

Appendix B

CHARACTERIZATION OF CONSUMPTIVE USES AND ASSOCIATED SOCIOECONOMIC CONSIDERATIONS IN THE REGION

B.1 Introduction

This appendix presents a summary characterization of consumptive uses (i.e., commercial and recreational fishing activities) and describes the economic contribution that consumptive activities make to regional and local economies in the Project area. In addition, the information in this appendix addresses the socioeconomic implications and potential displacement resulting from the establishment of marine protected areas (MPAs) and special closures under the Proposed Project and its alternatives.

This summary has been prepared to provide socioeconomic information to support the conclusions presented in the DEIR. However, as noted in Chapter 1 of the DEIR, Section 15131 of the State CEQA Guidelines states that “economic or social effects shall not be treated as significant effects on the environment.” Therefore, socioeconomic effects are not considered environmental impacts under CEQA, unless they have relevance to a significant physical impact.

The impact analysis of the DEIR therefore makes use of the socioeconomic information as appropriate, where such a nexus exists. CEQA-relevant indirect impacts of displacement include impacts on air quality, biological resources, cultural resources, and vessel traffic, which are described in more detail in Chapters 3 through 7 of the DEIR.

B.2 Consumptive Use Industries in the North Coast Study Region

Consumptive use industries of concern in and adjacent to the North Coast Study Region (Study Region) include commercial and recreational fishing. Unless otherwise noted, the information and data presented in section B.2 is from the *Regional Profile of the North Coast Study Region: California–Oregon Border to Alder Creek* (Regional Profile) (MLPAI 2010). For more detailed discussion of existing consumptive use industries in and adjacent to the Study Region, refer to the Regional Profile report.

B.2.1 Commercial Fishing

The Department collects landings data for all commercial fish landed at California ports. Fish dealers and receivers are required to report poundage and ex-vessel revenue (price paid to fisherman) by species or species groups, gear type, area where fish were caught, date that fish were landed, vessel name, fisher name, and fish business name (dealer that purchased the fish) on landing receipts. The data provided in this section were extracted

from the Commercial Fisheries Information System (CFIS), which houses California's commercial landings data. All finfish and invertebrate species caught in ocean waters in the Study Region (i.e., out to 3 statute miles [mi]) were included in the landings data reported in this appendix. Humboldt Bay is in the Study Region, and thus the herring fishery is included in the analyses for these ports, but freshwater species are excluded. Several species of economic importance to the North Coast fishing community (e.g., trawl-caught groundfish) are not included in the data reported in this appendix because they are harvested outside of the Study Region, in adjacent federal waters.

In addition to data on harvesting available from the CFIS, a recent report commissioned by the Department (Hackett et al. 2009) provides detailed descriptions of costs and revenues to the commercial fishing industry in California. Cost and revenue information in this report is specific to different types of commercial fishing operations, and to different marine regions including the North Coast region. An input-output model developed as part of the Hackett et al. study, is capable of assessing the effects of harvest management changes, including changes in ex-vessel prices or allowable harvest.

Commercially Harvested Species

Commercial fisheries that have the greatest potential to be affected by the implementation of new or expanded MPAs are those that occur primarily within state waters of a study region and mainly target residential, nonmigratory species in nearshore waters. Commercial fisheries that are located in state waters of the Study Region and/or are economically important to the fishing communities adjacent to the Study Region, and had landings in the years 1999 through 2008 are listed below (in descending order of average annual landings for all combined port complexes):

- ***Finfish Fisheries:*** Salmon, smelt, deeper nearshore (rockfish: black, brown, olive, copper, treefish, blue and quillback); hagfish; shallow nearshore (cabezon, monkeyface eel, and the following rockfish: black-and-yellow, China, gopher, kelp, and grass); lingcod; herring; skates, rays, and sharks; and surfperch. Others include pelagic finfish and California halibut.
- ***Invertebrate Fisheries:*** Dungeness crab, red urchin, and coonstripe shrimp. Others include jumbo squid, rock crab, and spot prawn.

Table B-1 shows average annual landings (in pounds) for principal commercial fisheries in the three counties adjacent to the Study Region over the 1999–2008 period. Commercial catch is reported either by species or by “market category,” that includes a variety of similar species or species commonly sold as a generic category of fish. Landings totals include species harvested in state waters outside of the Study Region's boundaries but landed in Study Region ports.

Over the 1999–2008 period, average annual landings in the Study Region totaled over 13 million pounds, with an average annual ex-vessel value of over \$24 million (**Table B-1** and **Table B-2**). Important ports in the Study Region are Crescent City, Trinidad, Eureka, King Salmon, Fields Landing, Shelter Cove, Fort Bragg, and Albion.

Table B-1. Average Annual Landings for Principal Commercial Fisheries in the North Coast Study Region, 1999–2008

Species and Market Category	Average Annual Landings (pounds)			
	Del Norte County	Humboldt County	Mendocino County	Total Average Landings
Deeper nearshore ^a	153,571	39,756	8,445	201,771
Dungeness crab	5,314,046	3,508,692	544,241	9,366,979
Hagfish	7,075	188,924	9	196,008
Herring	4,065	23,254	0	27,319
Lingcod	21,782	7,807	9,814	39,403
Salmon, Chinook	47,968	81,938	825,570	955,476
Shallow nearshore ^b	13,152	3,743	38,603	55,497
Shrimp, coonstripe	62,886	455	39	63,380
Skates/rays/sharks ^c	22,413	2,671	106	25,190
Smelt ^d	59,240	335,453	5,099	399,792
Surfperch ^e	4,338	18,066	161	22,564
Urchin, red	3,177	4,779	1,680,318	1,688,274
Total (state waters)	5,713,713	4,215,538	3,112,405	13,041,653
Total (state and federal waters)	12,372,012	16,182,151	7,174,504	35,041,653

Notes:

^a Includes the following rockfish: black, brown, olive, copper, treefish, blue, and quillback.

^b Includes cabezon, monkeyface eel, and the following rockfish: black-and-yellow, China, gopher, kelp, and grass.

^c Includes all sharks and rays except white shark and big skate.

^d Includes jacksmelt, topsmelt, and true, surf, and night smelt.

^e Includes redbtail surfperch.

Source: MLPAI 2010

Table B-2. Average Annual Ex-Vessel Revenue from Harvest for Principal Commercial Fisheries in the North Coast Study Region, 1999–2008

Species and Market Category	Average Annual Ex-Vessel Revenue (in constant 2008 dollars)			
	Del Norte County	Humboldt County	Mendocino County	Total Average Revenue
Deeper nearshore ^a	\$313,561	\$63,562	\$17,842	\$394,966
Dungeness crab	\$10,421,572	\$7,023,624	\$1,200,463	\$18,645,659
Hagfish	\$2,377	\$98,561	\$3	\$100,225
Herring	\$1,808	\$9,650	\$0	\$11,459
Lingcod	\$43,300	\$13,326	\$18,600	\$75,225
Salmon, Chinook	\$164,226	\$249,011	\$2,239,955	\$2,653,193
Shallow nearshore ^b	\$63,407	\$15,953	\$212,135	\$291,496
Shrimp, coonstripe	\$290,665	\$1,906	\$146	\$292,717
Skates/rays/sharks ^c	\$34,885	\$2,259	\$143	\$37,287
Smelt ^d	\$21,526	\$119,256	\$2,091	\$142,873
Surfperch ^e	\$6,507	\$23,614	\$237	\$30,358
Urchin	\$2,129	\$4,664	\$1,388,166	\$1,394,959
Total (State waters)	\$11,365,963	\$7,625,386	\$5,079,781	\$24,070,417
Total (State and federal waters)	\$13,975,615	\$13,104,261	\$8,226,342	\$35,306,219

Notes:

Reported ex-vessel revenues are in constant 2008 dollars. Data included for 2008 are preliminary.

^a Includes the following rockfish: black, brown, olive, copper, treefish, blue and quillback.

^b Includes cabezon, monkeyface eel, and the following rockfish: black-and-yellow, China, gopher, kelp, and grass.

^c Includes all sharks and rays except white shark and big skate.

^d Includes jacksmelt, topsmelt, and true, surf, and night smelt.

^e Includes redbtail surfperch.

Source: MLPAI 2010

Fishing Port Complexes and Associated Landings in the North Coast Study Region

For reporting purposes, the Department aggregates geographically co-occurring ports into nine major port complexes for the entire state. The Study Region encompasses all or part of two of these port complexes: Eureka and Fort Bragg. (The ports at Point Arena and Anchor Bay, which are the two southernmost ports in the Fort Bragg port complex, are not included because they are within the North Central Coast Study Region. Landings information for those ports is described in the North Central Coast MLPA EIR and supporting documents.)

A brief profile of each port complex and associated landings is discussed next.

Eureka Port Complex

The Eureka port complex encompasses Del Norte and Humboldt Counties, and includes ports from the California/Oregon border to Shelter Cove (approximately 35 mi south of Cape Mendocino). Port landings by county are described next.

Del Norte County

Average annual landings of commercially-harvested species between 1999 and 2008, at ports in Del Norte County are shown in Table B-1. Landings of Dungeness crab predominate at Del Norte County ports, averaging more than 5.3 million pounds annually over the 10-year period, and landings at Del Norte County ports account for about 93% of all landed catch in state waters.

In 2008, 117 California-registered commercial vessels, 122 licensed commercial fishers, and 21 businesses in Del Norte County reported landings from fisheries in the Study Region (MLPAI 2010).¹

In 2008, the total value of all landings at ports in Del Norte County was more than \$6 million, the profit on nearly three million pounds of finfish and invertebrates landed. During 2008, the top ten fisheries, in order of importance of total landed value at Del Norte County ports, were: Dungeness crab, deeper nearshore, coonstripe shrimp, salmon, shallow nearshore, lingcod, skates/rays/sharks, smelt, surfperch, hagfish, and rock crab. Even though pink shrimp and trawl fisheries (e.g., slope rockfish) are caught outside of state waters, and therefore outside the Study Region, these fisheries also are considered economically important to this port complex.

In a 2006 federal socioeconomic study (Pacific Fishery Management Council and National Marine Fisheries Service 2006, as cited in MLPAI 2010) to consider the needs of fishing communities, the County of Del Norte was classified as “vulnerable,” with high levels of dependence on commercial fishing and low levels of resilience. The town of Crescent City, located in Del Norte County, was classified as “vulnerable,” utilizing the same criteria.

Humboldt County

Average annual landings of commercially-harvested species between 1999 and 2008, at ports in Humboldt County also are shown in Table B-1. Similar to ports in Del Norte County,

¹ More than one fisher may report landings from the same commercial fishing vessel.

landings of Dungeness crab predominate at Humboldt County ports, averaging more than 3.5 million pounds annually over this 10-year period. This indicates that about 83% of all catch in state waters is landed at Humboldt County ports.

In 2008, 122 California registered commercial vessels, 137 licensed commercial fishers, and 43 businesses reported landings from fisheries in the Study Region. The top ten fisheries, in order of importance of total landed value, contributing to landings at Humboldt County ports during 2008 were Dungeness crab, hagfish, salmon, smelt, deeper nearshore, surfperch, shallow nearshore, lingcod, herring, and rock crab. Even though highly migratory (e.g., tuna) and trawl fisheries (e.g., slope rockfish) occur outside of state waters, and therefore outside the Study Region, these fisheries are still considered economically important to this port complex. The total value of all landings in 2008 was almost \$6 million, with over three million pounds landed.

The County of Humboldt was classified in the 2006 socioeconomic study (Pacific Fishery Management Council and National Marine Fisheries Service 2006, as cited in MLPAI 2010) as “most vulnerable,” with high levels of dependence on commercial fishing and low levels of resilience. The town of Eureka, located in Humboldt County, was classified as “vulnerable,” utilizing the same criteria.

Northern Fort Bragg Port Complex

The Fort Bragg Port Complex includes ports from Westport to Point Arena in Mendocino County. (As stated previously, the ports of Port Arena and Anchor Bay are not within the boundaries of the Study Region but are included in the North Central Coast Study Region for the MLPA EIR.) The remaining ports are referred to here as the Northern Fort Bragg Port Complex.

Between 1999 and 2008, landings of red urchin were the most important commercially harvested species at Mendocino County ports, averaging about 1.7 million pounds annually over this 10-year period (Table B-1). Landings of Dungeness crab were the second most important commercially harvested species in the Northern Fort Bragg Port Complex, annually accounting for an average of 544,241 pounds between 1999 and 2008.

In 2008, 83 California registered commercial vessels, 89 licensed commercial fishers, and 26 businesses reported landings at ports in the Northern Fort Bragg Port Complex. The top ten fisheries, in order of importance of total landed value, contributing to these ports from 1999–2008 were: Dungeness crab, salmon, red urchin, deeper nearshore, coonstripe shrimp, shallow nearshore, smelt, hagfish, lingcod, and skates/rays/sharks (similar to the Del Norte region, pink shrimp and trawl fisheries occur outside of state waters, and therefore outside of the Study Region, but these fisheries are still considered economically important to this port complex). The total value of all landings in 2008 was more than \$3 million, based on almost three million pounds landed.

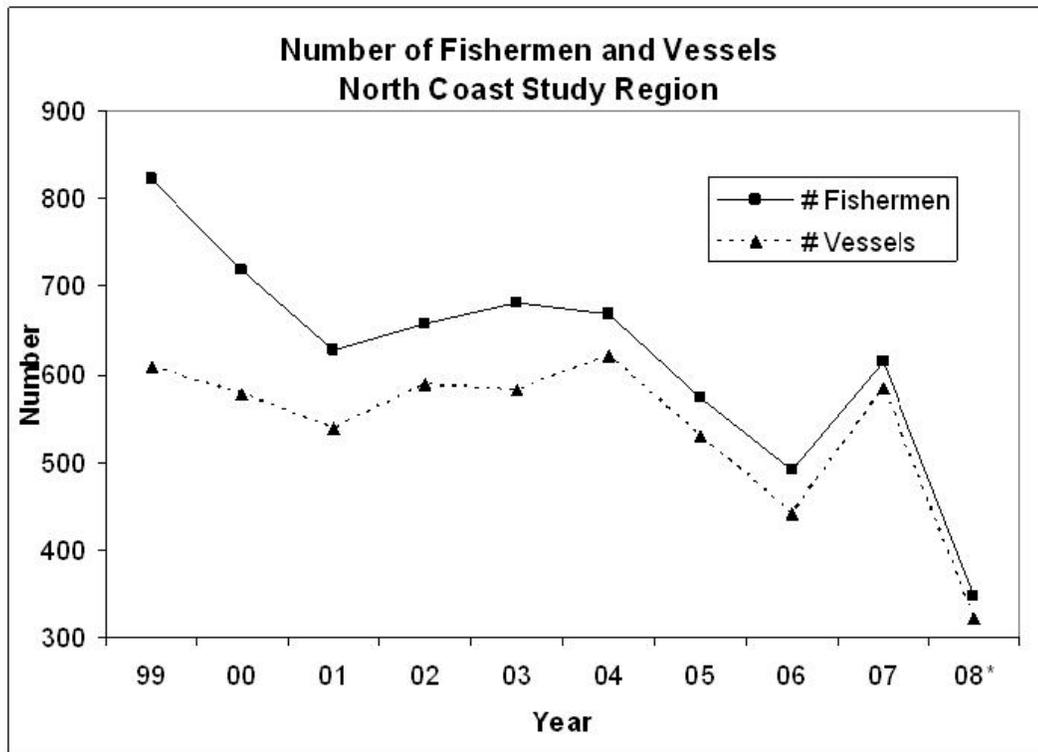
The County of Mendocino was classified in the 2006 socioeconomic study (Pacific Fishery Management Council and National Marine Fisheries Service 2006, as cited in MLPAI 2010) as “most vulnerable,” with high levels of dependence on commercial fishing and low levels of resilience. The town of Fort Bragg, located in Mendocino County, was classified as “vulnerable,” utilizing the same criteria.

Commercial Fishing Industry Trends

During the past 25 years, a statewide trend has been a decreasing number of fishers and commercial fishing vessels participating in California commercial fisheries. From 1980 to 2004, the number of commercial fishing licenses sold statewide declined by 69%, from approximately 20,400 to 6,300. From 1988, a decline in licenses sold occurred every year and averaged 3.7% per year (CDFG 2009).

Similarly, the overall number of commercial fishers and vessels in the Study Region declined from 1999 through 2008 (Figure B-1). The number of commercial fishers declined in the 10-year period, from about 830 to 330, and the number of vessels declined from about 600 to 310. The number of fishers shown in Figure B-1 may not reflect the number of “core” participants making landings in a port complex or fishery because the numbers reflect total fishers who made at least one landing from Study Region fisheries for each year.

Figure B-1. Numbers of Commercial Fishers and Vessels for All Ports in the North Coast Study Region, 1999-2008

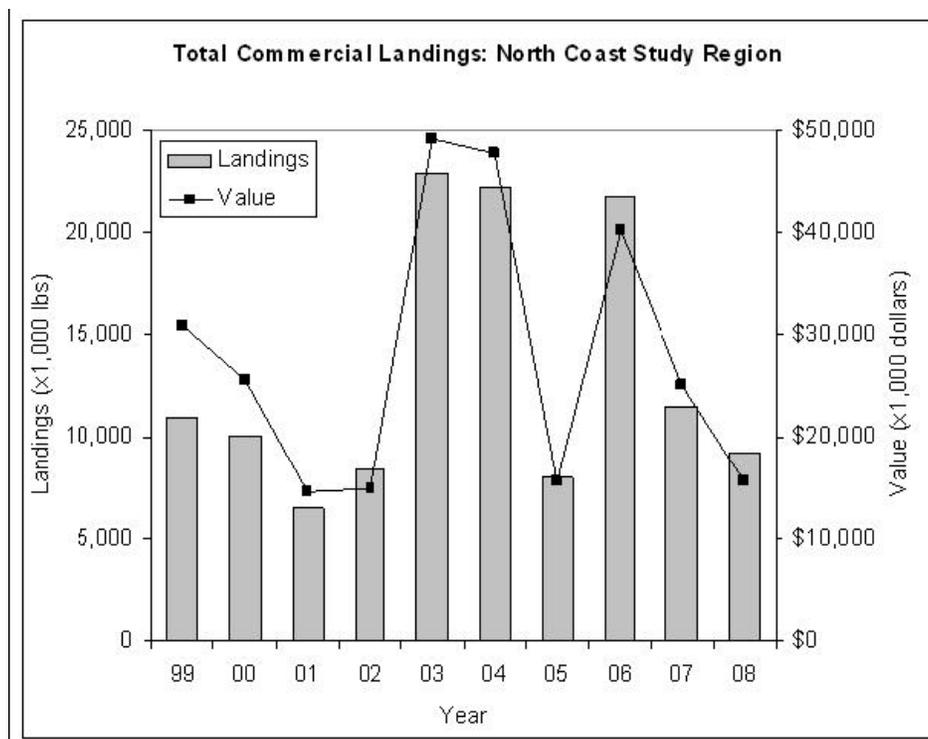


Source: CFIS, as cited in MLPAI 2010

Total commercial fishing revenues and landings in state waters in the Study Region also varied over the 1999–2008 period, with landings in 2008 similar, but slightly lower, than levels in 1998 (Figure B-2). Ex-vessel revenues (in constant 2008 dollars), however, were substantially lower in 2008 compared to 1999. Revenues and landings were highest in 2003, 2004, and 2006, and lowest in 2001, 2002, and 2005. In general, county-specific total landings and ex-vessel values for commercial fisheries that primarily occurred in state

waters were dependent on species availability, market demand, and restrictions imposed on fisheries through tighter regulations in the Study Region over the period from 1999 through 2008. This was particularly true for commercial salmon landings because of changes to fishery regulations. Commercial salmon regulations closed the area between the California/Oregon border and the Humboldt south jetty (Crescent City to Eureka) in 2006, and a complete closure occurred for all ocean salmon fishing in 2008.

Figure B-2. Total State Waters Landings and Values for All Ports in the North Coast Study Region, 1999–2008



Note: Values are reported in constant 2008 dollars.
 Source: CFIS, as cited in MLP AI 2010

Harvesting of Kelp and Edible Algae, and Aquaculture Leasing

This section briefly describes harvesting of kelp and edible algae in the Study Region. Leasing of areas in the Study Region for mariculture activities also is described. Additional details of these activities can be found in the Regional Profile report (MLPAI 2010).

Administrative Kelp Leases

Commercial harvest of bull kelp or giant kelp in the Study Region is regulated by administrative kelp bed leases, issued by the Commission. Leased beds may be harvested for use in a variety of industrial products, including fertilizer or alginate extraction. However, past bed leases in the Study Region were contracted to abalone farmers who harvested the kelp as feed for their abalone. Twelve administrative kelp bed areas are

located in the Study Region; however, only three are available for lease. Harvesting on the remaining administrative kelp beds is prohibited because they are classified as closed. The three beds available for lease are identified as kelp beds 308, 309, and 312. Bed number 308 is located between the middle of the Ten Mile River mouth north to Point Delgada, at Shelter Cover. Bed number 309 runs from Point Delgada north to Point Mendocino. Bed number 312 extends from the middle of the Klamath River mouth to the California/Oregon border. These three beds can be harvested only if a harvester enters into a lease with the Commission; otherwise, kelp cannot be commercially harvested in these locations. (MLPAI 2010)

Compared with the Department's regulation of administrative kelp beds in other parts of the state, the administrative kelp beds in the Study Region have tighter restrictions on harvesting. These restrictions include conducting a required biomass survey before harvesting, a limitation on harvesting to no more than 15% of the surveyed bull kelp biomass, and a limit on the collection method to hand-harvest only (no mechanical harvest is allowed).

Administrative kelp beds are classified as either closed, leasable, leased (to the state), or open. Closed beds may not be harvested. Leased beds provide the exclusive privilege of harvesting to the lessee and may be harvested for use in a variety of industrial products, including fertilizer or alginate extraction. Open beds may be harvested by anyone with a kelp-harvesting license.

Applicable commercial regulations pertain to the harvest of giant kelp or bull kelp only, with bull kelp being the primary form of kelp available to harvesters in the Study Region. There are 12 administratively numbered kelp beds in the Study Region, but nine of the 12 beds were closed as of October 2008 (**Table B-3**). The three open beds only can be harvested if a harvester enters into a lease with the Department. Without a lease agreement, kelp cannot be harvested from these beds, and the beds are effectively considered closed.

As of late 2008, no one held a lease for any of these beds, and therefore kelp harvesting effectively was not occurring in the Study Region, outside of edible kelp harvesting activities. However, an average of 6 wet tons of kelp per month was harvested from leased beds between 1995 and 2004. (MLPAI 2010)

Table B-3. Administrative Kelp Beds in the North Coast Study Region Available for Leasing

Bed Number	Leasing Status as of October 2008
301	Closed
302	Closed
303	Closed
304	Closed
305	Closed
306	Closed
307	Closed
308	Lease only
309	Lease only
310	Closed
311	Closed
312	Lease only

Source: MLPAI 2010

Edible Algae Harvest

Harvesting of edible algae (i.e., seaweed), which occurs all along the coastline, is not subject to the kelp bed leasing requirements that regulate commercial harvest of bull kelp.

Harvesting of aquatic plants that are classified as edible seaweeds for human consumption is permitted with a valid Commercial Kelp Harvester License, issued by the Department. The holder of a kelp harvester's license may take up to 4,000 pounds of bull kelp annually for human consumption. Edible seaweed license holders are partially restricted to the kelp leasing laws above. While they may legally harvest edible seaweeds, wherever they are found and throughout the year, keeping within the annual weight limitation, they may not harvest in kelp beds 308, 309, and 312 without a lease. In addition, regulations require that harvesters weigh and report the amount of edible algae that they harvest, and pay a royalty of \$24 to the state for each wet ton of seaweed harvested. Department harvesting data show that harvesting activities primarily occur from April through August. Although no enforceable regulations exist that pertain to the method of harvest, the Department encourages sustainable harvest techniques, such as cutting only the blade portion of certain plants and rotating harvest to allow adequate time for regrowth of previously harvested areas. (MLPAI 2010)

The edible algae industry in the Study Region is considered a cottage industry, harvesting a variety of algae for human consumption. In 2008, an estimated six harvesters with edible seaweed licenses operated in the Study Region. Latent capacity in the Study Region, however, is 21 license holders, based on the number of inactive harvesters who hold a kelp harvester's license and live near the Study Region (Owens, pers. comm. 2011). Overall, edible seaweed harvesters have recently averaged just over 23,500 pounds of edible seaweed annually (2002–2008 average). Most of this harvest comes from coastal waters within Mendocino County. These landings exclude most of the harvest near the Point Arena area since most harvest locations near Point Arena are outside of the Study Region.

Sea palm (*Postelsia palmaeformis*) is the most heavily harvested species in the Study Region, with an average of approximately 8,300 pounds collected annually from 2002–2008. Other prominent harvest yields include kombu (*Laminaria* spp.), with an average annual harvest of 4,700 pounds; wakame (*Alaria marginata*), averaging just under 3,900 pounds annually; and nori (*Porphyra* spp.), with an annual harvest average of 2,700 pounds from 2002–2008. (MLPAI 2010)

Table B-4 shows the total edible algae harvest yields for counties located adjacent to the Study Region. Overall, harvesters have averaged just over 25,000 pounds of edible seaweed annually for the past 7 years. The vast majority of this harvest comes from coastal waters within Mendocino County; however, edible algae collection in both Humboldt and Del Norte Counties is expanding. (MLPAI 2010)

Table B-4. Edible Algae Harvest by County near the North Coast Study Region

County	Wet Pounds of Edible Seaweed Harvested (2002–2008)						
	2002	2003	2004	2005	2006	2007	2008
Del Norte	0	0	0	0	0	1,582	1,624
Humboldt	0	0	0	709	3,487	3,315	2,923
Mendocino	17,854	7,945	33,519	23,138	26,658	21,225	33,651
Total	17,854	7,945	33,519	23,847	30,145	26,122	38,198

Source: MLPAI 2010

A small but unknown amount of kelp harvesting is done in the Study Region by recreational fishers. There is no closed season, closed hours, or minimum size limit, and the daily bag limit on all marine aquatic plants is 10 pounds wet weight. In addition to this, an unknown amount of algae may be collected by Native American tribal groups for subsistence use. This amount is believed to be small when compared to the commercially harvested edible algae.

Aquaculture Leases

Six operators currently hold leases for mariculture activities in the Study Region. Activities are focused in Humboldt Bay (though one grower holds a lease in Crescent City Harbor) and typically utilize a small portion of the entire lease for farming. Coast Seafoods Company leases over 1,000 acres but farms approximately one-third of its lease. Other companies hold smaller leases, ranging from about 10 to 350 acres.

Mariculturists in the Study Region primarily cultivate bivalves (oysters, clams, scallops, and mussels), but some growers also harvest seaweed. Shellfish companies sell both market oysters (sold in the shell for consumption) and seedlings (both clams and oysters) for sale to other farms. Humboldt Bay is the only approved California source for certified, disease-free seedlings, which are shipped to farms in Canada, Washington, Oregon, and California.

B.2.2 Recreational Fishing

Recreational fishing along the coastline is an important industry that generates significant economic activity. Nationally, saltwater fishing attracted an estimated 21.3 million recreational anglers in 2000, accounting for 10.3% of the American population 16 years or older (Leeworthy 2001, as cited in CDFG 2009). Second only to Florida, California contains more than 2.7 million residents who saltwater fish (Pendleton and Rooke 2006 and Department 2005, as cited in CDFG 2009). As described in the following, various forms of recreational fishing occur throughout the Study Region.

Recreational Fishing Modes

The distribution of recreational fishing activity throughout the Study Region varies by mode of fishing and access conditions. Some modes of fishing, such as private and rental boats, have the capability of traveling to more distant (from port) fishing areas, whereas other modes, such as kayaks, are more restricted to protected areas closer to launch sites.

Between 2005 and 2008, the annual number of recreational trips in north coast marine waters averaged an estimated 195,900 trips (**Table B-5**). Fishing from private boats comprised about 34% of all trips; beach and banks accounted for 32%; fishing from man-made structures accounted for 27%; and commercial passenger fishing vessels (CPFVs) accounted for about 6%.

Table B-5. Estimated Average Annual Angler Trips in North Coast Study Region Marine Waters by Mode, 2005–2008

Mode	Average Annual Angler Trips	Percentage of Total
Commercial passenger fishing vessels	12,218	6.2
Beach and bank	63,457	32.4
Human-made	53,634	27.4
Private boats	66,585	34.0
Total	195,894	100.0

Note: As cited in MLPAL 2010, commercial passenger fishing vessel (CPFV) fishing activity logbooks submitted to CDFG by CPFV operators were used for the estimates of CPFV effort; California Recreational Fisheries Survey data, extracted from the RecFIN database (<http://www.recfin.org/forms/est2004.html>) for trips in all waters of RecFIN "Wine and Redwood" Districts, which span Mendocino, Humboldt, and Del Norte counties.

Source: MLPAL 2010

Boat-Based Modes

Boat-based modes of recreational fishing occurring throughout the Study Region include CPFVs, private boats, and rental boats. Additional information about boat-based modes of recreational fishing can be found in Section 6.3.3, "Recreation," and Section 6.5.3, "Vessel Traffic and Hazards."

Commercial Passenger Fishing Vessels

CPFVs, also called party boats, are crewed vessels that carry recreational anglers to ocean fishing locations for a fee. CPFVs are generally limited by travel time and can be characterized by trip duration (extended day, half day) or species target (e.g., bottom fish, crab, or albacore). CPFVs in the Study Region operate out of ports in all three north coast counties—Del Norte, Humboldt, and Mendocino. In recent years, approximately 20 CPFVs have operated annually in the Study Region; passenger capacity ranges from four to 49 persons, with an average passenger load of 10 persons per trip. CPFVs in the Study Region fish in nearshore waters and bays of the mainland coast, as well as offshore.

Private and Rental Boats

Private boats are privately owned vessels, and rental boats are vessels that are rented without a crew. Private and rental boats include kayaks, skiffs, and large motor boats. Areas fished vary by vessel type and size, but they are similar to those fished by CPFVs. Most fishing effort is by hook-and-line, but crabbing by trap and consumptive diving also are popular forms of fishing from private boats.

Kayaks

Kayak fishing activity is part of the private and rental boat fishery. Areas fished include nearshore coastal waters, bays, and tidally influenced river mouths. Finfish target species include bottom fishes, salmon, and halibut. Abalone and crab also may be targeted by kayakers, who free dive or hoop net. Some important kayaking access areas include Humboldt Bay, Trinidad, Albion Harbor, Schooners Landing, Van Damme, Big River, Casper Beach, West Port, and Shelter Cove.

Shore-Based Modes

Shore-based modes include all land-based fishing, including from beaches, rocky shores, and human-made structures. Shore-based fishing includes scuba and free dive trips, where the point of access is shore-based and no vessel is used.

Beach and Bank

The beach and bank mode consists of fishing that occurs from the natural shoreline. Types of beach and bank fishing include angling, clamming and shore picking, pokepoling, and consumptive diving. Popular finfish targets in this region include redbtail and other surfperch species, rockfishes, greenlings, and smelts. Salmonids and elasmobranchs (sharks and rays) also are targeted from shore, in estuaries and river mouths. Abalone and various species of clams are important invertebrate targets.

Shore access in ocean and estuarine waters is limited in many locations throughout the Study Region. Large stretches of the Study Region have little or no shore access because of private land ownership and difficult or dangerous terrain. Shore access frequently occurs in the more populated areas adjacent to the Study Region, such as the Fort Bragg, Eureka, and Crescent City areas. In many of the less populated areas, access is locally more abundant, but these areas are not used as frequently because of their remoteness (examples include the Cape Mendocino, Shelter Cove, and Gold Bluffs Beach areas).

Human-made Structures

Human-made structures consist of piers, jetties, and breakwaters, docks, and other fishable structures. If these structures are public, a fishing license is not required. Finfish are typically targeted with hook-and-line gear, but dip nets may be used to target small schooling fish. Traps or hoop nets often are used to target crab. Consumptive diving also occurs from some structures, such as jetties. Popular finfish targets include rockfish, greenlings, other bottom fishes, and surfperch. Silversides (typically jacksmelt) and sharks also are targeted in bays and estuaries.

Consumptive Shore Diving

An important shore-based fishery in the Study Region is consumptive diving, especially free diving for red abalone. Spearfish targets include rockfish, lingcod, and cabezon. Divers often target rock scallop and Dungeness crab by hand.

Pokepoling

Pokepole fishing involves the use of a fiberglass or bamboo pole with a baited hook attached to the terminal end. The pole is used to access fish in deep rocky crevices or thick kelp along the shore (or human-made structures such as jetties). Monkeyface pricklebacks, cabezon, and nearshore rockfishes are frequently targeted.

Clamming

Clamming on the North Coast occurs both within protected bays and on open ocean beaches. Pacific razor clams are prized North Coast clams, dug using a specialized shovel from the low intertidal zone of surf-beaten sandy beaches. The most popular razor clam beaches are found from Clam Beach County Park (McKinleyville) to Moonstone Beach County Park (Westhaven) in Humboldt County; and Enderts Beach, South Beach and

beaches north of Point St. George (Crescent City) in Del Norte County. Other open coast species of clam, such as cockles, are taken between Battery Point and Point St. George.

A Department razor clam creel census of Humboldt County beaches, from 1971 to 1988, found highly variable annual efforts and catch. Annual catch estimates ranged from zero to 116,392 clams, and annual estimates of diggers ranged from 147 to 12,671 persons (Warner, unpublished, as cited in MLP AI 2010). Preliminary results of a 2008 and 2009 resumption of that creel census indicate effort, catch, and catch per unit effort were in the lower end of historic ranges (McVeigh, pers. comm., [2009], as cited in MLP AI 2010).

A variety of bay clam species are harvested in Humboldt Bay and Crescent City Harbor, by digging into mud or sand flats with rakes, shovels, or by hand. According to a Department creel census survey conducted from 1975 to 1989 in Humboldt Bay, annual effort and catch estimates ranged from 6,639 diggers extracting 188,000 clams in 1982, to 2,440 diggers extracting 72,000 clams in 1989 (Collier, unpublished, as cited in MLP AI 2010). A resumption of that study in 2008 showed annual sport clamming effort had decreased to an estimated 1,300 diggers annually, extracting a total of 31,000 clams (McVeigh, pers. comm., [2009], as cited in MLP AI 2010).

Recreationally Harvested Species

According to data from the Department's California Recreational Fisheries Survey (CRFS), 76 types of finfish species were recreationally harvested in state waters in the Study Region from 2005 to 2008. **Table B-6** shows that 74 recreationally harvested species types were identified.

In terms of total number of fish caught, rockfishes made up more than 55% of the average annual catch of recreationally caught fish in the Study Region between 2005 and 2008 (Table B-6). Important finfish species targeted by boat-based recreational anglers included rockfish, Chinook salmon, and lingcod. Albacore tuna also was an important target to boat-based anglers, although catches occurred primarily outside of state waters. Species important to shore-based anglers included surfperches, nearshore rockfishes, and greenlings.

The harvest of invertebrates, including red abalone, Dungeness crab, rock scallops, various species of clams, and in some years, Humboldt squid, also is important to the recreational fishery in the Study Region. Invertebrates such as sandcrabs and clams are harvested by recreational anglers for use as live bait. Although catch and effort data on recreational invertebrate fisheries are more limited than for finfish, the sport catch of abalone in the Study Region was estimated to average 121,430 abalone over the 2005–2008 period, with catch ranging from 108,030 in 2005 to 141,730 in 2007. Invertebrate catch was reported from 31 locations in the Study Region, with the greatest catch occurring in the areas of Van Damme, Mendocino Headlands, Todds Point, Albion Cove, and Elk.

Table B-6. Estimated Average Annual Catch of Recreational Finfish in the North Coast Study Region, 2005–2008

Type of Fish	Number of Species Harvested	Number of Fish Landed (in thousands)			Dominant Species
		Shore Catch	Boat Catch	Total Catch	
Anchovies	1	13.06	8.11	21.17	Northern anchovy
Chinook salmon ^a	1	0.00	45.10	45.1	Chinook salmon
Greenlings	4	5.43	2.43	7.86	Kelp greenling
Lingcod	1	0.57	14.84	15.41	Lingcod
Herrings	1	0.10	0.00	0.10	Pacific herring
Other	8	2.05	0.07	2.12	Unidentified fish
Other flatfishes	9	0.04	3.33	3.37	California halibut
Pacific halibut	1	0.00	0.18	0.18	Pacific halibut
Rockfishes	22	8.43	174.25	182.68	Black rockfish
Sculpins	4	1.30	3.37	4.67	Cabezon
Sharks and rays	8	0.13	0.13	0.26	Bat ray
Silversides	2	4.47	0.36	4.82	Jacksmelt
Surfperches	9	38.65	0.24	38.90	Redtail surfperch
Tuna and mackerels	3	0.03	2.12	2.15	Albacore
Total	74	74.26	254.53	328.79	Not applicable

Note: All catch figures are fish x 1,000 taken in the North Coast Study Region.

^a As cited in MLPAI 2010, the original source of data is the Department's Ocean Salmon Project. Chinook is the primary target species for ocean salmon anglers, especially because the retention of coho salmon has been prohibited since 1995. A few pink salmon (less than 50) also are caught by recreational anglers in odd years.

As cited in MLPAI 2010, California Recreational Fisheries Survey data was extracted from the RecFIN database at <http://www.recfin.org/forms/est2004.html>. Query consisted of sampler examined and angler reported dead fish (A+B1) catch by supergroup for trips occurring in inland and ocean waters within 3 statute miles of shore for Redwood and Wine Districts (Humboldt, Del Norte, and Mendocino Counties). Extraction date: July 15, 2009.

Source: MLPAI 2010

Recreational Fishing Industry Trends

Statewide trends in recreational fishing license sales and boat registrations for CPFVs have not mirrored California's increasing population trends. Between 1980 and 2000, sales of recreational fishing licenses for state residents (including fishing in all inland and ocean waters) declined steadily, from approximately 2.25 million in 1980 to 1.27 million in 2000, a 44% decrease. Sales of recreational fishing licenses in more recent years, however, have remained more stable (CDFG 2007a, as cited in MLPAI 2010).

The trend in the sale of Pacific Ocean-only sport fishing licenses is quite different. The Department issued this type of license from 1984 to 2003. From 1984 to 1991, license sales increased by 37%, and then gradually declined by 16% during the next 12 years to a level higher than that in 1984. The sharp rise in resident sport fishing licenses for all waters in 2004 likely was caused by the halt of sales of Pacific Ocean-only licenses after 2003 (CDFG 2007a, as cited in MLPAI 2010).

B.2.3 Species Harvested Jointly by Commercial and Recreational Fisheries

Some species available in the Study Region are important to both commercial and recreational anglers. As shown in Table B-1 and Table B-6, rockfish and Chinook salmon are important to both commercial and recreational fisheries. Also, commercially and recreationally harvested but of lesser importance in terms of numbers of pounds landed and fish caught, respectively, are lingcod, surfperch, and sharks and rays. A direct comparison between commercial and recreational fisheries cannot be made because of different data reporting periods and units of reporting (pounds landed for commercial fisheries, and number of fish caught for recreational fisheries).

B.2.4 Existing Fishing Closure Zones

The two primary types of fishery closures in and adjacent to the Study Region are conservation areas and essential fish habitat.

Rockfish conservation areas (RCAs) have been established along large portions of the West Coast, to minimize the incidental take of overfished rockfish that can co-occur with healthy stocks of groundfish. In the Study Region, extensive RCAs vary seasonally and by gear type. The most up-to-date list of RCAs is available online at: <http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Fishery-Management>.

In addition to RCAs, conservation areas in the Study Region include the Klamath River Salmon Conservation Zone, where the take of Pacific whiting is prohibited in an area reaching approximately 6 nautical miles (nm) north and south of the Klamath River mouth and extending approximately 12 nm from shore. This area was established to protect spawning runs of salmon as they congregate near the Klamath River mouth.

Essential Fish Habitat (EFH) areas have been established along the West Coast, to prevent habitat damage by fishing gear in areas of important groundfish habitat. Trawl gear is regulated along the West Coast, primarily through EFH areas that are intended to protect groundfish habitat from trawl gear damage. Although most trawl closures occur in federal waters, several trawl closures extend into state waters, including Blunts Reef, Mendocino Ridge, Delgada Canyon, and Tolo Bank bottom trawl closure areas. These and other trawl closure areas in federal waters are closed to bottom trawl gear other than demersal seines. Additionally, an extensive area of habitat in federal waters is closed to all bottom trawl gear. A map of current EFH closures is available online at <http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Fishery-Management/Groundfish-EFH/upload/Map-Gfish-EFH-Close.pdf>.

B.3 Potential Socioeconomic Effects of Proposed MPAs

The implementation of an MPA network would alter the economic and social dynamics of consumptive uses of fishery resources. In general, fishing reduces species abundance, alters size and age composition of fished populations, alters species diversity, changes biological interactions among species, and sometimes alters habitats. More importantly to CEQA, a new MPA network may change the physical resources and the species, population, community and meta-population dynamics in and around the zones of no or limited take.

B.3.1 Microeconomic Considerations

Commercial extractive uses of the marine system are a major source of revenue for the American economy. Nationally in 2000, commercial fisheries alone added approximately \$27 billion per year to U.S. gross domestic product (NOAA 2000, as cited in CDFG 2009). Some or all forms of commercial fishing activities would be displaced in many of the proposed MPAs; therefore, user groups could be expected to experience losses and increased costs to conduct their business, to the extent that they could not efficiently redirect their activities.

The displacement effort² both across fishing grounds and into other fisheries has been argued as the fundamental driver in determining the type and magnitude of benefits and costs from implementing MPAs (Sanchirico et al. 2002, as cited in CDFG 2009). Sanchirico and Wilen (2001, as cited in CDFG 2009) discuss the ecological/biological and socioeconomic conditions under which commercial fisheries might experience short- or long-term costs. These effects include:

- lost harvest revenue and income to fishers;
- secondary losses in output/sales, income, jobs and tax revenue in local economies;
- although no loss in harvest, increased cost of harvesting because of increased travel-related costs, resulting in lower net income to fishers (displacement effort);
- losses in consumer surplus associated with the purchase of commercial seafood products (if prices rise for products because of reductions in harvests);
- overcrowding, user conflicts, possible localized overfishing, depletion or habitat destruction in remaining open areas because of displacement (this could raise costs or lower harvests);
- loss of fishers' local area knowledge (as a result of displacement) that may support sustainable fishing practices; and
- social disruptions from losses in incomes and jobs.

The potential that any of these effects would actually occur, and the relative intensity of these potential effects, would be speculative because actual costs would depend greatly on offsite considerations, such as habitat degradation and reduction of fishable waters (Sanchirico 2000, as cited in CDFG 2009), fishery management regulations, and the economic conditions and behavioral responses of the fishing industry (CDFG 2002a, as cited in CDFG 2009), as well as behavioral responses of individual fishing operations, associated secondary industries (i.e., processing and distribution), and consumers.

These potential losses could be offset by increased biomass and aggregate harvests within fishing locations outside of the MPAs, caused by the spillover effect.³ Within the estimated

² "Displacement effort" is defined as the additional effort or cost to do business, beyond that which would normally occur, as a result of some action or change affecting the business.

³ "Spillover effect" is defined as the number and biomass of individuals' increase within reserves, many species will move out of reserves into fishing grounds, enhancing stocks in fished areas through spillover.

time frames necessary for habitats and fish stocks to improve (estimated to be 5 years or more), expected long-term benefits to commercial fishing could include:

- long-term increases in harvest revenue and income to fishers;
- long-term increases in secondary output/sales, income jobs, and tax revenues in local economies;
- long-term increases in consumer's surplus to consumers of commercial fishing products (if prices to consumers decline with increased harvest); and
- long-term increases in economic rents⁴ (may or may not exist in open access fisheries).

Some relevant literature suggests that no short- or long-term losses would occur (Leeworthy and Wiley 2001, as cited in CDFG 2009). Consequently, as datasets improve and adaptive management provides real world examples of cases with data feedback (Murray et al. 1999, as cited in CDFG 2009), economic theories would need to be applied to specific cases and the associated permutations.

B.3.2 Macroeconomic Considerations

Many fishers, especially commercial fishers, have expressed concerns about both external and internal factors that they believe are affecting their ability to maintain sustainable fisheries. These influences were identified in the ethnographic data survey that was conducted for the Channel Islands National Marine Sanctuary (Kronman et al. 2000, as cited in CDFG 2009) and are summarized next.

External Factors

- Effect of poor Asian economic conditions on overseas fish sales
- Elasticity of global and local consumption of fishing commodities and sensitivity of commodity pricing
- Variable exchange rate of the U.S. dollar
- Effect of international competition on domestic markets during closed seasons
- Increased cost of living in coastal areas
- El Niño events (i.e., natural oceanic fluctuations) that decrease catch and income
- Effects of pollution and habitat destruction from coastal development
- Conflicts over environmental allocations and ecological interactions (i.e., sea otters, seals and sea lions, birds)
- Potential conflicts among user groups resulting from new regulations

⁴ "Economic rent" is defined as the return on an investment over and above a normal rate of return.

Internal Factors

- Attrition of existing workforce and limited numbers of new participants into the fisheries
- Effects of marketing structure on ability to stabilize pricing
- History of open access and overcapitalization, causing biological or economic overfishing that leads to economically unsustainable fisheries

B.3.3 Fishery Displacement and Congestion

The primary potential effect on commercial and recreational fishing would be the displacement of fishing activity resulting from implementing the proposed MPAs, particularly the state marine reserves (SMRs), which would prohibit all harvest, and state marine conservation areas (SMCAs) that would prohibit the take of more sedentary bottom fishes and invertebrates. Depending on the level of harvest restriction and applicable species, each fishery participant who currently fishes within a proposed MPA would face a varying degree of need to accordingly redirect efforts outside the MPAs. This could result in a secondary pressure on particular fishing hotspots or areas along the immediate boundary of the new MPAs, thereby increasing congestion and competition in these areas. Primary effects of this displacement are addressed below; secondary effects on support businesses (e.g., effects on ancillary business including fishing supplies, fuel, boat repairs, etc.) are considered too speculative to be accurately assessed in this evaluation.

The study process designed to identify the proposed components of the MPA system intensively considered the effects of MPAs on affected user groups, and the components that would make up the proposed MPA network in the Study Region have been included in part because potential impacts associated with their MPA designation, including potential displacement-related economic effects, were considered. Information describing the planning process for designating MPA boundaries is provided in Chapter 1, "Introduction."

Displacement may affect both commercial and recreational fisheries. Although fisheries beyond the Study Region also may be affected, the analysis of aerial extent presented next is limited to the boundaries of the Study Region. Consistent with analyses conducted for MPAs proposed in other regions of California and with CEQA requirements focusing on assessing physical impacts, the analysis describes potential effects on important species-specific fishing grounds that were identified in surveys by commercial and recreational fishers operating out of Study Region ports. Potential economic effects, including effects on the "stated value" and revenues associated with harvesting activities, are available in the Ecotrust report (Scholz et al. 2011).

The displacement effects described below are based on findings from GIS-based analyses conducted by Ecotrust, and presented in its report entitled *Summary of Potential Impacts of the North Coast Enhanced Compliance Alternative and Revised Round 3 North Coast Regional Stakeholder Group Marine Protected Area Proposals on Commercial and Recreational Fisheries in the North Coast Study Region* (Appendix C in Scholz et al. 2011); supplemental GIS-based information also was conducted for the Proposed Project and provided by the Department (Ashcraft, pers. comm., 2011). For additional details about the tools and methods used to conduct the displacement analysis, refer to the Ecotrust report (Scholz et al. 2011).

Commercial Fisheries Displacement

To analyze displacement effects in the Study Region, data layers characterizing the spatial extent and relative importance of fishing grounds were used for 10 potentially affected commercial fisheries (anchovy/sardine, Dungeness crab, herring, rockfish, salmon, seaweed, shrimp, smelt, surfperch, and urchin). A key assumption of the analysis is that each of the MPA proposals included in the Proposed Project and Alternative 2 (ECA) would completely eliminate fishing opportunities in areas closed to specific fisheries, and that fishers are unable to adjust or mitigate in any way. In other words, the analysis assumes that all fishing in an area affected by an MPA would be lost completely, when in reality it would be more likely that some fishers would shift their efforts to areas outside the MPA. The effect of such an assumption is most likely an overestimate, and can be considered a worst case scenario.

As shown in **Table B-7**, the anticipated maximum potential displacement of important commercial fisheries for the Proposed Project would range from 0.0% up to 11.8% (for the rockfish fishery in the Trinidad area) of current fishing areas in the Study Region. Potential displacement impacts to commercial fishing grounds include the following ranges: Dungeness crab, from 0% (Shelter Cove and Albion port areas) to 3.1% (Fort Bragg port area); herring, from 0% (Crescent City port area) to 5.9% (Eureka port area); rockfish from 3.5% (Albion port area) to 11.8% (Trinidad port area); salmon from 0.6% (Albion port area) to 1% (Trinidad, Eureka, and Shelter Cover port areas); surfperch from 7.7% (Crescent City port area) to 9.5% (Eureka port area); and urchin, which are projected in the Fort Bragg and Albion port areas only, at 8.2% of the fishing grounds in these port areas.

As shown in Table B-7, a number of commercial fisheries either do not substantially occur in some port areas of the Study Region (as denoted by dashes), or would not be affected under the Proposed Project (as denoted by a % of 0.0). Effects on commercial fisheries are most notable for rockfish (in all ports except Albion), surfperch (in Crescent City and Eureka), and urchin (in Albion and Fort Bragg), although in all but one case (the rockfish fishery in Trinidad), the area affected would be less than 10% of the total area fished.

Under the Proposed Project, Native American tribal gathering by federally recognized tribes would continue in SMCAs, provided that a factual record could be established that showed ancestral and existing take. Because most harvesting of fishery resources in the Study Region is believed to occur by federally recognized tribes (i.e., Yuroks and Hoopa Tribes), implementation of the Proposed Project is not expected to substantially affect tribal harvest, either for commercial or ceremonial/subsistence purposes. Potential impacts of the Proposed Project on tribal gathering activities are discussed in Chapter 5, "Cultural Resources," and in Section 6.6, "Environmental Justice."

Under the Proposed Project, optional boundaries would be considered for eight of the proposed protected areas in the Study Region, as identified in Table 2-1. Implementation of these optional boundaries could be expected to slightly increase the displacement effects described above; however, because the boundary changes would be relatively minor and would not affect take, the overall effect of the boundary changes on commercial fisheries in the Study Region, as reported in Table B-7, would be less than significant.

Displacement associated with Alternative 2 (ECA) would be the same as under the Proposed Project. Under the No Project Alternative, no change in the status of commercial fishing

areas in the Study Region would occur, as compared to current baseline conditions, which includes four already designated MPAs.

Table B-7. Area of Total Commercial Fishing Grounds in the North Coast Study Region Potentially Affected by the Proposed Project and the Enhanced Compliance Alternative (ECA), by Landing Port

Landing Port	Fisheries	Proposed Project (percent)	ECA (Alternative 2) (percent)
Crescent City	Anchovy/sardine (lampara net)	---	---
	Dungeness crab (trap)	1.1	1.1
	Herring (gillnet)	0.0	0.0
	Rockfish (fixed gear)	9.4	9.4
	Salmon (troll)	0.8	0.8
	Seaweed (hand harvest)	0.0	0.0
	Shrimp (trap)	0.0	0.0
	Smelt (brail - dip net)	0.0	0.0
	Surfperch (hook and line)	7.7	7.7
Urchin (dive)	---	---	
Trinidad	Anchovy/sardine (lampara net)	---	---
	Dungeness crab (trap)	2.5	2.5
	Herring (gillnet)	---	---
	Rockfish (fixed gear)	11.8	11.8
	Salmon (troll)	1.0	1.0
	Seaweed (hand harvest)	---	---
	Shrimp (trap)	---	---
	Smelt (brail - dip net)	---	---
	Surfperch (hook and line)	---	---
Urchin (dive)	---	---	
Eureka	Anchovy/sardine (lampara net)	7.7	7.7
	Dungeness crab (trap)	2.6	2.6
	Herring (gillnet)	5.9	5.9
	Rockfish (fixed gear)	9.1	9.1
	Salmon (troll)	1.0	1.0
	Seaweed (hand harvest)	---	---
	Shrimp (trap)	---	---
	Smelt (brail - dip net)	0.0	0.0
	Surfperch (hook and line)	9.5	9.5
Urchin (dive)	---	---	
Shelter Cove	Anchovy/sardine (lampara net)	---	---
	Dungeness crab (trap)	0.0	0.0
	Herring (gillnet)	---	---
	Rockfish (fixed gear)	9.0	9.0
	Salmon (troll)	1.0	1.0
	Seaweed (hand harvest)	---	---
	Shrimp (trap)	---	---
	Smelt (brail - dip net)	---	---
	Surfperch (hook and line)	---	---
Urchin (dive)	---	---	
Fort Bragg	Anchovy/sardine (lampara net)	---	---
	Dungeness crab (trap)	3.1	3.1
	Herring (gillnet)	---	---
	Rockfish (fixed gear)	8.6	8.6

Table B-7. Area of Total Commercial Fishing Grounds in the North Coast Study Region Potentially Affected by the Proposed Project and the Enhanced Compliance Alternative (ECA), by Landing Port

Landing Port	Fisheries	Proposed Project (percent)	ECA (Alternative 2) (percent)
	Salmon (troll)	0.7	0.7
	Seaweed (hand harvest)	0.0	0.0
	Shrimp (trap)	---	---
	Smelt (brail - dip net)	---	---
	Surfperch (hook and line)	---	---
	Urchin (dive)	8.2	8.2
Albion	Anchovy/sardine (lampara net)	---	---
	Dungeness crab (trap)	0.0	0.0
	Herring (gillnet)	---	---
	Rockfish (fixed gear)	3.5	3.5
	Salmon (troll)	0.6	0.6
	Seaweed (hand harvest)	---	---
	Shrimp (trap)	---	---
	Smelt (brail - dip net)	---	---
	Surfperch (hook and line)	---	---
Urchin (dive)	8.2	8.2	

Note:

--- Denotes a fishery that does not occur or a fishery for which insufficient data were collected to merit presentation.

Source: Scholz et al. 2011

Kelp Lease and Edible Seaweed Harvesting Displacement

Under existing regulations adopted by the Commission, approximately half of the Study Region is closed to leasing for commercial kelp harvesting. However, three open areas are available for commercial kelp harvesting by lease only. No formal requests for a commercial kelp harvest lease have been made or are pending for these areas. **Table B-8** lists the available kelp bed lease areas and proposed MPAs located within these areas.

Table B-8. Available Kelp Harvest Leases and Overlapping Proposed Project MPAs

Kelp Bed Lease Number	Kelp Bed Lease Location	Overlapping Proposed Project MPAs
308	Middle of the Ten Mile River mouth north to Point Delgada, near Shelter Cover	Ten Mile SMR Double Cone Rock SMCA Double Cone Rock SMCA Option
309	Point Delgada to Cape Mendocino	South Cape Mendocino SMR Sea Lion Gulch SMR Sea Lion Gulch SMR Option Mattole Canyon SMR Big Flat SMCA
312	Middle of the Klamath River mouth to the California/Oregon border	Pyramid Point SMCA Pyramid Point SMCA Option

Notes: MPA = marine protected area, SMR = state marine reserve, SMCA = state marine conservation area
Source: North Coast MarineMap 2011

For the four state marine reserves (SMRs) listed in Table B-8 (Ten Mile, South Cape Mendocino, Mattole Canyon, and Sea Lion Gulch SMRs), take of all living marine resources, including bull kelp and giant kelp, would be prohibited. For the three state marine conservation areas (SMCAs) listed (Double Cone Rock, Big Flat, and Pyramid Point), commercial harvesting of bull kelp and giant kelp also would be prohibited. In the SMCAs, take of some species would be allowed; however, no exemptions would be granted for kelp harvesting included in the Proposed Regulations. Future leases issued to commercial harvesters by the Department would not allow kelp harvesting within the SMRs and SMCAs listed in Table B-4. Therefore, the Proposed Project would reduce the area that currently is available for commercial kelp harvesting. However, portions of the existing leases would remain available, and the Commission could open currently closed commercial kelp bed lease areas in the future, if it is found that those closed beds could support commercial harvest, to expand the area where kelp harvesting would be allowed. Considering that no currently active commercial kelp harvesters have submitted a formal request to lease any of the three available kelp bed areas, and because the net available area for kelp bed leases could increase in the future, this effect would not be substantially adverse.

Harvesting of edible seaweed for human consumption can occur anywhere in the Study Region and at any time of the year, if the harvester has a current kelp harvester's license and adheres to the license restrictions. However, kelp may not be harvested in kelp beds 308, 309, and 312 without a lease, even if intended for human consumption. The Proposed Project would prohibit licensed kelp harvesters from gathering edible seaweed at all proposed MPAs, except in the following:

- MacKerricher SMCA: Commercial take of bull kelp and giant kelp would be prohibited. All other take would be allowed.
- Russian Gulch SMCA: Commercial take of bull kelp and giant kelp would be prohibited. All other take would be allowed.
- Van Damme SMCA: Commercial take of bull kelp and giant kelp would be prohibited. All other take would be allowed.

Harvesting of edible seaweed species other than bull kelp or giant kelp would be allowed within the MacKerricher, Russian Gulch, and Van Damme SMCAs, and anywhere outside of an established MPA. As shown in Table B-7 above, hand harvest of seaweed does not substantially occur in port areas of the Study Region (as denoted by dashes), except for Crescent City and Fort Bragg port areas; there is, however, no projected impact (i.e., 0.0%) to edible seaweed harvesting grounds for Crescent City or Fort Bragg under the Proposed Project.

Recreational Fisheries Displacement

Similar to the assessment of commercial fisheries displacement, data layers characterizing the spatial extent and relative stated importance of fishing grounds were used by Ecotrust (Scholz et al. 2011) to assess CPFV fisheries, including California halibut, Dungeness crab, Pacific Halibut, rockfish/bottom fish, and salmon, and other recreational fisheries (abalone-dive only, California halibut, Dungeness crab, Pacific halibut, rockfish/bottom fish, and salmon).

The percentage area of total recreational fishing grounds affected by the Proposed Project and ECAs is presented in **Table B-9**. Recreational fishers are categorized in Table B-9 by user group (i.e., CPFVs, private vessels, kayak-based anglers, and dive) and by port. As for the commercial fishing assessment, the analysis of recreational displacement effects represents a worst case scenario because the analysis assumes that all fishing in an area affected by an MPA would be lost completely; in reality, it would be more likely that some (possibly most) recreational fishing effort would shift to areas outside of proposed MPAs.

As shown in Table B-9, the anticipated maximum potential displacement of important recreational fisheries for the Proposed Project would range from 0.0% up to 35.9% (for the Dungeness crab fishery for CPFVs in Fort Bragg); however, as footnoted in Table B-9, this indicator of displacement (percent of total fishing area affected) distorts the actual expected impact on recreational fishers when compared to the relative stated importance of fishing grounds. As noted in Table B-9, the effect on the stated value that recreational fishers place on the Dungeness crab fishery grounds in the Fort Bragg port area would be an estimated 9.5%, suggesting that mostly less important fishing grounds would be affected.

Under the Proposed Project and ECAs, potential displacement impacts would have greater effects, as expected, on fishing grounds accessed by CPFV and private vessels. Although the magnitude of displacement impacts varies by port area, as shown in Table B-9, species most widely affected are rockfish/bottom fish and halibut (both Pacific and California halibut).

Similar to commercial fisheries, a substantial number of the recreational fisheries either do not occur in the Study Region (as denoted by dashes in Table B-9), or would not be affected under the Proposed Project (as denoted by a % of 0.0 in Table B-9). Impacts on recreational fishery grounds would be most notable for rockfish, surfperch, and urchin recreational fisheries, although in all but a few cases (the Dungeness crab fishery by CPFVs in Fort Bragg, and the California halibut fishery by CPFVs in the Trinidad area), the area affected would be less than 15% of the total area fished. As previously noted, potential effects on the “stated value” of the fishing grounds for each recreational fishery would be substantially less than the estimated effects on fishing grounds.

As described for the assessment of commercial fishery effects, optional boundaries would be considered for eight of the proposed protected areas in the Study Region (see Chapter 2, Table 2-1). These optional boundaries would be expected to slightly increase displacement effects on the recreational fisheries described above, but because the optional boundary changes would be relatively minor and not affect take, the overall effect of the changes on recreational fisheries in the Study Region, as reported in Table B-9, would be negligible.

Displacement of recreational fisheries associated with Alternative 2 would similarly range from 0% up to 35.9% (the Dungeness crab fishery by CPFVs in Fort Bragg), with substantially less effect on the stated value of fishing areas affected. The effect on fishing grounds is similar between the Proposed Project and Alternative 2, although Alternative 2 has lower impacts of at least 1% for certain fisheries (California halibut by CPFVs in Trinidad, Rockfish/bottom fish by private vessels in Shelter Cove and Fort Bragg/Albion and by kayaks in Fort Bragg, California halibut and Pacific halibut by private vessels in Fort Bragg, and abalone by dive in Fort Bragg).

Under the No Project Alternative, no change in the status of recreational fishing areas in the Study Region would occur, as compared with current baseline conditions.

Table B-9. Area of Total Recreational Fishing Grounds in the North Coast Study Region Potentially Affected by the Proposed Project and the ECA, by Subregion

Subregion		Fisheries	Proposed Project (percent)	ECA (Alternative 2) (percent)
Commercial Passenger Fishing Vessels	Crescent City	California halibut	---	---
		Dungeness crab	0.0	0.0
		Pacific halibut	---	---
		Rockfish/bottom fish	0.0	0.0
		Salmon	1.2	1.2
	Trinidad	California halibut	17.2	16.2
		Dungeness crab	0.0	0.0
		Pacific halibut	2.1	2.1
		Rockfish/bottom fish	0.9	0.9
		Salmon	2.0	2.0
	Eureka	California halibut	0.0	0.0
		Dungeness crab	0.0	0.0
		Pacific halibut	7.7	7.4
		Rockfish/bottom fish	9.3	9.3
		Salmon	2.2	2.2
	Shelter Cove	California halibut	---	---
		Dungeness crab	---	---
		Pacific halibut	14.1	14.9
		Rockfish/bottom fish	9.0	8.9
		Salmon	0.0	0.0
Fort Bragg	California halibut	---	---	
	Dungeness crab	35.9 ^a	35.9 ^a	
	Pacific halibut	---	---	
	Rockfish/bottom fish	6.5	6.4	
	Salmon	8.2	6.3	

Table B-9. Area of Total Recreational Fishing Grounds in the North Coast Study Region Potentially Affected by the Proposed Project and the ECA, by Subregion

Subregion		Fisheries	Proposed Project (percent)	ECA (Alternative 2) (percent)
Private Vessels	Crescent City	California halibut	5.3	5.4
		Dungeness crab	0.0	0.0
		Pacific halibut	2.7	2.7
		Rockfish/bottom fish	5.2	5.3
		Salmon	1.4	1.4
	Trinidad	California halibut	0.0	0.0
		Dungeness crab	1.9	1.9
		Pacific halibut	0.0	0.0
		Rockfish/bottom fish	6.3	6.3
		Salmon	1.1	1.1
	Eureka	California halibut	3.3	3.1
		Dungeness crab	0.2	0.2
		Pacific halibut	3.7	3.7
		Rockfish/bottom fish	9.4	9.4
		Salmon	0.8	0.7
	Shelter Cove	California halibut	0.0	0.0
		Dungeness crab	0.0	0.0
		Pacific halibut	5.9	5.9
		Rockfish/bottom fish	12.8	10.0
		Salmon	0.0	0.0
Fort Bragg/Albion	California halibut	14.3	6.5	
	Dungeness crab	6.2	6.2	
	Pacific halibut	8.1	7.2	
	Rockfish/bottom fish	6.9	5.3	
	Salmon	1.0	0.8	
Kayak	Crescent City	Rockfish/bottom fish	---	---
		Salmon	---	---
	Trinidad	Rockfish/bottom fish	0.0	0.0
		Salmon	---	---
	Eureka	Rockfish/bottom fish	---	---
		Salmon	---	---
	Shelter Cove	Rockfish/bottom fish	---	---
		Salmon	---	---
	Fort Bragg/Albion	Rockfish/bottom fish	14.3	12.0
		Salmon	3.4	2.6
Dive	Crescent City	Abalone	0.0	0.0
		Dungeness crab	---	---
		Rockfish/bottom fish	1.1	1.1
	Trinidad	Abalone	0.0	0.0
		Dungeness crab	---	---
		Rockfish/bottom fish	0.0	0.0

Table B-9. Area of Total Recreational Fishing Grounds in the North Coast Study Region Potentially Affected by the Proposed Project and the ECA, by Subregion

Subregion	Fisheries	Proposed Project (percent)	ECA (Alternative 2) (percent)
Eureka	Abalone	1.0	1.0
	Dungeness crab	---	---
	Rockfish/bottom fish	13.4	12.7
Shelter Cove	Abalone	0.0	0.0
	Dungeness crab	---	---
	Rockfish/bottom fish	0.0	0.0
Fort Bragg/ Albion	Abalone	6.4	4.5
	Dungeness crab	0.0	0.0
	Rockfish/bottom fish	11.2	11.1

Note:

--- Denotes a fishery that does not occur or for which insufficient data were collected to merit presentation.

^a This estimated value comes from changes associated with a single MPA, Ten Mile State Marine Reserve. The 35.9% change reflects calculation of the physical area that the reserve encompasses. A more relevant indicator is the relative value (stated value) that this area represents to Fort Bragg crab fishers. The change associated with stated value is estimated to be 9.5%.

Source: Scholz et al. 2011; Ashcraft, pers. comm., 2011

Effects on Employment

Displacement of fishing efforts could cause economic hardship for some individual fishers and result in economic effects in local communities, particularly in the short term. Based on jobs information from the National Ocean Economics Program (2011), commercial fishing and mariculture activities in the three counties adjacent to the Study Region would directly support about 200 jobs.⁵ Additional information on the contribution of commercial fisheries to the economies adjacent to the Study Region is available in Hackett et al. (2009).

Based on the total pounds commercially landed at North Coast ports, the harvest of Dungeness crab accounts for more than 72% of the total pounds landed for all fisheries. Under the Proposed Project and Alternative 2, less than 5% of the important crab fishing grounds (as reported by fishers) in the Study Region (see Table B-7) would be affected by establishing the proposed MPAs. The greatest commercial fishing effect from establishing the proposed MPAs would be on rockfish fishing grounds, with effects by port ranging from about 4% to 12%. Rockfish, however, accounts for about 10.5% of the pounds and ex-vessel value of commercial fish landed and less than 2% of the total commercial fish/invertebrate pounds landed and ex-vessel value at North Coast ports, so even for this fishery, the effects would be minor, even under worst case assumptions (i.e., eliminating fishing activity).

Based on the harvest and related employment information described above, the effect of the Proposed Project and the ECA on jobs supported by commercial fisheries (and by extension, recreational fisheries) would not be substantial, and likely would be offset by potential increases in recreation activity because of greater protection of marine areas, particularly over the longer term as commercial and recreational fishers adjusted.

⁵ Data is available online at <http://www.oceaneconomics.org/Market/ocean/oceanEcon.asp>.

References

- Ashcraft, Susan. Senior Environmental Scientist Specialist, California Department of Fish and Game, Sacramento, CA. October and November 2011—e-mail to the California Department of Fish and Game regarding MarineMap calculations.
- California Department of Fish and Game. 2009 (March). *Draft Environmental Impact Report for the North Central Coast Marine Protected Areas Project*. Available: http://www.dfg.ca.gov/mlpa/impact_ncc.asp. Accessed November 2011.
- California Marine Life Protection Act Initiative. 2010 (April 19). *Regional Profile of the North Coast Study Region: California–Oregon Border to Alder Creek*. 3rd edition. California Natural Resources Agency. Sacramento, CA. Available: <http://www.dfg.ca.gov/mlpa/ncprofile.asp>. Accessed January 2011.
- CDFG. See California Department of Fish and Game.
- Hackett, S., M. Hansen, D. King, and E. Price. 2009 (June). *The Economic Structure of California's Commercial Fisheries*. A report in fulfillment of contract P0670015, prepared for the California Department of Fish and Game. Sacramento, CA.
- MLPAI. See California Marine Life Protection Act Initiative.
- National Economics Ocean Program. 2011. National Ocean Economics Program. Available: <http://noep.csUMB.edu>. Accessed November 2011.
- Owens, Brian. Environmental Scientist, California Department of Fish and Game, Belmont, CA. November 2011—e-mail to the California Department of Fish and Game regarding kelp harvester licenses.
- Scholz, A., C. Steinback, S. Kruse, J. Bonkoski, C. Chen, N. Lyman, L. Weiss, and T. Hesselgrave. 2011 (February). *Commercial and Recreational Fishing Grounds and Their Relative Importance off the North Coast of California*. Ecotrust. Report prepared for California Marine Life Protection Act Initiative. Sacramento, CA.