

4.0 PROTECTED SPECIES

4.1 Affected Environment

Protected species fall under three overlapping categories, reflecting four mandates: the ESA of 1973 (ESA), the Marine Mammal Protection Act of 1972 (MMPA), the Migratory Bird Treaty Act (MBTA), and EO 13186. Chapter 5 in Appendix A describes species which occur off the West Coast and are protected under these mandates.

The ESA protects species in danger of extinction throughout all or a significant part of their range and mandates the conservation of the ecosystems on which they depend. “Species” is defined by the ESA to mean a species, a subspecies, or—for vertebrates only—a distinct population. Under the ESA, a species is listed as “endangered” if it is in danger of extinction throughout a significant portion of its range and “threatened” if it is likely to become an endangered species within the foreseeable future throughout all, or a significant part, of its range. Bycatch of ESA-listed wild chinook salmon stocks by the whiting fishery is the most well-documented impact of groundfish fisheries on protected species. Limits on chinook bycatch in the whiting fishery were established as result of the September 27, 1993 Biological Opinion issue pursuant to the ESA. This opinion established the bycatch rate of 0.05 chinook salmon/mt of whiting with an 11,000 fish threshold for the entire whiting fishery (at-sea and shore-base sectors combined). Re-initiation of the Biological Opinion is required if both the bycatch rate and bycatch limit are exceeded (NMFS 2003b). (Table 5-3 in Appendix A shows the incidental annual catch of chinook salmon for all sectors of the whiting fleet combined from 1991 to 2001.)

Other ESA-listed species that may interact with West Coast groundfish fisheries are sea turtles. Four of the six species found in U.S. waters have been sighted off the West Coast. These species include: Loggerhead (*Caretta caretta*), Green (*Chelonia mydas*), Leatherback (*Dermochelys coriacea*), and olive ridley (*Lepidochelys olivacea*). Little is known about the interactions between sea turtles and West Coast fisheries. Directed fishing for sea turtles in West Coast groundfish fisheries is prohibited because of their ESA listings; however, incidental take of sea turtles by longline or trawl gear may occur. (Green, leatherback, and olive ridley sea turtles are listed as endangered; loggerheads are listed as threatened.) The management and conservation of sea turtles is shared between NMFS and the U.S. Fish and Wildlife Service (USFWS). Section 5.1.2 in Appendix A describes the range and occurrence of these species.

In addition to the ESA, the federal MMPA guides marine mammal species protection and conservation policy. Under the MMPA, on the West Coast NMFS is responsible for the management of cetaceans and pinnipeds, while the USFWS manages sea otters. Stock assessment reports review new information every year for strategic stocks and every three years for non-strategic stocks. (Strategic stocks are those whose human-caused mortality and injury exceeds the potential biological removal.) Marine mammals, whose abundance falls below the optimum sustainable population, are listed as “depleted” according to the MMPA.

Fisheries that interact with species listed as depleted, threatened, or endangered may be subject to management restrictions under the MMPA and ESA. NMFS publishes an annual list of fisheries in the *Federal Register* separating commercial fisheries into one of three categories based on the level of serious injury and mortality of marine mammals occurring incidentally in that fishery. The categorization of a fishery in the list of fisheries determines whether participants in that fishery are subject to certain provisions of the MMPA, such as registration, observer coverage, and take reduction plan requirements. West Coast groundfish fisheries are in Category III, denoting a remote likelihood of, or no known, serious injuries or mortalities to marine mammals. Section 5.2.2 in Appendix A describes 25 marine mammal species known to occur off the West Coast. Of these, 16 may interact with groundfish fisheries. Three of these 16

species—the Guadalupe fur seal, Stellar sea lion, and southern sea otter—are listed as threatened under the ESA (see Table 5-4 in Appendix A).

The USFWS is the primary federal agency responsible for seabird conservation and management. Four species found off the West Coast are listed under the ESA. (See Table 5-5 in Appendix A.) In 2002, the USFWS classified several seabird species that occur off the Pacific Coast as “Species of Conservation Concern.” These species include: black-footed albatross (*Phoebastria nigripes*), ash storm-petrel (*Oceanodroma homochroa*), gull-billed tern (*Sterna nilotica*), elegant tern (*Sterna elegans*), arctic tern (*Sterna paradisaea*), black skimmer (*Rynchops niger*), and Xantus’s murrelet (*Synthliboramphus hypoleucus*).

The MBTA implements various treaties and conventions between the U.S. and Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. Under the MBTA, taking, killing, or possessing migratory birds is unlawful. In addition to the MBTA, an EO, Responsibilities of Federal Agencies to Protect Migratory Birds, (EO 13186) directs federal agencies to negotiate Memoranda of Understanding with the USFWS that would obligate agencies to evaluate the impact on migratory birds as part of any NEPA process. The USFWS and NMFS are working on a Memorandum of Understanding concerning seabirds.

In February 2001, NMFS adopted a National Plan of Action (NPOA) to Reduce the Incidental Take of Seabirds in Longline Fisheries. This NPOA contains guidelines applicable to relevant groundfish fisheries and would require seabird incidental catch mitigation if a significant problem is found to exist. As part of NPOA implementation, NMFS assessed the incidental take of seabirds in longline fisheries. During the first year of the West Coast Groundfish Observer Program (WCGOP) (September 2001–October 2002), observers did not document any incidental seabird takes in the limited entry groundfish longline fleet. (During the assessment period, approximately 30% of landings by the limited entry fixed gear fleet had observer coverage.) Appendix A describes 60 seabird species occurring off the West Coast. Three of these species—the short-tailed albatross, California brown pelican, and California least tern—are listed as endangered under the ESA. One species, the marbled murrelet, is listed as threatened.

4.2 Criteria Used to Evaluate Impacts

Presumably, effects on protected species correlate with changes in the level of fishing effort. Increased fishing effort could lead to an increase in interactions between fishing vessels and protected species, while a decrease in fishing effort would have the opposite effect. Thus, changes in fishing effort could be one way to evaluate the relative effects of the alternatives. However, as discussed in Chapter 3 in connection with habitat and ecosystem impacts, there are limited data available on the distribution, intensity, and duration of fishing effort associated with the groundfish fisheries. Furthermore, different gear types would affect protected species differently, so the relative level of fishing effort by gear type would have to be accounted for. Even if such data were available, this distribution and intensity level of fishing effort would have to be correlated with the distribution of protected species. Finally, the effects of resulting interactions (aside from observed mortality) need to be better understood. Given these limitations, the different rebuilding plan targets in the alternatives, which will help to determine annual harvest levels, are used as proxies for fishing effort as criteria to assess the relative potential effects of the alternatives on protected species.

When an agency is evaluating reasonably foreseeable significant adverse effects, there is incomplete or unavailable information, and the costs of obtaining it are exorbitant or the means unknown, the agency must: (1) so state, (2) describe the importance of the unavailable information to the assessment, (3) summarize any existing scientific information, and (4) evaluate impacts based on generally accepted scientific principals (40 CFR Part 1502.22), which may accord with the best professional judgement of agency staff. NMFS acknowledges that the information necessary to fully evaluate impacts to protected species, as described in

the preceding paragraph, cannot be reasonably obtained at this time. Necessary information may become available at a future date. Beginning in 2004, NMFS implemented a vessel monitoring system (VMS) program for limited entry groundfish vessels, which will gather information on the location of vessels. This information may become available to resource managers, allowing a better assessment of the distribution of fishing effort. NMFS is also preparing an EIS addressing the identification and protection of EFH. A predictive risk assessment model is being developed for this project, which includes a fishing effort component (see Chapter 3). When completed, it may be possible to adapt this model to predict likely protected species interactions. The WCGOP is currently gathering data on interactions with protected species. As more data are gathered, the spatial and temporal distribution of interactions will be better understood.

Given the available information and the requirements of NEPA regulations, the remainder of this section describes the available scientific information on interactions, and based on the best professional judgement of agency staff, qualitatively assesses the predicted environmental impacts of the proposed action and alternatives on protected species, based on the best professional judgement of NMFS and Council staff.

4.3 Discussion of Direct and Indirect Impacts

The alternatives will have no direct impacts on protected species. Increased fishing effort could result in an increase in interactions between groundfish fisheries and protected species. Adverse impacts of these interactions could include death, due to capture by or entanglement in fishing gear, changes in the availability of prey species, and changes in behavior that reduce the fitness or reproductive capacity of a protected species. There is some information on gear-related mortality from fishery observers. There is insufficient information to determine what effect, if any, groundfish fisheries have on the availability of prey species and behavioral changes.

Incidental capture of ESA-listed wild salmon stocks is the best documented interaction between protected species and groundfish fisheries. The impacts of incidental catches in the whiting fishery are managed through the Biological Opinion mentioned above. Catch amounts and rates below the thresholds established in the Biological Opinion indicate the impacts are minor. (See Section 5.1.1 in Appendix A for a discussion of these thresholds.) If they are consistently exceeded, consultations would be reinitiated, and additional measures implemented to reduce impacts. Of the four species considered in this amendment, only widow rockfish are caught in significant numbers in the Pacific whiting fishery. In 2002, 135.6 mt of widow rockfish were caught (NMFS 2003a). A small amount of bocaccio, 190 kg, was also caught. If rebuilding measures for widow rockfish force steep reductions in the incidental catch of widow rockfish, changes in fleet activity could also reduce salmon bycatch, independent of any ongoing efforts on the part of the fleet to minimize salmon bycatch.

The groundfish bycatch mitigation draft programmatic EIS (DPEIS) (NMFS 2004b, pp. 4-147-4-160) describes impacts to sea turtles, marine mammals, and seabirds by West Coast groundfish fisheries.

Although incidental capture of sea turtles in various fisheries is a significant source of mortality (see cumulative effects below), the area of operation and gear types used in West Coast groundfish fisheries make it unlikely sea turtles are incidentally caught. Incidental catches of sea turtles have not been documented.

The groundfish bycatch mitigation DPEIS enumerates fishery-related mortality estimates for marine mammals on the West Coast. Most observed mortality has occurred in setnet, gillnet, and trammel net fisheries, which are not groundfish FMP fisheries. Table 4-1 lists marine mammal interactions observed during the first year of the WCGOP. Lethal interactions occurred in both the trawl and longline fisheries, although the highest mortality was of California sea lions taken by trawl gear, with seven individuals. Trawlers also took two

Stellar sea lions and an unidentified sea lion. One unidentified pinniped was taken by a longline vessel. (Seals and sea lions are pinnipeds.) Because marine mammals are diving animals and strong swimmers, they are more likely to be taken by trawl gear than longline gear. They are generally too large to be taken in traps (pots). (Sea otters, which are smaller animals, are an exception in this respect.) Other marine mammals noted as having been taken in West Coast groundfish fisheries are the harbor seal, sea otter, Dall's porpoise, white-sided dolphin, and short-beaked dolphin.

In the North Pacific, where seabird interactions are better documented, seabirds are most commonly incidentally-caught by longline vessels (USFWS 2003). This typically occurs during gear deployment. Seabirds like to forage for discarded offal and bait thrown overboard during fishing operations; they are then attracted to the baited hooks as the line is shot from the vessel. If they become hooked, they can be dragged under the water and drown. Some mortality may occur in trawl fisheries when seabirds may become entangled in cables running from the vessel to sonar gear attached to the net, causing them to drown (USFWS 2003). Similar impacts could occur in West Coast groundfish trawl fisheries. To date, the WCGOP has documented few seabird deaths. Table 4-2 shows observations from the first year of the program, September 2001 to October 2002. Approximately 10% of the coastwide limited entry trawl landed weight and 30% of the limited entry fixed gear landed weight was observed during this period. As shown in the table, five seabirds were taken and nine non-lethal interactions were documented. All the mortality was observed on a trawl vessel, which is unusual. Interactions also occurred on vessels using rod-and-reel, pot, and longline gear. Of the overfished species considered in this amendment, yelloweye rockfish are most commonly caught in fixed gear fisheries, and harvest restrictions have required management measures directed at these fisheries. More ambitious rebuilding targets for this species, requiring a reduction in the OY, could reduce fishing effort and potential seabird interaction in the fixed gear sector.

4.4 Discussion of Cumulative Impacts

The FEIS for the highly migratory species (HMS) FMP (PFMC 2003c), recently implemented by the Council, discusses effects of those fisheries on the range of protected species discussed here, except for ESA-listed salmon. An EIS evaluating the Western Pacific region pelagic fisheries FMP (URS Corporation 2001) presents a comprehensive treatment of cumulative effects to many of the same categories of protected species. Sea turtle stocks affected by those fisheries are the same as potentially interact with West Coast groundfish fisheries. Many of the marine mammals and seabirds affected by Western Pacific pelagic fisheries are different than those occurring off the West Coast, but similar external factors would interact cumulatively with groundfish fisheries to affect protected species. These sources are used to describe cumulative impacts to protected species potentially interacting with West Coast groundfish fisheries.

4.4.1 Cumulative Impacts—ESA-Listed Salmon

The EA for 2003 West Coast ocean salmon fisheries (PFMC 2003a) describes cumulative impacts to salmon stocks. From the perspective of groundfish management, take in salmon fisheries themselves represents a factor contributing to cumulative impacts. Commercial and recreational salmon fisheries are managed to optimize harvest of hatchery-produced fish, while keeping the take of wild, ESA-listed stocks within limits that will ensure their continued existence. Thus, in managing these stocks, all sources of fishing mortality are estimated or accounted for, including incidental take in groundfish fisheries. In addition to factors affecting other fish species, such as fishing mortality and the effect of environmental conditions on stock productivity, salmon are vulnerable to human-caused degradation of freshwater habitat used for spawning. These effects are generally well known and diverse. They include physical barriers to migration (dams), changes in water flow and temperature (often a secondary effect of dams or water diversion projects), and degradation of spawning environments, due to increased silt in the water due to adjacent land use. A very large proportion of the long-term, and often permanent, declines in salmon stocks is attributable to this class

of impacts. For a detailed summary of non-fishing impacts to salmon habitat see Section 3.2.5 of the EFH Appendix in Amendment 14 to the Pacific Coast Salmon FMP (PFMC 2000).

4.4.2 Cumulative Impacts—Sea Turtles

The Western Pacific pelagic fisheries FMP FEIS referenced above identifies these external factors contributing to cumulative effects, (1) fisheries effects (marine and shoreline), (2) impacts on the nesting environment, (3) impacts on the marine environment, and (4) the current and future regulatory regime. This FEIS points out that fishery-related mortality has a particularly strong effect because older, more reproductively important age classes are removed from the population.

Sea turtle populations—particularly loggerheads and leatherbacks—overlap in the eastern and western Pacific, making them vulnerable to a variety of, mainly pelagic, fisheries. However, sea turtles' patchy distribution in time and space makes it difficult to predict which fisheries will most impact them. The Biological Opinion for the Oregon/California drift gillnet fishery (NMFS 2000a) describes fisheries affecting sea turtles. These include longline and purse seine pelagic fisheries prosecuted by both U.S. and foreign vessels, North Pacific driftnet fisheries before 1993, and a range of commercial and artisanal fisheries off the Pacific coast of Latin America. Until recently, sea turtle fisheries were legal in most Pacific coast Latin American countries. Illegal directed take of sea turtles, along with incidental mortality in Baja California, Mexico, is a major source of mortality. West Coast fisheries known to take sea turtles include the California/Oregon drift gillnet fisheries (subject of the referenced Biological Opinion), California set gillnet fisheries, the West-Coast-based pelagic longline fishery, and the albacore troll fishery. According to the Western Pacific pelagic longline FMP FEIS, shoreline recreational fisheries in Hawaii also affect, primarily, green sea turtles, due to hook ingestion and line entanglement.

Sea turtles nest above the upper high tide mark on beaches, an area often heavily used by humans. They are vulnerable when nesting onshore because of directed take, habitat disturbance, and nest predation. A variety of effects can disturb the nesting environment: increased human presence, including vehicles; coastal construction and other development activities; artificial lighting; shoreline erosion and subsequent sand replenishment; and exotic vegetation. In the marine environment a variety of human activities and natural events can affect sea turtles. Marine debris are a major problem; sea turtles may become entangled and drown, or ingest material leading to intestinal blockage and starvation. Coastal and nearshore development activities, such as oil exploration and development, marinas and docks, dredging, power plant cooling, construction blasting, and environmental contaminants, can lead to injury or death. Degradation of marine habitats important to sea turtles—sea grass beds and coral reefs, for example—can limit food sources or refugia. Natural disasters and climate events, such as El Niño, also harm sea turtles (URS Corporation 2001).

Regulatory regimes under U.S. law are intended to reduce the incidental take of sea turtles. The Biological Opinion for the Oregon/California driftnet fishery mandated several measures to reduce leatherback and loggerhead take in this fishery. The Hawaii-based and West Coast-based longline fisheries have been subject to controversy over sea turtle take. Litigation (*Center for Marine Conservation v NMFS* (D. Haw.) Civ. No. 99-00152 DAE) and a subsequent Biological Opinion imposed a range of measures (closed areas, gear restrictions, prohibitions) to limit sea turtle take in the Hawaii-based longline fishery.^{1/} Shallow-set longline fishing, which targets swordfish, has been the major source of sea turtle take, and regulations have focused

1/ As a result of further litigation in Federal Court (*HLA v. NMFS*, Civ No. 01-765 slip op. at 51-62, August 31, 2003), that Biological Opinion and associated regulations were subsequently found unlawful and vacated by the Court. However, in a subsequent October 6, 2003, opinion, the Court ordered that the existing regulations stay in place until April 1, 2004. During this time NMFS prepared a new Biological Opinion, and based on this, issued revised regulations.

on limiting or eliminating this fishery. In response to subsequent litigation, new regulations (along with an FMP amendment) were implemented in April 2004 (see footnote) for fisheries west of 150° W longitude. This new regime substitutes effort limitation, gear modifications (use of circle hooks and different bait), and sea turtle conservation measures for the area closures and shallow-set prohibitions currently in place for pelagic longline fisheries west of 150° W longitude (69 FR 4098, January 28, 2004). The new HMS FMP developed by the Council makes West Coast pelagic longline vessels subject to the sea turtle take reduction measures currently applicable to the Hawaii-based fishery, but does not prohibit shallow-set longlining east of 150° W longitude. However, NMFS disapproved this aspect of the FMP, based on a Biological Opinion for West Coast HMS FMP fisheries (NMFS 2004a), so shallow-set swordfish targeting is prohibited east of 150° W longitude. (Under the HMS FMP, pelagic longlining is prohibited altogether in the West Coast EEZ.) West Coast pelagic longline fisheries also will be subject to the management regime currently in place west of 150° W longitude until the HMS FMP can be amended to make it consistent with ESA requirements in the aforementioned HMS FMP Biological Opinion (NMFS 2004a).

Population viability is another issue related to cumulative impacts. As population declines, productivity may be reduced, due to density dependent effects, including skewed sex ratios. There are also genetic risks; with a smaller gene pool, a population may be less able to evolutionarily adapt to changing environmental conditions. Below a certain point—the minimum viable population—a small population may enter an “extinction spiral” from which recovery is not possible even if mortality is reduced (NMFS 2000a).

4.4.3 Cumulative Impacts—Marine Mammals

Some of the same external factors affecting sea turtles are also relevant to marine mammals. The Western Pacific pelagic fisheries FMP FEIS (URS Corporation 2001) identifies fisheries incidental take, environmental fluctuations, ship traffic and anthropogenic noise, and marine debris as external factors cumulatively affecting marine mammals. According to available data (Table 4-1) it appears California sea lions and Stellar sea lions are most likely to interact with groundfish gear. California sea lions are not listed under the ESA or listed as strategic under the MMPA. Total human-caused mortality is below the Potential Biological Removals threshold (see Section 5.2.2.1 in Appendix A). The eastern Stellar sea lion stock, which occurs in West Coast waters, is listed as threatened under the ESA, depleted under the MMPA, and is classified as a strategic stock. However, total take-related mortality to this stock is below the Potential Biological Removal threshold (see Section 5.2.2.6 in Appendix A). The Oregon/California drift gillnet Biological Opinion (NMFS 2000a) notes that this stock has been in decline. Although the causes are unknown, the Biological Opinion suggests decreased prey availability, due to fisheries and environmental factors, may play a large role. Fisheries interactions also may be a factor. The Biological Opinion provides annual mortality estimates for the following fisheries: southeast Alaska salmon drift gillnet, Alaska salmon troll, British Columbia aquaculture predator control program, Northern Washington tribal setnet fishery, West Coast Pacific whiting trawl fishery, and the Oregon/California drift gillnet fishery, which is the subject of the Biological Opinion. This gives an indication of the range of other fisheries, in addition to West Coast groundfish fisheries, that may be cumulatively affecting Stellar sea lions.

4.4.4 Cumulative Impacts—Seabirds

As noted in the description of direct and indirect impacts, fishery-related seabirds mortality is most commonly due to birds striking baited hooks as they are being deployed from longline vessels. The birds become snagged or ingest the hook, are dragged underwater, and drown. Both the Western Pacific pelagic fisheries FMP FEIS (URS Corporation 2001) and the West Coast HMS FMP FEIS (PFMC 2003c) identify three albatross species with interactions in the pelagic longline fisheries: the black-footed albatross (*Phoebastria nigripes*), the most common albatross in West Coast waters; the Laysan albatross (*P. immutabilis*), more common in the Central and Western Pacific; and the short-tailed albatross (*P. albatrus*) which is listed as

endangered. The short-tailed albatross is of particular concern because they are severely depleted, with a population estimated at about 1,700 individuals and only two known breeding colonies on small islands off of Japan. These three albatross species have also been observed around West Coast groundfish vessels (Table 4-2). Albatrosses are wide-ranging in the Pacific, and the Western Pacific pelagic fisheries FMP FEIS (URS Corporation 2001) describes a range of foreign high seas longline fisheries that may contribute substantially to mortality of these species. In addition, the USFWS has issued Biological Opinions addressing incidental take in both the Hawaii-based pelagic longline fishery (FWS 2000) and Alaska demersal longline fisheries and trawl fisheries (USFWS 2003). Section 5.3.2 in Appendix A describes many other seabird species occurring off the West Coast; five of those species are listed under the ESA (see Appendix A, Table 5-5). Many of these species may minimally or modestly interact with West Coast groundfish fisheries or other fisheries, but are subject to other factors affecting them cumulatively. The Western Pacific pelagic fisheries FMP FEIS (URS Corporation 2001) identified fluctuations in the oceanic environment, extermination, loss of nesting habitat, marine debris and waste disposal, and air strikes as factors, in addition to fisheries take affecting seabirds. Fluctuations in the oceanic environment, such as the PDO and El Niño (discussed in Chapter 3), affect many marine species, including West Coast groundfish. This FEIS describes past military development on Midway atoll in the Northwest Hawaiian Islands as basis for the extermination of seabird species nesting there. This kind of development also may result in the loss of nesting habitat. Short-tailed albatross nesting habitat, which is confined to two small Japanese islands, is threatened by natural events such as volcanic eruptions and mud slides. The marbled murrelet, listed as threatened, ranges from southern Alaska to Northern California and nests in old growth coniferous forests. Further loss of this habitat could affect the species' reproductive success. This species forages in coastal waters. Salmon gillnet fisheries interact with this species (NMFS 2000a). The effects of groundfish fisheries on the marbled murrelet are unknown. However, most commercial groundfish vessels operate further offshore. Fixed gear open access fisheries targeting nearshore groundfish species are a sector operating in inshore areas. (Commercial groundfish harvesting is prohibited in Washington state waters. Nearshore open access fisheries, primarily supplying the live fish market are expanding in Oregon waters but are most active in Central and Southern California waters.) The line gear used in these fisheries is less likely to entangle these seabirds in comparison to the net gear mentioned above in connection with salmon fisheries. The information needed to fully determine whether there is any incidental take of this seabird species by groundfish fisheries, which would cumulatively affect this species, is currently unavailable. Available WCGOP data (see Table 4-2) shows one interaction with this seabird species: a marbled murrelet landed on the deck of a trawl vessel. Continuing observer coverage will increase the information base for determining what impact, if any, the groundfish fishery is having on this species. In the meantime, the available information, reviewed here, does not suggest that groundfish fisheries are an important contributor to any cumulatively significant adverse impacts to this species. but observes only cover a portion of all vessels.

4.4.5 Potential Unintended Consequences

Because of their very nature, describing unintended consequences is speculative. However, this discussion provides the public with another perspective on cumulative interactions of the proposed action and other actions and events. Protected species interactions could increase if stock rebuilding measures change the distribution and intensity of fishing effort. Recovery of overfished stocks could result in an overall increase in fishing effort leading to more interactions. Changes in the distribution of fishing effort stemming from management measures needed to rebuild stocks could increase or decrease interactions with different protected species. Changes in the configuration of the RCA, for example, could concentrate fishing effort in nearshore or offshore areas, increasing the likelihood of interactions with protected species occurring in those zones. Effort could shift among fishery sectors as a consequence of allocation decisions made on the basis of differential bycatch rates among sectors. (In other words, the Council could preferentially allocate fishing opportunity to sectors with lower bycatch rates of overfished species.) Given that different gear types interact with various protected species in different ways, this could change the interaction rate for a given

protected species. For example, if more fishing effort were to shift into fixed gear fisheries, this could increase interactions with seabirds, while a reduction in trawl fishing effort could decrease interactions with some marine mammal species.

4.5 Summary of Impacts

The impacts of the alternatives to protected species are evaluated in the same way as impacts to habitat and ecosystem. Changes in fishing effort intensity and distribution are inferred and used as a basis for predicting impacts.

4.5.1 No Action Alternative

OYs for bocaccio and cowcod under the precautionary framework (40-10 rule) would require restrictive management for fisheries in Southern California, especially recreational fisheries. This could reduce fishery interactions with protected species. Over the long term, bocaccio OYs are projected to increase more rapidly under No Action in comparison to the action alternatives, which could result in relatively more fishing effort and potential interactions with protected species. Recreational fisheries in Southern California likely have modest impacts on protected species, particularly those of greatest concern, as discussed above (e.g., Stellar sea lion, short-tailed albatross). The recreational sector would have to be curtailed in the short term, since these fisheries account for a large proportion of bocaccio (and cowcod) catches. A large increase in bocaccio OYs in the long term could allow more relaxation of limits on commercial fisheries, if recreational demand were to reach some natural ceiling, but limits on other overfished species, primarily canary rockfish in the Monterey area, would ultimately constrain these fisheries.

As mentioned in Chapter 3, the No Action Alternative is not legally viable for widow and yelloweye rockfish because these stocks are not projected to rebuild under the precautionary framework. Leaving aside the question of legality, fisheries north of Cape Mendocino could expand under the No Action Alternative. Interactions with marine mammals, including the Stellar sea lion, could increase, as well as interactions with seabirds. Since incidental catch of salmon in the Pacific whiting fishery, which is also subject to widow rockfish OYs because of bycatch, is already regulated under a Biological Opinion, any increase in incidental salmon take would be dealt with through this process. There is no evidence these fisheries interact with sea turtles.

4.5.2 The Action Alternatives

South of Cape Mendocino, the OYs for bocaccio and cowcod under the action alternatives are unlikely to require substantial change in the management measures currently in place. Therefore, impacts to protected species are unlikely to change from current conditions. Changes in OYs for widow rockfish would likely reduce interactions with protected species under Alternative 3 and Alternative 4; effects are unlikely to differ from current conditions under Alternative 1 and Alternative 2. As noted in Chapter 3, there is no practical difference among the alternatives in terms of OYs for yelloweye rockfish; current management measures would not have to be changed substantially specifically to further limit yelloweye rockfish OYs. For these reasons, under any of the action alternatives there is no expectation that take limits established in relevant Biological Opinions, or PBR thresholds under the MMPA, would be exceeded as a consequence of the proposed action.

4.5.3 The Council-Preferred Alternative

The Council-preferred Alternative adopts a combination of rebuilding strategies from Alternatives 1 through 4. These strategies are moderately risk averse and similar to the interim rebuilding strategies used

in 2003 and 2004 to establish harvest limits (OYs) for those years. In the near term, impacts to protected species are likely to remain at levels experienced in the recent past. As with the action alternatives, there is no take limits established in relevant BOs, or PBR thresholds under the MMPA would be exceeded as a consequence of implementing the preferred alternative. Over the long term, OYs for overfished species are expected to increase, given the likelihood of increases in the biomass of overfished stocks. This may result in an increase in fishing activity and consequent interactions with protected species.

TABLE 4-1. Interactions between marine mammals and the Pacific Coast groundfish fisheries documented by West Coast Groundfish Observers^{a/} between September 2001 and October 2002.

Species	Gear Type	Type of Interaction
California Sea Lion (<i>Zalophus californianus</i>)	Trawl	7 Individuals Taken
Unidentified Pinniped	Longline	1 Individual Taken
Unidentified Sea Lion	Trawl	1 Individual Taken
Steller Sea Lion (<i>Eumetopias jubatus</i>)	Trawl	2 Individuals Taken
California Sea Lion (<i>Zalophus californianus</i>)	Both Trawl and Longline	Feeding on Discard
Steller Sea Lion (<i>Eumetopias jubatus</i>)	Both Trawl and Longline	Feeding on Discard
Pacific White-Sided Dolphin (<i>Lagenorhynchus obliquidens</i>)	Trawl	Feeding on Discard

a/ Between September 2001 and October 2002, approximately 10% of the coastwide limited entry trawl landed weight and 30% of the limited entry fixed gear landed weight was observed.

TABLE 4-2. Interactions between seabirds and the Pacific Coast groundfish fisheries documented by West Coast Groundfish Observers^{a/} between September 2001 and October 2002.

Species	Gear Type	Type of Interaction
Unidentified Gull (<i>Larus species</i>)	Trawl	1 Individual Taken
Unidentified Sea Bird	Trawl	4 Individuals Taken
Short-Tailed Albatross (<i>Phoebastria albatrus</i>)	Longline and Trawl	Feeding on Discard
California Brown Pelican (<i>Pelecanus occidentalis californicus</i>)	Rod and Reel	Feeding on Discard
Marbled Murrelet (<i>Brachyramphus marmoratus</i>)	Trawl	Landed on Deck
Black-Footed Albatross (<i>Phoebastria nigripes</i>)	Trawl, Longline, and Pot	Feeding on Discard
Leach's Storm-Petrel (<i>Oceanodroma leucorhoa</i>)	Trawl	Landed on Deck
Cassin's Auklet (<i>Ptychoramphus aleuticus</i>)	Trawl	Landed on Deck
Pigeon Guillemots (<i>Cephus columba</i>)	Pot	Feeding on Discard
Laysan Albatross (<i>Phoebastria immutabilis</i>)	Pot	Feeding on Discard
Unidentified Cormorant (<i>Phalacrocorax species</i>)	Rod and Reel	Feeding on Discard
Unidentified Storm Petrel (<i>Oceanodroma species</i>)	Longline	Landed on Deck
Unidentified Shearwater (<i>Puffinus species</i>)	Pot	Feeding on Deck

a/ Between September 2001 and October 2002, approximately 10% of the coastwide limited entry trawl landed weight and 30% of the limited entry fixed gear landed weight was observed.

