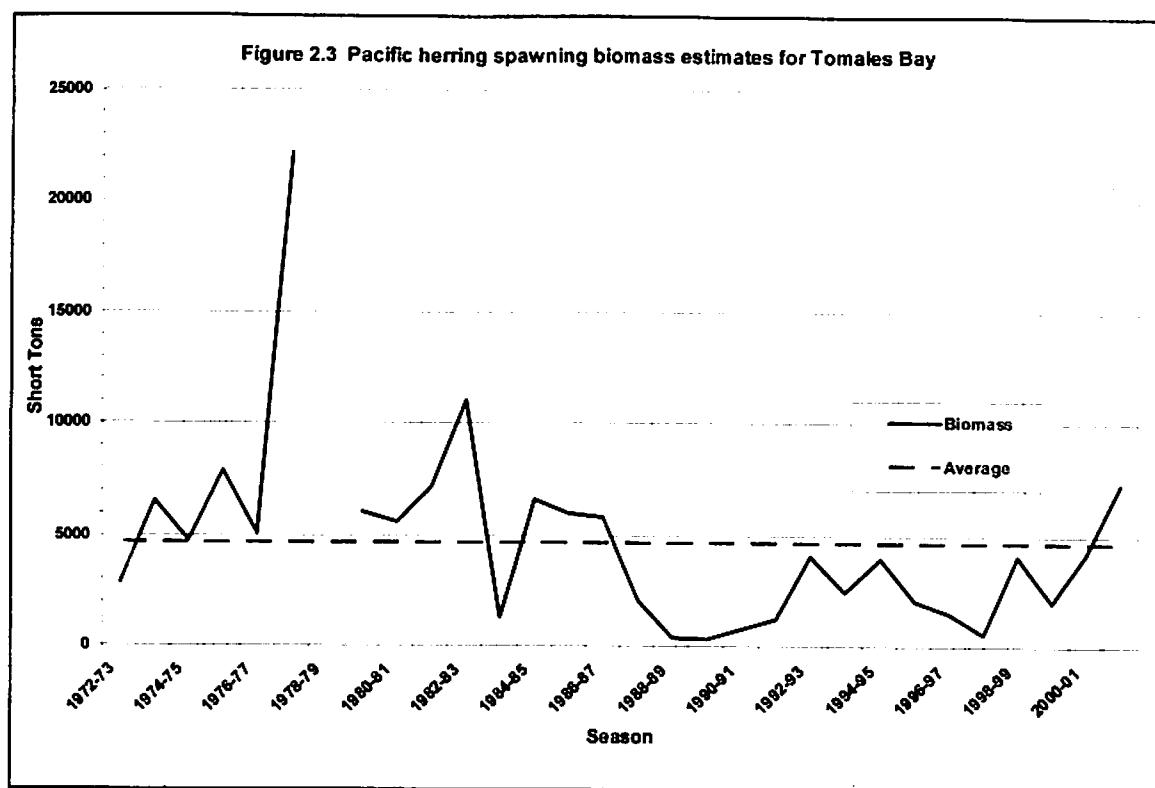
The commercial roe herring and eggs-on-kelp fisheries are closely regulated through a catch-quota system to provide for adequate protection and utilization of the herring resource. The Department conducts annual assessments of the size of the spawning population of herring in San Francisco and Tomales bays (Sec 3.2.2.1, FED). These data serve as the basis for establishing fishing quotas for the following season.

The principal regulatory changes proposed for the 2001-02 season (addressed in the FSED, 2001) included: a 4,476-ton quota for San Francisco Bay and an initial 300-ton quota for Tomales Bay; implementing noise reduction measures to address nighttime noise created by fishing activity along water fronts bordering residential properties in San Francisco Bay; and prohibiting the use of "seal bombs" or explosive marine mammal deterrent devices commonly used in San Francisco Bay waters during the San Francisco Bay herring fishery season. Other regulatory changes adopted prior to the 2001-02 season, as presented in the FSED, 2001, addressed the simultaneous fishing of two permits by a single permittee on a single vessel within the same platoon, penalty assignment issues, gill net identification flags, roe testing by buyers, gill net mesh size study, definition of terms related to the herring eggs-on-kelp fishery, prior permittee status, suspension notification, landing form revision, and make minor editorial revisions. The regulatory changes proposed for the 2001-02 season were approved by the Commission as proposed (Section 2.3 of the FSED, 2001). Other changes to the regulations as proposed by the Department in the DSED of 2001 were approved by the Commission as proposed in August 2001 (Section 2.3 of the FSED, 2001).

Annual herring spawning population estimates from biomass surveys in San Francisco and Tomales bays have been conducted by the Department since 1973. In San Francisco Bay, hydroacoustic and spawning ground surveys are used to estimate spawning biomass. In Tomales and Humboldt bays, spawning biomass estimates are based solely on spawning ground surveys. Hydroacoustic surveys use an echo sounder which transmits sound waves from a transducer on a boat and records reflected echoes to

determine the size and density of fish schools (Section 3.2.2.1.2 of the FED). Spawning ground surveys assess the total number of eggs spawned and use this to calculate the parental population size (Section 3.2.2.1.1 of the FED). Spawning biomass estimates for San Francisco and Tomales bays are shown in Figure 2.2 and 2.3, respectively. The Department does not conduct spawning biomass surveys in the Crescent City Harbor area.





Note: No spawning biomass surveys were conducted in the 1978-79 season.

Annual roe herring fishery quotas are conservative and limit the total commercial catch to no more than 20 percent, the exploitation rate of the previous season's spawning biomass. The previous season's biomass is considered the best available estimate of the quantity of fish returning the following season. This exploitation level was selected, based on computer model simulations developed by the Pacific Fisheries Management Council (Section 3.2.4 of the FED), to help ensure adequate protection of the herring resource and to provide for long-term yield of the fishery. Typically, exploitation rates of no more than 15 percent are recommended to prevent the 20 percent maximum from being exceeded. Quotas are not determined by a fixed percentage; they are modified based on additional biological and fishery data collected each season, such as growth rates, strength and importance of individual year-classes, and recruitment of incoming year-classes.

The 2001-02 spawning biomass estimate for San Francisco Bay is 35,400 tons, which is a 5.1 percent decline from the 2000-2001 season. Landings from the San Francisco Bay roe herring fishery totaled 3,287 tons, 841 tons less than the 4,128-ton

quota. This harvest level is 9.3 percent of the season's spawning biomass estimate. The 2001-02 estimate for Tomales Bay is 7,243 tons, which is a 72.6 percent increase from the 2000-2001 season, and the largest since the 1982-83 season. Tomales Bay roe herring landings totaled 354 tons, 146 tons less than the 500-ton season quota, and 4.9 percent of the season's estimated spawning biomass. This season's catch is the second highest since the fishery was limited to Tomales Bay following the 1991-92 season.

The 2001-2002 herring season marked the second consecutive year that spawning ground surveys and commercial fishery monitoring and assessment were carried out in Humboldt Bay since these surveys were discontinued following the 1991-1992 herring season. Total spawn escapement was estimated to be 617 tons, a 60.3 percent increase above the 2000-2001 seasons' estimate of 385 tons. The total spawning biomass estimate (spawn escapement plus commercial catch) was 649 tons, well above estimates from surveys conducted during the 1974-75, 1975-76, 1990-91, and 1991-92 seasons, which recorded spawning biomass in Humboldt Bay of 372, 232, 400, and 225 tons, respectively.

Spawning ground surveys and commercial fishery assessments were not conducted in the Crescent City area for the 2001-02 season. Only 20 percent (6.14 tons) of the 30-ton quota for this fishery was landed, 4.36 tons less than last season and far below the 30-year average of 22 tons. The Department does not plan to conduct spawning ground surveys and commercial fishery assessments in the Crescent City area for the 2002-03 season.

In addition to annual changes in the quota, management recommendations to improve or provide for the efficient harvest and orderly conduct of the herring fisheries are solicited from interested fishermen, individuals at public meetings, and DHAC. The proposed amendments to Section 163, 163.5 and 164, Title 14 CCR, addressed by this FSED, reflect both Department and the public recommendations brought forward by the Department.

2.3.1 Roe Herring Fisheries

2.3.1.1 San Francisco Bay 2002-03 Quota

The 2001-02 spawning biomass estimate for San Francisco Bay is 35,400 tons

(including catch), which is a 5.1 percent decline from last season's estimate. Since the 1997-98 El Niño, the San Francisco Bay stock appears to have stabilized at a level well below the 24-year average of 52,255 tons. Herring samples taken this season indicate average recruitment of young fish (2- and 3-year-olds combined). However, older fish (4-, 5-, and 6-year-olds) remained well below average abundance this season and are entirely absent for some year classes (7- and 8-year-olds). The average recruitment of young fish and below-average abundance of older fish are the primary reason for the 2001-02 season's below-average spawning biomass.

The herring young-of-the-year (YOY) abundance indices for the 2000 and 2001 year classes, which could recruit next season as 3- and 2-year-olds, respectively, are the highest indices since the 1986 year class. Although the correlation is weak, the strength of the YOY indices for the 2000 and 2001 year classes may indicate favorable environmental conditions for survival, growth, and potential recruitment as 3- and 2-year olds. Until such time as the Department can determine the recruitment strength of these year classes, a conservative exploitation rate is required for the protection of this resource.

A fishing quota of 3,540 tons, representing 10 percent of the 35,400-ton estimated spawning biomass, is proposed for the 2002-03 San Francisco Bay herring fishery. This represents a 21 percent decrease from the 2001-02 seasons' quota. The conservative 3,540 ton quota proposal accounts for the below-average 2001-02 spawning biomass estimate, less abundant older age classes, and anticipates the potential of emerging El Niño conditions that may result in unfavorable conditions affecting the growth and survival of herring.

Within the overall quota in San Francisco Bay, separate quotas are established for each gill net platoon (i.e., December ("DH"), Odd, and Even platoons). The overall quota is divided among the three platoons in proportion to the number of permits assigned to them. Slight annual adjustments in the quota portions assigned for each platoon are needed to account for attrition of permittees and the use of sac roe herring permits in the herring eggs-on-kelp fishery.

2.3.1.2 Tomales Bay 2001-02 Quota

The 2001-02 spawning biomass estimate for Tomales Bay is 7,243 tons, which is 73 percent greater than the 2000-2001 biomass estimate of 4,196 tons. This estimate is 60 percent higher than the average seasonal biomass over the past twenty-nine seasons (4,537 tons), and 161 percent higher than the preceding nine year average (2,772 tons). This large spawning biomass is the third highest in the thirty-season history of the fishery (in 1977-78 and 1982-83). The Tomales Bay herring fishery closed following the 1988-89 season due to consecutive years of poor spawning and low numbers of returning fish. This fishery reopened in the 1992-93 season.

Due to the relative small scale of the Tomales Bay fishery, the Department has provisions in the regulations that allow for in-season quota increases should the spawning biomass support such increases. Refer to Section 2.2.2 of this FSED. While the Department generally sets Tomales Bay initial quotas at a conservative 10 percent of the previous season's spawning biomass, which is half of the 20 percent maximum exploitation rate recommended by the Pacific Fishery Management Council (PFMC) in the Pacific Herring Fishery Management Plan (1981), the exploitation rate for this fishery has not been more than 7.1 percent since the 1996-97 season, when the exploitation rate was 14.7 percent.

For the 2002-03 season, the Department proposes to set the initial catch quota at 300 tons, which is 4.1 percent of the 2001-02 estimated spawning biomass of 7,243 tons. Although the proposed initial quota is set at an exploitation rate below the level typically applied by the Department, historic landings trends for Tomales Bay have shown that, in some seasons following years of high herring biomass in Tomales Bay, large initial catch quotas (>300 tons) have resulted in exploitation rates of greater than 15 percent (e.g., 1986-87 and 1994-95).

The 2001-02 biomass estimate is noteworthy when compared with recent seasons, and may indicate a peak in the population size. Based on the fluctuation in the Tomales Bay spawning biomass over the past 30 seasons, it is unlikely that the 2002-03 biomass will surpass the 2001-02 estimate. In addition, the Department is in the midst of a mesh size study that allows permittees to use a gill net mesh size of 2 inches, which is smaller

than the 2 ½ inch mesh allowed prior to the mesh size study. A proposed quota based on 10 percent of the 2001-02 spawning biomass combined with unknown effects of the use of 2-inch mesh, dynamic oceanic conditions, and the historic fluctuation in the herring population, would not be consistent with the Department's conservative management strategy.

Since the implementation of the one net per permittee restriction, the Tomales Bay commercial catch has exceeded 300 tons twice, during the 1995-96 and 2001-02 seasons. Thus, a 300-ton initial quota would provide Tomales Bay permittees with a viable fishery, and it is likely that no cessation of fishing effort would result. The proposed regulations also contain provisions to increase the quota based on in-season estimates of spawning escapement. If the spawning escapement reaches or exceeds 3,000 tons prior to February 15, 2003, the quota shall be increased as follows: 1) if the spawning escapement is more than 3,000 tons, the total take of herring shall not exceed 400 tons for the season; 2) if the spawning escapement is more than 4,000 tons, the total take of herring shall not exceed 500 tons for the season.

2.3.1.3 Humboldt Bay and Crescent City 2002-03 Quota

The 2001-2002 herring season marked the second consecutive year that spawning ground surveys and commercial fishery monitoring and assessment were carried out in Humboldt Bay since these surveys were discontinued following the 1991-1992 herring season. Spawn escapement for 2001-02 was estimated to be 617 tons, 38 percent above the 2000-2001 seasons' estimate of 385 tons. The total spawning biomass estimate (spawn escapement plus commercial catch) was 648 tons, well above estimates from surveys conducted during the 1974-75, 1975-76, 1990-91, and 1991-92 seasons, which recorded a spawning biomass in Humboldt Bay of 372, 232, 400, and 225 tons, respectively. Spawn escapement data from current and historic surveys suggests that the Humboldt Bay spawning population can support the 60-ton seasonal quota established in 1983.

Permittees failed to fill the 60-ton quota for Humboldt Bay during 2002. This year's catch of 34.5 tons was 20 percent below the 42.9-ton average since 1983.

Although 2002 landings were among the lowest since the 60-ton quota was set in 1983, they were still much higher than the combined landings (24.4 tons) of the 1997-98, 1998-99, and 1999-00 seasons.

The Department proposes no changes to quotas for the Humboldt Bay or Crescent City herring fisheries for the 2002-03 season. The proposed quota for Humboldt Bay and Crescent City are 60 tons and 30 tons, respectively.

2.3.1.4 Season Dates

Season opening and closing dates for San Francisco and Tomales bays, as well as the dates of various provisions of the regulations, are adjusted each year to account for annual changes in the calendar. The consensus of the Director's Herring Advisory Committee which met on March 27, 2002, was to recommend that the dates of the roe herring fisheries in San Francisco Bay be set for 5:00 p.m. on Sunday, December 1, 2002 to noon on Friday, December 20, 2002 ("DH" gill net platoon only), and from 5:00 p.m. on Sunday, January 5, 2003 to noon on Friday, March 14, 2003. The consensus among Tomales Bay permittees was to recommend opening at 5:00 p.m. on Sunday, December 29, 2002 until noon on Tuesday, December 31, 2002, and from 5:00 p.m. on Sunday, January 5, 2003, to noon on Friday, March 7, 2003.

2.3.1.5 Quota Allotment for Research Study Participants

Existing regulations provide for a mesh size study in San Francisco Bay. This study is critical for evaluating the optimal mesh size for selecting age classes of herring specified in our current environmental document. The regulations currently state that research nets shall be supplied by the participating permittee and the tonnage of herring that each participant may take during the season. The specified tonnage was based on the average tonnage per gill net permit calculated from that season's quota; the quota is adjusted yearly to account for changes in the spawning biomass estimate. The proposed regulation removes the specific tonnage for each individual research quota and specifies that an individual research quota will be based on a specific percent of the gill net quota as it changes each season. This regulation will meet the goal of tying the research provision to the season's quota, but will omit the necessity to revise this section of the

regulations each year. The Department recommends individual research quotas of 0.5 percent of the seasonal gill net quota for each platoon to which a permit is assigned (i.e., one for a single gill net permit, and two for a CH permit). Since the commencement of the mesh size study during the 1999-2000 season, interest among permittees in participating has been low due to the added expense of purchasing the necessary experimental gill nets and investing the time involved to follow research protocols.

The Department believes that incentives are needed to make participation profitable for herring permittees so that this important research project can resume during the 2002-03 season. A 0.5 percent per platoon individual quota will encourage participation in the study and help to offset costs associated with participation, such as nets, fuel, and additional time requirements on the water. This will increase the incentive for profitable participation without having a significant impact on the resource. Additionally, this proposed regulatory change is supported by members of the industry.

The regulations allocate 20 tons of herring from the San Francisco Bay quota to the fresh fish market, to which a maximum of 10 permits are assigned. To compensate for the reduction of herring quota available to gill net permittees not participating in research on mesh size, the Department proposed to reallocate tonnage from the allowable take of herring from the San Francisco Bay fresh fish market fishery for one season only. This change allows for potential revisions to the proposed reallocation after one season, if needed. No landings have been made in the herring fresh fish fishery during the past several years. During the 2001-02 season, the Commission adopted a one-year change to the regulations to provide for 10 tons of quota to be transferred from the 20 tons of the herring fresh fish fishery quota to the gill net fishery for use in the study. The Department recommends the continuation of this provision for the 2002-03 season and finds, based on the underutilization of the fresh fish quota that continued re-allocation of half of the current quota will not impact those who wish to participate in the fresh fish fishery.

2.3.1.6 Number of Permittees that May Participate in Research Study

The Department proposes to increase the number from three permits to no more than six permits. Existing regulations specify that no more than three permittees

(designated by the Department in writing) may participate in Department-sponsored research on mesh size. The selection of three permittees was made to allow one participant on a single vessel in each platoon. However, the first unnumbered paragraph of Section 163 allows two permits to jointly fish on a single vessel. The use of two permits and, therefore, two nets on a fishing vessel designated for research will improve the efficiency and collection of research data without adversely impacting the resource or its management.

2.3.1.7 Application of Penalty Points to a Permittee's Temporary Substitute

The first unnumbered paragraph of Section 163 specifies that a permittee shall be aboard the vessel named on their permit at all times during herring fishing operations, except that a Department-authorized crew member may serve temporarily in a permittee's place aboard the vessel during a season. In addition, regulations in subsection 163.5(f)(2) assign points to category I and II violations for monetary penalties for compromise settlement agreements, and assign 10 points for failure of the permittee to be aboard the vessel during herring fishing operations. The proposed amendment to subsection 163.5(f)(2)(B)(7) would apply the same penalty points to the permit if a crewmember authorized by the Department to serve as a temporary substitute for the permittee failed to be aboard the vessel during herring fishing operations. The proposed regulation change would provide for monetary penalties in lieu of suspension or revocation of a herring permit for those permittees who had a temporary substitute at the time of the violation.

2.3.1.8 Navigational Coordinates for Permit Areas and Fishing Areas

Permit areas are defined in the regulations through a combination of points of land or defined landmarks, line-of-sight, and navigational coordinates in the form of latitude and longitude. During the 2001-02 season, it became apparent that some of the coordinates provided in the regulations might be inaccurate. Additionally, some points that did not include coordinates resulted in confusion among both permittees and enforcement staff regarding interpretation of the boundaries of certain fishing areas. To reduce confusion over permit areas and fishing boundaries, the proposed regulations

employ United States Geological Survey (USGS) charts to provide correct navigational coordinates for all positions specified, and correct existing navigational coordinates to be consistent with USGS chart locales.

2.3.1.9 Corrections and Clarifications

The following change relating to the Release of Property form is proposed by the Department for the sake of clarity and for purposes of consistency with other regulations: add the Release of Property form number (Form FG-MR-674 (Rev. 5/02)) to the existing referral to the release of property form.

2.3.2 Herring Eggs-on-Kelp (HEOK) Fishery

2.3.2.1 Definition of a Line Used in HEOK Fishing

The Department, with support from industry, proposes to modify existing language in Subsection (j) Method of Take which describes the amount of area that a line may occupy in herring eggs-on-kelp fishing. The change will describe the area that a line may occupy as a line length to specify how much line may be used to suspend kelp. The intention of allowing a line to be fished is to permit fishing in areas where raft placement is difficult and or costly. The intention is not to allow more area than would be utilized by a raft. Most of the rafts are approximately 60-ft x 40-ft, with 30 lines strung between raft pontoons. Given these dimensions, a line of 1,200 feet (40 feet width of raft x 30 lines across) would be the equivalent to the amount of line fished from a raft. The proposed length of 1,200-feet does not provide for more surface area than was previously allowed (2,500 square feet), and provides for a definable length that the permittees and Department personnel can readily identify.

Additionally, existing regulations describe a line as a "...continuous piece of line...". This description has caused some confusion among Department enforcement and industry as to what constitutes a "continuous" piece of line. The original intention of this regulation was to restrict the number of lines being used by each permittee at different locations, not to restrict the method by which a permittee constructs a line used for kelp suspension. In an effort to clarify the regulation, the Department proposes to omit the word "continuous" from the regulatory language. The proposed change in

regulatory language would incorporate the above mentioned line length description in Subsection (j) Method of Take. The intention of this change is to allow for the construction of a 1,200-foot piece of line from several smaller pieces without forcing the permittee incurring undue costs. Beginning and end points of the line shall be marked as specified in Section 164 (j)(1) of Title 14, CCR.

2.3.2.2. Corrections and Clarifications

The following changes are proposed to provide for the efficient operation and orderly conduct of the fishery, to improve the clarity of the regulations, and to provide for the protection of the resource:

- Revise the Herring Eggs on Kelp Permit Application number from FG 1406 (4/99) to FG 1406 (02/02).
- Revise the Release of Property form number from MRR/WLP [revised 10/93] to FG-MR-674 (Rev. 5/02).

2.4 Project Alternatives

Three alternatives to the proposed project are considered. These alternatives were examined and detailed in the FED, 1998, and reexamined as they apply to this FSED. Two of these alternatives take the form of additional changes to the existing regulations that could feasibly be joined. The third alternative is a no project (no fishery) alternative. In evaluating alternatives, the comparative merits and impacts of individual alternatives that could be logically and feasibly joined should be considered as so joined unless otherwise stated. The alternatives to be considered are:

- Alternative 1 (no project, i.e. no fishery, alternative). Under this alternative, the commercial harvest of herring would be prohibited.
- Alternative 2 (existing regulations). Under this alternative, existing regulations would be modified only by adjusting quotas to reflect current biomass estimates and by adjusting dates to reflect changes in the calendar.
- Alternative 3 (individual vessel quota for gill net vessels in herring roe fishery). Under this alternative the proposed regulations would be

modified by establishing an individual vessel quota for all gill net vessels. The proposed individual gill net vessel quota would equal the overall gill net quota divided by the number of permittees using gill net gear.

The following section states the specific purpose of the alternatives and summarizes the factual basis for determining that the alternatives are reasonably necessary.

2.4.1 Alternative 1 (no project)

This is a CEQA required alternative. It provides a reference for comparison to the proposed project and alternatives 2 and 3.

2.4.2 Alternative 2 (existing regulations)

The existing regulations for the commercial herring fishery are for the 2001-02 season. This alternative would apply those 2001-02 season regulations to the 2002-03 season, with changes in the quotas to reflect current biomass estimates and changes in season dates to reflect annual changes in the calendar. Regulatory changes for the 2001-02 are described in the FSED of 2001. None of the other amendments to the regulations contained in the proposed project would be considered.

2.4.3 Alternative 3 (individual vessel quota)

This alternative would establish an individual herring quota for each San Francisco Bay gill net permittee. Under existing regulations [Section 163(g)(4)(C), Title 14, CCR] an overall herring quota is established for each of the three gill net groups (platoons) in San Francisco Bay, allowing individual permittees to take and land as much fish (tonnage) as they are capable of until the overall quota for their respective group is reached. An individual permit quota has been suggested each season for the past several years. However, there has never been a clear consensus of support or opposition among industry members about this issue. See Section 2.4.3 of the FED for a full description of this alternative.

Chapter 3. ENVIRONMENTAL SETTING

3.1 General

Pacific herring, *Clupea pallasii*, are found throughout the coastal zone from northern Baja California on the North American coast, around the rim of the North Pacific Basin and Korea on the Asian coast (Outram and Humphreys 1974, Hart 1973). In California, herring are found offshore during the spring and summer months foraging in the open ocean. Beginning as early as October and continuing as late as April, schools of adult herring migrate inshore to bays and estuaries to spawn. Schools first appear in the deep water channels of bays to ripen (gonadal maturation) for up to two weeks, then gradually move into shallow areas to spawn. The largest spawning aggregations in California occur in San Francisco and Tomales bays.

Spawning occurs in the intertidal and shallow subtidal zones. Males release milt into the water column while females extrude adhesive eggs on a variety of surfaces including vegetation, rocks, and man-made structures such as pier pilings, boat bottoms, and breakwater walls. Embryos (fertilized eggs) typically hatch in seven to ten days, determined by water temperature. Larval herring metamorphose into juvenile herring in about ten to twelve weeks. In San Francisco Bay, juvenile herring typically stay in the Bay through summer, and then migrate out to sea.

It is during the spawning season that most of the herring harvest occurs. The roe herring or gill net fisheries catch herring as they move into the shallows to spawn, when the eggs in the females are ripest. The product from this fishery is the sac roe (eggs) in the females. The California fisheries occur in the Crescent City area, Humboldt Bay, Tomales Bay, and San Francisco Bay.

The San Francisco Bay herring eggs-on-kelp fishery suspends Giant kelp, *Macrocystis pyrifera*, from rafts for herring to spawn on. The kelp is harvested near the Channel Islands and or in Monterey Bay and then transported to San Francisco Bay. The product of this fishery is the egg-coated kelp.

The only existing ocean fishery occurs during the non-spawning season in Monterey Bay. Small fisheries for fresh fish are also permitted during the non-spawning season in Tomales Bay and San Francisco Bay.

Herring are a food source for many species of birds, fish, invertebrates, and mammals. Predation is particularly high during spawning when adult fish and eggs are concentrated and available in shallow areas. Predation during the egg stage is a significant cause of natural mortality for herring.

The roe herring fishery in California has been intensively regulated by the Fish and Game Commission (Commission) and by the Department of Fish and Game (Department) since its inception in 1973. Estimates of the spawning population have provided a critical source of information used for establishing fishery quotas to control the harvest of herring and provide for the long-term health of the herring resource. Annual estimates of spawning biomass are made by the Department in Tomales and Humboldt bays using egg deposition surveys. In San Francisco Bay, spawning biomass is estimated by the Department annually using egg deposition surveys as well as hydroacoustic surveys. In addition to these estimates of spawning biomass, the Department collects age composition data on the population as well as the fishery, and assesses the strength of each season's young-of-the-year herring. All of the information collected by the Department is used in an assessment of the population's status.

A thorough description of the environmental setting is provided in Chapter 3 of the Final Environmental Document (FED), which includes Pacific herring life history, ecology, status of stocks and fisheries, and biological and environmental descriptions of herring fishery locations (Crescent City area, Humboldt Bay, Tomales Bay, San Francisco Bay, and Monterey Bay).

3.2 Status of the San Francisco Bay Spawning Population

The 2001-02 spawning biomass estimate for San Francisco Bay is 35,400 tons (including catch), which is a 5.1 percent decline from last season's estimate. Since the 1997-98 El Niño, the San Francisco Bay stock appears to have stabilized at a level well below the 24-year average of 52,255 tons. Samples of herring taken this season indicate an average recruitment of young fish, with the 2- and 3-year-olds grouped together (Table 3.1). However, older fish (4-, 5-, and 6-year-olds) remained well below average abundance this season and are entirely absent for some year classes (7- and 8-year-olds). The average recruitment of young fish and below-average abundance of

Table 3.1. Estimated Numbers (x 1,000) of Herring-at-Age in the San Francisco Bay Spawning Population, 1982-83 to present

Season	Age								
	1	2	3	4	5	6	7	8	9
84-85	^a	184,695	190,998	46,613	22,153	25,914	6,652	688	0
%		38.7	40	9.8	4.6	5.4	1.4	0.1	0
85-86	^a	162,422	160,613	126,535	26,790	16,038	7,752	717	182
%		32.4	32.1	25.3	5.3	3.2	1.5	0.1	0
86-87	^a	168,962	194,365	134,528	64,598	9,182	6,175	1,065	246
%		29.2	33.6	23.2	11.2	1.6	1.1	0.2	0
87-88	^a	233,193	292,508	136,604	66,494	25,337	5,027	3,939	0
%		30.6	38.3	17.9	8.7	3.3	0.7	0.5	0
88-89	^a	146,525	222,058	139,906	44,435	12,310	3,030	534	0
%		25.8	39	24.6	7.8	2.2	0.5	0.1	0
89-90	^a	294,631	237,377	136,248	84,361	23,970	6,572	0	0
%		37.6	30.3	17.4	10.8	3.1	0.8	0	0
91-92	1,356	13,666	126,016	206,930	82,870	23,764	3,490	0	0
%	0.3	3	28	45.2	18.1	5.2	0.8	0	0
92-93	0	48,925	50,398	79,045	51,713	8,642	0	0	0
%	0	20.5	21.1	33.1	21.7	3.6	0	0	0
93-94	11,485	22,403	134,870	160,335	63,331	25,926	4,808	355	0
%	2.6	5.1	31	36.9	14.6	6	1.1	0.08	0
94-95	2,276	39,363	236,783	94,833	42,850	18,223	3,196	0	0
%	0.5	9	54.1	21.7	9.8	4.2	0.7	0	0
95-96	3,142	483,164	359,357	282,069	81,768	28,904	1,687	0	0
%	0.3	38.9	29	22.7	6.6	2.3	0.1	0	0
96-97	1,184	290,497	359,459	183,370	120,029	33,098	8,935	270	0
%	0.1	29.1	36	18.4	12	3.3	0.9	0.02	0
97-98	42	45,092	129,411	65,637	18,724	2,259	1,430	0	0
%	0.01	17.2	49.3	25	7.1	0.9	0.5	0	0
98-99	1,931	256,816	54,306	114,835	56,915	9,729	558	978	^b
%	0.4	52	11	23.2	11.5	2	0.1	0.2	^b
99-00	1,440	103,490	154,260	48,150	29,000	4,310	0	0	0
%	0.4	30.4	45.3	14.1	8.5	1.3	0	0	0
00-01 ^c	50,449	163,690	196,664	67,225	12,301	2,724	0	0	0
%	10.3	33.4	40.1	13.7	2.5	0.1	0	0	0
01-02 ^c	14,227	172,077	172,774	66,345	17,342	2,481	0	0	0
%	3.2	38.6	38.8	14.9	3.9	0.6	0	0	0

Note: 1990-91 season was not included due to incomplete data set for that season.

^a 1-year-olds were excluded. ^b 1- and 9-year-olds excluded. ^c preliminary-based on lengths.

older fish is the primary reason for the 2001-02 season's below-average spawning biomass. Recruitment of younger herring into the spawning population is highly variable, and contributes to annual fluctuations in spawning biomass. The abundance of young fish can be greatly affected by a number of environmental factors, such as prevailing oceanographic conditions and delta outflow. Mild to moderate El Niño conditions are expected to occur in the fall and winter of 2002 and in early in 2003 according to the National Oceanic and Atmospheric Administration's Climate Prediction Center. It is important to note that the impacts of the forecasted El Niño are unknown at this time, but it is not expected to produce as large an impact on the herring population as effected by the strong 1997-98 El Niño.

Pacific herring young-of-the-year (YOY) are commonly caught by the Department's Central Valley Bay-Delta Branch San Francisco Bay Study (SFBS) during the spring and early summer of each year. The SFBS conducts surveys to determine the abundance and distribution of invertebrates and fish in the Western Delta and San Francisco Bay. Stations are sampled using a variety of research nets and assorted sampling equipment, including a midwater trawl that is towed obliquely through the water column to capture species inhabiting varying depths. An index of abundance is calculated for YOY Pacific herring (Interagency Ecological Program Technical Report 63).

The herring young-of-the-year (YOY) abundance indices for the 2000 and 2001 year classes, who will be next season's 3- and 2-year-olds, respectively, are the two highest indices since the 1986 year class. The strength of the YOY indices for the 2000 and 2001 year classes may indicate favorable environmental conditions for survival, growth, and potential recruitment as 3- and 2-year olds. Preliminary results of the 2001-02 season assessment suggest that a significant number of the 2001 year class recruited to the spawning population as 1-year-olds, which would be the second highest return to last season's all-time high. Preliminary results from the 2002 SFBS data also suggest that the index of abundance for the 2002 year class may be comparable to the previous two seasons (Kathy Hieb, Central Valley Bay-Delta Branch, San Francisco Bay Study, California Department of Fish and Game, personal communication).

3.3 Status of the Tomales Bay Spawning Population

The 2001-02 spawning biomass estimate for Tomales Bay is 7,243 tons, which is 73 percent greater than the 2000-01 biomass estimate of 4,196 tons. This season's biomass surpassed the long-term, twenty-nine season, average spawning biomass of 4,537 tons by 60 percent. It is the largest spawning biomass since the 1982-83 season (Table 3.2).

The 2001-02 season biomass surpassed the post-closure average by 161 percent. The Tomales Bay fishery closed for three seasons following the 1988-89 season as a consequence of several consecutive years of low spawning and abundance in Tomales Bay. Fishing was allowed in outer Bodega Bay during the Tomales Bay closure. The Tomales Bay fishery re-opened and the outer Bodega Bay fishery was closed in the 1992-93 season following significant improvement in spawning within Tomales Bay during the closed period. The outer Bodega Bay fishery was closed due to concern that this fishery intercepted potential Tomales Bay spawning fish. Since the fishery reopened in the 1992-93 season, the average seasonal biomass is 2,772 tons.

There were eight spawning events during the 2001-02 season and a correspondence with significant rain events was noted. The timing of the spawning events was much earlier this season than what it has been historically. Spawn escapement in November was the largest ever recorded for the month totaling 577 tons. December spawning was higher than normal totaling 4,568 tons, more than last season's entire spawning biomass estimate of 4,196 tons. Spawning earlier in the season is most likely due to rain events coinciding with favorable tidal conditions. The increase in the Tomales Bay herring biomass is due in part to better oceanic conditions, strong recruitment, significant rain events, and conservative fishery management strategies, all of which have helped the Tomales Bay herring population rebound.

For the first time since the 1986-87 season, herring spawned on the eelgrass beds around Hog Island located in the northern portion of the Bay. It is also noted that the red alga, *Gracilaria* spp., was the predominant spawning substrate this year. Seventy percent of the total spawning escapement this season was estimated to have occurred on *Gracilaria* spp. The increase in use of *Gracilaria* spp. may be related to the decline in the density of eelgrass beds located in Tomales Bay. Eelgrass bed

Table 3.2. Tomales Bay Herring Biomass Estimates 1972-73 through 2001-02 Season.

Season	Spawn Escapement (tons)	Catch (tons)	Percent Catch (Exploitation Rate)	Spawning Biomass (tons)
Gillnet and Lampara Fisheries in Tomales Bay and Outer Bodega Bay				
1972-73	2,265	598	26.4	2,863
1973-74	6,041	521	7.9	6,562
1974-75	4,210	518	11	4,728
1975-76	7,769	144	1.8	7,913
1976-77	4,739	344	6.8	5,083
Gillnet Only Fishery - Tomales Bay and Outer Bodega Bay				
1977-78	21,513	646	2.9	22,159
1978-79	—	448	—	— *
1979-80	5,420	603	10	6,023
1980-81	5,128	448	8	5,576
1981-82	6,298	851	11.9	7,149
1982-83	10,218	822	7.4	11,040
1983-84	1,170	110	8.6	1,280
1984-85	6,156	430	6.5	6,586
1985-86	435	771	12.8	6,000**
1986-87	4,931	867	15	5,798
1987-88	1,311	750	36.4	2,061
1988-89	167	213	56	380
Tomales Bay Gillnet Fishery Closed - Fishing in Outer Bodega Bay Only				
1989-90	345	0	0	345
1990-91	779	0	0	779
1991-92	1,214	0	0	1,214
Tomales Bay Gillnet Fishery Opened - Fishing in Outer Bodega Bay Closed				
1992-93	3,856	222	5.4	4,078
1993-94	2,244	219	8.9	2,463
1994-95	3,704	275	6.9	3,979
1995-96	1,704	355	17.2	2,059
1996-97	1,288	222	14.7	1,510
1997-98	586	0	0	586
1998-99	4,015	54	1.3	4,069
1999-00	1,969	42	2.1	2,011
2000-01	3,898	298	7.1	4,196
2001-02	6,889	354	4.9	7,243
AVERAGE	4,147	371	10.3	4,633

* No herring fieldwork this season.

**Biomass estimated by cohort analysis; for all other years, biomass was estimated from spawning-ground surveys.

density has appeared to decline, while *Gracilaria* spp. and Giant kelp (*Macrocystis* spp.) have increased in abundance in many areas where eelgrass density declined. Herring displayed a preference for *Gracilaria* spp. as a spawning substrate, which was evident by comparing egg densities between *Gracilaria* spp. and eelgrass spawns. This was especially noticeable in areas where both types of vegetation occurred simultaneously. Despite an increase in the abundance of *Macrocystis* spp., herring did not use this vegetation for spawning.

Pacific herring that were caught in Tomales Bay during the 2001-02 season were slightly smaller than those caught in 2000-01. Commercial catch data from this season have shown that fishermen caught a lower percentage of 6- and 7-year-old fish than in 2000-01, but the fishery was still selective for 4-year-old and older herring. Research catch data using an experimental multi-panel variable mesh size gill net this season also showed a loss of older age fish in the population. There was a much lower percentage of 6- to 7-year-old fish than last season. The apparent loss of larger and older fish has been a concern since the 1997-98 El Niño and is comparable to the similar phenomenon seen in San Francisco Bay (see Section 3.2). However, research data indicate strong recruitment to the spawning population. These younger herring, the 3- and 4-year-olds, appeared to compose a greater percentage of the population than in 2000-01, and will recruit to the fishery next season as 4- and 5-year-olds, respectively. The Department proposes to continue using the 2-inch experimental mesh for commercial gill nets through the 2002-03 season. It is recognized that more time must be allowed to evaluate the potential impacts of 2-inch mesh on the herring population in Tomales Bay.

3.4 Status of the Humboldt Bay and Crescent City Spawning Populations

The 2001-02 herring season marked the second consecutive year that spawning ground surveys and commercial fishery monitoring and assessment were carried out in Humboldt Bay since these surveys were discontinued following the 1991-92 herring season. Total spawn escapement was estimated to be 617 tons, 38 percent above the 2000-01 season's estimate of 385 tons. The total spawning biomass estimate (spawn escapement plus commercial catch) was 648 tons, well above estimates from surveys conducted during the 1974-75, 1975-76, 1990-91, and 1991-92 seasons, which recorded a

spawning biomass in Humboldt Bay of 372, 232, 400, and 225 tons, respectively. Spawn escapement data from current and historic surveys suggest that the Humboldt Bay spawning population can support the 60-ton seasonal quota established in 1983.

The mean size of herring sampled from the commercial catch was 200.6 mm (range 187-227 mm) with herring from the Department's research net averaging 183.7 mm (range 149-210 mm). Most length classes appear to be well represented this season in the samples from the research net with the exception of fish in the 185-190 mm range. This corresponded to a low percentage of 175-180 mm range fish in the research net catch during the 2000-01 spawning season, which might be a consequence of the negative effects of the 1997-98 El Niño on the 1998 year-class. Overall, the Humboldt Bay spawning population appears to have recovered from the last El Niño event.

Permittees failed to fill the 60-ton quota for Humboldt Bay in 2002. This year's catch of 34.48 tons was 20 percent below the 42.9 ton average since 1983. Although 2002 landings were among the lowest since the 60-ton quota was set in 1983, they were still much greater than the combined landings (24.4 tons) of the 1997-98, 1998-99, and 1999-2000 seasons.

The Department of Fish and Game continued to work with University of California Sea Grant, Humboldt State University, and Humboldt Bay Harbor District to monitor eelgrass biomass in Humboldt Bay. Agencies completed a full year of sampling with 15 sample sites in both the north and the south regions of Humboldt Bay. Summer eelgrass biomass ranged from 0.23 kg/m² to 0.84 kg/m² and winter eelgrass biomass ranged from 0.12 kg/m² to 0.88 kg/m². This data is essential for herring research and has greatly improved the accuracy of this season's spawning biomass estimate.

Spawning ground surveys and commercial fishery assessments were not conducted in the Crescent City area for the 2001-02 season. Fishing effort was minimal with only one out of the three Crescent City permittees landing fish. Only 20 percent (6.14 tons) of the 30-ton quota for this fishery was landed, 4.36 tons less than last season and far below the 30-year average of 22 tons. The Department does not plan to conduct spawning ground surveys or commercial fishery assessments in the Crescent City area for the 2002-03 season.

3.5 Status of Noise Issues in San Francisco Bay

During the 2000-01 season and the public-scoping process, the Department received commentary from residents regarding transient nighttime noise created by herring fishing activity near residential properties bordering the shoreline of San Francisco Bay. The herring fishing industry expressed to the Department a willingness to address complaints regarding nighttime noise, and in coordination with the Department and residents, brought forward a list of actions that would reduce the noise produced by fishing activities. The regulations, Subsection 163 (f)(2)(F), Title 14, CCR, were amended to address nighttime noise issues.

The number of noise complaints received during the 2001-02 season by local agencies and Department staff has declined since the 2000-01 season. Noise complaints were limited to noise from deck speakers, and engines sounds from fishing boats maneuvering nearshore. A herring gill net permittee, who volunteered to be the point of contact between city police staff and the fleet, expeditiously addressed complaints when phoned on three occasions last season, promptly contacted the offending boat skippers. In addition, the Department contacted gill net boats that did not appear to recognize city noise ordinances while fishing as stipulated in the amended regulation. A list of complaints received by the local police department was compiled and when identified, vessel crew and operators were contacted by Department staff in an effort to curb further noise infractions. The Department will continue to evaluate the effectiveness of this regulation.

Chapter 4. ENVIRONMENTAL IMPACT ANALYSIS AND CUMULATIVE EFFECTS

This chapter addresses the impacts and cumulative effects of the proposed project (changes to the commercial herring fishing regulations) on the existing environment described in Chapter 3 of this document and the FED. The proposed project and two of the three alternatives will permit a continuation of the regulated commercial harvest of Pacific herring in California. An analysis of the impacts of the proposed project and its cumulative effects identified no new impacts that were not already addressed in the FED.

Existing regulations permit the commercial harvest of herring in five geographical areas: San Francisco Bay, Tomales Bay, Humboldt Bay, the Crescent City area, and the open ocean. Chapter 4 of the FED examined the environmental sensitivity of each of these areas at existing harvest levels. Thirteen environmental categories were considered, including: land use, traffic circulation, water quality, air quality, housing, public utilities, geological, biological, archaeological, scenic, recreation, noise, and growth inducement. Three categories (land use, archaeology, and growth inducement) were considered to have no environmental sensitivity to commercial herring fishery activity in any of the five geographical areas and were not considered in the impact analysis. The basis for this assessment is provided in detail in section 4.1 of the FED.

Section 4.2 of the FED provided a detailed impact analysis for the ten categories found to have environmental sensitivity to commercial herring fishery activity. Potential impacts to traffic circulation, water quality, air quality, housing and utilities, geology, and scenic, recreation, and noise that were identified as an aspect of herring fisheries varied in degree with geographic area, but all were considered to be localized, short-term, and less than significant. Some of these potential impacts are mitigated by various existing regulations.

Section 4.2.6 of the FED provided a detailed analysis of the potential environmental impacts to biological resources that exist from commercial herring fisheries. The proposed project adds no new impacts to be analyzed. The FED divided potential impacts into two categories: (1) direct harvest impacts; and (2) trophic level impacts. Short and long term

potential adverse impacts exist within each of these categories. Many of these potential impacts are mitigated by current management practices including annual stock assessments and regulations that control harvest and fishery impacts. Others are considered localized, short-term and less than significant.

Chapter 5 of the FED provided a detailed analysis of the factors that have the capacity to influence future Pacific herring population status in California in addition to the existing herring fisheries or alternatives (cumulative effects). The proposed project introduces no new cumulative effects to those addressed by the FED. The FED discussed in detail the factors with greatest potential for cumulative effects, including: continued commercial harvest of herring, unusual biological events, competitive interactions with other pelagic fish, unusual weather events, habitat loss, and water quality. Mitigation for these potential cumulative effects will be provided by annual stock assessments, annual changes in the level of harvest, or the selection of a no fishery alternative.

Chapter 5. ANALYSIS OF ALTERNATIVES

An analysis of the potential environmental impacts of the three alternatives described in Section 2.4 is provided in Chapter 6 of the Final Environmental Document (FED). The three commercial harvest alternatives were selected for consideration by the Fish and Game Commission (Commission) based on Department of Fish and Game's (Department) consideration, public comment received during the normal review process, or in response to the Notice of Preparation (NOP). These alternatives were selected to provide the Commission with a range of commercial harvest alternatives. The two commercial harvest alternatives contain common elements with only selected elements of the management framework considered as alternatives. A "no project" (no commercial harvest of herring within California state waters) alternative is also provided.

5.1 Alternative 1 (no project)

The "no project" alternative would eliminate the commercial harvest within California waters of Pacific herring resources. Selection of this alternative would be expected to: (1) reduce total mortality and allow herring stocks to increase to carrying capacity; (2) reduce the health of stocks through density dependent competition between individual herring; (3) increase competition between species (e.g., sardines and anchovies) occupying the same ecological niche as Pacific herring and reduce standing crops of these species; (4) increase the availability of herring to predators by reducing search effort and increasing capture success; (5) eliminate the ethical concern of those opposed to the commercial harvest of herring and the scientific information on herring derived from sampling the commercial harvest; (6) eliminate revenues to local and regional economies, and State and Federal agencies derived from the commercial harvest of herring.

Localized, short-term, and less than significant impacts to traffic circulation, water quality, air quality, housing, utilities, scenic quality, recreational opportunities, and noise levels would also be eliminated under the no project alternative. Section 6.1 of the FED provides a full analysis of the potential impacts associated with this alternative.

5.2 Alternative 2 (existing regulations)

Existing regulations, adopted in 2001, are for the 2001-02 Pacific herring commercial fishing season. These regulations reflect the amendments as adopted by the Commission and detailed in the FSED of 2001. Under alternative 2, the only changes to the 2001-02 regulations would be to revise the herring fishing seasons, by location, and adjust quotas to reflect the 2001-02 biomass estimates determined by the Department. In most regards, the environmental impacts of alternative 2 will be similar to those of the proposed project. However, alternative 2 does not address problems or conditions that are addressed by the proposed project. Some of the changes and amendments in the proposed project address simultaneous fishing of two permits by one individual, gear specifications, implementation of noise reduction measures during hours of nighttime fishing, prohibition on the usage of seal bombs in San Francisco Bay, gear requirements, herring eggs-on-kelp fishery issues, or are simply clarification changes and are without apparent environmental implications.

5.3 Alternative 3 (individual vessel quota)

This alternative modifies alternative 2 by establishing individual boat quotas for the roe herring gill net fishery in San Francisco Bay. Localized, short-term, and less than significant impacts of this alternative to circulation of traffic, water quality, air quality, housing, utilities, scenic quality, recreational opportunities, and noise levels are expected to be comparable to the proposed project. However, fishing effort could extend further into the season since the economic incentive would direct effort toward higher roe counts rather than quantity. Without individual boat quotas, overall quotas have typically been met long before season closure. Having the latitude to strive for higher roe counts could add incrementally to the potential impacts associated with the fishery. Section 6.3 of the FED provides further analysis of the potential environmental impacts of this alternative.

5.4 Proposed Project

The proposed project, described in full in Chapter 2 of this Final Supplemental

Environmental Document (FSED) is a body of recommended regulations governing the commercial harvest of herring for roe products, the harvest of herring eggs-on-kelp, and the harvest of herring for the fresh fish market, bait, and pet food. The proposed project is identified as the preferred alternative because it provides a set of regulations most likely to achieve the State's policy with respect to the conservation, maintenance and utilization of the Pacific herring resource.

Chapter 6. CONSULTATION

Chapter 7 of the Final Environmental Document (FED) explains the role that consultation with other agencies, professionals, and the public plays in the Department's marine resource management programs.

Consultations also occur during the annual review of regulations guiding the commercial harvest of herring. The process began this year when the Department presented the results of its annual population assessment and discussed possible regulatory changes for the 2002-03 season with the Director's Herring Advisory Committee on March 27, 2002.

The Department's recommendations were modified, as necessary, based on the Committee's comments, and presented at public hearings on April 4, 2002. This meeting also served as a scoping session for the content of the Draft Supplemental Environmental Document (DSED). The recommendations were again modified, as necessary, based on information and comments received during the public hearing, and will be presented to the Fish and Game Commission.

Prior to preparation of the DSED, the Department initiated a broader consultation by distributing a Notice of Preparation (NOP) that announced the intent to prepare the document. In the NOP, the Department requested submission of views on the scope and content of the environmental information to be contained therein. The notice was distributed to members of the public and interested organizations that had expressed prior interest in herring management. The NOP was also provided to the State Clearinghouse for distribution to appropriate responsible and trustee agencies.

Chapter 7. RESPONSES TO COMMENTS REGARDING THE PROPOSED PROJECT

Pursuant to Sections 2180.5 (d)(2)(vi) and 2180.5 (d)(3)(ii) of the Public Resources Code, a copy of the Draft Supplemental Environmental Document (DSED) was placed on file and made available for public review for a 45-day period. Notice was also given at the time of filing that any person interested could submit statements in writing relevant to the environmental document until 5:00 p.m. on August 9, 2002, at the Fish and Game Commission office in Sacramento. Written and oral comments relative to the DSED were also solicited by the Commission at its August 2, 2002 meeting in San Luis Obispo.

7.1 Summary of Comments Received

No oral or written comments regarding the DSED were received by the Department of Fish and Game (Department) during the public review period.

7.2 Department Responses to Comments

Not applicable.

7.3 Copy of Letters Received

No letters were received.

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