

Guide to California's Marine Life Management Act

by

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and

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Foreword

The passage of the Marine Life Management Act in 1998 opened a new chapter in the conservation of California's marine wildlife and the management of our marine fisheries. The law not only gave the California Department of Fish and Game and the California Fish and Game Commission greater responsibility for marine fisheries, but it also called for greater efforts to involve fishermen, scientists, and interested citizens in developing management measures for our fisheries. The Department and Commission are committed to fulfilling this mandate. For this reason, we welcome the publication of this Guide to California's Marine Life Management Act.

The MLMA requires all of us to adopt new approaches to the formidable task of conserving California's marine life and fostering healthy fisheries. For instance, the MLMA places a high priority on using the best available scientific information in managing our fisheries. Just as we must not use a lack of information as a pretext for avoiding action, so must we follow scientific guidance when it is available. There will be times when meeting this challenge will be particularly difficult because of the sacrifices that fishermen and others may have to make in order to secure a long-term future. But, if we fail this challenge and abandon sound science in order to avoid difficult sacrifices, we will all be much poorer in good time.

The art of fisheries management is not simply about science, however. Fisheries management requires managing ourselves. After all, we can do little to change the influence of climate or ocean currents on wildlife. But by controlling our own activities, from fishing to coastal development and pollution, we can avoid adding more strain on wildlife populations. While other laws aim to reduce the burden from coastal development and pollution, the MLMA aims at ensuring that fishing respects the limits of wild populations.

Just as fishing is a human activity, so must fisheries management concern itself with people. Under the MLMA, people are not simply to be controlled or manipulated, but are to be involved in determining how our fisheries can be sustainable. This requires expanding traditional government approaches to public involvement and opening up the decisionmaking process so that the rationale for decisions is clear once decisions are made. This challenge is as formidable as relying upon the best available science. In many ways, the success of the MLMA hinges on meeting this challenge, also.

With these thoughts in mind, we are pleased to recommend to you this Guide to California's Marine Life Management Act. We believe you will find it a useful reference to which you will return time and again.

Mike Chrisman, president
California Fish and Game
Commission

Robert C. Hight, director
California Department
of Fish and Game

Preface

The idea for this guide arose from the conviction that the success of the Marine Life Management Act (MLMA) hinges on an active understanding by everyone involved in the management of California's marine life. The MLMA marks a departure from earlier marine life management by placing front and center the involvement of constituents in decision making.

The MLMA is a complex law, reflecting the many dimensions of managing marine life, including fisheries, for sustainability. We hope that this guide helps readers understand the law so that they can more effectively promote its success. The core of the book describes the major and minor themes of the MLMA and attempts to show how they relate to each other. This discussion is complemented by appendices that present information on California's marine wildlife, its fisheries, the regulatory process, important contacts, and other sources of information. Finally, appendices include the complete text of the Marine Life Management Act, as amended in 1999 and 2000, and the California Fish and Game Commission's Policy on Restricted Access. Where the text of this guide is based directly on a provision of the MLMA or another section in the Fish and Game Code, a citation is provided in brackets.

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This guide is a product of two related programs concerned with implementation of the Marine Life Management Act: Commonwealth's Ocean Policy Program and the California Marine Life Management Project at the National Fish and Wildlife Foundation. We thank the Jenifer Altman Foundation, Homeland Foundation, and the David and Lucile Packard Foundation, and the

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Introduction

California's marine life is both rich and diverse. Thousands of species of marine plants, crustaceans, mollusks, other invertebrates, fish, seabirds, and marine mammals use an astonishing diversity of habitats. Some species, such as squid, may swarm by the millions in relatively small areas near the coast. Other species, such as blue whales, come in small numbers from distant waters to feed on blooms of krill. Marine mammals, seabirds, and fish migrate from one part of the California coast to another or across the boundaries between Mexico and California. Some fish and shellfish spend their entire lives in a particular area, though they may have begun life as a tiny egg that currents carried a great distance from where it was spawned.

The Marine Life Management Act or MLMA seeks to assure that the way we use this richness and diversity of life is sustainable. The MLMA recognizes that the way we fish for one species, for instance, may affect other species or their habitats in ways that harm marine ecosystems. The MLMA also recognizes that research and an understanding of marine life are essential to making good decisions about our stewardship of marine living resources. As a result, the MLMA promotes the use of scientific information about the lives and needs of marine plants and animals.

As Dr. Ken Norris of the University of California at Santa Cruz wrote more than two decades ago, wildlife management is not so much the management of wildlife as the management of people. The MLMA embraces the importance of including people in the conservation equation. This importance arises partly from the knowledge different people possess, including commercial and recreational fishermen, scientists, wildlife photographers, fish processors, conservationists, and consumers. It arises also from the fact that conservation is concerned mostly with the effects of human activities, ranging from the use of different types of fishing gear to the conversion of coastal wetlands from coast and ocean tourism to changes in markets, prices, and consumption patterns in California, the United States, and abroad. Although some of these factors are beyond the reach of the MLMA, they influence marine life to such an extent that they must be taken into account in encouraging sustainable activities.

There are other aspects of the human side of the conservation equation. For instance, the MLMA recognizes that when people become involved in management decisions, their stake in the stewardship of marine life grows. Fisheries managers also need to understand the effects of management measures both on the fish themselves and on the users. Failure to examine how fishermen will respond to specific management measures often has undermined effective management. Finally, the effectiveness of management measures depends greatly upon public confidence in the way in which decisions are made

and put into practice. Critical to building and maintaining this confidence is an openness in decision making that goes beyond traditional, formal processes.

A variety of factors drives the fluctuations in populations of fish and other marine wildlife. We cannot manage some of these factors, such as changes in climate or in ocean currents. As a result, it is even more important to ensure that we do manage those factors that we can control, such as fishing and habitat alteration, so that we do not increase the stress on wild populations beyond the breaking point. In many cases, restraining exploitation may be key to rebuilding wild populations that have declined, even if the decline was caused by factors other than human activities. The MLMA provides a structure for doing so.

Management Jurisdictions

The management of marine living resources off California is a complex mosaic of federal, state, and international authorities, statutes, treaties, and agencies. The following description is not exhaustive, but includes the information most relevant to the MLMA.

Generally, waters from the shoreline to three miles are state waters, and from three miles to 200 miles is the U.S. Exclusive Economic Zone (EEZ) or federal waters. In the EEZ, the federal government retains authority for management of living marine resources, including fisheries, marine mammals, seabirds, and species listed under the Endangered Species Act. Beyond 200 miles from shore lie the high seas, where management of activities affecting marine wildlife is left to treaties among countries. Although there are few treaties concerning fish populations on the high seas off the California coast, the Inter-American Tropical Tuna Commission does make recommendations for the management of fishing on tuna and tuna-like species on the high seas as far north as Cape Mendocino.

Marine wildlife pays no attention to these artificial boundaries. Some populations remain on the high seas or within state waters, but more frequently, populations of marine wildlife straddle or move across boundaries. For instance, bluefin tuna caught in state and federal waters migrate thousands of miles across the Pacific Ocean at certain stages in their lives.

Federal Marine Life and Fisheries Management

The federal agency with primary responsibility for the conservation and management of marine fisheries is the National Marine Fisheries Service, an agency of the National Oceanic and Atmospheric Administration in the U.S. Department of Commerce.

The principal federal fisheries management law is the Magnuson-Stevens Fishery Conservation and Management Act, which was last amended by the Sustainable Fisheries Act of 1996. Like the MLMA in many ways, the Magnuson-Stevens Act calls for fishery management plans that meet certain standards, such as avoiding overfishing. In most cases, the federal fishery management

process begins with the Pacific Fishery Management Council, or PFMC. The PFMC is composed of state and federal agency representatives as well as commercial and recreational fishermen from California, Oregon, Washington, and Idaho, and a representative of the Indian treaty tribes.

Fisheries within the 200-mile Exclusive Economic Zone (EEZ) may be managed under fishery management plans developed by the PFMC and approved by the Secretary of Commerce. In the absence of a federal fishery management plan, however, the state can manage fishing by vessels registered in California to the limit of the EEZ.

The Secretary of Commerce has approved fishery management plans for Pacific coast groundfish, salmon, and coastal pelagics. The groundfish plan includes management measures for whiting, soles, thornyheads, lingcod, rockfish, sablefish, and several other species. Lingcod and a number of species of rockfish inhabit state waters and are sought by both commercial and recreational fishermen. As a result, the State of California must ensure that its management of recreational and commercial fisheries in its waters does not conflict with federal management. This is also true for state management of coastal pelagics and salmon.

The salmon management plan, which was first implemented in 1984, coordinates the management of fisheries principally for chinook and coho salmon. The coastal pelagics fishery management plan concerns schooling species such as, squid, anchovy, sardine, and pacific and jack mackerel. The PFMC is developing a fishery management plan for tunas, swordfish, marlins, sailfish, oceanic sharks, and other highly migratory species.

Together with Alaska, Idaho, Oregon, and Washington, California is also a member of the Pacific States Marine Fisheries Commission. The Commission, which was established by Congress in 1947, has no regulatory powers, but aims at promoting coordinated management of fisheries in state waters.

Several other federal laws concern the management of marine life off California. The National Marine Fisheries Service (NMFS) splits responsibility with the Interior Department's U.S. Fish and Wildlife Service for species under the Endangered Species Act and the Marine Mammal Protection Act. While the U.S. Fish and Wildlife Service holds responsibility for the conservation of southern sea otters and birds, NMFS oversees the conservation of protected fish and shellfish, seals, sea lions, dolphins, and whales off California.

Several species of marine life have been listed under the Endangered Species Act of 1973. The Endangered Species Act prohibits "taking" an endangered species; taking means "to pursue, hunt, shoot, capture, collect, kill or attempt" to do so. Limited taking of an endangered species incidental to activities such as fishing may be permitted. These and other protections for endangered species do not apply to threatened species unless separate regulations are adopted. Under Section 7 of the Endangered Species Act, federal agencies must consult

with NMFS or the U.S. Fish and Wildlife Service to insure that their actions do not jeopardize the continued existence of listed species.

The following species found along California's coast have been listed as endangered under the federal Endangered Species Act: humpback, blue, fin, sei, and sperm whales; leatherback, olive ridley, green, and hawksbill sea turtles; Sacramento winter-run chinook salmon; southern California steelhead; California brown pelican; and California least tern. Threatened species include Central Valley spring-run chinook, California coastal chinook, and Central and Northern California coho salmon; steelhead of the Central Valley and the south-central and northern California coasts; Guadalupe fur seals; loggerhead sea turtles; marbled murrelets; and snowy plovers.

The Marine Mammal Protection Act (MMPA) of 1972 imposed a moratorium on "taking" marine mammals, with a few exceptions that include taking marine mammals incidental to commercial fishing. Under the MMPA, taking may include intentional or unintentional capture or harassment. Amendments to the MMPA adopted by Congress in 1994 established a new regime to govern incidental taking in commercial fishing. This program aims to reduce serious injury and mortality of marine mammals to insignificant levels approaching zero.

The regime divides fisheries into three categories, based on criteria such as the frequency of marine mammal captures and the degree of threat that the capture poses to marine mammal populations. Vessels in Categories I or II must register with NMFS and may be required to carry an observer to collect information. A Take Reduction Team, composed of fishermen, scientists, and conservationists, was convened to suggest means of reducing the incidental catch of marine mammals in the swordfish drift gillnet fishery off California. In 1997, NMFS adopted regulations requiring that fishermen use pingers on their nets and hang their nets well below the surface in order to reduce the capture of several species of small whales as well as humpback and sperm whales in these nets.

One other federal wildlife law deserves mention: the Migratory Bird Treaty Act. Under this legislation, which implements several international treaties, migratory birds may not be captured or killed unless permitted by regulations adopted by the Secretary of the Interior. Seabirds, shorebirds, and other non-game birds fall under the protection of the Migratory Bird Treaty Act.

Finally, several federal laws apply to the conservation and use of coastal habitats and the prevention of water pollution, including the Coastal Zone Management Act, the Clean Water Act, and the Ocean Dumping Act. These laws are administered by other state and federal agencies, including the Environmental Protection Agency and the Army Corps of Engineers.

State Marine Life and Fisheries Management

The federal Submerged Lands Act of 1953 authorizes the State of California to control and regulate the use of marine resources, including living marine resources, as well, as oil and gas and other minerals, in state waters within three miles of the shoreline. There are several exceptions to this general rule. For instance, under the Marine Mammal Protection Act and the Endangered Species Act, the federal government has pre-empted state authority in the conservation of marine mammals and endangered and threatened species in state waters.

California can regulate fishermen licensed in California wherever they fish. It can also regulate fishermen licensed in other states whenever they fish in California waters or land their catch in California ports. If vessels from other states fish beyond three miles offshore and do not call at a California port, the state cannot control their activities. Similarly, the states of Oregon and Washington do not have jurisdiction over California vessels that fish in waters more than three miles off their shores, for pink shrimp and Dungeness crab as examples, and land their catch in California. State regulations must be consistent with federal regulations, however, for species included in a federal fishery management plan. Generally, that means that state regulation may be stricter but not less restrictive than the federal requirements.

Within California state government, there are three principal “managers” of marine life and fisheries: the California Fish and Game Commission (Commission) and the California Department of Fish and Game (Department), both of which reside within the Resources Agency, and the Legislature. Before 1998, when the Legislature enacted the Marine Life Management Act, the authority of the Commission was restricted to managing sport fisheries, kelp harvesting, and some commercial fisheries; creating ecological reserves; and taking emergency actions. Management of other activities affecting marine life, including fisheries, has been carried out through legislation. Two committees have principal jurisdiction over marine legislation in the Assembly: the Committee on Water, Parks, and Wildlife, and the Committee on Natural Resources. In the Senate, the Committee on Natural Resources and Wildlife has primary jurisdiction. The Senate and Assembly’s Joint Committee on Fisheries and Aquaculture plays an important role as well. Most legislated measures concerning marine wildlife are assembled in the Fish and Game Code, while others may be found in other codes such as the Public Resources Code.

As described later, the MLMA shifted more authority for the management of commercial marine fisheries to the Commission. The California State Constitution established the Commission to carry out functions delegated to it by law. The Commission’s five members are appointed by the Governor to six-year terms. The Commission has adopted regulations for marine life and fisheries where the Legislature has given it authority. When adopting regulations, the Commission must comply with procedural requirements of such laws as the Administrative Procedure Act and the California Environmental

Quality Act or CEQA. To do so, the Commission holds at least one hearing in order to gather public comment on proposed regulations. Often, more than one hearing is held. Once adopted, regulations are reviewed by the Office of Administrative Law. When approved and filed with the Secretary of State, they become part of Title 14 of the California Administrative Code.

The Department manages activities affecting marine wildlife, primarily fisheries, by implementing state and federal laws and state regulations adopted by the Commission or the Department. The Department also provides expert advice to the Commission, carries out research, and enforces fisheries regulations and law.

Most of the budget of the Department's Marine Region, which was established in its present form in November 1997 and has lead responsibility for these programs, comes from recreational fishing licenses, commercial fishing licenses, taxes on commercial landings, and permit fees. Since tax rates for most species have not increased since 1972, increased revenues from commercial landings have been modest and more than offset by inflation. Some additional funding has come from the Federal Aid In Sport Fish Restoration Act of 1950 (Dingell-Johnson Act) and the Interjurisdictional Fisheries Act of 1986. In the 1999-2000 budget year, the Marine Region budget received a substantial infusion from the state's General Fund for the first time. That funding was specifically designated for implementation of the Marine Life Management Act.

In 1998-1999, the Marine Region had 110 biological field and administrative support positions and 33 law enforcement positions dedicated to marine patrol. This represented about a 40 percent decline from staffing levels in 1980-1981.

California Marine Districts

The boundaries of the Marine Region's districts are depicted in the map below and described right:

The Fish and Game Code divides California into more than two dozen districts. The waters from the mean high-tide line to three miles offshore comprise several of these districts. (Note that the waters of some bays, sloughs, and rivers are not included in these districts.)

district 6: From the Oregon border to the entrance to Humboldt Bay near Eureka.

district 7: From the entrance to Humboldt Bay to the southern boundary of Mendocino County

district 8: The northern portion of Humboldt Bay.

district 9: The southern portion of Humboldt Bay.

district 10: From the southern boundary of Mendocino County to Pigeon Point in San Mateo County. The district includes most of Tomales Bay, but excludes Bodega Bay and Bolinas Lagoon.

district 11: In general terms, San Francisco Bay west of Alcatraz and Angel islands.

district 12: In general terms, San Francisco Bay north of the San Francisco-Oakland Bay Bridge.

district 13: In general terms, San Francisco Bay south of the San Francisco-Oakland Bay Bridge.

district 16: Nearshore waters off Pacific Grove and Monterey.

district 17: From Pigeon Point to Yankee Point at the Carmel Highlands south of Carmel, but excluding District 16.

district 18: From Yankee Point to Rincon Point at the border between Santa Barbara and Ventura counties.

district 118: From the pier at San Simeon to the state park at Cambria.

district 118.5: Waters out to two miles from the boundary between Monterey and San Luis Obispo counties south to the boundary between Santa Barbara and Ventura counties.

district 19: From the border between Santa Barbara and Ventura counties to the Mexican border, but excluding the following districts:

District 19a: Santa Monica Bay, from Malibu Point (is this Point Dume?) to Palos Verdes Point.

District 19b: The waters within the breakwater off San Pedro and Long Beach to the jetty at Anaheim Bay in Seal Beach.

district 20: The waters off the northern, eastern, and southern sides of Catalina Island, from West End to China Point.

District 20a: The waters off the western side of Catalina Island between China Point and West End.

district 21: San Diego Bay.

General Aspects of California Fisheries Law

For regulatory purposes, the state's coastline is divided into 19 commercial fishing districts. Regulatory measures such as area closures or gear restrictions may apply in some districts and not in others.

Unless mentioned by name in the regulations, any species may be taken without restriction for commercial purposes. If a species is mentioned in regulations, it may be taken only under the conditions described in those regulations. Species groups listed in the code of regulations include abalone, anchovy, bait fish, barracuda, several basses, broadbill swordfish, California halibut, clams, corbina, several crabs, several croakers, goby, grunion, hagfish, herring, Kellet's whelk, killifish, limpets, lingcod, spiny lobster, marlin, mussels,

octopus, oysters, Pacific bonito, plainfin midshipman, prawns, queenfish, rays, rockfish, sablefish, salmon, sardines, sea cucumber, sea urchin, shad, several sharks, shiner perch, shrimp, skates, smelt, squid, sculpin, sturgeon, sunfish, surfperch, several tunas, and yellowtail. The Fish and Game Code prohibits commercial fishing for several dozen other species, including some invertebrates such as scallops and krill, and some fish, such as white sharks, garibaldi, and marlin.

Only those types of fishing gear listed in the Fish and Game Code may be used. These gear include gill and trammel nets, round-haul nets, trawl nets, beach nets, dip nets, fishing lines, spears, traps, shovels, among others. Each type of gear is subject to restrictions. For instance, in fishing for California halibut in district 19 (south of the Santa Barbara-Ventura county line), gill nets or trammel nets must have a mesh size greater than 8.5 inches and may not be longer than 9,000 feet.

Regulations also require that commercial fishermen, fishing vessel operators, crew members, and others obtain various licenses and permits.

The Commission has primary responsibility for setting regulations for most recreational fisheries. In odd-numbered years, the Commission devotes its August, October, November, and December meetings to setting sport fishing regulations. State marine sport fishing regulations include restrictions on catching and retaining some species, but not others. For instance, state regulations set bag limits on some species, such as rockfish and California halibut, but not on others, such as albacore and starry flounder. There is a zero limit on giant sea bass, garibaldi, and white shark. Other regulations specify open and closed seasons and permissible fishing gear.

The Marine Life Management Act

The Marine Life Management Act, which became law on January 1, 1999, opened a new era in the management and conservation of marine living resources. In fashioning the MLMA, which had been introduced as AB 1241 by Assemblyman Fred Keeley in February 1997, the Legislature drew upon years of experience in California and elsewhere in the United States and the world.

The Act includes a number of innovative features. First, the MLMA applies not only to fish and shellfish taken by commercial and recreational fishermen, but to all marine wildlife. Second, rather than assuming that exploitation should continue until damage has become clear, the MLMA was intended to shift the burden of proof toward demonstrating that fisheries and other activities are sustainable. Third, while the Legislature retained its control of some of the State's commercial fisheries, it gave the Commission new authority, using the standards and procedures of the MLMA.

The MLMA sets out several underlying goals.

- **Conserve Entire Systems:** It is not simply exploited populations of marine life that are to be conserved, but the species and habitats that make up the ecosystem of which they are a part [7050(b)(1)].
- **Non-Consumptive Values:** Marine life need not be consumed to provide important benefits to people, including aesthetic and recreational enjoyment as well as scientific study and education [7050(a)].
- **Sustainability:** Fisheries and other uses of marine living resources are to be sustainable so that long-term health is not sacrificed for short-term benefits [7050(b)(2); 7055(a)].
- **Habitat Conservation:** The habitat of marine wildlife is to be maintained, restored or enhanced, and any damage from fishing practices is to be minimized [7055(b); 7056(b)].
- **Restoration:** Depressed fisheries are to be rebuilt within a specified time [7055(b); 7056(c)].

- **Bycatch:** The bycatch of marine living resources in fisheries is to be limited to acceptable types and amounts [7056(d)].
- **Fishing Communities:** Fisheries management should recognize the long-term interests of people dependent on fishing, and adverse impacts of management measures on fishing communities are to be minimized [7056(i) and (j)].

To meet these standards, the MLMA calls for using several basic tools.

- **Science:** Management is to be based on the best available scientific information as well as other relevant information. Lack of information should not greatly delay taking action. To help ensure the scientific soundness of decisions, key documents should be reviewed by experts [7050(b)(6); 7062; 7072(b)].
- **Constituent Involvement:** The MLMA places a strong emphasis on decision making that is open and that involves people who are interested in or affected by management measures [7056(h)].
- **Fishery Management Plans:** Rather than ad hoc and piecemeal decisions on individual fisheries, the aim is to base decisions on comprehensive reviews of fisheries and on clear objectives and measures for fostering sustainable fisheries. The vehicle for this objective is a fishery management plan [7070; 7078].
- **Master Plan:** The Department will prepare, and the Commission will adopt, a Master Plan that prioritizes fisheries according to need for comprehensive management through fishery management plans [7073].
- **Status of the Fisheries Report:** Annually, the Department will prepare a report on the status of California's fisheries and the effectiveness of management programs [7065; 7066].

Below is a description of the Marine Life Management Act's many sections. This description reorganizes the MLMA's provisions into four broad categories that move from general statements of policy to application of the policy. These categories are:

- General Policies
- Scope
- General means for achieving the act's goals
- Specific Tools

As with any description of legislation, this guide is somewhat interpretive. The precise meaning of specific passages in the legislation awaits application by government agencies and, potentially, interpretation by the courts. The full text of the MLMA as it appears in the Fish and Game Code may be found in Appendix B.

Definitions of key terms may be found in Appendix A. These terms include adaptive management, bycatch, depressed fishery, discards, emerging fishery, essential fishery information, fish, fishery, limited entry fishery, marine living resources, maximum sustainable yield, nearshore fish stocks, nearshore fisheries, nearshore waters, optimum yield, overfished, overfishing, fishery participants, population or stock, restricted access, sustainable, sustainable use, and sustainability.

General Marine Life Management Act Policies

The MLMA has two sets of general policies. The first applies to all marine life management by the state, while the second focuses more narrowly on general fisheries management policies.

General Policy on Marine Living Resources

The MLMA's overriding goal is to ensure the conservation, sustainable use, and restoration of California's marine living resources [7050(b)]. This includes the conservation of healthy and diverse marine ecosystems and marine living resources [7050(b)1]. To achieve this goal, the MLMA calls for allowing and encouraging only those activities and uses that are sustainable [7050(b)2]. Although most of the MLMA is devoted to fisheries management, it also recognizes that non-consumptive values such as aesthetic, educational, and recreational are equally important [7050(b)3].

Unlike previous law, which focused on individual species, the MLMA recognizes that maintaining the health of marine ecosystems is important in and of itself. The MLMA also holds that maintaining the health of marine ecosystems is key to productive fisheries and non-consumptive uses of marine living resources. Furthermore, as in other areas of the United States and the world, restoration of depleted fisheries and damaged habitats has become a pressing need.

The words "sustainable" and "sustainability" have inspired mountains of reports and hours of discussion among fisheries managers around the world. At 99.5, the MLMA provides its definition. A sustainable fishery is one in which fish populations are allowed to replace themselves. The MLMA recognizes that populations of marine wildlife may fluctuate from year to year in response to external environmental factors, such as climate and oceanic conditions. A sustainable fishery also ensures that marine wildlife can continue providing the "fullest possible range" of economic, social, and ecological benefits. Unlike traditional definitions of sustainability in fisheries, the MLMA's definition calls for maintaining biological diversity.

It is fruitless to try to identify exact measures for determining how sustainable individual fisheries are. The Legislature wisely decided to describe the features of a fishery management system that would produce sustainable fisheries. The Legislature's formulation reflects years of debate in this country and internationally on how to develop a new, more sustainable approach to fisheries.

In Section 7056, the Legislature identified the features it believed would provide the range of benefits that Californians seek from marine wildlife—sustainable fisheries. These features include limiting bycatch, rebuilding depressed fisheries, maintaining long-term benefits rather than opting for short-term benefits, making decisions in the open, basing decisions on scientific advice and other useful information, and adapting to changing circumstances. In so many words, the Legislature said that doing these few things would lead to the kind of fisheries that Californians desire.

General Policy on Marine Fisheries

Within this overall policy on marine living resources, the MLMA sets the State's policy for marine fisheries [7055; 7056]. Both commercial and recreational fisheries are to be managed to assure the long-term economic, recreational, cultural and social benefits of the fisheries and the marine habitats upon which they depend. With this in mind, the MLMA establishes a marine fishery conservation program in order to:

- Achieve sustainable use of fisheries,
- Ensure conservation,
- Promote habitat protection and restoration,
- Rebuild depressed stocks,
- Prevent overfishing, and
- Develop information for management decisions.

The policy also calls for reasonable sport use and encourages the growth of commercial fisheries [7055(c) and (d)].

The primary management goal of the fishery management system is sustainability [7056]. Unlike other natural resource laws that call for balancing various objectives without indicating any priority, the MLMA places sustainability above other objectives of the act. For instance, while the MLMA calls for considering the interests of fishing communities, it does not place these interests above the long-term sustainability of marine populations. As a result, decisions under the MLMA may cause some sacrifice in the short-term. However, the economic and social dislocation caused by collapsed fisheries around the United States shows the long-term costs of avoiding such sacrifices to satisfy short-term needs. By shifting from a short-term to a long-term perspective, the MLMA fosters more stable and productive fisheries in the future.

The fishery management system is to pursue sustainability by achieving a number of objectives, two of which give more detail about sustainability. First, the long-term health of the resource should not be sacrificed for short-term benefits. Second, depressed fisheries are to be rebuilt to the highest sustainable yields allowed by environmental and habitat conditions.

There are several other important features of the MLMA's provisions on sustainability in fisheries. First is the emphasis on acting for the long-term

rather than short-term benefits. For instance, the MLMA recognizes commercial, recreational, cultural, and social benefits. Also, the MLMA recognizes the close linkage between the health of many fish populations and their habitat. Unlike management of most fishing activities, which fall under the jurisdiction of the Commission and Department, protecting and restoring habitat will require working with many other agencies, whose mission may or may not include the conservation of fisheries.

The MLMA recognizes the importance of commercial and recreational fisheries to Californians and the need for allocating marine living resources fairly. The MLMA calls for maintaining fish populations that are sought by sport fishermen at levels that will provide satisfying levels of sport use [7055(c)]. At the same time, the MLMA encourages the growth of commercial fisheries [7055(d)]. The MLMA requires that the effects of regulations be allocated fairly between commercial and recreational fishermen [7072(c)]. It is worth repeating, however, that these objectives are secondary to ensuring that fisheries are sustainable.

Scope of The Marine Life Management Act

The provisions of the MLMA are limited geographically [7051(a)]. Unless the authority already existed on January 1, 1999, the MLMA's provisions apply only to ocean and bay waters and not upstream from the mouths of rivers. As mentioned above, the state may manage fishing outside of state waters in certain circumstances.

The fishery management system established by the MLMA applies to four groups of fisheries [7051(b) and 7071(a), (b), and(c)]. The first group includes those fisheries for which the Commission held some management authority before January 1, 1999. This group includes all sport fisheries and commercial fishing for the species listed on page 8. Future new regulations affecting these fisheries will need to conform to the MLMA. For example, the constituent involvement standards of the MLMA would apply if new regulations are developed for the commercial sea urchin fishery. Similarly, if a fishery management plan is developed for the recreational and commercial lobster fishery, it will need to follow the fishery management plan process and design in the MLMA.

The second group of fisheries includes the nearshore finfish fishery and the white seabass fishery [7071(c)]. The MLMA calls for the development and adoption of a fishery management plan for each of these fisheries by January 2002.

The third group of fisheries comprises so-called emerging fisheries—that is, new and growing fisheries that are not currently subject to specific regulation [7071(c) and 7090]. The Commission must adopt criteria for identifying emerging fisheries before it may regulate them.

The final group of fisheries are those commercial fisheries for which there is no statutory delegation of authority to the Commission and Department. In the case of these fisheries, the Department may prepare, and the Commission may adopt, a fishery management plan, but that plan cannot be implemented without a further delegation of authority through the legislative process.

General Policies for Achieving The MLMA's Goals

The MLMA includes four general policies for achieving its goals of conservation, sustainable use, and restoration of California's marine living resources: science, constituent involvement, adaptive management, and socio-economic considerations. The application of each of these general policies is reflected in other provisions of the MLMA.

Science

At the core of the MLMA is the principle of basing decisions on sound science and other useful information. With this in mind, the MLMA includes, as a general objective, promotion of research on marine ecosystems that will enable better management decisions [7050(b)(5)]. The MLMA also calls for basing decisions on the best available scientific information as well as other information that the Department and Commission possess [7050(b)(6)]. While the MLMA emphasizes scientific information, it also recognizes the value and importance of relying upon other sources of information in making decisions regarding the conservation and sustainable use of California's marine living resources, such as local knowledge [7056(h)].

Within this general policy on science and marine living resources, the MLMA establishes more specific policies for the management of marine fisheries. Fishery management decisions are to be based on the best available scientific and other relevant information, including what the MLMA calls essential fishery information. Essential fishery information includes the biology of fish, population status and trends, fishing effort, catch levels, and impacts of fishing [93]. The MLMA calls upon the Department to collect essential fishery information for all marine fisheries managed by the State [7060(a) and (b)].

This kind of information is to form the basis for fishery management plans developed under the MLMA [7072(b)]. Obtaining information shall not substantially delay the development of a plan, however. This provision is intended to ensure that the pursuit of additional information does not delay the adoption of needed management measures, thereby increasing the risk of unsustainable fishing. To foster improvements in the management of individual fisheries, the MLMA requires that fishery management plans include a research protocol that identifies critical information gaps and the steps that will be taken to close those gaps [7081].

There are other ways in which the MLMA calls for the use of sound science in managing fisheries.

- Fishery management plans are to summarize the best available scientific and other relevant information regarding the effects of management measures on fish populations and habitats, fishermen, and coastal communities [7083(b)].
- Plans are to rely on such information in identifying measures that might minimize damage to habitat from fishing [7084(a)].
- Where bycatch occurs in a fishery, a fishery management plan is to summarize the best available scientific information on such things as level of bycatch and its effects on other fisheries, the conservation of bycatch species, and the ecosystem [7085].
- Fishery management plans are also to draw on such information when identifying criteria for determining when a fishery is overfished [7086(a)].
- To foster the soundness of scientific information used in decisions on fisheries, the MLMA calls for the Department to have the scientific basis for management documents reviewed by a panel of external experts [7062(a)].

Constituent Involvement Generally

The MLMA builds upon traditional public participation in government decisionmaking in laying out its policy on involving constituents in its implementation. As a matter of practice, both the Department and the Commission have regularly held meetings to gather suggestions for changes in management and regulations. Under the California Environmental Quality Act, they also hold hearings and solicit comments on regulatory matters. The Department has established several committees, such as the Director's Marine Resources Advisory Committee, as well as committees on sea urchins, and abalone. The Legislature has established several other committees, as on abalone, Dungeness crab, squid, herring, and salmon. Usually, membership on these committees is allocated to specific interest groups, such as sport and commercial fishermen, processors, and environmental organizations. Less formally, Department and Commission staff speak and correspond with interested individuals, and distribute information through newsletters and at meetings and conferences. (See Appendix C for more information on the regulatory process.)

In addition to these traditional approaches, the MLMA calls for the development of new ways of involving fishermen, conservationists, processors, and others in issues ranging from identifying fisheries most in need of management to developing research protocols for individual fisheries. It is up to the Department and constituents to decide how constituents will be involved. Depending on the situation, the particular issue, and the stage in the decisionmaking process, meaningful involvement may require conversations in person or by telephone, a newsletter, email, small-group discussions, workshops, large meetings, or hearings. In other words, the MLMA does not

dictate the form that constituent involvement is to take, but does require that the decisionmaking process be open and meaningful.

Generally, the MLMA calls for involving “all interested parties” in making decisions regarding marine living resources [7050(b)(7)] and for disseminating accurate information on the status of marine life and its management [7050(b)(8)]. The MLMA emphasizes the importance of ongoing communication among the Department, the Commission, and those most affected by decisions, and other interested parties [7059(a)(1)]. It encourages the Department and the Commission to seek the help of specialists in the sciences and other individuals in dealing with the complex issues that arise in managing fisheries [7059(a)(2)]. Finally, to foster participation, meetings should be conducted in those areas most affected by decisions [7059(a)(4)].

As with other management tasks, the Department and the Commission should seek to improve communication, collaboration, and dispute resolution activities, partly by soliciting the views of constituents [7059(b)(1)]. The Commission and Department must also develop a way of designing factfinding and dispute resolution processes appropriate for each element of the MLMA [7059(b)(2)]. The Act specifically mentions as models the take reduction teams established under the federal Marine Mammal Protection Act, and the processes used for improving the management of the California herring, sea urchin, prawn, angel shark, and white seabass fisheries [7059(b)(2)].

Constituent Involvement in Marine Fisheries Management

The MLMA focuses special attention on constituent involvement in marine fisheries management—not only in the development of management plans but in other key activities such as research and implementation of management decisions. This focus does not mean that the Department or the Commission are to abdicate their public trust responsibility to ensure that fisheries are ecologically sustainable. Rather, the Department and the Commission are to strive to build agreements with constituents within the policy guidelines of the MLMA.

The MLMA requires that the overall fishery management system meets several objectives regarding constituent involvement [7056(h), (k), and (l)]:

- The process is open and seeks relevant information from interested people.
- Collaborative management is encouraged, and dispute resolution mechanisms are in place.
- The management system seeks to respond to the concerns of participants in the fishery and to changing conditions in the environment and markets, for instance.

In involving fishermen, the MLMA specifically mentions that the Department and Commission should ensure adequate involvement by considering the gear used in a fishery, the involvement of commercial and/or recreational fishermen, and the areas of the coast where the fishery occurs [7059(b)(4)].

The MLMA specifically mentions application of these constituent involvement policies in the following fisheries management activities:

- designing and conducting research [7060(c)],
- preparing the annual state of the fisheries report [7065(a)],
- preparing fishery management plans [7076(a)],
- developing the master plan for fisheries management [7073(a)],
- developing a process for involving constituents in the preparation of fishery management plans, plan amendments, and research plans in the master plan [7073(b)(4)],
- designing research protocols for individual fishery management plans [7074(b)], and
- developing criteria for determining when a fishery management plan may be exempted from peer review [7075(c)].

Adaptive Management

Conservation and sustainable use of marine living resources are hampered by the limits of our understanding and the many external forces, from climate changes to economic changes, that affect human activities and the abundance and distribution of marine life. As a result, the outcomes of management are much less certain than those of engineering, for instance.

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

The MLMA explicitly calls for ensuring that managers can respond to changing environmental and socio-economic conditions [7056(l)]. It also calls for reviewing the overall fishery management system’s effectiveness in achieving sustainability and in involving people in a fair and reasonable manner [7056(m)]. Besides requiring the Department and Commission to review their public involvement and communication activities [7059(b)(1)], the MLMA also requires that the master plan for fisheries and fishery management plans include periodic review and amendment [7073(b)(5); 7087.1]. The Act also suggests that the annual report on the status of fisheries recommend changes in the management system.

Socio-Economic Considerations

While the overriding goal of the MLMA is to ensure that activities affecting marine life, including fisheries, are sustainable, the Act recognizes other needs as well. Several times in the MLMA, the Legislature referred to the different values and benefits that Californians find in their marine wildlife:

environmental, economic, aesthetic, recreational, educational, scientific, nutritional, social, and historic [7050(a)].

Since the MLMA is largely devoted to the management of marine fisheries, it pays more attention to the values and interests of fishermen and others interested in fisheries. In general, the MLMA calls not only for maintaining satisfying sport fisheries but for fostering the growth of commercial fisheries [7050(c) and (d)]. The MLMA recognizes the potential for conflict between commercial and recreational fishing and calls for close coordination in the management of these activities [7056(f)]. The long-term interests of those dependent on fishing for food, livelihood, or recreation receive special mention in the MLMA [7056(i)]. The management system established by the MLMA also is to minimize adverse impacts on small-scale fisheries, coastal communities, and local economies [7056(j)]. Note, however, that these concerns are secondary to the broader mission of fostering sustainable fisheries.

These themes draw together in the preparation of fishery management plans. Under the MLMA, FMPs are to summarize information on economic and social factors in the fishery [7080(e)]. If an FMP includes new management measures, it must analyze their anticipated effects on fishermen as well as coastal communities and businesses that rely on the fishery [7083(b)]. Any increases or restrictions on catches are to be allocated fairly among recreational and commercial fishermen [7072(c)].

Specific Tools for Achieving The MLMA'S Goals

The MLMA identifies several tools for achieving its goals.

- External peer review,
- Fishery research protocols,
- Fishery management plans,
- Fishery management master plan,
- Emerging fisheries,
- Emergency management, and
- Annual status of fisheries report.

External Peer Review

The MLMA identifies several ways in which management decisions can be based on the best available scientific information. The first is external peer review of the scientific basis of key documents [7062(a)]. At a minimum, these documents include fishery research protocols [7074], fishery research plans [7062.1], and fishery management plans [7075(a)].

The MLMA authorizes the Department to contract with an outside, non-advocacy organization, such as Sea Grant, or other groups approved by the Commission, to select and administer panels of reviewers [7062(b)]. These reviewers are to have relevant expertise for evaluating the document. The

reviewers are not to have participated in the document's preparation or be Department or Commission employees.

The panel of peer reviewers is to provide a written report evaluating the scientific basis of a document [7062(c)]. The report should state whether any scientific parts of the document are not based on sound scientific knowledge, methods, and practices. If the Department does not revise the document to address such a finding, it is to explain its reasons for doing so. Both the peer review report and the Department's response are to be submitted to the Commission.

The Department may determine that a particular fishery management plan does not require an external peer review, based on criteria adopted by the Commission [7075(a)]. If it does so, the Department must submit its reasons to the Commission. A similar process applies to exempting interim fishery research protocols discussed later [7074(d)]. But, for both fishery management plans and research protocols, a peer review is the default requirement.

Fishery Research Protocols

The MLMA requires that fishery management plans and amendments contain a fishery research protocol that includes the following information [7081]:

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

The only management plans identified specifically in the MLMA are the plans for white seabass and for nearshore finfish. The MLMA also requires that the Department prepare interim research protocols for at least the top three priority fisheries identified in the master plan [7074(a)]. In preparing these interim protocols, the Department is to involve fishermen, conservationists, marine scientists and others [7074(b)]. These protocols also must be submitted to external peer review unless the Department determines there is no need, based on criteria approved by the Commission [7074(c) and (d)].

Fishery Management Plans (FMPs)

As elsewhere in the United States and the world, the management of fisheries in California has generally been undertaken in a piecemeal fashion. Borrowing from experience with federal fishery management law, the MLMA has initiated a more comprehensive approach to fisheries management. The primary vehicle for this approach is the development of fishery management plans for all of the State's major recreational and commercial fisheries. Initially, the MLMA authorizes the development and implementation of two fishery management plans: one for white seabass and the other for the nearshore finfish fishery.

Fishery Management Plan Policies

The MLMA emphasizes that achieving its goals in managing California's sport and commercial marine fisheries requires fishery management plans [7070; 7072(a)]. These plans, or FMPs, are to be based on the best scientific information available, as well as other relevant information [7072(b)]. FMPs are to allocate any increases or decreases in allowable catches fairly between commercial and recreational fishermen [7072(c)].

Fishery Management Plan Process

The MLMA makes the Department responsible for developing fishery management plans and implementing regulations, as well as amendments to any existing plans [7075(a)]. The Department may have a fishery management plan developed under contract [7075(b)]. Whether an FMP is developed by the Department itself or under contract, the Department is to seek the views and help of fishermen, conservationists, marine scientists, and other people, as well as California Sea Grant, NMFS, the PFMC, the Pacific States Marine Fisheries Commission, and the Department's own advisory committees [7076(a)].

As in the cases of other decision documents, the scientific basis of a plan is to be reviewed by an independent panel of experts [7075(a)]. The Department is to provide the peer review panel with any written comments it has received from the public regarding the plan [7076(b)]. If the Department determines external peer review is unnecessary, it must provide the Commission with its reasons, based on criteria previously adopted by the Commission [7075(a)].

The Department then submits a completed fishery management plan and implementing regulations to the Commission for its consideration [7075(a)]. The Department must also make the plan and implementing regulations available for public review and comment at least 30 days before the Commission holds a hearing on the plan [7077]. The Department must also post plans and hearing schedules on its Internet website.

After the 30-day period, but within 60 days of the submission of the plan, the Commission is to hold at least two public hearings [7078(a)]. The Commission may take action on the plan at the second public hearing or at any later Commission meeting [7078(b)]. If the Commission rejects a plan, including its regulations, the Commission is to provide the Department with its reasons. The Department then has 90 days to revise and resubmit the plan. The Commission then reviews the plan, as before, and either approves or rejects it.

The Commission must adopt implementing regulations within 60 days after approving an FMP [7078(e)]. While adoption of these regulations must follow the Administrative Procedure Act, it does not trigger additional review under the California Environmental Quality Act, whose requirements are satisfied by the FMP. If the Commission's adoption of an FMP would supersede any existing statute, the Commission is to provide the Legislature with a copy of the plan before adoption [7078(d)].

While the MLMA itself specifies two fisheries for which FMPs are to be developed (nearshore finfish and white seabass), fishermen, scientists, conservationists, and other people may propose plans or provisions of plans for other fisheries [7075(d)]. After its review of such proposals, the Commission may recommend that the Department develop an FMP or incorporate provisions in an FMP, as proposed.

The process just described also applies to amendments to fishery management plans.

Contents of a Fishery Management Plan

Fishery management plans (FMPs) are just that: planning documents. FMPs assemble information, analyses, and management alternatives that allow the Department to provide a coherent package of information and management measures to the Commission. FMPs also provide a focus and basis for discussions among scientists, fishermen, conservationists, processors, and other people about the many issues that affect the sustainability of a fishery. Since we have only a limited understanding of how fish populations, their habitats, and human activities change and affect each other, we must make assumptions in selecting management measures for a particular fishery. An FMP can articulate these assumptions, so that they can be tested through monitoring, and improvements can be made in the management of the fishery. Finally, an FMP describes how fishery management measures reflect the standards of the MLMA, from ensuring sustainability to limiting bycatch.

Under the MLMA, fishery management plans are to include at least the seven following elements:

- Description of the fishery,
- Fishery science and essential fishery information,
- Basic fishery conservation measures,
- Habitat provisions,
- Bycatch and discards,
- Overfishing and rebuilding, and
- Amendment and other modification of an FMP.

The MLMA describes the contents of each of these sections. FMPs will include other elements to satisfy requirements of other law such as the California Environmental Quality Act.

i. description of the fishery: Marine fisheries are complex phenomena, in which fish, habitats, ocean conditions, fishermen, markets, and broader economic conditions all interact. A first step in managing such a complex thing is to describe its parts and their interactions. With this in mind, the MLMA calls for the Department to summarize readily available information about a fishery (7080). This summary is to include what is known about the following and other types of information:

- The species of fish and their location, their natural history and population dynamics, and effects of ocean conditions;
- The habitat of the fish and threats to the habitat;
- The role of the target species in the ecosystem and the fishery's effect on that role;
- The fleet, fishing effort, and landings by commercial and recreational fishermen;
- Economic and social factors in the fishery; and
- Past conservation and management measures in the fishery.

Note that in preparing this and other sections of an FMP, the Department is to seek out the best available scientific information as well as other relevant information that can be obtained without substantially delaying the FMP [7072(b)]. Indeed, there may be little available information in some areas, such as socio-economic factors in a fishery and the population dynamics of individual species of fish or shellfish. The MLMA requires that research protocols identify these gaps and the steps that will be taken to fill them.

ii. fishery science and essential fishery information: Management of marine fisheries is more likely to succeed if it is based on solid information and an understanding of the fish and the fishermen. Often, however, key pieces of information are lacking to begin with. Furthermore, fisheries change in response to regulations, fishing, and other factors such as climate. Effective management depends on clearly understanding what is known and not known. Collecting information will help us learn how well our view of the workings of a fishery actually track with reality.

Under the MLMA, the vehicle for initiating this critical task is the fishery research protocol that each FMP is to include [7081]. This protocol is to describe the following:

- Past and current monitoring of the fishery,
- Essential fishery information for that fishery,
- The time and resources needed to fill gaps in this information, and
- The steps the Department is taking to monitor a fishery and to obtain essential fishery information.

“Essential fishery information” includes information about the life history and habitat requirements of a species, status and trends in fish populations, effects of fishing on the age structure of a fish populations and on other marine living resources and users and whatever other information is needed to manage a fishery sustainably (93).

iii. basic fishery conservation measures: As mentioned above, the primary goal of the MLMA's fishery management policies is sustainability. Sustainability is to be achieved by:

- Preventing overfishing,

- Rebuilding depressed stocks,
- Ensuring conservation, and
- Promoting habitat protection and restoration.

Management and conservation measures are the principal direct means for achieving these goals. The MLMA identifies several types of measures [7082]:

- Limitations on area, time, amount of catch, species, type or amount of gear,
- Restricted access,
- Review and adjustment of catch quotas, and
- Personal, gear, or vessel permits and fees.

The Department is to incorporate existing management measures into a fishery management plan if they will contribute to a sustainable fishery [7083(a)]. If the Department proposes additional measures, it must summarize anticipated effects on fish populations and habitats, fishermen, and coastal communities that rely on a fishery [7083(b)].

iv. habitat provisions: Healthy habitats are important for maintaining the productivity and diversity of marine ecosystems and viable commercial and recreational fisheries. With this in mind, the MLMA calls for minimizing damage to habitats [7056(b)]. While a lot of effort and funding has been devoted to the protection, conservation, and restoration of coastal habitats damaged by development and other activities on land, until recently the effect of some kinds of fishing gear and practices has been ignored. Now, however, research has shown that some fishing methods can dramatically alter seabed habitats.

The MLMA recognizes the importance of protecting fisheries habitat from all types of activities, including fishing. It requires FMPs to include measures that minimize habitat damage caused by a fishery [7084]. Measures are limited to those that are “practicable.”

The Legislature exempted kelp harvesting from this requirement, since kelp is both a target of the fishery and a habitat. The other requirements of the MLMA will apply to any fishery management plan that might be developed for kelp.

v. bycatch and discards: To one degree or another, nearly all types of sport and commercial fishing gear capture marine life other than the fish that are being sought. Trawls fishing for shrimp and prawns capture finfish and other marine life. Traps set for lobster may capture finfish as well. Longlines set for tunas may catch sharks, swordfish, or sea turtles. Gillnets may catch marine mammals, birds, and sharks. Because of the behavior of rockfish, commercial and recreational fishermen using hook and line often cannot tell which species of rockfish they will catch. Indeed, the only predictably “clean” fishing gears are the harpoon, the spear gun, sea urchin rake, and the human hand. Since discarded marine life often does not survive, bycatch can be a serious problem.

While recreational and commercial fishermen may retain some bycatch, they discard fish that are of an undesirable species, size, or quality, or that

regulations require that they release [91.1]. In the past, such bycatch and discards were so accepted as a part of fishing that they were not even monitored. But, in the last thirty years, the decline of vulnerable species of marine mammals, sea birds, sea turtles, and some fish gradually changed this view. Government agencies, fishermen, and scientists have been collecting information on bycatch in some fisheries. Fishermen and government scientists have also developed several new types of gear and fishing practices that have dramatically reduced bycatch.

The MLMA aims to reduce the impact of bycatch and discards as a matter of standard management of fishing activities. The MLMA calls for making positive efforts to limit bycatch to “acceptable types and amounts” [7056(d)]. To meet this goal, the MLMA requires that an FMP for a fishery with bycatch include information on the amount and type of bycatch [7085]. An FMP is to determine the following:

- The legality of the bycatch,
- The threat posed to the bycatch species,
- The impact on fisheries that target the bycatch species, and
- The impact on ecosystems.

If the amount or type of bycatch is unacceptable, the MLMA calls for adopting management measures that minimize the bycatch and the mortality of discards that cannot be avoided.

Note that the MLMA defines and addresses bycatch differently from federal fisheries law, which defines bycatch as “fish which are harvested in a fishery, but which are not sold or kept for personal use, and includes economic discards and regulatory discards. Such term does not include fish released alive under a recreational catch and release fishery management program” [16 U.S.C. 1802]. The MLMA, on the other hand, includes marine life other than fish if it is not the target of the fishery, and whether or not the bycatch is discarded [90.5].

This difference in the definition of bycatch has several important consequences. Among other things, the MLMA does not defer to other law in addressing bycatch of marine life such as marine mammals, seabirds, and endangered and threatened species. Under the Magnuson-Stevens Act, on the other hand, bycatch of such animals is addressed under other law, such as the Marine Mammal Protection Act.

One national standard of the federal Magnuson Act calls for minimizing all bycatch. In contrast, the MLMA recognizes that the bycatch of marine animals in fisheries may have no appreciable effect. For instance, under-size lobster and crabs may be incidentally captured and released many times before they reach legal size. The MLMA only calls for the minimization of bycatch when the amount or type is “unacceptable”.

vi. overfishing and rebuilding: For the last century, the primary focus of fisheries management has been the development of fisheries. As government

and private investment poured into fisheries and technology developed, the power of fishing fleets grew so that catches were no longer limited by the number or size of fishing boats, but by the size of fish populations. Together with other factors, such as habitat loss and changes in ocean conditions, this increased fishing power led to overexploitation of some fish populations. Besides damage to ecosystems, overfishing has led to economic and social disruption, including lost jobs, higher consumer prices, lost investments, and the decline of fishing communities.

Two of the goals of the MLMA are to prevent overfishing and to rebuild depressed fish populations [7055(b)]. To understand these goals, it is necessary to understand the use of several terms: depressed fishery, overfishing, and overfished.

depressed fishery: The MLMA classifies a fishery as de-pressed if it meets either of two standards:

1. If the fishery has been declining over a period of time appropriate for the fishery [90.7]. For instance, a population of a species that fluctuates widely in response to oceanographic changes, such as squid, probably would not qualify as de-pressed if it declined over a few years. However, the population of another species that was more vulnerable to fishing such as some rockfish might be classified as depressed if its abundance were at very low levels for the same number of years.
2. If the abundance of a fish populations is below the level needed to produce what is called maximum sustainable yield.

The concept of depressed fisheries is not found in federal fisheries management law, which focuses only overfishing. The MLMA's depressed fishery classification is meant to foster conservation action for populations that are declining for unknown reasons or for a variety of reasons, such as habitat degradation, fishing, or changes in ocean conditions.

overfishing: The MLMA uses MSY also as one standard for determining whether there is overfishing in a fishery. According to the MLMA, overfishing is a rate or level of taking that the Department determines is not sustainable or that jeopardizes the capacity of a fishery to produce MSY in the future [98]. The MLMA does not require that the Department determine what the maximum sustainable yield of fishery is before concluding that overfishing is occurring.

overfished: If a fish population is depressed, and the principal means for rebuilding the population is a reduction of take, then the fishery is to be classified as "overfished" [97.5].

As a first step in preventing overfishing, the MLMA requires that an FMP include criteria for determining when a fishery is overfished [7086(a)]. This

measure, which is borrowed from a broader suite of precautionary measures found in several international treaties, is a major innovation in California fisheries. If properly set, these criteria will provide a way of identifying unsustainable trends in a fishery before drastic cut-backs in fishing have become inescapable.

If a fishery is already overfished or overfishing is occurring, an FMP is to include measures to prevent or end overfishing and rebuild the fishery [7086(b)]. In these cases, an FMP is to specify a time period in which overfishing will be prevented or ended and the fishery will be rebuilt [7086(c)]. The rebuilding period is to be no longer than ten years, unless the biology of the fish or environmental conditions call for a different period of time. For example, it may not be possible to rebuild a depressed population of long-lived rockfish in ten years or less. The rebuilding program's restrictions and benefits must be equitably allocated among different parts of a fishery.

vii. amending and modifying fmps: Fisheries change constantly. Fish populations may change with increasing or decreasing fishing effort or changes in ocean conditions. Commercial fishing effort may change with new technology or new markets. Broader economic trends can influence fish prices or the affordability of recreational fishing. Our understanding of fisheries also changes, as better monitoring or research provides new information. The ability to effectively implement fishery measures may change through better enforcement or new fishing gear. As a result, FMPs must be able to change.

Maximum Sustainable Yield (MSY)

Although the maximum sustainable yield, or MSY, of most California fisheries has not been estimated, MSY is such a common standard in fisheries management that it is worth describing.

The MLMA [96.5] defines MSY the same way as federal law: "the highest average yield over time that does not result in a continuing reduction in stock abundance." The MLMA recognizes that factors other than fishing may affect the abundance of a population, and requires that estimates of MSY take into account fluctuations in abundance and changes in ocean conditions.

An MSY model, which was developed in the 1950s, assumes that a typical population of fish will produce the largest amount of new fish for a fishery when the population has been reduced well below its unexploited size. While the model is quite elegant, it has been criticized on a number of grounds. For instance, the accuracy of MSY estimates depends upon such measures as rates of growth, mortality, and reproduction that are difficult to determine and that change over time. As a result, scientists generally produce a range of estimates for MSY, based on different assumptions. If the higher estimates are used for setting quotas, the risk of overfishing and short-term socio-economic and political benefits may be higher. If the lower estimates are used, the risk of overfishing and the loss of long-term socio-economic and political benefits may be lower.

Instead of MSY, federal law calls for achieving Optimum Yield or OY in a fishery, defined as MSY reduced for ecological, economic, and social factors. For example, in deciding OY for a fishery, the MSY amount might be reduced because of the importance of the target species as food for other marine species.

The MLMA adopts the same approach to OY. But note, once again, that MSY and OY estimates have been made for very few California fisheries. The MSY and OY concepts were included in the MLMA because they are traditional management tools and may become more useful in state fisheries management in the future as enough information is acquired to estimate MSY.

With this in mind, the MLMA requires that FMPs establish a procedure for regular review and amendment, if that is appropriate [7087(a)]. Because the review and amendment of an FMP is generally a lengthy process, the MLMA allows greater flexibility in responding to changes in a fishery by allowing an FMP to specify the kinds of regulations that may be changed without amending the FMP itself [7087(b)]. This process mirrors the federal government's process, where annual quotas or in-seasons adjustments in management measures may generally be made without resorting to the lengthy process of amending the FMP itself.

FMP Master Plan

The white seabass fishery and the nearshore finfish fishery hardly exhaust California's commercial and recreational fisheries in need of comprehensive management under the MLMA. Because the preparation and adoption of FMPs requires considerable time and effort and there are a large number of fisheries, it is critical to set some priorities. With this in mind, the Legislature directed the Department to submit to the Commission a master plan for the State's fisheries. The master plan must identify the resources needed to prepare and adopt FMPs and to list fisheries in order of priority for preparing fishery management plans [7073(a and b)]. In preparing the draft plan, the MLMA requires that the Department seek the help of fishermen, conservationists, marine scientists, and other people. The MLMA requires that the plan include the following elements [7073(b)]:

- A list of the fisheries managed by the state;
- A priority list for FMPs, with the highest priority going to those fisheries whose management is least consistent with the policies and requirements of the MLMA;
- A description of current research and monitoring of each of the fisheries and any additional efforts needed to obtain essential fishery information for each fishery;
- A process that ensures the opportunity for meaningful involvement of fishermen, conservationists, scientists, and others in the development of FMPs and research plans; and
- A process for periodic review and amendment of the master plan.

Once the Department has completed its consultations with various interests and has prepared a draft plan, it must submit the plan to the Commission no later than September 1, 2001 [7073(a)]. The Commission must hold at least one public hearing on the draft plan, then may adopt the plan, or reject it entirely or in part [7073(c)]. The Commission must return any rejected part of the master plan to the Department, together with a written statement of the reasons for rejection [7073(c); 7075(a)]. The Department and the Commission then follow the same procedures as for the rejection and resubmission of a fishery management plan [7075(a)]. The Department must revise the rejected parts of the master plan and resubmit them to the Commission within 90 days.

Once the master plan is adopted, the MLMA requires the preparation of interim research protocols for at least the three highest priority fisheries [7074(a)]. The interim research protocol for a fishery remains effective until an FMP, which includes a research protocol, is prepared by the Department and adopted by the Commission. Like other such fisheries management documents, the interim research protocol and the FMP must be based partly on the involvement of interested people and peer review [7074(b) through (d)].

Emerging Fisheries

It may be difficult to imagine, but even after many centuries of fishing, new fisheries emerge. As species rise or decline in abundance, as general economic conditions and social tastes change, as new uses and markets are developed, as some fisheries become more restricted, species once scorned become valuable. Likewise, fishermen who find themselves increasingly restricted in their favorite fisheries may look to new fisheries to sustain themselves.

A key to sustainable fisheries is to ensure that new fisheries do not make the mistake of many old fisheries — growing more quickly than the knowledge and understanding necessary for managing them for sustainability. The Legislature recognized the special place of emerging fisheries in the MLMA by calling for the Commission to “encourage, manage, and regulate” emerging fisheries using the policies of the MLMA [7090(a)].

What is an emerging fishery? The Legislature identified several conditions for classifying a fishery as emerging and required the Commission to specify others. The Legislature specified that an emerging fishery cannot be an “established fishery”—that is, a fishery that has any of the following features [7090(b)(2)]:

- A restricted access program,
- Limitations on catch and fishing season under a federal fishery management plan,
- A population estimate and annual catch quota,
- Regulations that are considered by the Commission every two years, or
- At least two management measures adopted by the Commission or the Legislature, including minimum or maximum size limits, seasons, time, gear, or area restrictions, and prohibitions on the sale or possession of fish.

The MLMA also requires the Commission to adopt a set of standards, which must be based on increasing landings or participants as well as the degree of regulation [7090(b)(1)]. The Director of the Department will then use these standards in determining whether or not a fishery is an emerging fishery.

The Department must monitor landings and other relevant factors and alert the Commission to new emerging fisheries [7090(c)]. Upon the Department's recommendation, the Commission may then either adopt regulations to limit the catch in the fishery, or direct the department to prepare an FMP and regulations for the fishery [7090(d)]. Whatever regulations the Commission issues remain effective for 12 months or until an FMP is prepared and adopted, if that takes less than 12 months.

In preparing an FMP for an emerging fishery, the Department must follow the MLMA's guidelines [7090(e)]. In addition, the FMP is to include an evaluation period of up to three years—a period that may be extended by the Commission. During this period, the FMP must use such measures as restricted landings or access, as well as time or area closures, to prevent excess fishing effort from entering the fishery [7090(e)(1)]. These measures must restrict effort in the fishery only to the level that the Department determines is necessary for evaluation of the fishery. The FMP must also contain a research plan outlining objectives, methods, and a timetable for evaluating the fishery [7090(e)(2)].

To support the research and management program, the Commission may impose a fee, which it may reduce in later years [7090(f)]. The Commission and Department must also consult with fishermen and others regarding alternative sources of funding.

As long as they do not conflict with the MLMA, other provisions in the Fish and Game Code may apply to emerging fisheries, particularly to the use of new types of fishing gear, or the use of existing gear in new areas or in new ways [8606(a)]. For example, earlier legislation requires that in order to use new fishing gear or existing gear in new areas or new ways, fishermen must obtain an "experimental fishing permit." The Commission may grant a permit for no more than one year at a time; a permit may be renewed up to three times, until the Legislature approves or disapproves of the use of the gear [8606(a)(2)]. In granting a permit, the Commission must set conditions to ensure proper use and protection of marine living resources and to minimize conflicts between user groups [8606(a)(1)]. The Commission is to revoke a permit if it is damaging marine living resources or is creating conflicts among user groups [8606(a)(d)].

Emergency Management

The MLMA amended provisions regarding emergency management of fisheries. Under these provisions, the Director of the Department may close or restrict fishing for particular species if the best available scientific or other information

indicates the fishing is unsustainable [7710(a)]. Before doing so, however, the Department must hold at least one public hearing in the area of the fishery.

Emergency regulations, which expire within 30 days unless the Commission or Director extend them, may be challenged by appealing to the Commission [7710.1]. The Director may suspend emergency restrictions within 30 days by issuing another emergency regulation under the Administrative Procedure Act [7710.5].

Annual Status of Fisheries Report

Good fisheries managers periodically take stock of the effectiveness of their programs. Under the MLMA, there are two principal measures of effectiveness: sustainable fisheries, and fair and reasonable dealings with constituents [7056(m)]. To help ensure that the effectiveness of California's management programs is regularly evaluated, the MLMA requires that the Department prepare an annual report on the status of sport and commercial marine fisheries managed by the state [7065].

While later reports are to cover one-fourth of the state's fisheries, the first report is to cover all fisheries. The first report, which is due to the Commission by September 1, 2001, may be combined with the master plan described above [7065(a) and (c)]. The MLMA directs the Department to involve experts outside the Department, such as Sea Grant staff, other marine scientists, fishermen, and others, in preparing the report.

In assessing each fishery, an annual report must present information on landings, fishing effort and location, as well as other matters that the Department and Commission may decide are relevant [7065(b)]. Each annual report is to note if a fishery does not meet the sustainability policies of the MLMA [7066(b)]. If a fishery is classified as depressed, the report is to describe the causes, steps being taken to rebuild the fishery, and any recommendations for further action. The report must also describe any habitat problems and recommend solutions. An annual report must evaluate the effectiveness of the management system in achieving the sustainability goals of the MLMA and the fairness and reasonableness of its dealings with affected people [7066(c)]. The report may recommend changes in the overall management system itself.

Finally, at least every five years, each restricted access program is to be reviewed for consistency with the Commission's Policy on Restricted Access in the annual report. (See Appendix D.)

Specific Fishery Management Plans

The preparation of FMPs is a complex process that requires considerable research and discussion before adoption. Recognizing the size of this task, the Legislature did not call for the adoption of FMPs for all California fisheries. Rather, the Legislature called initially for the adoption of two FMPs: one for the white seabass and one for nearshore finfish fisheries by January 1, 2002.

White Seabass Fishery

The dramatic decline of white seabass in southern California and increasing competition between recreational and commercial fishermen during the late 1980s and early 1990s triggered several responses. In 1990, for instance, California voters approved Proposition 132, which ended the use of gill nets within state waters South of Point Conception after January 1993. This greatly reduced the coastal set gillnet fishery for white seabass, reducing commercial landings by 70 percent.

In 1993, the Legislature directed the Department to prepare an FMP for both recreational and commercial white seabass fisheries by June 30, 1995. As it was, the Legislature had delegated management authority to the Commission only for recreational fisheries for white seabass. In preparing the white seabass FMP, the Department drew upon the knowledge and advice of the Director's Marine Resources Advisory Committee and a panel of scientists in a way that the Legislature cited as a model in the MLMA. The FMP, which the Commission approved on March 8, 1996, proposed that the Legislature give the Commission general authority to adopt annual regulations for the commercial and recreational fisheries for white seabass. The Commission then forwarded the FMP to the Legislature. For a variety of reasons, however, the Legislature did not enact legislation that would authorize implementation of the FMP.

The MLMA clarifies the Commission's authority to manage both the recreational and commercial fisheries for white seabass under the FMP it adopted in 1996 [7071]. However, the legislation directs the Commission to bring the existing white seabass FMP into compliance with the MLMA's standards for FMPs by January 1, 2002.

Nearshore Finfish Fishery

Until relatively recently, finfish within a mile of land attracted little commercial fishing effort. This area was the domain of recreational fishermen, who fished with hooks and lines from small boats and kayaks or with spears while free-diving or scuba-diving. However, in the 1980s, commercial fishermen in southern California began targeting some nearshore species, especially California sheephead, for a growing market for live fish in restaurants. More recently, commercial fishermen in northern California, who were hard pressed by reductions in other fisheries, began fishing for nearshore rockfish to supply the live-fish market. Conflicts between recreational and commercial fishermen are growing, while some populations of finfish have been showing signs of decline.

At the same time that the Legislature was considering the Marine Life Management Act, it was also considering legislation to bring the nearshore finfish fishery under management. Late in the 1998 legislative session, the two bills were combined and the Nearshore Fisheries Management Act became part of the MLMA.

Under the MLMA, the Commission must adopt an FMP for the nearshore finfish fishery no later than January 1, 2002 [7072(d)]. In articulating its reasons for adopting these provisions, the Legislature noted increasing fishing pressure, the biology of many species that makes them vulnerable to overfishing, and the lack of information on many species [8585.5]. The Legislature also stated that “whenever feasible and practicable,” the state aims to maintain commercial and recreational nearshore fisheries, and the employment that they support. For these reasons, the Legislature granted authority to the Commission to regulate commercial and recreational nearshore fisheries “to assure the sustainable populations of nearshore stocks.”

The MLMA is quite specific about its scope in the nearshore fishery: fisheries for finfish that are found primarily within one nautical mile of land [8586(c)]. The Act goes on to list specific groups of fish as nearshore fish stocks, including certain species of rockfish, California sheephead, greenlings, cabezon, and scorpionfish. The Commission may also add “other species of finfish found primarily in rocky reef or kelp habitat in nearshore waters.”

The MLMA gave the Commission broad authority to adopt regulations regarding nearshore fisheries prior to adoption of an FMP, based on the advice and recommendations of the Department [8587.1(a)]. Among possible management measures, the Legislature specifically cited requirements for landing information, logbooks, restricted access, limitations on time, area, type and amount of fishing gear, as well as catch quotas and size limits [8587.1(a)]. In developing and adopting such measures, the Department and Commission are to consult with fishermen and others interested in the fishery [8587.1(d)].

As a first step in bringing some controls to bear on the nearshore commercial fishery, the Legislature included size limits for nine species caught for sale. (The MLMA exempts trawl fisheries from these size limits.) The minimum size limits are as follows [8588]:

- Black and yellow rockfish..... 10”
- Gopher rockfish..... 10”
- Kelp rockfish..... 10”
- California scorpionfish or sculpin..... 10”
- Greenlings (Genus Hexagrammos)..... 12”
- China rockfish..... 12”
- Grass rockfish..... 12”
- California sheephead..... 12”
- Cabezon.....14”

The Commission may also change these size limits, set maximum size limits, or set size limits for additional species after at least one public hearing [8588(c); 8586(a)].

The MLMA requires commercial fishermen to obtain a nearshore fishery permit, which the Commission can suspend or revoke for violations [8587;

8589.5]. Funds generated by the purchase of the \$125 permit are to be deposited in the Fish and Game Preservation Fund and used for preparing the nearshore FMP as well as other activities, including research on nearshore fish and their habitat, enforcement, direction of volunteer groups, presentations at conferences and educational institutions, and relevant publications [8589.7(a)].

appendix a: Definitions

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

90.5 “Bycatch” means fish or other marine life that are taken in a fishery but which are not the target of the fishery. “Bycatch” includes discards.

90.7. “Depressed,” with regard to a marine fishery, means the condition of a fishery for which the best available scientific information, and other relevant information that the commission or department possesses or receives, indicates a declining population trend has occurred over a period of time appropriate to that fishery. With regard to fisheries for which management is based on maximum sustainable yield, or in which a natural mortality rate is available, “depressed” means the condition of a fishery that exhibits declining fish population abundance levels below those consistent with maximum sustainable yield.

91. “Discards” means fish that are taken in a fishery but are not retained because they are of an undesirable species, size, sex, or quality, or because they are required by law not to be retained.

7090(b) “Emerging fishery,” in regard to a marine fishery, means both of the following:

- (1) A fishery that the director has determined is an emerging fishery, based on criteria that are approved by the commission and are related to a trend of increased landings or participants in the fishery and the degree of existing regulation of the fishery.
- (2) A fishery that is not an established fishery. “Established fish -ery,” in regard to a marine fishery, means, prior to January 1, 1999, one or more of the following:

- (A) A restricted access fishery has been established in this code or in regulations adopted by the commission.
- (B) A fishery, for which a federal fishery management plan exists, and in which the catch is limited within a designated time period.
- (C) A fishery for which a population estimate and catch quota is established annually.
- (D) A fishery for which regulations for the fishery are considered at least biennially by the commission.
- (E) A fishery for which this code or regulations adopted by the commission prescribes at least two management measures developed for the purpose of sustaining the fishery. Management measures include minimum or maximum size limits, seasons, time, gear, area restriction, and prohibition on sale or possession of fish.

93. "Essential fishery information," with regard to a marine fishery, means information about fish life history and habitat requirements; the status and trends of fish populations, fishing effort, and catch levels; fishery effects on fish age structure and on other marine living resources and users, and any other information related to the biology of a fish species or to taking in the fishery that is necessary to permit fisheries to be managed according to the requirements of this code.

45. "Fish" means wild fish, mollusks, crustaceans, invertebrates, or amphibians, including any part, spawn, or ova thereof.

94. "Fishery" means either of the following:

- (a) One or more populations of marine fish or marine plants that may be treated as a unit for purposes of conservation and management and that are identified on the basis of geographical, scientific, technical, recreational, and economic characteristics.
- (b) Fishing for or harvesting of the populations described in (a).

8100. "Limited entry fishery" means a fishery in which the number of persons who may participate or the number of vessels that may be used in taking a specified species of fish is limited by statute or regulation. (Note that limited entry is a type of restricted access. See Appendix D.)

96. "Marine living resources" includes all wild mammals, birds, reptiles, fish, and plants that normally occur in or are associated with salt water, and the marine habitats upon which these animals and plants depend for their continued viability.

96.5. "Maximum sustainable yield" in a marine fishery means the highest average yield over time that does not result in a continuing reduction in stock abundance, taking into account fluctuations in abundance and environmental variability.

8586(a) "Nearshore fish stocks" means any of the following: rockfish (genus *Sebastes*) for which size limits are established under this article, California sheephead (*Semicossyphus pulcher*), greenlings of the genus *Hexagrammos*, cabezon (*Scorpaenichthys marmoratus*), scorpionfish (*Scorpaena guttata*), and may include other species of finfish found primarily in rocky reef or kelp habitat in nearshore waters.

8586(b) "Nearshore fisheries" means the commercial or recreational take or landing of any species of nearshore finfish stocks.

8586(c) "Nearshore waters" means the ocean waters of the state extending from the shore to one nautical mile from land, including one nautical mile around offshore rocks and islands.

97. "Optimum yield," with regard to a marine fishery, means the amount of fish taken in a fishery that does all of the following:

- (a) Provides the greatest overall benefit to the people of California, particularly with respect to food production and recreational opportunities, and takes into account the protection of marine ecosystems.
- (b) Is the maximum sustainable yield of the fishery, as reduced by relevant economic, social, or ecological factors.
- (c) In the case of an overfished fishery, provides for rebuilding to a level consistent with producing maximum sustainable yield in the fishery.

97.5. "Overfished," with regard to a marine fishery, means both of the following:

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

98. "Overfishing" means a rate or level of taking that the best available scientific information, and other relevant information that the commission or department possesses or receives, indicates is not sustainable or that jeopardizes the capacity of a marine fishery to produce the maximum sustainable yield on a continuing basis.

98.2. "Participants" in regard to a fishery means the sportfishing, commercial fishing, and fish receiving and processing sectors of the fishery.

98.5. "Population" or "stock" means a species, subspecies, geographical grouping, or other category of fish capable of management as a unit.

99. "Restricted access," with regard to a marine fishery, means a fishery in which the number of persons who may participate, or the number of vessels that may be used in taking a specified species of fish, or the catch allocated to

each fishery participant, is limited by statute or regulation. (Note that there are several types of restricted access, including limited entry and individual quotas. See Appendix D.)

99.5. “Sustainable,” “sustainable use,” and “sustainability,” with regard to a marine fishery, mean both of the following:

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

appendix b: The Marine Life Management Act

The text of the MLMA and other provisions of the Fish and Game Code are available from several sources. A hardcopy version of the Code is available for purchase from two publishers:

Lexis Law Publishing
P.O. Box 7587
Charlottesville, VA 22906-7587
Tel: 800-562-1197
www.lexislawpublishing.com

LawTech Publishing Co. Ltd.
1060 Calle Cordillera, Suite 105
San Clemente, CA 92673
Tel: 949-498-4815
Fax: 949-498-4858
Email: sales@lawtech-pub.com
www.lawtech-pub.com

The entire California Code of Regulations can be accessed on the web at www.leginfo.ca.gov/calaw.html.

FISH AND GAME CODE
Division 0.5 General Provisions and Definitions
Chapter 2: Marine Life Definitions

90. Definitions

The definitions in this chapter govern the construction of Chapter 7 (commencing with Section 1700) of Division 2 and Division 6 (commencing with Section 5500) and all regulations adopted pursuant to those provisions.

90.1. Adaptive Management

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

90.5 Bycatch

“Bycatch” means fish or other marine life that are taken in a fishery but which are not the target of the fishery. “Bycatch” includes discards.

90.7. Depressed

“Depressed,” with regard to a marine fishery, means the condition of a fishery for which the best available scientific information, and other relevant information that the commission or department possesses or receives, indicates a declining population trend has occurred over a period of time appropriate to that fishery. With regard to fisheries for which management is based on maximum sustainable yield, or in which a natural mortality rate is available, “depressed” means the condition of a fishery that exhibits declining fish population abundance levels below those consistent with maximum sustainable yield.

91. Discards

“Discards” means fish that are taken in a fishery but are not retained because they are of an undesirable species, size, sex, or quality, or because they are required by law not to be retained.

93. Essential Fishery Information

“Essential fishery information,” with regard to a marine fishery, means information about fish life history and habitat requirements; the status and trends of fish populations, fishing effort, and catch levels; fishery effects on fish age structure and on other marine living resources and users, and any other information related to the biology of a fish species or to taking in the fishery that is necessary to permit fisheries to be managed according to the requirements of this code.

94. Fishery

“Fishery” means either of the following:

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

that are identified on the basis of geographical, scientific, technical, recreational, and economic characteristics.

- (b) Fishing for or harvesting of the populations described in (a).

96. Marine Living Resources

“Marine living resources” includes all wild mammals, birds, reptiles, fish, and plants that normally occur in or are associated with salt water, and the marine habitats upon which these animals and plants depend for their continued viability.

96.5. Maximum Sustainable Yield

“Maximum sustainable yield” in a marine fishery means the highest average yield over time that does not result in a continuing reduction in stock abundance, taking into account fluctuations in abundance and environmental variability.

97. Optimum Yield

“Optimum yield,” with regard to a marine fishery, means the amount of fish taken in a fishery that does all of the following:

- (a) Provides the greatest overall benefit to the people of California, particularly with respect to food production and recreational opportunities, and takes into account the protection of marine ecosystems.
- (b) Is the maximum sustainable yield of the fishery, as reduced by relevant economic, social, or ecological factors.
- (c) In the case of an overfished fishery, provides for rebuilding to a level consistent with producing maximum sustainable yield in the fishery.

97.5. Overfished

“Overfished,” with regard to a marine fishery, means both of the following:

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

98. Overfishing

“Overfishing” means a rate or level of taking that the best available scientific information, and other relevant information that the commission or department possesses or receives, indicates is not sustainable or that jeopardizes the capacity of a marine fishery to produce the maximum sustainable yield on a continuing basis.

98.2. Participants

“Participants” in regard to a fishery means the sportfishing, commercial fishing, and fish receiving and processing sectors of the fishery.

98.5. Population or Stock

“Population” or “stock” means a species, subspecies, geographical grouping, or other category of fish capable of management as a unit.

99. Restricted Access

“Restricted access,” with regard to a marine fishery, means a fishery in which the number of persons who may participate, or the number of vessels that may be used in taking a specified species of fish, or the catch allocated to each fishery participant, is limited by statute or regulation.

99.5. Sustainable, Sustainable Use, Sustainability

“Sustainable,” “sustainable use,” and “sustainability,” with regard to a marine fishery, mean both of the following:

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

Division 6. Fish

Part 1.7. Conservation and Management of Marine Living Resources

7050. Finding and Declaration

- (a) The Legislature finds and declares that the Pacific Ocean and its rich marine living resources are of great environmental, economic, aesthetic, recreational, educational, scientific, nutritional, social, and historic importance to the people of California.
- (b) It is the policy of the state to ensure the conservation, sustainable use, and, where feasible, restoration of California’s marine living resources for the benefit of all the citizens of the state. The objective of this policy shall be to accomplish all of the following:
 - (1) Conserve the health and diversity of marine ecosystems and marine living resources.
 - (2) Allow and encourage only those activities and uses of marine living resources that are sustainable.
 - (3) Recognize the importance of the aesthetic, educational, scientific, and recreational uses that do not involve the taking of California’s marine living resources.
 - (4) Recognize the importance to the economy and the culture of California of sustainable sport and commercial fisheries and the

development of commercial aquaculture consistent with the marine living resource conservation policies of this part.

- (5) Support and promote scientific research on marine ecosystems and their components to develop better information on which to base marine living resource management decisions.
- (6) Manage marine living resources on the basis of the best available scientific information and other relevant information that the commission or department possesses or receives.
- (7) Involve all interested parties, including, but not limited to, individuals from the sport and commercial fishing industries, aquaculture industries, coastal and ocean tourism and recreation industries, marine conservation organizations, local governments, marine scientists, and the public in marine living resource management decisions.
- (8) Promote the dissemination of accurate information concerning the condition of, or management of, marine resources and fisheries by seeking out the best available information and making it available to the public through the marine resources management process.
- (9) Coordinate and cooperate with adjacent states, as well as with Mexico and Canada, and encourage regional approaches to management of activities and uses that affect marine living resources. Particular attention shall be paid to coordinated approaches to the management of shared fisheries.

1. Regulations Apply Only to Ocean Waters and Bays;

Limitation on Authority of Department

- (a) A regulation adopted pursuant to this part shall apply only to ocean waters and bays. Notwithstanding any other provision of this part, nothing contained in this part grants the department or any other agency of the state any regulatory authority not in existence on January 1, 1999, in any river upstream of the mouth of such river, in the Sacramento-San Joaquin Delta or in any other estuary.
- (b) The policies in this part shall apply only to fishery management plans and regulations adopted by the commission on or after January 1, 1999. No power is delegated to the commission or the department by this part to regulate fisheries other than the nearshore fishery, the white sea bass fishery, emerging fisheries, and fisheries for which the commission or department had regulatory authority prior to January 1, 1999.

Chapter 2: Marine Fisheries Generally

7055. Legislative Finding and Declaration

The Legislature finds and declares that it is the policy of the state that:

- (a) California's marine sport and commercial fisheries, and the resources upon which they depend, are important to the people of the state and, to the extent practicable, shall be managed in accordance with the policies and other requirements of this part in order to assure the long-term economic, recreational, ecological, cultural, and social benefits of those fisheries and the marine habitats on which they depend.
- (b) Programs for the conservation and management of the marine fishery resources of California shall be established and administered to prevent overfishing, to rebuild depressed stocks, to ensure conservation, to facilitate long-term protection and, where feasible, restoration of marine fishery habitats, and to achieve the sustainable use of the state's fishery resources.
- (c) Where a species is the object of sportfishing, a sufficient resource shall be maintained to support a reasonable sport use, taking into consideration the necessity of regulating individual sport fishery bag limits to the quantity that is sufficient to provide a satisfying sport.
- (d) The growth of commercial fisheries, including distant-water fisheries, shall be encouraged.

7056. Management of Commercial Fisheries; Objectives

In order to achieve the primary fishery management goal of sustainability, every sport and commercial marine fishery under the jurisdiction of the state shall be managed under a system whose objectives include all of the following:

- (a) The fishery is conducted sustainably so that long-term health of the resource is not sacrificed in favor of short-term benefits. In the case of a fishery managed on the basis of maximum sustainable yield, management shall have optimum yield as its objective.
- (b) The health of marine fishery habitat is maintained and, to the extent feasible, habitat is restored, and where appropriate, habitat is enhanced.
- (c) Depressed fisheries are rebuilt to the highest sustainable yields consistent with environmental and habitat conditions.
- (d) The fishery limits bycatch to acceptable types and amounts, as determined for each fishery.
- (e) The fishery management system allows fishery participants to propose methods to prevent or reduce excess effort in marine fisheries.
- (f) Management of a species that is the target of both sport and commercial fisheries or of a fishery that employs different gears is closely coordinated.
- (g) Fishery management decisions are adaptive and are based on the best available scientific information and other relevant information that the commission or department possesses or receives, and the commission and department have available to them essential fishery information on which to base their decisions.

- (h) The management decisionmaking process is open and seeks the advice and assistance of interested parties so as to consider relevant information, including local knowledge.
- (i) The fishery management system observes the long-term interests of people dependent on fishing for food, livelihood, or recreation.
- (j) The adverse impacts of fishery management on small-scale fisheries, coastal communities, and local economies are minimized.
- (k) Collaborative and cooperative approaches to management, involving fishery participants, marine scientists, and other interested parties are strongly encouraged, and appropriate mechanisms are in place to resolve disputes such as access, allocation, and gear conflicts.
- (l) The management system is proactive and responds quickly to changing environmental conditions and market or other so-cioeconomic factors and to the concerns of fishery participants.
- (m) The management system is periodically reviewed for effectiveness in achieving sustainability goals and for fairness and reasonableness in its interaction with people affected by management.

7057.

Notwithstanding Section 7550.5 of the Government Code, on or before February 1, 2000, the commission shall make recommendations to the Legislature in regard to changes in statutes governing restricted access commercial fisheries, the recommendations to be based on both of the following:

- (a) Any restricted access fishery policies adopted by the commission.
- (b) The experience of the commission and department in applying the restricted access policies adopted by the commission in developing or revising a restricted access program for a fishery managed by the state, with priority given to the pink shrimp fishery, for which a restricted access program statute is scheduled to be repealed on April 1, 2001.

7058. Regulations Adopted to Conform with Policies of Section 7055 & 7056

Any fishery management regulation adopted pursuant to this part shall, to the extent practicable, conform to the policies of Sections 7055 and 7056.

7059. Legislative Findings and Declaration

- (a) The Legislature finds and declares all of the following:
 - (1) Successful marine life and fishery management is a collaborative process that requires a high degree of ongoing communication and participation of all those involved in the management process, particularly the commission, the department, and those who represent

the people and resources that will be most affected by fishery management decisions, especially fishery participants and other interested parties.

- (2) In order to maximize the marine science expertise applied to the complex issues of marine life and fishery management, the commission and the department are encouraged to continue to, and to find creative new ways to, contract with or otherwise effectively involve Sea Grant staff, marine scientists, economists, collaborative factfinding process and dispute resolution specialists, and others with the necessary expertise at colleges, universities, private institutions, and other agencies.
 - (3) The benefits of the collaborative process required by this section apply to most marine life and fishery management activities including, but not limited to, the development and implementation of research plans, marine managed area plans, fishery management plans, and plan amendments, and the preparation of fishery status reports such as those required by Section 7065.
 - (4) Because California is a large state with a long coast, and because travel is time consuming and costly, the involvement of interested parties shall be facilitated, to the extent practicable, by conducting meetings and discussions in the areas of the coast and in ports where those most affected are concentrated.
- (b) In order to fulfill the intent of subdivision (a), the commission and the department shall do all of the following:
- (1) Periodically review marine life and fishery management operations with a view to improving communication, collaboration, and dispute resolution, seeking advice from interested parties as part of the review.
 - (2) Develop a process for the involvement of interested parties and for factfinding and dispute resolution processes appropriate to each element in the marine life and fishery management process. Models to consider include, but are not limited to, the take reduction teams authorized under the Marine Mammal Protection Act (16 U.S.C. Sec. 1361 et seq.) and the processes that led to improved management in the California herring, sea urchin, prawn, angel shark, and white seabass fisheries.
 - (3) Consider the appropriateness of various forms of fisheries comanagement, which involves close cooperation between the department and fishery participants, when developing and implementing fishery management plans.
 - (4) When involving fishery participants in the management process, give particular consideration to the gear used, involvement of sport or commercial sectors or both sectors, and the areas of the coast where the fishery is conducted in order to ensure adequate involvement.

Chapter 3. Fisheries Science

7060. Legislative Finding and Declaration

- (a) The Legislature finds and declares that for the purposes of sustainable fishery management and this part, essential fishery information is necessary for federally and state-managed marine fisheries important to the people of this state to provide sustainable economic and recreational benefits to the people of California. The Legislature further finds and declares that acquiring essential fishery information can best be accomplished through the ongoing cooperation and collaboration of participants in fisheries.
- (b) The department, to the extent feasible, shall conduct and support research to obtain essential fishery information for all marine fisheries managed by the state.
- (c) The department, to the maximum extent practicable and consistent with Section 7059, shall encourage the participation of fishermen in fisheries research within a framework that ensures the objective collection and analysis of data, the collaboration of fishermen in research design, and the cooperation of fishermen in carrying out research.
- (d) The department may apply for grants to conduct research and may enter into contracts or issue competitive grants to public or private research institutions to conduct research.

7062. Program for External Peer Review;

Department May Contract with Outside Entities

- (a) The department shall establish a program for external peer review of the scientific basis of marine living resources management documents. The department, in its discretion and unless otherwise required by this part, may submit to peer review, documents that include, but are not limited to, fishery management plans and plan amendments, marine resource and fishery research plans.
- (b) The department may enter into an agreement with one or more outside entities that are significantly involved with researching and understanding marine fisheries and are not advocacy organizations. These entities may include, but not be limited to, the Sea Grant program of any state, the University of California, the California State University, the Pacific States Marine Fisheries Commission, or any other entity approved by the commission to select and administer peer review panels, as needed. The peer review panels shall be composed of individuals with technical expertise specific to the document to be reviewed. The entity with which the department enters into an agreement for a peer review shall be responsible for the scientific integrity of the peer review process. Each peer reviewer may be compensated as needed to ensure competent peer

review. Peer reviewers shall not be employees or officers of the department or the commission and shall not have participated in the development of the document to be reviewed.

- (c) The external peer review entity, within the timeframe and budget agreed upon by the department and the external scientific peer review entity, shall provide the department with the written report of the peer review panel that contains an evaluation of the scientific basis of the document. If the report finds that the department has failed to demonstrate that a scientific portion of the document is based on sound scientific knowledge, methods, and practices, the report shall state that finding, and the reasons for the finding. The department may accept the finding, in whole or in part, and may revise the scientific portions of the document accordingly. If the department disagrees with any aspect of the finding of the external scientific peer review, it shall explain, and include as part of the record, its basis for arriving at such a determination in the analysis prepared for the adoption of the final document, including the reasons why it has determined that the scientific portions of the document are based on sound scientific knowledge, methods, or practice. The department shall submit the external scientific peer review report to the commission with any peer reviewed document that is to be adopted or approved by the commission.
- (d) The requirements of this section do not apply to any emergency regulation adopted pursuant to subdivision (b) of Section 11346.1 of the Government Code.
- (e) Nothing in this section shall be interpreted, in any way, to limit the authority of the commission or department to adopt a plan or regulation.

Chapter 4. Commission and Department

7065. Annual Report

- (a) The director shall report annually in writing to the commission on the status of sport and commercial marine fisheries managed by the state. The date of the report shall be chosen by the commission with the advice of the department. Each annual report shall cover at least one-fourth of the marine fisheries managed by the state so that every fishery will be reported on at least once every four years. The department shall, consistent with Section 7059, involve expertise from outside the department in compiling information for the report, which may include, but need not be limited to, Sea Grant staff, other marine scientists, fishery participants, and other interested parties.
- (b) For each fishery reported on in an annual report, the report shall include information on landings, fishing effort, areas where the fishery occurs, and other factors affecting the fishery as determined by the

department and the commission. Each restricted access program shall be reviewed at least every five years for consistency with the policies of the commission on restricted access fisheries.

- (c) Notwithstanding subdivision (a), the first annual report shall be presented to the commission on or before September 1, 2001, and shall cover all the marine fisheries managed by the state. To the extent that the requirements of this section and Section 7073 are duplicative, the first annual report may be combined with the plan required pursuant to Section 7073.

7066. Identification of Fishery Not Meeting Sustainability Policies

- (a) The Legislature finds and declares that a number of human-caused and natural factors can affect the health of marine fishery resources and result in marine fisheries that do not meet the policies and other requirements of this part.
- (b) To the extent feasible, the director's report to the commission pursuant to Section 7065 shall identify any marine fishery that does not meet the sustainability policies of this part. In the case of a fishery identified as being depressed, the report shall indicate the causes of the depressed condition of the fishery, describe steps being taken to rebuild the fishery, and, to the extent practicable, recommend additional steps to rebuild the fishery.
- (c) The director's report to the commission pursuant to Section 7065, consistent with subdivision (m) of Section 7056, shall evaluate the management system and may recommend modifications of that system to the commission.

Chapter 5. Fishery Management Plans — General Policies

7070. Legislative Finding and Declaration; Management of Fisheries

The Legislature finds and declares that the critical need to conserve, utilize, and manage the state's marine fish resources and to meet the policies and other requirements stated in this part require that the state's fisheries be managed by means of fishery management plans.

7071. Exceptions

- (a) Any white seabass fishery management plan adopted by the commission on or before January 1, 1999, shall remain in effect until amended pursuant to this part. Notwithstanding paragraph (2) of subdivision (b) of Section 7073, any white seabass fishery management

plan adopted by the commission and in existence on January 1, 1999, shall be amended to comply with this part on or before January 1, 2002.

- (b) In the case of any fishery for which the commission has management authority, including white seabass, regulations that the commission adopts to implement a fishery management plan or plan amendment for that fishery may make inoperative, in regard to that fishery, any fishery management statute that applies to that fishery, including, but not limited to, statutes that govern allowable catch, restricted access programs, and time, area, and methods of taking.
- (c) On and after January 1, 2000, the commission may adopt regulations as it determines necessary, based on the advice and recommendations of the department, and in a process consistent with Section 7059, to regulate all emerging fisheries, consistent with Section 7090, all fisheries for nearshore fish stocks, and all fisheries for white seabass. Regulations adopted by the commission may include, but need not be limited to, establishing time and area closures, requiring submittal of landing and permit information, regulating fishing gear, and establishing restricted access fisheries.

7072. Management Plans; Requirements

- (a) Fishery management plans shall form the primary basis for managing California's sport and commercial marine fisheries.
- (b) Fishery management plans shall be based on the best scientific information that is available, on other relevant information that the department possesses, or on such scientific information or other relevant information that can be obtained without substantially delaying the preparation of the plan.
- (c) To the extent that conservation and management measures in a fishery management plan either increase or restrict the overall harvest in a fishery, fishery management plans shall allocate those increases or restrictions fairly among recreational and commercial sectors participating in the fishery.
- (d) Consistent with Article 17 (commencing with Section 8585), the commission shall adopt a fishery management plan for the nearshore fishery on or before January 1, 2002, if funds are appropriated for that purpose in the annual Budget Act or pursuant to any other law.

7073. Master Plan Contents; Submission to Commission

- (a) On or before September 1, 2001, the department shall submit to the commission for its approval a master plan that specifies the process and the resources needed to prepare, adopt, and implement fishery management plans for sport and commercial marine fisheries managed by the state. Consistent with Section 7059, the master plan shall be prepared with the advice, assistance, and involvement of participants in the various

fisheries and their representatives, marine conservationists, marine scientists, and other interested persons.

- (b) The master plan shall include all of the following:
- (1) A list identifying the fisheries managed by the state, with individual fisheries assigned to fishery management plans as determined by the department according to conservation and management needs and consistent with subdivision (f) of Section 7056.
 - (2) A priority list for preparation of fishery management plans. Highest priority shall be given to fisheries that the department determines have the greatest need for changes in conservation and management measures in order to comply with the policies and requirements set forth in this part. Fisheries for which the department determines that current management complies with the policies and requirements of this part shall be given the lowest priority.
 - (3) A description of the research, monitoring, and data collection activities that the department conducts for marine fisheries and of any additional activities that might be needed for the department to acquire essential fishery information, with emphasis on the higher priority fisheries identified pursuant to paragraph (2).
 - (4) A process consistent with Section 7059 that ensures the opportunity for meaningful involvement in the development of fishery management plans and research plans by fishery participants and their representatives, marine scientists, and other interested parties.
 - (5) A process for periodic review and amendment of the master plan.
- (c) The commission shall adopt or reject the master plan or master plan amendment, in whole or in part, after a public hearing. If the commission rejects a part of the master plan or master plan amendment, the commission shall return that part to the department for revision and resubmission pursuant to the revision and resubmission procedures for fishery management plans as described in subdivision (a) of Section 7075.

7074. Interim Fishery Research Protocols

- (a) The department shall prepare interim fishery research protocols for at least the three highest priority fisheries identified pursuant to paragraph (2) of subdivision (b) of Section 7073. An interim fishery protocol shall be used by the department until a fishery management plan is implemented for that fishery.
- (b) Consistent with Section 7059, each protocol shall be prepared with the advice, assistance, and involvement of participants in the various fisheries and their representatives, marine conservationists, marine scientists, and other interested persons.

- (c) Interim protocols shall be submitted to peer review as described in Section 7062 unless the department, pursuant to subdivision (d), determines that peer review of the interim protocol is not justified. For the purpose of peer review, interim protocols may be combined in the following circumstances:
- (1) For related fisheries.
 - (2) For two or more interim protocols that the commission determines will require the same peer review expertise.
- (d) The commission, with the advice of the department, shall adopt criteria to be applied in determining whether an interim protocol may be exempted from peer review.

Chapter 6. Fishery Management Plan Preparation Approval, and Regulations

7075. Preparation of Fishery Management Plans and Amendments

- (a) The department shall prepare fishery management plans and plan amendments, including any proposed regulations necessary to implement plans or plan amendments, to be submitted to the commission for adoption or rejection. Prior to submitting a plan or plan amendment, including any proposed regulations necessary for implementation, to the commission, the department shall submit the plan to peer review pursuant to Section 7062, unless the department determines that peer review of the plan or plan amendment may be exempted pursuant to subdivision (c). If the department makes that determination, it shall submit its reasons for that determination to the commission with the plan. If the commission rejects a plan or plan amendment, including proposed regulations necessary for implementation, the commission shall return the plan or plan amendment to the department for revision and resubmission together with a written statement of reasons for the rejection. The department shall revise and resubmit the plan or plan amendment to the commission within 90 days of the rejection. The revised plan or plan amendment shall be subject to the review and adoption requirements of this chapter.
- (b) The department may contract with qualified individuals or organizations to assist in the preparation of fishery management plans or plan amendments.
- (c) The commission, with the advice of the department and consistent with Section 7059, shall adopt criteria to be applied in determining whether a plan or plan amendment may be exempted from peer review.
- (d) Fishery participants and their representatives, fishery scientists, or other interested parties may propose plan provisions or plan amendments to the department or commission. The commission shall review any proposal submitted to the commission and may recommend to the

department that the department develop a fishery management plan or plan amendment to incorporate the proposal.

**7076. Department to Seek Advice and Assistance;
Peer Review Written Comments**

- (a) To the extent practicable, and consistent with Section 7059, the department shall seek advice and assistance in developing a fishery management plan from participants in the affected fishery, marine scientists, and other interested parties. The department shall also seek the advice and assistance of other persons or entities that it deems appropriate, which may include, but is not limited to, Sea Grant, the National Marine Fisheries Service, the Pacific States Marine Fisheries Commission, the Pacific Fishery Management Council, and any advisory committee of the department.
- (b) In the case of a fishery management plan or a plan amendment that is submitted to peer review, the department shall provide the peer review panel with any written comments on the plan or plan amendment that the department has received from fishery participants and other interested parties.

7077. Public Review of Plans and Amendments

A fishery management plan or plan amendment, or proposed regulations necessary for implementation of a plan or plan amendment, developed by the department shall be available to the public for review at least 30 days prior to a hearing on the management plan or plan amendment by the commission. Persons requesting to be notified of the availability of the plan shall be notified in sufficient time to allow them to review and submit comments at or prior to a hearing. Proposed plans and plan amendments and hearing schedules and agendas shall be posted on the department's Internet website.

7078. Public Hearings; Adoption of Regulations; Requirements

- (a) The commission shall hold at least two public hearings on a fishery management plan or plan amendment prior to the commission's adoption or rejection of the plan.
- (b) The plan or plan amendment shall be heard not later than 60 days following receipt of the plan or plan amendment by the commission. The commission may adopt the plan or plan amendment at the second public hearing, at the commission's meeting following the second public hearing, or at any duly noticed subsequent meeting, subject to subdivision (c).
- (c) When scheduling the location of a hearing or meeting relating to a fishery management plan or plan amendment, the commission shall consider factors, including, among other factors, the area of the state, if any, where participants in the fishery are concentrated.

- (d) Notwithstanding Section 7550.5 of the Government Code, prior to the adoption of a fishery management plan or plan amendment that would make inoperative a statute, the commission shall provide a copy of the plan or plan amendment to the Legislature for review by the Joint Committee on Fisheries and Aquaculture or, if there is no such committee, to the appropriate policy committee in each house of the Legislature.
- (e) The commission shall adopt any regulations necessary to implement a fishery plan or plan amendment no more than 60 days following adoption of the plan or plan amendment. All implementing regulations adopted under this subdivision shall be adopted as a regulation pursuant to the rulemaking provisions of the Administrative Procedure Act, Chapter 3.5 (commencing with Section 11340) of Part 1 of Division 3 of Title 2 of the Government Code. The commission's adoption of regulations to implement a fishery management plan or plan amendment shall not trigger an additional review process under the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code).
- (f) Regulations adopted by the commission to implement a plan or plan amendment shall specify any statute or regulation of the commission that is to become inoperative as to the particular fishery. The list shall designate each statute or regulation by individual section number, rather than by reference to articles or chapters.

Chapter 7. Contents of Fishery Management Plans

7080. Contents of Summary

Consistent with subdivision (b) of Section 7072, each fishery management plan prepared by the department shall summarize readily available information about the fishery including, but not limited to, all of the following:

- (a) The species of fish and their location, number of vessels and participants involved, fishing effort, historical landings in the sport and commercial sectors, and a history of conservation and management measures affecting the fishery.
- (b) The natural history and population dynamics of the target species and the effects of changing oceanic conditions on the target species.
- (c) The habitat for the fishery and known threats to the habitat.
- (d) The ecosystem role of the target species and the relationship of the fishery to the ecosystem role of the target species.
- (e) Economic and social factors related to the fishery.

7081. Fishery Research Protocol; Requirements

Consistent with subdivision (b) of Section 7072, each fishery management plan or plan amendment prepared by the department shall include a fishery research protocol that does all of the following:

- (a) Describe past and ongoing monitoring of the fishery.
- (b) Identify essential fishery information for the fishery, including, but not limited to, age and growth, minimum size at maturity, spawning season, age structure of the population, and, if essential fishery information is lacking, identify the additional information needed and the resources and time necessary to acquire the information.
- (c) Indicate the steps the department shall take to monitor the fishery and to obtain essential fishery information, including the data collection and research methodologies, on an ongoing basis.

7082. Measures for Conservation and Management of Fishery; Requirements

Each fishery management plan or plan amendment prepared by the department shall contain the measures necessary and appropriate for the conservation and management of the fishery according to the policies and other requirements in this part. The measures may include, but are not limited to, all of the following:

- (a) Limitations on the fishery based on area, time, amount of catch, species, size, sex, type or amount of gear, or other factors.
- (b) Creation or modification of a restricted access fishery that contributes to a more orderly and sustainable fishery.
- (c) A procedure to establish and to periodically review and revise a catch quota in any fishery for which there is a catch quota.
- (d) Requirement for a personal, gear, or vessel permit and reasonable fees.

7083. Incorporation of Existing Conservation and Management Measures

- (a) Each fishery management plan prepared by the department shall incorporate the existing conservation and management measures provided in this code that are determined by the department to result in a sustainable fishery.
- (b) If additional conservation and management measures are included in the plan, the department shall, consistent with subdivision (b) of Section 7072, summarize anticipated effects of those measures on relevant fish populations and habitats, on fishery participants, and on coastal communities and businesses that rely on the fishery.

7084. Measures to Minimize Adverse Effects on Habitat

- (a) Consistent with subdivision (b) of Section 7072, each fishery management plan or plan amendment prepared by the department for a fishery that the department has determined has adverse effects on marine fishery habitat shall include measures that, to the extent practicable, minimize adverse effects on habitat caused by fishing.
- (b) Subdivision (a) does not apply to activities regulated by Chapter 6 (commencing with Section 6650) of Part 1.

7085. Bycatch Requirements

Consistent with subdivision (b) of Section 7072, each fishery management plan or plan amendment prepared by the department, in fisheries in which bycatch occurs, shall include all of the following:

- (a) Information on the amount and type of bycatch.
- (b) Analysis of the amount and type of bycatch based on the following criteria:
 - (1) Legality of the bycatch under any relevant law.
 - (2) Degree of threat to the sustainability of the bycatch species.
 - (3) Impacts on fisheries that target the bycatch species.
 - (4) Ecosystem impacts.
- (c) In the case of unacceptable amounts or types of bycatch, conservation and management measures that, in the following priority, do the following:
 - (1) Minimize bycatch.
 - (2) Minimize mortality of discards that cannot be avoided.

7086. Identification of Fisheries that are Overfished

- (a) Consistent with subdivision (b) of Section 7072, each fishery management plan or plan amendment prepared by the department shall specify criteria for identifying when the fishery is overfished.
- (b) In the case of a fishery management plan for a fishery that has been determined to be overfished or in which overfishing is occurring, the fishery management plan shall contain measures to prevent, end, or otherwise appropriately address overfishing and to rebuild the fishery.
- (c) Any fishery management plan, plan amendment, or regulation prepared pursuant to subdivision (b), shall do both of the following:
 - (1) Specify a time period for preventing or ending or otherwise appropriately addressing overfishing and rebuilding the fishery that shall be as short as possible, and shall not exceed 10 years except in cases where the biology of the population of fish or other environmental conditions dictate otherwise.
 - (2) Allocate both overfishing restrictions and recovery benefits fairly and equitably among sectors of the fishery.

7087. Plan Review and Amendment Procedures Required

- (a) Each fishery management plan prepared by the department shall include a procedure for review and amendment of the plan, as necessary.
- (b) Each fishery management plan or plan amendment prepared by the department shall specify the types of regulations that the department may adopt without a plan amendment.

7088. Plan to List Inoperative Statues or Regulations

Each fishery management plan and plan amendment shall include a list of any statutes and regulations that shall become inoperative, as to the particular fishery covered by the fishery management plan or plan amendment, upon the commission's adoption of implementing regulations for that fishery management plan or plan amendment.

Chapter 8. Emerging Fisheries

7090. Emerging Fisheries; Proactive Management

- (a) The Legislature finds and declares that a proactive approach to management of emerging fisheries will foster a healthy marine environment and will benefit both commercial and sport fisheries and other marine-dependent activities. Therefore, the commission, based upon the advice and recommendations of the department, shall encourage, manage, and regulate emerging fisheries consistent with the policies of this part.
- (b) "Emerging fishery," in regard to a marine fishery, means both of the following:
 - (1) A fishery that the director has determined is an emerging fishery, based on criteria that are approved by the commission and are related to a trend of increased landings or participants in the fishery and the degree of existing regulation of the fishery.
 - (2) A fishery that is not an established fishery. "Established fishery," in regard to a marine fishery, means, prior to January 1, 1999, one or more of the following:
 - (A) A restricted access fishery has been established in this code or in regulations adopted by the commission.
 - (B) A fishery, for which a federal fishery management plan exists, and in which the catch is limited within a designated time period.
 - (C) A fishery for which a population estimate and catch quota is established annually.
 - (D) A fishery for which regulations for the fishery are considered at least biennially by the commission.
 - (E) A fishery for which this code or regulations adopted by the commission prescribes at least two management measures developed for the purpose of sustaining the fishery. Management measures include minimum or maximum size limits, seasons, time, gear, area restriction, and prohibition on sale or possession of fish.
- (c) The department shall closely monitor landings and other factors it deems relevant in each emerging fishery and shall notify the commission of the existence of an emerging fishery.
- (d) The commission, upon the recommendation of the department, may do either, or both, of the following:

- (1) Adopt regulations that limit taking in the fishery by means that may include, but not be limited to, restricting landings, time, area, gear, or access. These regulations may remain in effect until a fishery management plan is adopted or for 12 months, whichever is shorter.
 - (2) Direct the department to prepare a fishery management plan for the fishery and regulations necessary to implement the plan.
- (e) A fishery management plan for an emerging fishery shall comply with the requirements for preparing and adopting fishery management plans contained in this part. In addition to those requirements, to allow for adequate evaluation of the fishery and the acquisition of essential fishery information, the fishery management plan shall provide an evaluation period, which shall not exceed three years unless extended by the commission. During the evaluation period, the plan shall do both of the following:
- (1) In order to prevent excess fishing effort during the evaluation period, limit taking in the fishery by means that may include, but need not be limited to, restricting landings, time, area, gear, or access to a level that the department determines is necessary for evaluation of the fishery.
 - (2) Contain a research plan that includes objectives for evaluating the fishery, a description of the methods and data collection techniques for evaluating the fishery, and a timetable for completing the evaluation.
- (f) The commission is authorized to impose a fee on an emerging fishery in order to pay the costs of implementing this chapter. The fees may include, but need not be limited to, ocean fishing stamps and permit fees. The fees may not be levied in excess of the necessary costs to implement and administer this chapter. The commission may reduce fees annually if it determines that sufficient revenues exist to cover costs incurred by the department in administering this chapter. The commission and the department, with the advice of fishery participants and other interested parties, shall consider alternative ways to fund the evaluation of emerging fisheries.
- (g) An emerging fishery is subject to this section unless the department incorporates the fishery into a fishery management plan developed under Sections 7070 to 7088, inclusive.
- (h) In the event that this section is found to conflict with Section 8606, 8614, or 8615, this section shall prevail.

Part 3. Commercial Fishing
Chapter 2. Particular Varieties of Fish
Article 17. Nearshore Fisheries Management Act

8585. Title of Article

This article shall be known and may be cited as the Nearshore Fisheries Management Act.

8585.5. Legislative Finding and Declaration

The Legislature finds and declares that important commercial and recreational fisheries exist on numerous stocks of rockfish (genus *Sebastes*), California sheephead (genus *Semicossyphus*), kelp greenling (genus *Hexagrammos*), cabezon (genus *Scorpaenichthys*), and scorpionfish (genus *Scorpaena*), in the nearshore state waters extending from the shore to one nautical mile offshore the California coast, that there is increasing pressure being placed on these fish from recreational and commercial fisheries, that many of these fish species found in the nearshore waters are slow growing and long lived, and that, if depleted, many of these species may take decades to rebuild. The Legislature further finds and declares that, although extensive research has been conducted on some of these species by state and federal governments, there are many gaps in the information on these species and their habitats and that there is no program currently adequate for the systematic research, conservation, and management of nearshore fish stocks and the sustainable activity of recreational and commercial nearshore fisheries. The Legislature further finds and declares that recreational fishing in California generates funds pursuant to the Federal Aid in Sport Fish Restoration Act (16 U.S.C. Secs. 777 to 777l, inclusive), with revenues used for, among other things, research, conservation, and management of nearshore fish. The Legislature further finds and declares that a program for research and conservation of nearshore fish species and their habitats is needed, and that a management program for the nearshore fisheries is necessary. The Legislature further finds and declares that the commission should be granted additional authority to regulate the commercial and recreational fisheries to assure the sustainable populations of nearshore fish stocks. Lastly, the Legislature finds and declares that, whenever feasible and practicable, it is the policy of the state to assure sustainable commercial and recreational nearshore fisheries, to protect recreational opportunities, and to assure long-term employment in commercial and recreational fisheries.

8586. Definitions

The following definitions govern the construction of this article:

- (a) “Nearshore fish stocks” means any of the following: rockfish (genus *Sebastes*) for which size limits are established under this article, California sheephead (*Semicossyphus pulcher*), greenlings of the genus *Hexagrammos*, cabezon (*Scorpaenichthys marmoratus*), scorpionfish (*Scorpaena guttata*), and may include other species of finfish found primarily in rocky reef or kelp habitat in nearshore waters.
- (b) “Nearshore fisheries” means the commercial or recreational take or landing of any species of nearshore finfish stocks.

- (c) “Nearshore waters” means the ocean waters of the state extending from the shore to one nautical mile from land, including one nautical mile around offshore rocks and islands.

8586.1. Funding

Funding to pay the costs of this article shall be made available from the revenues deposited in the Fish and Game Preservation Fund pursuant to Sections 8587, 8589.5, and 8589.7, and other funds appropriated for these purposes.

8587. Valid Nearshore Fishing Permit Required

Any person taking, possessing aboard a boat, or landing any species of nearshore fish stock for commercial purposes shall possess a valid nearshore fishery permit issued to that person that has not been suspended or revoked, except that when using a boat to take nearshore fish stocks at least one person aboard the boat shall have a valid nearshore fishery permit. Nearshore fishing permits are revocable. The fee for a nearshore fishing permit is one hundred and twenty five dollars (\$125).

8587.1. Commission May Adopt Regulations

- (a) The commission may adopt regulations as it determines necessary, based on the advice and recommendations of the department, to regulate nearshore fish stocks and fisheries. Regulations adopted by the commission pursuant to this section may include, but are not limited to, requiring submittal of landing and permit information, including logbooks; establishing a restricted access program; and establishing limitations on the fishery based on time, area, type, and amount of gear, and amount of catch, species, and size of fish.
- (b) Regulations adopted by the commission pursuant to this section may make inoperative any fishery management statute relevant to the nearshore fishery. Any regulation adopted by the commission pursuant to this subdivision shall specify the particular statute to be made inoperative.
- (c) The circumstances, restrictions, and requirements of Section 219 do not apply to regulations adopted pursuant to this section.
- (d) Any regulations adopted pursuant to this section shall be adopted following consultation with fishery participants and other interested persons consistent with Section 7059.

8588. Minimum Size Limits

- (a) Notwithstanding any other provision of this code or any regulation adopted by the commission, no fish listed under this section taken pursuant to a commercial fishing license, shall be possessed, sold, or purchased unless it exceeds the specified minimum total length in the round or dressed with head on, as established under subdivision (b),

except that nearshore finfish taken in trawls and landed dead are exempt from these size limits.

- (b) The minimum size limits are as follows:
- (1) Black and yellow rockfish
(*Sebastes chrysomelas*) 10 in. or 254 mm
 - (2) Gopher rockfish
(*Sebastes carnatus*) 10 in. or 254 mm
 - (3) Kelp rockfish
(*Sebastes atrovirens*) 10 in. or 254 mm
 - (4) California scorpionfish or sculpin
(*Scorpaena guttata*) 10 in. or 254 mm
 - (5) Greenlings of the Genus *Hexagrammos*
(*Hexagrammos* spp.) 12 in. or 305 mm
 - (6) China rockfish
(*Sebastes nebulosus*) 12 in. or 305 mm
 - (7) Grass rockfish
(*Sebastes rastrelliger*) 12 in. or 305 mm
 - (8) California sheephead (*Semicossyphus pulcher*) 12 in. or 305 mm
 - (9) Cabezon
(*Scorpaenichthys marmoratus*) 14 in. or 356 mm
- (c) The commission may adopt regulations to modify the minimum size limits or to specify maximum size limits based on the best available scientific information.
- (d) Regulations adopted by the commission pursuant to subdivision (c) shall only be adopted following public notice and not less than one public hearing.
- (e) Any nearshore fish as defined in this article or in regulations adopted by the commission pursuant to this section that are taken in a nearshore fishery shall be measured immediately upon being brought aboard the vessel and released immediately if not in compliance with the size limits specified.
- (f) This section shall remain in effect until the adoption of regulations implementing a fishery management plan for nearshore fish stocks by the commission, and as of that date, is repealed.

8589. Funding

Funding to prepare the plan pursuant to subdivision (d) of Section 7072 and any planning and scoping meetings shall be derived from moneys deposited in the Fish and Game Preservation Fund pursuant to Section 8587 and other funds appropriated for these purposes.

8589.5. Suspension or Revocation of Permits

The commission shall temporarily suspend and may permanently revoke the nearshore fishing permit of any person convicted of a violation of this article. In addition to, or in lieu of, a license or permit suspension or revocation, the commission may adopt and apply a schedule of fines for convictions of violations of this article.

8589.7. Fees; Adoption and Use

- (a) Fees received by the department pursuant to Section 8587 shall be deposited in the Fish and Game Preservation Fund to be used by the department to prepare, develop, and implement the nearshore fisheries management plan and for the following purposes:
 - (1) For research and management of nearshore fish stocks and nearshore habitat. For the purposes of this section, “research” includes, but is not limited to, investigation, experimentation, monitoring, and analysis and “management” means establishing and maintaining a sustainable utilization.
 - (2) For supplementary funding of allocations for the enforcement of statutes and regulations applicable to nearshore fish stocks, including, but not limited to, the acquisition of special equipment and the production and dissemination of printed materials, such as pamphlets, booklets, and posters aimed at compliance with nearshore fishing regulations.
 - (3) For the direction of volunteer groups assisting with nearshore fish stocks and nearshore habitat management, for presentations of related matters at scientific conferences and educational institutions, and for publication of related material.
- (b) The department shall maintain internal accounts that ensure that the fees received pursuant to Section 8587 are disbursed for the purposes stated in subdivision (a).
- (c) The commission shall require an annual accounting from the department on the deposits into, and expenditures from, the Fish and Game Preservation Fund, as related to the revenues generated pursuant to Section 8587. Notwithstanding Section 7550.5 of the Government Code, a copy of the accounting shall be provided to the Legislature for review by the Joint Committee on Fisheries and Aquaculture, and if that committee is not in existence at the time, by the appropriate policy committee in each house of the Legislature.
- (d) Unencumbered fees collected pursuant to Section 8587 during any previous calendar year shall remain in the fund and expended for the purposes of subdivision (a). All interest and other earnings on the fees received pursuant to Section 8587 shall be deposited in the fund and shall be used for the purposes of subdivision (a).

appendix c: The Regulatory Process

Often, implementation of laws such as the Marine Life Management Act requires the California Fish and Game Commission to adopt regulations prepared by the California Department of Fish and Game. The State's Administrative Procedure Act (APA), the California Environmental Quality Act (CEQA), and other regulatory laws describe the process that the Commission and the Department must use in adopting regulations. Understanding this process will help you understand how you can best get involved in these important decisions.

Any number of events may trigger the beginning of the regulatory process. For instance, a law may require the Commission to adopt regulations before the Department may make a decision on certain matters. Regulations may expire, requiring new regulations. Citizens may petition the Commission or the Department to issue regulations based upon a law passed by the Legislature.

Frequently, the Department will present a set of options for regulations to the Commission. The Commission may take testimony and hold meetings regarding the options. Once these meetings are completed, the Commission may decide to formally consider adopting regulations.

Initial Regulatory Documents

Whatever the immediate reason for beginning the regulatory process, the first step is the preparation of several documents by the Department and the Commission. These are the following:

- Proposed regulations,
- An Initial Statement of Reasons (or Prepublication Notice),
- A public notice, and
- A rulemaking file.

public notice: After the Commission has asked the Department to begin the regulatory process, the Department prepares a notice that the Commission then publishes in the California Regulatory Notice Register. The notice includes the following:

- an Informative Digest summarizing existing law and the effect of the proposed action,
- a deadline for public comments,
- the time and place of any public hearings, and
- contact information for obtaining additional information.

The Notice is sent to people on the Commission's and Department's active mailing lists. The Notice is also published in the California Regulatory Notice Register, which is available through subscription from the Office of Administrative Law in Sacramento. The table of contents of each issue is available at the web page of the Office of Administrative Law (www.oal.ca.gov).

proposed regulations: Proposed regulations are just that—the proposed language that will appear in Title 14 of the California Code of Regulations. If the Commission will be considering several options, as for fishing seasons or fishing gear, there will be a set of proposed regulations for each option. Each set of proposed regulations will also include the section in the Fish and Game Code that provides legal authority for adopting the regulations and a listing of other relevant sections of the Code.

initial statement of reasons: A Statement of Reasons describes the reasons for proposing regulations. This statement describes the problem or legislative requirement the proposed regulations are meant to address. It also includes the facts, studies, and other materials that the Department relied upon in preparing the regulations. The statement must say whether the regulations may result in significant costs for individuals, businesses, and state or local governments or agencies. Finally, the Statement of Reasons lists alternatives the Department considered to lessen impacts on small businesses. The Initial Statement of Reasons accompanies the proposed regulations and may differ from the Final Statement of Reasons, which is issued with the final regulations.

rulemaking file: Beginning with the draft proposed regulations, the Commission and Department must assemble a complete record of the rulemaking and make it available for public review. This rulemaking file includes published notices, proposed regulations, the statement of reasons, supporting evidence, and cost estimates. This file must be made available upon request.

These documents may be obtained from the Commission or other entity mentioned in the Public Notice.

Timing of the Regulatory Process

The basic regulatory process, which takes about 140 days, may be preceded by months of meetings and other discussions, and begins with the Public Notice mentioned above. The Commission may not adopt proposed regulations until 45 days after the Public Notice. During this comment period, citizens may submit written statements to the Department or the Commission regarding the regulatory proposal. The Commission generally must hold one public hearing before adopting regulations.

If public comments or other information leads the Commission to make changes in the proposed regulations, those who submitted comments or requested notification have another 15 days within which to comment on the

revised regulations. If the Commission makes substantive changes to the proposed regulations, it must issue a new Public Notice and allow another 45 days for comment.

Once the comment period is closed, the Department and Commission must prepare the final rulemaking file for submission to the Office of Administrative Law. The final rulemaking file contains the following:

- data and factual information submitted by the public,
- written comments and minutes of public meetings,
- a summary of each comment specific to the proposed regulatory action and a description of how the proposed regulations were changed in response to the comment, or an explanation for rejecting the comment,
- the final text of the regulations,
- a Final Statement of Reasons, and
- an updated Informative Digest.

The Office of Administrative Law then has 30 days within which to review the file and regulatory action. If approved, the regulations are sent to the Secretary of State, are published, and become effective within 30 days. (Where the law requires otherwise or an agency demonstrates good cause, regulations may become effective earlier.)

If the Office of Administrative Law disapproves the regulations, the rulemaking is returned to the agency and a description of the reasons for the disapproval is printed in the Regulatory Notice Register.

The Commission may adopt an emergency regulation after one hearing, rather than two, if

- the adoption is “necessary for the immediate conservation, preservation, or protection of birds, mammals, reptiles, or fish...,” or
- if it is “necessary for the immediate preservation of the public peace, health and safety or general welfare....”

Emergency regulations are effective for 120 days unless additional regulatory action is taken to extend them for a second 120 day period, or to make them permanent.

appendix d:
Fish and Game Commission Policies
Regarding Restricted Access to Commercial Fisheries/

The policies in this document provide a source of information for the public and a guide for the Commission and Department in preparing and reviewing legislation, regulations, or policies that propose to restrict access to commercial fisheries. The development and adoption of these policies do not represent an initiative to apply restricted access approaches to all California fisheries. The objective is primarily to guide the Commission and Department in responding to requested for restricted access programs.

1. Restricted Access as a Management Tool

the global context. Virtually every modern fishery faces—or has faced—similar intractable management problems. Because these problems recur in so many dissimilar fisheries, it is clear that they are not caused by the biology of the species harvested, nor do they depend on the type of gear or size of vessel employed by harvesters.

The one factor common to all of these fisheries is that the fishery resources are available to anyone who wants to pursue them. Once a fisheries management authority specifies the total catch, the season length, and the allowable gear, every fisherman competes with every other fisherman to catch as much as possible in the shortest time possible. In some fisheries, bigger and faster boats, more electronics, more gear, longer hours each day and fewer days each season are the result as each fisherman rushes to catch more than the other — the “race for fish” so often described in the fishery management and economics literature. In other fisheries, the problem may just be that the number of participants has increased to a level that jeopardizes the economic viability of the fishery. What makes sense for the individual makes no sense in the aggregate because it results in too many vessels, too much gear, too much waste, and too little income for fishermen. Moreover, excess fishing capacity usually leads to overfished populations of fish, which eventually leads to confrontations between fishermen and fishery managers over the status of the resource and the need for more restrictive regulations. Debate then follows over the need for better data.

The race for fish, does not result from inadequate biological information. Population surveys, stock assessments and biological samples are important components of sound fishery management, and improving the science on which management decisions are based is always a desirable objective. But management plans based on better biology alone will not solve problems caused by the economics of the harvest system. Economic problems must be addressed directly.

The most effective solutions to these fishery management problems restrict fishing effort in some way so that the “race for fish” is ended. New entry to a fishery is most often restricted by issuing only a certain number of licenses to participate in the fishery. Existing effort in a fishery is usually restricted by

limiting the size of the vessel, limiting the size or amount of gear, or directly limiting the quantity of fish that can be landed. Theoretically, the “right” number of licenses fished by the “right” size of vessels using the “right” amount of gear can harvest fish more sustainably and efficiently than the unrestricted fleet.

The problems restricted access programs are meant to address can actually become worse if the programs are poorly designed. Because many restricted access programs have been seriously flawed, some fishermen and others lack confidence that they can work. For example, in setting up restricted access programs, fishery managers have sometimes issued licenses to many more participants than are possible for the fishery to be both sustainable and economically viable for its participants. Clearly, expanding the fleet can have no effect on slowing the race for fish. Just as important, effort restrictions, such as those on the size of vessels or amount of gear, have sometimes been insufficient to restrain fishing power. Finally, managers sometimes address only one dimension of the race for fish by restricting access without also restricting capacity expansion by existing fishermen.

Because these mistakes have been frequent, it is sometimes said that restricted access doesn’t work. What does not work is a management system that lacks the clear policies, the will, and the compassion to design and implement restricted access systems that reconcile the need of fishermen to make a living with the need to restrict total harvest. The set of policies in this document are intended to provide guidance on restricted access programs for the Commission, the Department, the fishing industry, and other interested members of the public.

the california context. Because California historically did not restrict the number or amount of fishing effort allowed to harvest fish, the State’s commercial fisheries generally are overcapitalized: they have the physical capacity to exert more fishing pressure than the resources are able to sustain. Loss and degradation of marine and anadromous habitats and other ecological changes have aggravated this condition of excess fishing capacity.

The build-up in harvest capacity began with the advent of ocean commercial fishing in the mid-1800’s and accelerated following World War II. Vessels became larger and faster, have greatly increased fishing power and hold capacity, and use a wide variety of electronic innovations to find and catch fish. At the same time, increasing knowledge of the behavior of target species have made fishermen increasingly skilled at their trade.

Since the early 1980s, various programs have been implemented, through statute or regulation, to limit the number of commercial vessels or fishermen allowed to use specific types of fishing gear or to harvest specific species or species groups of fishes. These programs have seldom resulted in adequate reduction in the overall fishing capacity for those species. They sometimes have

been effective in capping the number of fishery participants; however, an unintended consequence has been a shift in effort from restricted fisheries to open access fisheries that were already fully developed.

The lack of consistent policies for guiding the development of restricted access fisheries has resulted in a myriad of laws and regulations that are confusing to the industry, difficult for the Department to interpret and administer, and, in some cases, of questionable benefit to the fishery or the resource they were intended to protect (see Appendix 1 for a summary of existing restricted access provisions).

potential benefits. Properly designed, restricted access programs can enhance the State's ability to manage its commercial fishery resources. Restricted access programs should:

- Contribute to sustainable fisheries management by providing a means to match the level of effort in a fishery to the health of the fishery resource and by giving fishery participants a greater stake in maintaining sustainability;
- Provide a mechanism for funding fishery management, research, monitoring, and law enforcement activities;
- Provide long-term social and economic benefits to the State and fishery participants; and
- Broaden opportunities for the commercial fishing industry to share management responsibility with the Department.

need for other fishery management tools—Restricted access programs are an important tool for fishery managers, but they do not eliminate the need for other fishery management measures, such as gear restrictions, time and area closures, size limits, landing quotas, total allowable catches, and related measures. In all fisheries, a minority of vessels or divers catch most of the fish. Statistics show that a major fleet size reduction would be required to significantly reduce the fleet's fishing capacity (Table 1). A severe restriction in the number of fishery participants, while perhaps contributing to fishery sustainability, can have other consequences that are undesirable: processors may have difficulty acquiring fishery product, for example, and the control of harvest might shift to a few individuals. Laws or regulations that limit the amount of gear that vessels may use or that restrict the amount or size of fish that may be taken are usually important in ensuring that restricted access initiatives achieve the desired benefits.

POLICY—1.1: The Commission and the Department may use restricted access programs as one of a number of tools to conserve and manage fisheries as a public trust resource.

2. General Restricted Access Policy/Goals and Objectives of Restricted Access Programs

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

Fisheries are also a finite and renewable resource. If harvest and other human-caused factors affecting their health are not managed, fishery resources may be less than optimally productive or, in the worst case, may suffer serious declines. Therefore, as part of a program of controlling harvest, it is appropriate to control the amount of fishing effort applied in a fishery, including restrictions on the number of individuals or numbers of vessels participating. Restricting access to a fishery has become one of many standard fishery management tools that have been used by public agencies in carrying out their conservation and management responsibilities for publicly held, finite fishery resources.

In general, the goals of restricting access to commercial fisheries are to contribute to the effective conservation and management of the State's marine living resources, provide long-term social and economic benefits to the commercial fishing industry and the State, and retain the public ownership status of those resources. More specifically, the Commission's purposes for restricting access or entry to a fishery are described as being to: 1) promote sustainable fisheries; 2) provide for an orderly fishery; 3) promote conservation among fishery participants; and 4) maintain the long-term economic viability of fisheries. Restricted access programs may be instituted in order to carry out one or more of these purposes in a given fishery.

promote sustainable fisheries. Depending on the fishery, limiting the fishing capacity of the fishery by limiting the number of individual fishermen or vessels may be one means of reducing take in order to protect the fishery resource. In most instances, reducing the number of individuals or vessels alone will not in itself reduce take unless it is accompanied by complementary measures such as trip limits, quotas, seasons, or gear limitations. Together restrictions on access coupled with other measures can be an effective way of controlling effort to protect fishery resources and contribute to sustainability.

provide for an orderly fishery. Extreme overcapitalization can lead to unsafe conditions as part of the competition among fishery participants, as in the case of "derby" fisheries. Properly designed restricted access programs can promote safety in those circumstances. Where fishing grounds are limited due either to

geographical factors or fish congregating in small areas where harvest occurs, it may be necessary to limit the number of individuals or vessels involved in the fishery. The herring roe fishery is one example of where restricted access was established primarily for the purpose of maintaining an orderly fishery.

promote conservation among fishery participants. Limiting the number of individuals or vessels in a fishery can give those in the fishery a greater stake in the resource, a sense of ownership, and confidence that a long-term opportunity exists in the fishery that usually does not exist in open access fisheries. A well-designed restricted access program can give fishery participants greater incentive to be stewards of that resource and even to invest in rebuilding the fishery (the commercial salmon stamp program, for example). Limiting access can also increase compliance with fishery regulations since an individual with a restricted access permit is much less likely to risk losing the opportunity to participate in that fishery because of a fishery violation.

maintain the long-term economic viability of fisheries. To assure the greatest economic benefit to society from the harvest of a public fishery resource, it may be necessary to limit the number of individuals or vessels to assure economically viable fishing operations. When open access contributes to the impoverishment of fishery participants or illegal or unsavory behavior by participants competing for the limited resource, some form of restricted access based on economic viability may be necessary. Any restricted access program established, entirely or in part, for the purpose of economic viability must be crafted to avoid restricting access more than is necessary.

POLICY 2.1: The Commission may develop restricted access programs for fisheries that retain the public ownership status of the resource for one or more of the following purposes: 1) to promote sustainability; 2) to create an orderly fishery; 3) to promote conservation among fishery participants; 4) to maintain the long-term economic viability of fisheries.

3. Development and Review of Restricted Access Programs

participation of stakeholders in program development. Restricted access programs should be developed with substantial support and involvement from stakeholders. Indeed, many of California's current restricted access programs were drafted by, or with considerable input from, the affected fishermen (the salmon, herring, Dungeness crab, and sea urchin fisheries, for example). Programs in which fishery participants and others have a substantial role in the design benefit from their knowledge of both the resource and the business aspects of the fishery. Such programs are also more likely to enjoy the support of fishery participants during implementation. Furthermore, any restricted

access program must be developed consistent with the stakeholder participation requirements of Section 7059 of the Fish and Game Code.<

programs specific to the needs of the fishery. Standardization in the elements of restricted access programs is a laudable goal and could help reduce some of the complexity fishermen and the Department are faced with when dealing with different requirements for different fisheries. However, the overriding concern is that each restricted access program meets the needs of its particular fishery.

Each of the existing restricted access programs in California fisheries was designed to meet the needs of a particular fishery. As a result of periodic reviews of those programs, it may be possible to reduce some of the complexity that has resulted. However, a program should not be revised solely for the purpose of uniformity or consistency if there is a sound basis for the unique features of the program.

program review. Restricted access programs need periodic review for possible revision. Restricted access programs should be reviewed periodically by the Department and fishery participants in the particular fishery to determine whether the program still meets the objectives of the State and the needs of the fishery participants. For the statutorily created restricted access programs, this review should take place preceding the expiration (“sunset”) dates when the law is under consideration for extension. In addition, this restricted access policy should be reviewed at a regularly scheduled Commission meeting at least once every four years following its adoption.

POLICY—3.1: Restricted access programs shall be developed with the substantial involvement of participants in the affected fishery and others, consistent with the stakeholder participation requirements of Section 7059 of the Fish and Game Code, and shall balance the specific needs of the fishery with the desirability of increasing uniformity among restricted access programs in order to reduce administrative complexity.

3.2: Each restricted access program shall be reviewed at least every four years and, if appropriate, revised to ensure that it continues to meet the objectives of the State and the fishery participants. Review of each restricted access program shall occur at least as often as the particular fishery is reviewed in the annual fishery status report required by Section 7065 of the Fish and Game Code. The general restricted access policy should be reviewed at a regularly scheduled Commission meeting at least once every four years following its adoption.

4. Elements of Restricted Access Programs

categories of restricted access fisheries. Existing restricted access programs in California generally are based on target species or species groups of the fishery.

The Commission expects that most new restricted access programs will follow that pattern.

Another option that may be appropriate for some fisheries, or groups of fisheries, is basing the restricted access system on gear type. Sixteen species or species groups of fishes comprise 90 percent of the State's commercial fish landings, although only a relatively few basic gear types produce the entire catch. As a means to minimize the number of programs and provide greater flexibility for fishery participants, the Commission and Department could base each restricted access program, first, on the gear type and then, if necessary, on endorsements for the species or species groups that are the target of that gear type. Where possible, the entire range of species (i.e., multi-species, ecosystem approach) contacted by a particular gear type would be included in the same program. (Table 2 outlines this approach. Included, in bold letters, are additional restricted access fisheries that would be provided for, along with a list of existing permit holders who would receive permits under this approach.)

Additional flexibility would be provided in instances in which a fishery participant converted a restricted access permit from one gear type to another. Whether such conversions are allowed would be decided on a fishery-by-fishery basis depending on whether the conversion is consistent with the State's sustainable fisheries policies and the objectives of the two restricted access programs involved.

Each restricted access program should take into account possible impacts on open access fisheries and on other restricted access fisheries.

fishery capacity goals and means to achieve capacity goals. Because a primary purpose of restricted access programs is to match the level of effort in a fishery to the health of the fishery resource, each restricted access program that is not based on harvest rights (see section on harvest rights) shall identify a fishery capacity goal intended to promote resource sustainability and economic viability of the fishery. Fishery capacity goals can be expressed as some factor or combination of factors that fairly represents the fishing capacity of the fleet. These factors may include the number of permitted fishery participants, number of permitted boats, net tonnage of the permitted fleet, amount of gear used in the fishery, and cumulative hold capacity. Fishery capacity goals should be based on such biological and economic factors as what is known about the size and distribution of the target species, historic fleet size or harvest capacity, and distribution of harvest within the current fleet. Conflicts with other fisheries or ocean interest groups and economic conditions (current and future) within the fishery may also be factored in to such determinations. Depending on the fishery, the fishery capacity goal may be expressed as a single number or as a range.

The preferred approach to determining the capacity goal is to conduct a biological and economic analysis of the fishery. The analysis should consider

the probable level of resource sustainability and the impact of various fleet capacities on the fishery and local communities. When such an analysis is not feasible, the Commission, Department, and stakeholders should work together in reviewing available information to arrive at a reasonable capacity goal for the fishery.

Capacity goals should be included in each restricted access program review. A fishery capacity goal will not be useful in managing effort in a fishery unless the restricted access program includes mechanisms for achieving the goal. If the fishery is overcapitalized and above its fishery capacity goal, there must be a system to reduce capacity as a basic requirement of the restricted access program. If the fishery is below its capacity goal, there must be a method to increase participation. In fisheries that are above their fishery capacity goals, transfers of permits should be allowed only if they are consistent with the system for achieving the fishery capacity goal (see Permit Transfers section).

In restricted access fisheries in which the permit is vessel based, the system for achieving fishery capacity goals must include a means of comparing and controlling the fishing power of individual vessels. Without that ability, the system controls only one aspect of fishery capacity—the number of vessels—without providing a means to manage the fishing power of those vessels (see policies on Permit Transfers and Replacement Vessels). The system may be based on factors such as vessel length, displacement, horsepower, hold capacity, or allowable amount of gear.

There are several options available to reduce the number of permits to meet fishery capacity goals. A few examples include:

- Attrition — permit reduction when permit holders fail to renew their permits — has contributed to reducing effort in some fisheries. That process is slow, however, and only occurs when the outlook for the fishery is so poor that the permit has little value.
- “Two-for-one” or similar requirements in transfer of permits have been used in several fisheries to reduce capacity and is effective if there is an active market for permits.
- Annual “performance” standards can be required of each permit holder. For example, a minimum number of landings could be required to qualify for permit renewal. This approach may be appropriated in some fisheries, although it can artificially increase effort.
- Permit or vessel buybacks have been used in a few fisheries and being explored for others in the United States. California’s experience with this system is limited to nearshore set gill nets in Southern California. Buyback programs have been funded by both industry (through permit transfer fees, landing fees, special permit fees, etc.) and the public.

POLICY—4.1: Each new restricted access program shall be based either on one or more species or species groups targeted by the fishery or on a type of gear

(as in Table 2). In programs based on a type of gear, an endorsement may be required for one or more species or species groups targeted by the gear type. Each restricted access program should take into account possible impacts of the program on other fisheries.

4.2: Each restricted access program that is not based on harvest rights shall have a capacity goal. The Commission, Department, and stakeholders will use the best available biological and economic information in determining each capacity goal.

4.3: Each restricted access fishery system shall have an equitable, practicable, and enforceable system for reducing fishing capacity when the fishery is exceeding its participation goal and for increasing fishing capacity when the fishery is below its fishery capacity goal.

4.4: In fisheries that exceed their fishery capacity goals, permit transfers will be allowed only if they are consistent with the means for achieving the fishery capacity goal.

5. Permits

issuance of initial permits. The public will be given reasonable notice of intent to limit access to the fishery. A legislative bill may serve as an initial notice of intent, or the Commission may take an action that serves as a notice of intent.

The Commission may set a Control Date for determining qualification for a restricted access program. Some level of fishery participation may be required to qualify for an initial permit. Fishery qualification can be based upon fishery participation during a period of time preceding notification of intent. In determining criteria for qualifying for the program, the Commission may consider the balance of gear types currently or historically relying on the fishery or the specialty markets or niches that the fishery was intended to serve. Fish landing data maintained by the Department shall be the basis for documenting fishery participation. Affidavits of fishery participation, or medical statements of inability to meet qualification standards shall not be accepted unless a system for considering exceptions, consistent with Policy 5.1, is included in the design of the restricted access program. Vessels under construction or inoperable during the qualification period shall not be considered for a permit.

California has had a practice—shared with other states, the Federal government, and other nations—of giving preference for issuing permits into a restricted access fishery to fishermen or vessels with past participation in that fishery. The practice has meant, as well, that permits generally have been issued to licensed California commercial fishermen rather than to nonfishermen or persons not licensed in the State. The practice is a fair means to assure that those who rely on that fishery or who have invested in that fishery can remain

in the fishery. In determining priorities for the issuance of permits in a restricted access fishery, first priority for permits shall be given to licensed commercial fishermen/vessels with past participation in that fishery. Among fishermen or vessels with past participation in the affected fishery, preference for permits may be based on factors such as years of participation in the fishery or level of participation (landings). Second priority for permits may be based on such factors as crew experience, number of years in California fisheries, or participation in fisheries similar to that for which a program is being developed. (An example of a similar fishery being considered for eligibility for a permit was when displaced abalone divers were added to those eligible for any new sea urchin permits.) Drawings or lotteries for permits should only be used when two or more applicants have identical qualifications (for example, the same number of points for eligibility for a herring permit).

When initiating a restricted access program with vessel-based permits, designing a formula for deciding which vessels qualify that is equitable but does not increase the number of permits or the amount of effort already in the fishery is difficult but necessary; without such a formula, the program can easily exacerbate the fishery's problems. The Commission's policy on this issue has three elements. First, the policy for all restricted access fisheries begins with the premise that initiating a restricted access program must not increase the recent level of fishing effort. Second, the default approach in designing a new program will be to issue initial permits only to the current owners of qualifying vessels. Third, in order to meet the needs of a particular fishery, it may be desirable to modify the approach of giving permits only to current owners of qualifying vessels.

Such exceptions would be decided fishery by fishery, but in no case would the formula allow increasing the recent level of effort.

A permit issued for dive, gill net, and some trap fisheries shall be issued to qualifying fishermen. A permit issued for a boat-based fishery may be issued to, 1) an individual who owned a qualifying vessel during the period in which the vessel qualified, and 2) 20-year commercial fishermen (as provided in Section 8101 of the Fish & Game Code).

issuance of new permits. In the case of restricted access fisheries that are below their fishery capacity goals, new permits may be issued. The factors used to determine priority for issuance of new permits may be the same as for the issuance of initial permits.

permit renewal and duration. Permits are renewable annually upon application and payment of the permit fee if the permit holder meets the requirements of the restricted access program. Permits may be renewed annually for the life of the restricted access program. Limiting participation to a period less than the actual life of the limited access program has several drawbacks. First, it could eliminate incentive for conservation among permit holders if they know that

their participation in the fishery will be limited. Second, a limitation on permit life would tend to discourage investment and diminish the value of existing investment (vessels, for example) in the fishery. New investment in many fisheries is needed for safer, more fuel efficient vessels, for equipment to maintain quality of the catch, and for changing gear. That will be discouraged if the duration of the permits is limited.

substitutes. Each restricted access program with fishermen-based permits should determine whether substitutes for the permit holder will be allowed and, if so, in what circumstances and for what length of time. One option is that the permit holder must be present. Some programs have allowed temporary use of the permit by another in the case of death or disability of the permit holder.

POLICY—5.1: The Commission will give adequate public notice of intent to establish a restricted access program. The Commission may set a Control Date for determining qualification for a restricted access program. A new restricted access program shall not allow fishing effort to increase beyond recent levels. Some level of fishery participation may be required to qualify for an initial permit. Fishery qualification can be based upon fishery participation during a period of time preceding notification of intent, or on other factors relevant to the particular fishery. Affidavits of fishery participation, or medical statements of inability to meet qualification standards shall not be accepted. Vessels under construction or inoperable during the qualification period shall not be considered for a permit.

5.2: New permits in a restricted access fishery shall only be issued when the fishery is below its fishery capacity goal.

5.3: Restricted access fishery permits shall be of one year duration and are renewed upon annual application and payment of the permit fee and shall be valid, provided they are annually renewed and the permit holder meets the requirements of the restricted access program, for the life of the program.

5.4: Each fisherman-based program shall determine in what circumstances, if any, a substitute may fish the permit.

6. Permit Transfers.

Permits within a restricted access program may be transferable or not, depending on the fishery. California currently manages some restricted access fisheries in which the permits are not transferable. Although non-transferable permits may be appropriate for some fisheries, the Commission expects that the

trend will be toward transferability. First, permit transferability can and should be used as part of the mechanism for reducing capacity in a fishery that is above its capacity goal. Second, permit transferability allows for new entry into a restricted access fishery, particularly for younger fishermen or crew. Third, permit transferability protects part of an individual's investment in a fishery.

In California, as in nearly all states and federally managed fisheries, most limited access permits are transferable. Although a number of limited access fishery programs in California initially did not allow for permit transfers, these systems were found unworkable. Permit holders, even the aged, the sick, or those seeking to leave the fishery, held on to their permits, attempting in many instances to have the permit fished by another, non-permitted, individual. Non-transferability encouraged some fishery participants to work around the program rather than within it. Moreover, fishing vessels, particularly the larger ones or those built for a specific fishery, were rendered useless if there was no permit to go with them at the time of sale. For fishermen, as is the case with small business owners or farmers, their retirement funds are derived from the sale of their business, which in the case of a fisherman may be his/her vessel.

Fully transferable permits in restricted access programs have been criticized for the following reasons: 1) sales of permits on the open market can make the cost of entry into a fishery for young fishermen or crew extremely expensive and does not assure that the most deserving individuals obtain permits; 2) sales of permits on the open market can result in windfall profits for those individuals who were initially issued a permit by the State and whose investment in the permit has only been the payment to the State of the permit fee; and 3) sales of permits on the open market can result in permits going to more active participants or to larger vessels deploying more fishing effort thereby increasing the fishing effort or capacity of the fleet. To the extent that these criticisms are valid, they can, and currently are in California, being addressed through conditions placed on permit transfers.

In order to prevent an increase in fishing power, in California's salmon limited entry program, permits are transferable with the fishing vessel at the time of sale or to another vessel of equal or less fishing capacity, under specified conditions.

In the herring fishery, where the permit is to the individual rather than the vessel, permit transfers may only be made to a fishing partner or an individual holding a maximum number of points in that fishery, with points based on years of crew experience and years in California fisheries. This limitation on transfers is intended to give an advantage to those who have spent time in the fishery. Thus, those deserving of a permit are given a preference. By limiting the market for permit sales, the cost of entry is lower than it would be if the permits were available on a wide open market.

It is also possible to prevent increases in fishery capacity and reduce speculation in permits by setting fishery participation criteria in selected

qualifying years for a permit to be transferable, or by requiring that the permit be held for some minimum number of years before it can be sold.

It is possible, as well, for the State and other participants in the fishery to benefit from the sale of permits through transfer fees or two-for-one permit transfer requirements. In California, there are transfer fees in some restricted access fisheries where the fees exceed the cost of administering a change in the permit. A transfer fee addresses the concern that permit holders may be making windfall profits from the sale of permits and can allow the State to share in the economic benefits of good conservation and management measures. Other participants in the fishery can benefit if the permit transfer fees are re-invested in the fishery, such as through a permit buyback program. Both the State and participants in the fishery can benefit through two-for-one permit transfer requirements if they are used to help reach a fishery capacity goal.

POLICY 6.1: Restricted access permits may be transferable. In fisheries in which the permit is transferable, transfer may be subject to conditions that contribute to the objectives of the restricted access program. In new restricted access programs, permit transfers will not be allowed unless a fishery capacity goal and a system for achieving that goal is part of the restricted access program. In existing restricted access programs, the objective is to review and revise those programs to include fishery capacity goals and systems to achieve those goals. A restricted access program may include a fee on the transfer of permits, in excess of actual administrative costs for the permit change, to offset other costs involved in the conservation and management of that fishery.

7. Vessel Issues

vessel retirement. All vessel-based restricted access programs should provide for the voluntary retirement of commercial fishing vessels so that these vessels are no longer eligible to compete with permitted vessels in future years. Any vessels requested by the owner to be retired will be permanently identified on Department commercial fishing vessel registration documents. Permits from retired vessels may be allowed to transfer to replacement vessels within one year of retirement provided the replacement vessel is of equal or lower fishing capacity or to a larger vessel if the restricted access program provides for vessel upgrades (see section on vessel upgrades).

replacement vessels. Replacement vessels of the same or lower fishing capacity as the permitted vessel will be allowed only if the permitted vessel is lost, stolen, or no longer able to participate as a commercial fishing vessel, as shown on State or government documents, or other sources of information that the Department might consider. This requirement is necessary to preclude effort shift to open-access and other restricted access fisheries. Replacement vessel

determinations will be made by the Department. The ownership of the replacement vessel, as shown on government documents, shall be same as the permitted vessel.

vessel permit upgrades. Fishermen who hold vessel permits may want the option of acquiring a larger or more efficient vessel and transferring their existing permits or acquiring and adding new permits to the new vessel. The concern with allowing fishermen to upgrade their vessels is that by doing so the overall capacity of the fleet to catch fish increases, which should be allowed only to the extent that it is consistent with the fishery capacity goal. To offset this increase in fleet harvest capacity in fisheries that are above their fishery capacity goal, a permit consolidation process is needed whereby two or more permits can be combined to allow for the permitting of a single larger vessel. This is not a new concept in restricted access programs elsewhere. The Pacific Fishery Management Council, for example, uses a formula based on vessel length and capacity that allows for combining permits to allow for larger vessels in the groundfish fishery. In the California salmon fishery, vessel length is used by the Salmon Review Board in approving or denying vessel transfer requests for vessels in the 20- to 40-foot range.

support vessels. In some fisheries, the use of support vessels can substantially increase the available fishing power of the fleet. In such restricted access fisheries with vessel-based permits, only vessels with a permit for that fishery should be allowed to support fishing operations of other permitted vessels. Non-permitted vessels shall not be allowed to attract fish for permitted vessels or to receive fish from permitted vessels for landing. In programs in which the permit is fisherman based, the use of support vessels may be allowed if they do not create significant enforcement problems or significantly add to the capacity of the fishery, but a registration fee may be required that is the same as the annual permit fee paid by a fishery participant.

POLICY—7.1: Vessels requested to be retired by the vessel owner will no longer be eligible to participate in commercial fisheries in California.

7.2: Replacement vessels of the same or lower fishing capacity as the permitted vessel will be allowed only if the permitted vessel is lost, stolen, retired, or no longer able to participate as a commercial fishing vessel.

7.3: Each restricted access program that allows for vessel permit transfers may allow for vessel upgrades, provided a permit consolidation/vessel retirement process consistent with the fishery capacity goal is made part of the program.

7.4: A restricted access program may prohibit the use of support vessels or require that they be permitted in the fishery or that they pay a fee comparable to the permit fee.

8. Harvest Rights

background. Harvest rights, often called individual transferable quotas (ITQs), involve the assignment of the exclusive rights to harvest a share of the annual total allowable catch (TAC) in a fishery. Harvest rights systems are a form of restricted access programs in that participation in the fishery is restricted to those who own quota shares. Setting TACs has been a key element in determining quota shares. The State or nation retains ownership of the fisheries resource. In most cases, individual quota systems have been implemented in fisheries with previously established limited entry programs. These individual quotas can be allocated for specific time periods, but most often are allocated in perpetuity. Individual quotas are often allocated for specific geographic areas such as the International Pacific Halibut Commission's zones. Usually, individual quotas are fully transferable (buy, sell, lease) to allow quota owners to optimize their business activities. Transferability of quota shares allows fishermen to move between fisheries. In exchange for this exclusive harvest right, quota owners usually are required to pay the costs of management, enforcement, and research. This cost recovery often leads to increased involvement of industry in research and management.

Harvest rights have usually been allocated to vessel owners. In some fisheries around the world quotas have also been allocated to communities, processors, and fishermen's organizations. Limits on the amount of quota harvest rights each entity can hold are set to prevent excessive aggregation. Aggregation limits currently range from 0.5 percent in Alaska's halibut fishery to 35 percent in some New Zealand offshore fisheries.

Similar management systems have been used to allocate fishing gear units instead of shares of a TAC. A tradeable lobster trap certificate program developed by fishermen in the southeastern United States is an example.

When these restricted access policies were adopted (1999) industry comment was negative in regard to harvest rights systems. Nonetheless, these programs have become a tool for managing fisheries in various parts of the world, with the herring-roe-on-kelp fishery in California being one example. This policy acknowledges the existence of this tool as well as the complex issues that must be dealt with in developing any harvest rights program. The Commission may consider recommending development of a harvest rights program after careful consideration of stakeholder input.

The first 15 years of experience with individual quota management has shown that they end the race for fish and provide incentives to fishermen to change their business to maximize revenues and minimize costs. However, individual and community transferable quota systems have been controversial in the United States. In the Sustainable Fisheries Act of 1996, Congress placed a four-year moratorium of implementation of new ITQs and instructed the National

Academy of Sciences to conduct a thorough study. In December 1998, the NAS study recommended that Congress end the moratorium.

Numerous issues have arisen when individual quotas are implemented and need to be considered:

1. allocation of initial quotas. This usually, but not always, has been based on historical catches and/or vessel fishing power. The NAS study recommends that alternative methods of initial allocation be considered in addition to catch histories. Who receives the allocations (fishermen, processors, communities, tribes, etc.) must be determined and other issues resolved. Will initial allocation be free? Will the harvest right be for a certain time or perpetuity? Who is and is not eligible to obtain quota?
2. catch histories. If initial harvest rights are based to some degree on catch histories, accurate individual vessel or fisherman landings data are needed.
3. transferability. The degree to which quotas are transferable (buy, sell, lease, "fishing on behalf of") must be determined.
4. total allowable catches. Assuming individual quotas are a percentage of the TAC, in order to determine how much actual quota each quota owner may harvest, a TAC will have to be set. Setting TACs requires high quality resource assessment information and scientifically sound estimates of sustainable yields.
5. aggregation limits. Limits on the amount of quota an individual, company, community or other entity may hold needs to be considered, perhaps on a fishery by fishery basis.
6. enforcement and monitoring. Emphasis would likely shift towards enforcement methods to prevent quota holders from under-reporting their catches. Methods used elsewhere include increased record keeping/tracking of catches, limiting number of landing ports, and increased use of industry-funded monitors at landing ports.
7. cost recovery. Most individual quota systems include, at a minimum, methods for having quota owners pay the cost of managing the system.
8. processor-fishery participant relationships. Depending on who winds up owning the harvest right, this relationship might change. Past experience shows that the quota owner will have increased influence on fishing decisions.
9. quality considerations. Early experience with individual quotas shows a consistent trend towards maximizing quality to maximize prices received. This could affect the timing and location of fishing and the other types of regulations needed.

POLICY—8.1: It is the policy of the Commission that harvest rights systems such as individual transferable quotas may be considered only after careful consideration of stakeholder input. In establishing such management systems the State should consider, (1) fair and equitable initial allocation of quota shares which considers past participation in the fishery, (2) resource assessment for establishing total allowable catch estimates, (3) fishery participation goals and aggregation limits, (4) cost recovery from quota owners, (5) quota transferability and, (6) recreational fisheries issues.

9. Administration of Restricted Access Programs

administration. Administrative costs should be minimized by requiring easily understood regulatory or statutory language including a minimum of exceptions to the main provisions. The use of review or advisory boards may be considered on a program-by-program basis. Board members should be reimbursed for travel and per diem expenses. The total cost for administration of each a program should be borne by that program.

The Department will determine what unit is responsible for program administration and make all determinations relating to vessel fishing capacity.

cost accounting. Fees collected from restricted access initiatives should, for cost accounting and reporting purposes, be deposited in a single, dedicated Restricted Access Fishery Account within the Fish and Game Preservation Fund. Charges would be made against the account for direct restricted access program support. A fund condition and activity report should be published annually and include the amount of funds received from each restricted access fishery and the distribution and expenditure of those funds.

enforcement. Restricted access programs should provide specific disincentives for violations of pertinent laws and regulations. Provision for a Civil Damages schedule, pursuant to regulations of the Commission, can serve in this regard. Because restricted access programs confer benefits to permit holders that are denied to those not in the fishery, penalties should be high for violations of the provisions of restricted access programs.

Restricted access programs should minimize enforcement costs. New technologies such as satellite-based vessel tracking are available and can be required of commercial fisheries that operate under Federal fishery management plans. Commission authority to require such technology, if deemed desirable, should be a part of any legislation or regulation creating a restricted access fishery. Wildlife protection staff will be responsible for monitoring the vessels and enforcing the pertinent laws and regulations. Enforcement costs for restricted access fisheries should be borne by the restricted access programs.

POLICY—9.1: Administrative costs shall be minimized, and those costs shall be borne by the respective programs. Review or advisory boards may be considered on a program-by-program basis. The programs shall be administered in their entirety within an existing department unit.

9.2: Fees collected from restricted access initiatives may, for cost accounting and reporting purposes, be deposited in a single, dedicated Restricted Access Fishery Account within the Fish and Game Preservation Fund. A fund condition and activity report should be published annually.

9.3: Restricted access programs should provide specific disincentives for violations of pertinent laws and regulations. Enforcement costs of restricted access programs should be minimized through the use of new technologies or other means.

Table 1
Gear types proposed as candidates for restricted access fisheries.

permit eligibility	endorsement	
Trawl (vessel)		
Current permittees	Cucumber	
prawn, shrimp and	general: Federal trawl permittees;	others, such as
	halibut trawlers, to be determined	
Round-haul (vessel)		
Current permittees (phasing out)	Herring	
sardine, mackerel, and tuna	general: Others such as squid, seiners to be determined	anchovy,
Dive (personal)		
Historic permittees (currently closed)	Abalone	
Current permittees	Sea Urchin	
Current permittees	Cucumber	
Trap (vessel)		
Current permittees	Lobster	
Current permittees	Crab	
sablefish fishermen could be	general: Current live-fish; Federal pot permittees; others such as open included	access
Line (vessel)		
Current permittees	Salmon	
determined	general: Federal line permittees;	others to be
Gillnet (vessel)		
Current permittees	Swordfish/Shark	
Current permittees	Herring	
Current permittees	General	

appendix e: Contacts

Department of Fish and Game Offices

(An asterisk indicates that licenses are not issued from that office)

Bodega Bay*
P.O. Box 1560
Bodega Bay, CA 94923
Tel: 707-875-4260

Eureka
619 Second Street
Eureka, CA 95501
Tel: 707-445-6493

Fairfield
425-G Executive Court
Fairfield, CA 94585
Tel: 707-864-4900

Fort Bragg*
19160 South Harbor Drive
Fort Bragg, CA 94537
Tel: 707-964-9078

Healdsburg*
1528 Healdsburg Avenue
Healdsburg, CA 95448
Tel: 707-431-2951

Fresno - San Joaquin Valley -
Southern Sierra Region Headquarters
1234 East Shaw Avenue
Fresno, CA 93710
Tel: 559-243-4005 x 151

Los Alamitos
4665 Lampson Avenue, Suite C
Los Alamitos, CA 90720
Tel: 562-342-7100

Menlo Park
411 Burgess Drive
Menlo Park, Ca 94025
Tel: 650-688-6340

Morro Bay*
213 Beach Street
Morro Bay, CA 93442

Tel: 805-772-1261

Monterey
20 Lower Ragsdale Drive, Suite 100
Monterey, CA 93940
Tel: 831-649-2870

Napa - Central Coast
Marine Region Headquarters
P.O. Box 47
Yountville, CA 94599
Tel: 707-944-5500

Redding - Northern California -
North Coast Region Headquarters
601 Locust Street
Redding, CA 96001
Tel: 530-225-2300

Sacramento - License and Revenue Branch
3211 S Street
Sacramento, CA 95816
Tel: 916-227-2232

San Diego
4949 Viewridge Avenue
San Diego, CA 92123
Tel: 858-467-4201

Santa Barbara*
1933 Cliff Drive, Suite 9
Santa Barbara, CA 93109
Tel: 805-568-1231

Other Useful Addresses

California Fish and Game Commission
1416 Ninth Street, Room 1320
Sacramento, CA 95814
Tel: 916-653-4899

California Assembly Committee on
Natural Resources
4112 Capitol Building
Sacramento, CA 95814
Tel: 916-319-2092

California Assembly Committee
on Water, Parks, and Wildlife
5136 Capitol Building
Sacramento, CA 95814
Tel: 916-319-2096

California Senate Committee

on Natural Resources and Wildlife
2080 Capitol Building
Sacramento, CA 95814
Tel: 916-445-5441

Joint Committee
on Fisheries and Aquaculture
1020 N Street, #531
Sacramento, CA 95814
Tel: 916-322-4816

California Sea Grant Program
California Sea Grant College Program
University of California
La Jolla, California 92093-0232
Phone: 858-534-4440
Fax: 858-534-2231
Pacific Fishery Management Council
2130 SW Fifth Avenue, Suite 224
Portland, Oregon 97201
Tel: 503-326-6352
Fax: 503-326-6831

Pacific States Marine Fisheries Commission
45 SE 82nd Avenue, Suite 100
Gladstone, Oregon 97027-2522
Tel: 503-650-5400
Fax: 503-650-5426

appendix f:
Written Sources of Information

Periodicals on Recreational Fishing

Pacific Fisherman. Monthly glossy magazine about marine recreational fishing. \$25.00 per year. 23182 Alcalde, Suite K, Laguna Hills, CA 92653. 1-714-830-2290.

South Coast Sportfishing. Monthly glossy magazine about marine recreational fishing. \$32.95 per year. 15012 Redhill Avenue, Suite H, Tustin, CA 92780.

Western Outdoor News. Weekly tabloid about fishing and hunting. \$52.00 per year. P.O. Box 469011, Escondido, CA 92046-9011.

Periodicals on Commercial Fishing

National Fisherman. Monthly magazine about commercial fishing around the United States. \$22.95. 121 Free St., P.O. Box 7438, Portland, ME 04112. www.nationalfisherman.com

Pacific Fishing. Monthly magazine about commercial fishing from California to Alaska. \$24.00 per year. 4209 21st Avenue W, Suite 402, Seattle, WA 98199. www.pfmag.com.

Books and Reports

California Coastal Resource Guide. 1987. From mountains high to seas below, this readable, well-illustrated, 384 page introduction to California's 1,100-mile coastline is the best single introduction to the Golden State's golden coast. \$40.00. University of California Press, Berkeley, CA.

California Cooperative Oceanic Fisheries Investigations Reports. Various years. Available through the CalCOFI Coordinator, University of California at San Diego, Marine Life Research Group, Scripps Institution of Oceanography, 9500 Gilman Drive, La Jolla, CA 92093-0227. This peer-reviewed journal carries articles about California fisheries as well as papers presented at annual symposia on the physical and biological oceanography of the California current. Begun in 1949 as an effort to understand the collapse of sardine populations, CalCOFI is one of the longest-running systematic studies of a marine region in the world.

California's Living Marine Resources and their Utilization. 1992. Edited by Leet, Dewees, and Haugen, this is one of the great bargains in marine literature. Authoritative accounts of dozens of species and fisheries, as well as enough data to keep any spreadsheet fanatic happy make this 257-page work a must-have. Just \$15.00!!! Sea Grant Extension Program, University of California at Davis. 1-800-994-1239 or 1-530-752-5797.

California's Ocean Resources: An Agenda for the Future. March 1997. This inch-thick overview of California's ocean resources, industries, and government programs puts fisheries in their place. Includes information on state and federal

laws and agency programs as well as proposals for the future of California's ocean and coast. A summary is available on the Ocean Resources Management Plan web page, together with information on ordering the full report. Or send a check for \$15.00 to Ocean Resources Management Program, Resources Agency of California, 1416 Ninth Street, Suite 1311, Sacramento, CA 98514.

Commercial and Recreational Fishing in California: Their Impact in the State Economy. 1994. McWilliams and Goldman of UC Berkeley provide a 25-page profile of the state's fisheries. University of California at Davis. 1-800-994-1239. Email: anrpubs@ucdavis.edu.

Fisheries of the United States, 1998. 1999. Prepared by the Fisheries Statistics and Economics Division of the National Marine Fisheries Service. This series of statistical reports on U.S. commercial and recreational fishing stretch back more than a century, in one form or another. Recent editions may be downloaded at www.nmfs.gov/st1/.

A Guide to California Seafood. This \$40.00 guide for fishermen and fish mongers offers fish lovers a concise introduction to dozens of species of fish and shellfish, as well as the fisheries that catch them. California Seafood Council, P.O. Box 91540, Santa Barbara, CA 93190. 1-805-568-3811.

Probably More Than You Want To Know About The Fishes Of The Pacific Coast. 1996. Author Milton Love claims he knows more about the marine fish of California than anyone, and he may be right. This readable, humorous guide covers the identification, distribution, biology, and fisheries of dozens of species. \$19.95. Really Big Press, P.O. Box 60123, Santa Barbara, CA 93160.

appendix g: Useful Web Pages

California Environmental Resources Evaluation System

www.ceres.ca.gov

CERES is an information system developed by the California Resources Agency to facilitate access to a variety of electronic data describing California's rich and diverse environments. The goal of CERES is to improve environmental analysis and planning by integrating natural and cultural resource information from multiple contributors and by making it available and useful to a wide variety of users.

California Department of Fish and Game

www.dfg.ca.gov

The Department's web page includes information on sport and commercial fishing regulations, marine reserves and refuges, and publications, among other things.

California Coastal Commission

www.ceres.ca.gov/coastalcomm/web/

The Coastal Commission was established by voter initiative in 1972 (Proposition 20) and made permanent by the Legislature in 1976. The mission of the Commission, as the lead agency responsible for carrying out California's coastal management program, is to plan for and regulate development in the coastal zone consistent with the policies of the California Coastal Act.

The California Coastal Commission's web page provides general and specific information on California's coastal policy and law, permit applications, meeting agendas, information on commission programs such as pollution control, and other matters.

California Fish and Game Commission

www.dfg.ca.gov/fg_comm/index.html

The Commission's web page includes meeting schedules and agendas, Commission policies, fish and game regulations, the Commission's Strategic Plan, and other matters.

California Office of Administrative Law

www.oal.ca.gov

The State of California's Office of Administrative Law (OAL) is an independent office in the executive branch of California state government that enforces the laws which allow California state agencies to adopt rules and regulations. OAL reviews proposed administrative regulations before they go into effect.

The Office's web page includes the California Code of Regulations, the table of contents for the California Regulatory Notice Register (one way to keep up with proposed regulations), and information on the regulatory process.

California Sea Grant Program

www.csgc.ucsd.edu

California Sea Grant, administered by the University of California, draws on the talents of scientists and engineers at public and private universities, and works in partnership with industry, government and the public. California Sea Grant supports advanced research on marine issues as well as an extension program of area advisors and specialists. Extension personnel form a direct link for two-way communication between the university on the one hand, and industry and the public on the other.

The program's web page includes descriptions of current research, the program's newsletter, publications, and other material.

California Seafood Council

www.CA-Seafood.org/csc_org/index.htm

In 1991, California's fishing industry authorized the establishment of the California Seafood Council (CSC) by referendum. California's Department of Food and Agriculture (CDFA) administers the Council, an advisory body to the Secretary of Food and Agriculture. The Council represents commercial fishermen and primary fish handlers. More than 3,000 commercial fishermen and 200 primary receivers who harvest and receive California seafood pay assessments to support Council activities.

The Council's web page includes information on its activities, factsheets, recipes, and links to other web pages.

California State Assembly

www.assembly.ca.gov

The State Assembly's web page includes the daily schedule of business, a directory, and other information about the State Assembly.

California State Senate

www.sen.ca.gov

Like the Assembly's web page, the State Senate's web page includes information on legislators, committees, schedules, and an audio link.

California State Legislative Information

www.leginfo.ca.gov

This site includes a wealth of information on legislation and legislative activities in the State Senate and Assembly, including the text and history of bills before the legislature, information on the organization of the legislature, committee memberships, and guides to the legislative process.

Center for Marine Conservation

www.cmc-ocean.org

The Center for Marine Conservation, which operates an office in San Francisco, is one of the largest national environmental organizations involved in marine fisheries conservation. CMC's web page provides an orientation to the organization and its many activities.

Environmental Defense

www.edf.org

Environmental Defense, another national environmental organization, has devoted much of its marine conservation effort to promoting marine reserves and the use of market-based approaches to fisheries conservation. The web page includes extensive material on ED's oceans program, including reports on marine reserves and individual transferable quotas.

Fisherman's Marketing Association

www.trawl.org

The FMA is composed of trawl vessel owners, skippers and deck hands. The Association is divided into districts with each district electing members to the Board of Directors. The Fishermen's Marketing Association (FMA) was founded in 1952 in order to promote stable prices and an orderly flow of wholesome seafood to the consumer. Today the FMA supplies groundfish and shrimp to around twenty different fish processing companies at over forty buying stations from Bellingham, Washington to San Pedro, California. The foremost objective of the FMA is to promote market stability.

The FMA's web page includes its monthly newsletter, reports on the west coast fishing industry, fisheries management, and fisheries legislation, and other information.

Gadus Associates

www.wimsey.com/~gadus/index.html

This web page includes an enormous worldwide list of links to web pages related to fisheries, from organizations and suppliers to scientific reports and management organizations.

Institute for Fishery Resources

www.pond.net/~fish1ifr

The web page of the Institute for Fishery Resources, which is affiliated with the Pacific Coast Federation of Fishermen's Association, includes information on its projects on salmon and seabird bycatch as well as a weekly newsletter.

The Marine Stewardship Council

www.msc.org

Based in London, England, with an office in Seattle, the Marine Stewardship Council oversees the certification of fisheries that meet its standards for sustainability. The web page includes the organization's principles and criteria, description of fisheries that have been certified, as well as other materials.

National Marine Fisheries Service

www.nmfs.gov

The federal marine fisheries agency's web page includes information ranging from commercial and recreational fishing statistics to reports on issues such as seabird bycatch, the Magnuson-Stevens Fishery Conservation and Management Act, the Endangered Species Act, and the Marine Mammal Protection Act. The web also includes links to the pages of Fishery Management Councils as well as the program and regional offices of NMFS.

Natural Resources Defense Council

www.nrdc.org/nrdc

The National Resources Defense Council, which is based in New York City, operates offices in Los Angeles and San Francisco. NRDC staff were heavily involved in the drafting of the MLMA. NRDC's web page includes information on their campaigns, including long-standing efforts to curb coastal water pollution.

Pacific Coast Federation of Fishermen's Associations

www.pond.net/~pcffa

The Pacific Coast Federation of Fishermen's Associations (PCFFA) is a coalition of 25 different port and fishermen's marketing associations spanning the US west coast from San Diego to Alaska. It is funded principally through assessments on catches, collected at the local port level.

The PCFFA web page includes testimony presented to the State Legislature, links to other organizations, and position papers on issues such as marine protected areas.

Pacific Fishery Management Council

www.pcouncil.org

The Pacific Council is one of eight regional fishery management councils established under the Magnuson Fishery Conservation and Management Act of 1976. The Pacific Council has developed fishery management plans for salmon, groundfish, and coastal pelagic species in the U.S. Exclusive Economic Zone (EEZ) off the coasts of Washington, Oregon and California, and recommends Pacific halibut harvest regulations to the International Pacific Halibut Commission.

The web page includes the Council's newsletter and information on managed fisheries, fisheries management plans, meetings, reports, and other matters.

Pacific States Marine Fisheries Commission

www.psfmc.org

Authorized by Congress in 1947, the Pacific States Marine Fisheries Commission (PSMFC) includes representatives from California, Oregon, Washington, Idaho, and Alaska. The PSMFC does not have regulatory or management authority; rather it serves as a forum for discussion and works for coastwide consensus among state and federal authorities.

The web page includes information on PSMFC projects and publications ranging from research reports to meeting summaries. One can also access data on commercial landings data and prices and recreational catches in the PacFIN and RecFIN databases.

Sea Urchin Harvesters Association

www.seaurchin.org/index.html

SUHAC is a communications network among sea urchin divers that provides information on policies, procedures, statutes, and regulations affecting the sea urchin fishery. SUHAC convenes statewide conferences for members of the industry to meet for purposes of strengthening the industry and benefiting industry goals.

The web page includes information on the sea urchin fishery, and on issues ranging from Individual Transferable Quotas to sea otters.

Sportfishing Association of California

www.sacemup.org

The Sportfishing Association of California or SAC is a non-profit industry organization whose members are associated one way or another with the recreational fishing industry in southern California, particularly party and charter boats. The organization, which was founded in 1972, is politically active at state and federal levels and in Mexico.

The web page provides background on SAC's positions and issues.

United Anglers of California

www.unitedanglers.org

United Anglers is an organization of recreational anglers founded in 1981. The web page carries news about the organization's activities.

United Nations Food and Agriculture Organization

www.fao.org/fi/default.asp

The Fisheries Department of the United Nations Food and Agriculture Organization oversees a wide variety of programs, ranging from the compilation of worldwide statistics to the development and implementation of international plans of action on seabird bycatch and shark conservation. The web page provides a means for keeping track of international developments, and offers useful databases, including a glossary that defines and sometimes illustrates important terms.

appendix h: California's Marine Fisheries

The Setting

For 1,100 miles, the spectacular mass of California's lands meets the Pacific Ocean. In many areas, mountains plunge into the oceans. Elsewhere, ancient shorelines stand as terraces above the surf. Streams and rivers break through the coastal mountains and, in some places, flow into bays and lagoons rimmed with wetlands. Offshore, islands and rocks break the surface.

This is what we can easily see. But beneath the surface of the water offshore, California's dramatic geological formations continue. Unlike the Atlantic or Gulf coasts, California's shallow continental shelf is quite narrow, generally no wider than five miles. At its broadest point off San Francisco, the shelf extends 30 miles offshore before plunging from 600 feet to the abyssal region at 6,000 feet. Here and there, peaks called seamounts rise from the depths to the photic zone where sunlight spurs plant growth and attracts life.

Whether near or far from shore, the ocean bottom may be rocky, sandy, or silty. It may be flat or formed of rocky reefs. In many areas along the coast, great canyons cut into the continental shelf quite close to shore. For example, the Monterey submarine canyon, which is larger than the Grand Canyon of the Colorado, begins within miles of the shoreline. There, as at other submarine canyons, marine life normally found far offshore is drawn close to land by the deep waters. Off southern California, the ocean bottom appears like a piece of crumpled paper, with basins, troughs, canyons, peaks, and cliffs alternating in a checkerboard pattern.

Ocean currents introduce other dimensions to California's coastal waters. For much of the year, the California Current brings cool northern waters southward along the shore as far as southern California. There, where the coastline juts eastward, the California Current moves offshore. In the gap between the California Current and the mainland, the Southern California Countercurrent flows into the Santa Barbara Channel. Around Point Conception, these two currents meet, creating a rich transition zone. Closer to shore and deeper, the California Undercurrent also carries warmer water northward.

Seasonal changes in wind direction commonly create seasonal patterns for these currents. In March, for instance, northwesterly winds combine with the rotation of the Earth to drive surface waters offshore, triggering the upwelling of cold, nutrient-rich water from the depths. Fueled by sunlight and the nutrients, single-celled algae bloom and create a rich soup that fuels a blossoming of marine life, attracting larger animals from seabirds and swordfish to humpback and blue whales.

By September, as the northwesterly winds die down, the cold water sinks again and warmer waters return to the coast. This oceanic period lasts into October, when the winds move to the southwesterly direction. These winds drive a surface current, called the Davidson Current, which flows north of Point Conception and inside the California Current, generally lasting through February.

Laid over this general pattern are both short-term and long-term changes. Local winds, topography, tidal motions, and discharge from rivers create their own currents in nearshore waters. Less frequently, a massive change in atmospheric pressure off Australia floods the eastern Pacific with warm water, which suppresses the normal pattern of upwelling. These short-term climatic changes, called El Niño, reduce the productivity of coastal waters, causing some fisheries and seabird and marine mammal populations to decline. El Niños can also increase the abundance of other species. For instance, warm waters that flow north in an El Niño carry the larva of sheephead and lobster from the heart of their geographical range in Mexico into the waters off California.

Other oceanographic changes last for a decade or more. In these regime shifts, water temperatures rise or fall significantly, causing dramatic changes in the distribution and abundance of marine life. The collapse of the California sardine fishery occurred when heavy fishing continued on sardine populations that were greatly reduced by a cooling of offshore waters in the late 1940s and early 1950s. In response to the decline in sardines, California law severely curtailed the catch. In 1977, waters off California began warming and remained relatively warm. The warmer water temperatures were favorable for sardines, whose abundance greatly increased. But the warmer waters also reduced the productivity of other fish, including many rockfish, lingcod, sablefish, and most flatfish, which favor cold water for successful reproduction.

Currents and other bodies of water may differ dramatically in temperature and chemistry, as well as speed and direction. These factors all influence the kinds of marine life found in different bodies of water. In general terms, geography, oceanography, and biology combine to divide California marine fisheries and other marine life into two major regions north and south of Point Conception. Within each region, other differences emerge. Conservation and use of California's marine life depends partly upon recognizing these differences.

Marine Life of California

The waters off California are host to 544 species of fish from 144 families. Thousands of species of marine invertebrates inhabit the sea floor from tidepools along the shoreline to muddy plains 8,000 feet deep. Dozens of species of coastal and offshore birds spend some part of the year in California's waters, as do 35 species of marine mammals.

This great variety of marine life reflects the different responses of groups of animals and plants to changing environmental conditions over long periods of time. In successfully meeting their needs for growth, survival, and reproduction, individual species have developed a set of characteristics that biologists call life history traits. These traits include age at maturity, maximum age, maximum size, growth rate, natural mortality, and feeding and reproductive strategies.

Differences among species can be dramatic. For instance, California market squid mature within 12 months and die soon after spawning, whereas widow rockfish do not mature until age five at the earliest and may live as long as 59 years. This has profound consequences for managing fisheries so that they are sustainable. An analogy drawn by Richard Young between fishing and forestry illustrates the point. If it takes 50 years to grow a marketable tree, we can harvest only one-fiftieth of the trees each year if we want to maintain the same size forest. If we harvest more, the forest gets smaller. If we harvest less, it gets larger. However, if it takes only 10 years to grow a marketable tree, we can harvest 10 percent of the trees every year without reducing the size of the forest. So, if it takes a species of rockfish ten years to reach maturity, we can take only a small number of them and maintain the same size population, even if they appear to be “so thick you can walk on them.”

Reproductive strategies also vary. Queenfish, for instance, may spawn 24 times in a season, releasing their body weight in eggs into the open water, where most will be eaten whether or not they are fertilized. In contrast, species such as olive rockfish spawn just once a year, releasing up to 500,000 larvae, which have been fertilized and developed internally.

Amid the variety, the life histories of fish tend to fall into several larger categories. For instance, fish species that have low rates of mortality as adults, such as many species of sharks, bluefin tuna, billfish, and rockfish, also mature late and reproduce in smaller numbers. Organisms that have high rates of mortality as adults, such as anchovies and squid, grow quickly, mature early, and reproduce in large numbers. Some species spend the first 90 days of their lives floating as plankton in ocean currents. Climate and oceanographic changes influence the abundance of these species more than does the number of spawning adult fish.

Species differ also in their movements. For instance, during winter Dover sole move into deep water where they reproduce, then move into shallow water in the summer to feed. Pacific whiting migrate from their summer feeding grounds off Oregon and Washington to their winter spawning grounds off southern California and Baja California. By contrast, kelp bass, which can live to 30 years, venture less than a mile from their home range.

Individual plants and animals are part of larger communities that are linked in many ways. One of the clearest are the relationships among who eats whom, also known as the food web. Generally, the eating begins with herbivores, who

consume plants that have manufactured food through photosynthesis. These herbivores may be as small as the larva of an anchovy or as large as a basking shark. The smaller herbivores pass along much of the food value of the plants when they are eaten by primary carnivores. In some marine communities, the story may end here. But the eating generally continues several more steps.

These relationships among wildlife populations differ considerably among different habitats and communities. A decrease in the abundance of some species, due to fishing, habitat alteration, or climate changes, for instance, can affect species that feed upon them. Considering these interrelationships when managing fisheries requires an ecosystem perspective.

Healthy habitat can also play an important role in the abundance of marine wildlife. Some species of fish and shellfish are so dependent upon particular types of habitat, such as kelp forests or coastal wetlands, that the destruction of these habitats can devastate wild populations. The damming of almost every major coastal river in California has driven most runs of Pacific salmon to dangerously low levels. Since the 1850s, 90 percent of the state's coastal wetlands have been destroyed, causing incalculable losses in coastal wildlife. Finally, pollution of coastal waters can expose marine animals to toxic chemicals and can foster changes in plant communities that wildlife depend upon.

A Profile of California's Commercial Fisheries

California's marine fisheries are diverse. In 1999, California commercial fishermen reported landing 125 species of fish and shellfish. Although many species were caught in waters off California, other species, such as skipjack, yellowfin, and albacore tunas, swordfish, and pink shrimp, were caught in waters off other states or off other countries. In terms of weight and the revenues they generate for fishermen, a few species dominated landings in California, according to statistics maintained by the Pacific States Marine Fisheries Commission. In 1999, when California fishermen landed 214,245 metric tons of fish and shellfish, the top species by weight were the following:

Species	Metric Tons	Thousands of Dollars
Market squid	90,661	34,949
Pacific sardine	59,168	5,178
Chub mackerel		8,642 1,075
Red sea urchin	6,377	13,303
Albacore tuna	5,491	10,102
Northern anchovy		5,225 1,293
Rockfish	4,418	7,794
Dungeness crab		3,917 17,015
Dover sole	3,813	2,784
Skipjack tuna	3,759	2,748

All told, these species accounted for nearly 90 percent of the weight of fish and shellfish landed in California in 1999. Some of these species, such as mackerel and skipjack tuna, fetch little at the dock since they are reduced for use as animal feed or are used to produce low-priced canned products. Other species, such as sea urchins, Dungeness crab, and spot prawns, attract a higher price. As a result, the fish that led in the revenues they generated for fishermen in 1999 are different from those above:

Species	Metric Tons	Thousands of Dollars
Market squid	90,661	34,949
Dungeness crab		3,917 17,015
Red sea urchin	6,377	13,303
Albacore tuna	5,491	10,102
Swordfish	1,982	8,253
Rockfish	4,418	7,794
Chinook salmon		2,009 7,446
Pacific sardine	59,168	5,178
Spot prawn	279	4,265
Sablefish	1,957	4,261

These species accounted for 77 percent of the \$146 million that fishermen were paid for their catch in 1999.

Although other species are caught in much lower volumes, they generate significant earnings for fishermen because of their high prices. In 1999, average prices paid to fishermen for spot prawns were \$6.94 per pound, according to the Pacific States Marine Fisheries Commission. Fishermen who collected herring roe on kelp for export to Japan received an average of \$2.66 per pound. Other species caught in relatively small volumes but fetching more than \$2.00 per pound included bluefin tuna, California spiny lobster, California halibut, kelp greenling, cabezon, and eels.

Kelp has often dominated other marine life in volume of production in California. Kelp harvesting varies widely over the years, according to statistics maintained by the National Marine Fisheries Service. After a peak of 295 million pounds in 1980, kelp production fell to just 11 million pounds in 1984, after the El Niño of 1982-1983 decimated kelp beds along much of the California coast. Landings rebounded again to 303 million pounds in 1990, then fell to just 56 million pounds in 1998, another El Niño year.

Recreational Fisheries

California has long been among the leading states in recreational fishing. In 1985, California ranked second after Florida in the amount of money spent by anglers. The overall economic impact of recreational fishing, including both

freshwater and saltwater angling, is greater than that of commercial fishing because of anglers' expenditures for goods and services such as transportation, fishing equipment, clothing, and boats. In all, recreational fishing generated about \$5 billion in personal income and 153,849 jobs, according to a 1994 University of California study.

In the 1980s, when California's population increased by 25 percent, recreational fishing activity both in freshwater and saltwater declined. Between 1980 and 1989, the number of marine angling trips declined by 26 percent off northern California and 34 percent off southern California. Sales of annual resident fishing licenses also declined by 29 percent. Surveys indicated that common reasons for the decline were loss of interest, lack of time, lack of a fishing partner, and concern about pollution. More recent surveys for the federal government show a further decline in number of anglers and trips. The number of anglers fell from 1.5 million in 1993 to 1.4 million in 1998, while the number of trips fell from 5.8 million to 4.9 million.

Recreational fishermen most commonly use rod and reel with artificial lures, live bait, or dead bait. In 1997, chinook salmon led all other species in the recreational catch by hook and line. Fishermen may also use hoop nets to catch crabs, lobsters, or shrimp. Divers catch a wide variety of finfish with spears, and may catch crabs, lobsters, abalone, urchins, and scallops by hand. Shore pickers gather mussels, clams, or crabs at low tide, or California grunion by moonlight. The most common finfish caught by recreational anglers are different species of rockfish, kelp and sand bass, and Pacific mackerel. Of invertebrates, abalone and lobster are most popular among recreational divers, while shore pickers favor abalones, pismo clams, and rock crabs.

In 1980-1985, 35 percent of marine angling was from private boats, 25 percent from manmade structures, 20 percent from beaches and banks, and 20 percent from partyboats and charter boats (known technically as commercial passenger fishing vessels or CPFVs). There is little information on the amount of effort by shorepickers, although a 1989 survey concluded that 380,000 such trips were made in that year. Roughly 46 percent of those trips were for abalone, 30 percent for lobster, and 24 percent for clams.

In recent years, partyboat fishing has increased to about 30 percent of all marine recreational fishing. Better equipment, newer vessels, and greater fishing effort increased landings from two million fish in 1947 to nearly six million in 1969. The number of anglers boarding partyboats has ranged around 700,000 since 1970. The number of partyboats also increased rapidly after World War II, growing from 343 boats in 1947 to a peak of 612 in 1954. The partyboat fleet then declined to a low of 287 in 1985, and stood at 309 vessels in 1990.

In 1997, an estimated 1.5 million anglers took 5.2 million marine recreational fishing trips, according to the Marine Recreational Fisheries Statistics Survey (MRFSS) of the National Marine Fisheries Service. Based on interviews and surveys conducted by the MRFSS, anglers caught about 21 million ocean fish

and released about half of them, generally because they were undersized or an undesired species. Anglers retained about 18 million pounds of fish. The top ten species groups were as follows:

Species	Metric Tons
Miscellaneous tunas & mackerels	2,051
Yellowtail	1,463
Pacific barracuda	771
Kelp bass	346
Barred sand bass	338
Miscellaneous rockfish	256
California halibut	205
Pacific bonito	181
Yellowtail rockfish	171
Lingcod	163
Blue rockfish	141

As in other matters, there are two Californias when it comes to recreational fishing: those fisheries south of Point Conception and those north of Point Conception. Not counting salmon, which are tallied separately from marine species, anglers in southern California accounted for 64 percent of the total recreational catch in 1997, and all of the catch of three of the top ten species: yellowtail, Pacific barracuda, and barred sand bass. Sport fishermen in southern California also caught 99 percent of the kelp bass and Pacific bonito and 73 percent of the California halibut caught. Northern California sport fishermen dominated in salmon, yellowtail rockfish, lingcod, blue rockfish, tunas and mackerels, as well as most rockfish. Fifteen species were caught only by southern California anglers, while 13 were caught only by northern California anglers.

The southern California recreational fishery extends into the waters of Mexico. Estimates for 1985-1990 indicate that California anglers made 127,000 trips annually to Mexico, mostly from San Diego. Long-range, multi-day trips targeted yellowtail, mahi mahi, and tunas. Short-range, one-day trips targeted rockfish, kelp bass, and barracuda. Annual landings averaged 271,000 fish, with a peak of 404,000 fish.

California's Changing Fisheries

Marine fisheries in California have changed dramatically in the last quarter-century as governmental programs and regulations, economic conditions, markets, technology, and other factors have evolved. Consider the following:

- The San Diego purse-seine fleet that delivered thousands of tons of yellowfin and skipjack tuna to processing plants in San Diego and San Pedro in the 1970s no longer fishes off Mexico and Central America nor delivers tuna to

packing houses in southern California. In 1999, landings of skipjack and yellowfin tuna in California, which accounted for 37 percent of the volume and 58 percent of the value of commercial fisheries in 1981, accounted for just 2 percent of the volume and 3 percent of the value of California landings.

- Of the top ten species in weight in 1975, only half ranked in the top ten in 1997: northern anchovy, skipjack tuna, squid, rockfish, and Dover sole. Yellowfin tuna, jackmackerel, Pacific bonito, bluefin tuna, and albacore tuna were replaced by Pacific sardine, chub mackerel, Pacific herring, sea urchins, and Pacific hake.
- Since the early 1980s, total revenues to fishermen for their catches have fallen. From a peak of \$289 million in 1980, the amount paid fishermen fell, largely due to the dramatic decline in landings of tunas caught off Mexico and Central America. In 1999, total revenues amounted to \$146 million.
- In the last 20 years, the number of full-time commercial fishermen has declined by three quarters.
- Between 1977 and 1997, the number of commercial fishing vessels declined from 2,677 to 1,700, while the number of commercial fishing boats declined from 4,746 to 1,421. (Fishing vessels have a storage capacity of more than 5 net registered tons—that is, about 500 cubic feet—and must be registered with the U.S. Coast Guard.)

California Finfish and Shellfish Landings and Revenues 1970-1999

(Sources: Leet, Dewees, and Haugen (1992); CDFG Annual Statistical Reports)

Some fisheries have risen in the last two decades. For instance, successful marketing of urchin roe in Japan, with the assistance of the National Marine Fisheries Service, fostered the growth of a commercial fishery for sea urchins that became one of the state's most valuable. Between 1975 and 1980 alone, landings of sea urchins rose from 7.6 million pounds to 22.2 million pounds, while revenues grew from \$615,000 to \$3.6 million.

Other fisheries have declined for a wide variety of reasons including climate change, disease, and fishing. As these fish populations have declined, fishing has moved on to other species. In some cases, this pattern has led to serial depletion of species after species. A commonly cited case of this pattern is the abalone fishery, in which fishing moved from one species to the next as each species declined.

Changes in markets also can have profound effects on what gets caught. For instance, as expanding markets drove up prices for live fish in the late 1980s, the catch of nearshore fish, especially rockfish, grew as well. Grass rockfish, which fetched fishermen 75¢ per pound in 1981, garnered \$5.03 per pound in 1999, while cabezon rose from 17¢ per pound in 1981 to \$3.82 per pound in 1999. Documented landings of these and other nearshore species grew rapidly as well. Commercial landings of grass rockfish increased from 3,630 pounds in 1991 to a peak of 118,742 pounds in 1995. Similarly, commercial landings of cabezon grew from 16,300 in 1991 to a peak of 373,400 pounds in 1998.

Other economic forces have affected fisheries in California. For example, inflation influences the ability of businesses of any kind to prosper, much less survive if they cannot raise prices at the same rate as their expenses rise. Fisheries are no different. Prices paid for many rockfish, spiny lobster, Dungeness crab, sea urchins, and spot prawns have more than kept pace with inflation. In other fisheries, however, the story is different. For instance, Dover sole fetched 22¢ per pound in 1981, according to Department of Fish and Game statistics. In 1999 dollars, that amounts to 43¢ per pound, much higher than the average 33¢ that fishermen actually received in 1999.

Increases in operating costs and other developments combined against fishermen in other fisheries. As the salmon farming industry expanded after 1980, Atlantic salmon from Norway, then Canada and Chile began flooding markets in the United States, driving salmon prices down. Prices that fishermen received for wild chinook salmon fell from \$2.59 per pound in 1981 to \$1.93 in 1999. Had chinook salmon prices just kept pace with inflation, California fishermen would have received \$5.08 per pound in 1999.

In the late 1990s, as a consumer boycott of Atlantic swordfish got underway and imports remained high, prices paid California fishermen for Pacific swordfish continued slipping. In 1999, fishermen received \$2.74 per pound for Pacific swordfish, compared to \$2.95 in 1980—\$5.79 in 1997 dollars.

Finally, changing oceanography has influenced California fisheries as well. In the 1990s, for instance, squid landings rose rapidly from 29 million pounds in 1992 to 178 million pounds in 1996, generating revenues to fishermen of \$27 million in that year. The increased abundance of squid is thought to be related to cooler water temperatures, although strong prices in China also encouraged greater fishing effort. After a warming period, however, squid catches declined to 6 million pounds in 1998, then rebounded to 200 million pounds in 1999.

Commercial Fishing Gear and Methods

As fishermen of different nationalities have settled in California in the last 150 years, they have introduced different methods of fishing from their home countries. The Portuguese fishermen who settled in the San Diego area introduced pole-and-line fishing for tuna. Italian and Yugoslavian fishermen who settled in San Pedro perfected the use of purse seines and introduced the power block for catching squid and sardines. Italian fishermen from the Ligurian Sea took up fishing in the Santa Barbara area, using traps to catch lobster and gillnets or hook-and-line to catch fish. In more recent years, fishermen from Vietnam have used gillnets in catching rockfish and nearshore species such as halibut and croaker.

Technological innovations spurred by the war effort during World War II brought still more changes to fishing technology. Besides the use of steel and lightweight fiberglass for boat hulls, war research developed lightweight synthetic nylon yarns that enabled the manufacture of larger, lighter nets. More powerful and reliable engines enabled fishermen to get to and from fishing grounds more quickly, while onboard refrigeration ensured that their catch did not spoil. Electronic equipment such as sonar, radar, and GPS, made it possible for fishermen to locate particular areas of the ocean with unprecedented accuracy and to locate schools of fish.

Innovation has continued. Satellite communications have made it possible for fishermen to communicate regularly and reliably with shore and among themselves, and to return to productive fishing grounds or to retrieve nets and traps. Satellite sensors also have provided fishermen with real-time pictures of currents and areas of productive waters, allowing them to search more efficiently for billfish or schools of tuna, for instance.

Off California, commercial fishermen use several basic types of fishing gear, including nets, hooks and lines, and traps, among others.

gillnets: Gillnets are panels of net that may have different dimensions. Gillnets may be fished on the bottom, in midwater, or at the surface, and the size of

their mesh—that is the openings in the net—will vary depending on the species of fish being sought. Regulations often set a minimum mesh size that is small enough to catch the “target” species of a particular size, but large enough to allow juvenile or other small fish to escape. For instance, the minimum mesh size for California halibut is 8-1/2 inches measured diagonally between knots, whereas the minimum mesh size for white seabass is 6 inches.

If the panel of net is set taut, fish become ensnared as they attempt to back out of the net and become caught either in their midsection or by their gills. When the net is set more loosely, it is called a trammel net. With this gear, fish become entangled as a fin or other part of the body becomes snagged and the fish becomes increasingly enmeshed as it struggles to free itself.

Gillnets may be fixed to the bottom or may be attached to a vessel that drifts with the currents. Depending on the species being sought, drift gillnets are set at or below the surface. When fishing for seabass or barracuda, for instance, fishermen set their nets at the surface and drift during the day. When fishing for swordfish or sharks, fishermen set their nets below the surface and drift at night. The size of the mesh differs, also. Drift gillnets set to catch white seabass must have a minimum mesh size of six inches, while the fishery for sharks and swordfish uses gillnets with a mesh size of 18-22 inches. To catch barracuda, fishermen use nets with a mesh size of three inches.

Over the years, the legislature adopted restrictions on the use of gillnets in many nearshore areas because of declines in some nearshore fish populations, conflicts with other fisheries and the incidental capture and drowning of seabirds and marine mammals. Proposition 132, passed by the voters in 1990, created a Marine Resources Protection Zone within three miles of the mainland coast, and in waters less than 70 fathoms or within one nautical mile of the Channel Islands, whichever is less. The initiative banned the use of gill and trammel nets in these waters beginning in 1994.

trawls: Trawls are sock-shaped nets that taper from a wide mouth to a narrow tail called a codend. Trawls are towed behind a fishing vessel along the bottom or in midwater, depending on the species. The mesh sizes in trawls vary as well. For instance, shrimp and prawn trawls use 1-1/2 inch mesh, midwater trawls use 3-inch mesh to catch whiting and widow rockfish, groundfish trawls use 4-1/2 inch mesh, and trawls targeting California halibut use 7-1/2 inch mesh. Any organism that is larger than the size mesh in the trawl is captured and accumulates in the codend.

The rope or cable on the lower leading edge of a trawl towed along the bottom is usually protected by chain sinkers that stir organisms up from the sea bottom. The bottom rope may also be protected by rubber disks or bobbins that allow a trawl to be dragged over hard bottom that might otherwise snag the net. Such trawls are called roller rigs. Bottom trawls also vary in how high their opening is. Trawls used to catch shrimp and groundfish, for instance, have a low

opening, whereas trawls fishing for other species have a high opening. The mouth of trawls may be held wide by otter boards that are attached to the two forward corners of the net; the boards act like wings and pull the net wide as it moves through the water.

round-hall net: There are two types of round-haul nets: the lampara net and the purse-seine net. These nets are used to catch sardines, anchovies, herring, squid, bonito, mackerel, and tuna. Both types of round-hall nets consist of long panels of netting that are used to encircle a school of fish. The nets are pulled from the deck of a vessel by a skiff so that the net surrounds the fish. After a lampara net is deployed, the leadline at the bottom of the net is pulled until it closes the net into a scoop, and the catch is brought on board the boat.

In a purse-seine net, a smaller-meshed landing bag is at the end of the net. When the net has been set by the skiff, a line running through rings at the bottom of the net is drawn closed like a purse. The rings then are brought aboard, and the wings of the net are pulled aboard with a power block. The catch is captured in the bag of the net. Many fishermen now use drum seines, which retrieve the net via a large reel mounted at the stern of the vessel. Purse seines are used to catch tuna, mackerel, squid, sardines, and anchovies.

hook and line: California fishermen use several types of hook and line fishing methods. The most familiar perhaps is the rod and reel, in which a one or more hooks is attached to a line that runs along a pole and is retracted by means of a mechanical reel. Whether or not a pole is used, reels may be hand-powered or mechanized.

In California, where surface or so-called pelagic longlines are prohibited, set longlines may be used. These are lines of hooks run horizontally across the seafloor. The line is held in place by anchors, while floats suspend the line above the seafloor, with hooks attached at regular intervals. In some areas along the California coast, no more than 150 hooks may be attached to set longlines. This gear is used to catch rockfish and sablefish.

A related type of hook-and-line gear is called stick gear, which is used almost entirely in the nearshore fishery for live fish. Stick gear is a series of hooks attached to a weighted rod by short lines. This gear is placed on the seafloor.

In jigging, a vertical line of lures is moved up and down by hand or mechanically. This method is used principally to catch squid.

In using troll gear to catch salmon, up to six stainless steel lines are run from hydraulic spools to outrigger poles from which they are spread and suspended from the boat. Hooks, baited with herring or anchovy or with artificial lures, are attached to the mainline with monofilament leaders at roughly 18-foot intervals. A weight attached to the end of each wire line keeps the line at a particular depth. The lines are then pulled slowly through the water—an activity

called “trolling.” To catch albacore tuna, fishermen use a simpler arrangement of several lines towed on the surface.

trap or pot: Traps are generally constructed of galvanized wire that may or may not be vinyl coated. Escape ports or rings allow undersized lobsters, crabs, or fish to escape. Metal fastenings or cotton twine dissolve after a time in sea water allowing the catch to escape if the trap is lost. Buoys painted with the fisherman’s permit number are attached to strings of traps. As winter arrives, traps are set in deeper and deeper water. fishermen use traps to catch spot prawns, spiny lobster, rock crabs, rockfish, cabezon, and sheephead.

diving gear: In taking sea urchins or sea cucumbers, commercial divers use a “hookah” system, rather than the usual tank we associate with scuba diving. A hookah system is simply a long air hose attached to an air compressor on the deck of a boat. Divers may spend as long as six hours a day underwater. Animals are harvested by hand so the rate of harvest depends on the diver, not the size of the boat.

A small number of species often dominate the catch in different types of gear. For instance, according to National Marine Fisheries Service statistics, California commercial fishermen caught 5,837 metric tons of fish on troll lines in 1997. Of this 2,752 metric tons was chinook salmon, 2,729 metric tons was albacore tuna, and 254 metric tons was chilipepper rockfish. California squid, Pacific sardine, and chub mackerel made up 80 percent of 164,882 metric tons of fish caught in gillnets and seines. Longline catch was dominated by sablefish, swordfish, and albacore tunas, which accounted for 45 percent of the 5,400 metric ton in catch.

All these gears catch many other different types of fish, some of which are retained. Pink shrimp made up 92 percent of shrimp trawl landings, while the other eight percent was made up of several dozen other species including California halibut, rockfish, and flatfish. Similarly, groundfish trawls, whose landings were principally Pacific hake, Dover sole, and longspine thornyhead, also include significant amounts of rockfish, sablefish, skates, flounder, and sole. For the most part, little is known about what is caught and discarded in different fisheries. The impact of different types of gear on fisheries habitat is even less understood.

Similarly, different types of gear dominate the catches of different species, although there often is a mix. In 1997, according to statistics maintained by the National Marine Fisheries Service, 68 percent of cabezon were caught on lines while 31 percent were caught in traps. Nearly all Pacific sanddabs and several species of rockfish were caught in trawls. Of 28 metric tons of white seabass caught commercially, 84 percent was by gillnet.

The size of vessels used by California fishermen ranges widely, from skiffs and kayaks in the nearshore live-fish fishery to large purse seiners in the squid, tuna, and mackerel fisheries. Most fishing vessels, from trawlers to trap boats,

fall between these two extremes. Size plays a major role in who fishes in some areas. Generally, large vessels are more mobile, able to move from area to area and to stay offshore, while smaller vessels are more resident and more likely to be day-boats.

Finally, catching and landing fish and shellfish is but one step in a process that includes processing, distributing, preparing, and consuming seafood products. In 1997, there were 141 processing plants employing roughly 7,000 people in California. Another 393 wholesale distributors reported employing 4,791 people. Other businesses engaged in building, maintaining, and supplying fishing vessels rely greatly on commercial fishing, as well as recreational fishing. All of these activities generate jobs and income in local communities and regions. According to a 1992 study, commercial fishing in California generated nearly 17,000 jobs and \$554 million in total income.