

Executive Summary

ES.1 The Proposed Action

The Pacific Fishery Management Council (Council) and National Marine Fisheries Service (NMFS, also called NOAA Fisheries - National Oceanic and Atmospheric Administration, U.S. Department of Commerce) propose to evaluate, at a broad scale, how to minimize bycatch in the West Coast groundfish fisheries to the extent practicable, minimize the mortality of unavoidable bycatch, and ensure that bycatch is reported and monitored as required by law. The proposed action would establish the policies and program direction to achieve this purpose. Upon completion of this Final Programmatic Environmental Impact Statement (PEIS), the Council is expected to begin preparing a groundfish fishery management plan (FMP) amendment or series of amendments and/or regulatory actions that will include the conservation and management measures necessary to minimize bycatch and to minimize the mortality of bycatch that cannot be avoided, to the extent practicable. This PEIS is intended to provide the analytical underpinnings for that effort.

ES.1.1 Why is Action Needed?

The 1996 Sustainable Fisheries Act established National Standard 9 of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). National Standard 9 requires that “Conservation and management measures shall, to the extent practicable, (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.” Section 303(a)(11) of the Magnuson-Stevens Act requires each FMP to “establish a standardized reporting methodology to assess the amount and type of bycatch occurring in the fishery, and include conservation and management measures that, to the extent practicable and in the following priority –

- (A) minimize bycatch; and
- (B) minimize the mortality of bycatch which cannot be avoided.”

The Council’s Groundfish FMP includes provisions relating to bycatch mitigation. Some measures, such as gear definitions and restrictions, have been established as long-term regulations that remain in effect until the Council and NMFS amend them. Other measures are established through the biennial management process and expire at the end of each two-year fishing period. The current bycatch mitigation program is not clearly spelled out in a single place. Rather, elements are spread throughout the FMP, the regulations as recorded in the *Code of Federal Regulations*, various FMP amendments, and numerous *Federal Register* notices. The proposed action is needed to describe the elements of the groundfish bycatch program, to identify the various bycatch mitigation tools available to the Council, to evaluate the effects and effectiveness of those

tools, and to evaluate potential improvements that might result from other combinations and applications of bycatch mitigation tools. A comprehensive program to minimize bycatch and bycatch mortality to the extent practicable in the groundfish fishery would (1) reduce waste, discard, and collateral damage to marine plants and animals by groundfish fishing activities on the Pacific coast, (2) collect and report appropriate and adequate information to support the groundfish fishery management program, and (3) balance these needs with environmental and social values.

ES.1.2 What is the Purpose of the Proposed Action?

The Council appointed an ad hoc Environmental Impact Statement Oversight Committee (Committee) to provide direction to drafters of this EIS. The Committee identified the following objectives for the groundfish bycatch mitigation program, which the Council subsequently adopted. These objectives define the purpose of the proposed action:

- account for total fishing mortality by species
- establish monitoring and accounting mechanisms to keep total catch of each groundfish stock from exceeding the specified limits
- reduce unwanted incidental catch and bycatch of groundfish and other species
- reduce the mortality of animals taken as bycatch
- provide incentives for fishers to reduce bycatch and flexibility/opportunity to develop bycatch reduction methods
- monitor incidental catch and bycatch in a manner that is accurate, timely, and not excessively costly
- reduce unobserved fishing-caused mortalities of all fish
- gather information on unassessed and/or non-commercial species to aid in development of ecosystem management approaches.

This EIS has been prepared as a programmatic document to assist the Council and NOAA Fisheries in taking the next steps necessary to meet the bycatch requirements of the Magnuson-Stevens Act.

ES.1.3 Background

Since 1996, the Council has prepared two FMP amendments to bring the FMP into compliance with the Magnuson-Stevens Act bycatch minimization requirements. The first attempt was Amendment 11. NMFS disapproved the bycatch provisions of that amendment as inadequate and returned it to the Council for further consideration. The Council and NMFS worked together to prepare Amendment 13, which NMFS subsequently approved. However, the amendment was challenged in federal district court. The court disapproved Amendment 13 and its accompanying Environmental Assessment (EA) as inadequate in Pacific

Marine Conservation Council v. Evans, 200 F.Supp.2d 1194 (N.D. Calif. 2002). This court ruling is referred to as PMCC in this EIS.

In PMCC, the court made several rulings with respect to the adequacy of the Amendment 13 bycatch revisions and the EA. The court held that Amendment 13 failed to establish a standardized reporting methodology because it established neither a mandatory nor an adequate observer program. Further, the court held that the amendment did not minimize bycatch and bycatch mortality because it failed to include all practicable management measures in the FMP itself. The court also found a lack of reasoned decisionmaking, as the amendment rejected four specific bycatch reduction measures (fleet size reduction, marine reserves, vessel incentives, and discard caps) without consideration on their merits. With respect to NEPA, the EA prepared for Amendment 13 failed to address adequately the ten criteria for an action's significance set forth in the CEQ regulations at 40 CFR 1508.27(b), and also failed to analyze reasonable alternatives, particularly the immediate implementation of an adequate at-sea observer program and bycatch reduction measures.

This PEIS addresses the specific legal deficiencies identified by the court in the PMCC decision. Since the PMCC decision, Amendment 16-1 to the FMP has made the ongoing West Coast Groundfish Observer Program mandatory within the FMP. The Council is expected to prepare an FMP amendment that will include additional conservation and management measures necessary to minimize bycatch and to minimize the mortality of bycatch that cannot be avoided, to the extent practicable. This PEIS is intended to provide the analytical underpinnings for that effort. In addition to other bycatch mitigation tools, it includes consideration of fleet size reduction, marine reserves, vessel incentives, and discard caps, as required by the PMCC decision.

Since the early 1990s, the FMP has required fishing vessels to carry observers at the request of NMFS. In August 2001, NMFS initiated a mandatory groundfish fishery observer program. The West Coast Groundfish Observer Program is conducted by the Fishery Resource Analysis and Monitoring Division of the NMFS Northwest Fisheries Science Center. Later, the Council and NMFS adopted a mandatory observer program into the FMP via Amendment 16-1. NMFS approved this amendment on November 14, 2003.

The Groundfish FMP covers more than 80 species of groundfish, many of which are caught together with a variety of fishing gears that are used to target groundfish. Groundfish are also caught incidentally in fisheries for non-groundfish species, such as pink shrimp and California halibut. As of July 2004, eight groundfish species are designated as overfished: darkblotched rockfish, canary rockfish, lingcod, yelloweye rockfish, bocaccio rockfish, cowcod (also a

rockfish species), widow rockfish, and Pacific ocean perch (another rockfish).^{1/} The Council has prepared (or is in the process of preparing) a plan to rebuild each of these species.

The groundfish fishery off the West Coast of the United States is executed from the Canadian to Mexican borders. Many types of vessels participate in this fishery. They range in size from 8 foot long kayaks to 120 foot trawlers, and vessels that fish in nearshore to offshore waters. These vessels use various types of gear including bottom trawls, midwater trawls, pots, longlines and other hook and line gear. Trawlers take the majority of commercially-harvested groundfish. The catch can be incredibly diverse in species and fish size and overall catch size can vary widely as well. In many cases, a portion of the catch is retained and another portion of the catch, that may be of the wrong size, species, or is over management retention limits, is discarded at sea. Discarded fish are called bycatch.

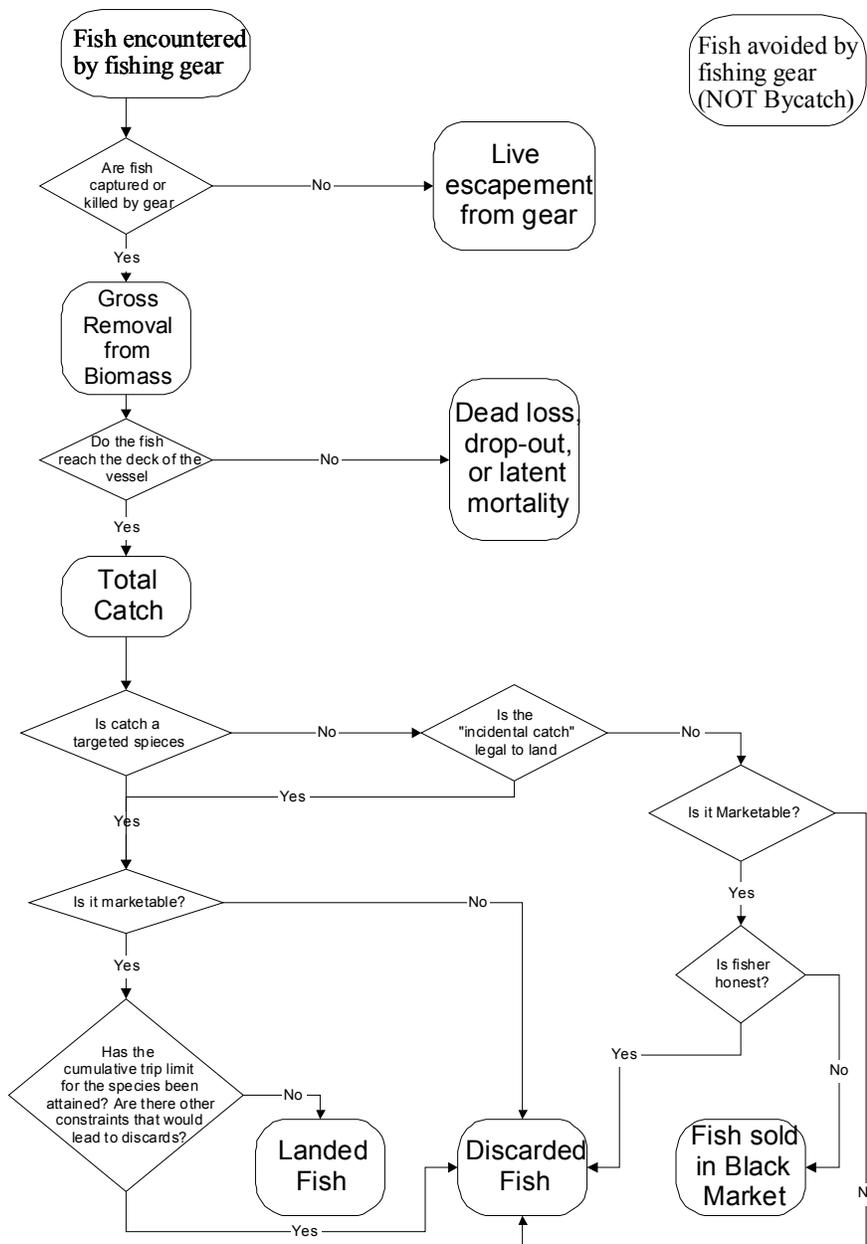
Figure ES.1 illustrates the meaning of bycatch and other catch-related terms as they are defined and used in the Magnuson-Stevens Act and Groundfish FMP. Some fish encounter fishing gear but escape alive. However, there will almost always be some unobserved mortality resulting from injury when fish encounter fishing gear, especially mass-contact types of gear, such as trawl gear. The latent or pass-through mortality of fish escaping from a trawl net may be quite high, depending on the design and manner in which the gear is fished as well as its mesh size. Additional delayed mortality may occur after fish escape gear. This type of mortality may be related to the stress of capture and physiological injuries which subsequently turn out to be fatal. There may also be mortality associated with gear that is lost or abandoned — the bycatch resulting from this is often called ghost fishing. NMFS considers this unobserved fishing-related mortality included in the definition of bycatch because it constitutes a harvest of fish that are not sold or kept for personal use (63 FR 24235, May 1, 1998).

ES.2 Measuring Environmental Consequences

Short-term effects are mortalities resulting from fisheries, including harvest and incidental mortality that occurs when fishers capture and then release groundfish and other species. Long-term effects are changes in the abundance of successive generations of the affected stock that may occur as a result of reductions in short-term impacts and the consequent increase in the species' populations. These effects are qualitatively described in this PEIS.

¹ Pacific whiting, which had previously been designated as overfished, has recently been declared rebuilt.

Cumulative effects are changes to groundfish stocks and other marine animal populations that may result from a combination of short- and long-term effects of the actions in the groundfish fisheries, along with the effects of other past, present, or foreseeable future actions. Changes to the human environment stem from modifying management measures and the conduct of fisheries. These are described in terms of bycatch mitigation tools: changes in harvest specifications, season duration and structure, harvest, fishing effort, commercial fisheries, and



angler benefits. Social and cultural effects are qualitatively described for the communities of commercial and recreational fishers and for coastal communities and tribes.

Figure ES.1: Diagrammatic representation of bycatch and other catch-related terms.

ES.3 The Alternatives

The Draft PEIS addressed five alternatives to the current bycatch management program. At its April 2004 meeting, the Council created and adopted a seventh alternative that combined elements of those alternatives (Table E.S.1). Each of the seven alternatives would use many of the current mitigation tools, but may use different combinations or may apply some differently. Alternative 1 is the no action/status quo. It describes the current bycatch program. Alternative 2 would emphasize capacity reduction, which means reducing the size of the commercial groundfish fleet. Specifically, it would reduce the trawl fleet by half (50%) from the number permitted to fish in 2002-2003. Since this alternative was proposed, a federal buyback program was approved and implemented, resulting in 91 trawl vessels being permanently eliminated and reducing the number of trawl fleet participants by 35%. That buyback program made the effects of Alternative 2 more similar to Alternative 1. Alternative 3 would reduce fishing effort by reducing the amount of groundfish fishing time for every commercial vessel. This reduction might be through shorter seasons, establishing fishing platoons, or other methods to limit fishing. Alternative 4 would allocate a portion of the available harvest to identified sectors and manage each of those sectors based on their catch and bycatch levels. These allocations would be fishing mortality limits for various species, and achievement of any sector limit would result in closure of that sector. In addition, Alternative 4 would use a combination of catch limits and trip limits. Any vessel reaching a catch limit would be required to stop fishing in that sector for the remainder of the period. Alternative 5 would replace trip limits with dedicated access privileges (individual fishing quotas or IFQs), which would be defined as catch or mortality limits. Quota holders would be allowed to buy and sell these quota shares. Discard caps for overfished species would also be established. Alternative 6 would focus on reducing bycatch to near zero by establishing no-take marine reserves, individual vessel catch quotas, and prohibiting discard of most groundfish. Alternative 7, the Council's preferred alternative, combines elements of Alternatives 1, 4 and 5. It would primarily use sector allocations and reward those sectors with the best bycatch minimization performance. It would encourage individual vessels to carry observers at the vessel's expense and provide larger trip limits for those vessels, in combination with catch limits for overfished species. Those vessels that participate would be exempted from the sectors and not be closed if a sector were closed. In the longer term, the Council will support development of IFQs (as proposed in Alternative 5) for appropriate sectors and vessels.

Table E.S.1 provides a brief summary of the bycatch mitigation tools used in each alternative, but does not portray many of the important details and intricacies. The details of these alternatives are spelled out in Chapter 2 and further described in Chapter 4.

Table E.S.1. Bycatch reduction methods (bycatch mitigation tools) included in the alternatives.

	<u>Alt 1</u>	<u>Alt 2</u>	<u>Alt 3</u>	<u>Alt 4</u>	<u>Alt 5</u>	<u>Alt 6</u>	<u>Alt 7</u>
Harvest Levels							
ABC/OY	Y	Y	Y	Y	Y	Y	Y
Set overfished groundfish catch caps							
Use trip limits	Y	Y	Y	Y	N	N	Y
Use catch limits	N	N	N	Y	Y	Y	Y
Set individual	N	N	N	Y	Y	Y	Y
Set groundfish discard caps							
Establish IQs	N	N	N	N	Y	Y	Y
Establish bycatch performance standards							
Establish a reserve	N	N	N	Y	N/Y	Y	Y
Gear Restrictions							
Rely on gear	Y	Y	Y	Y	N	Y	Y
Time/Area Restrictions							
Establish long term closures for all groundfish fishing	N	N	N	N	N/Y	Y	N
Establish long term closures for on-bottom fishing	N	N	N	N	N/Y	Y	N
Capacity reduction (mandatory)	Y	Y(50%)	Y	Y	Y	Y	Y
Monitoring/Reporting							
Trawl logbooks	Y	Y	100%	Y	N	N	N
Fixed-gear logbooks	N	N	100%	Y	N	N	N
CPFV logbooks	N	N	N	Y	N	N	N
Commercial port sampling							
Recreational	Y	Y	Y	>Y	N/Y	Y	>Y
Observer coverage (commercial)	10%	10%	10%+ logbook verification	increased, by sector (10-60%?)	100%	100%	increased, sector (10-60%)
CPFV observers	N	N	N	Y	Y	100%	Y
VMS	Y	Y	Y	Y	Y	Y	Y
Post-season observer data OK	Y	Y	Y	N	N	N	N
Inseason observer data required	N	N	N	Y	Y	Y	Y

Table E.S.1. Bycatch reduction methods (bycatch mitigation tools) included in the alternatives.

Rely on fish tickets
as the primary
monitoring tool for
groundfish landings
inseason

Y	Y	Y	N	N	N	N
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E.S. 4. The Affected Environment

Chapter 3 describes the physical and biological environment that may be affected by the proposed action and alternatives. In general, aspects of the environment that may be affected include: the groundfish species managed under the FMP, other fish that may be captured intentionally or unintentionally by commercial, recreational and tribal fishers, marine mammals and seabirds; the physical environment, including essential fish habitat; and, social and economic conditions for fishery participants, communities, and the general public that consumes fish products from the region.

ES.4.1 Environmental Impacts of the Alternatives

Chapter 4 describes numerous environmental impacts that may occur if no action is taken or if any of the alternatives is adopted. The results of the analyses of impacts are summarized in Tables ES.2 through ES.5 at the end of this section.

Each alternative substantially reduces bycatch compared to an unregulated groundfish fishery. The status quo minimizes bycatch by establishing large marine protected areas that greatly reduce the likelihood that fishers will catch any overfished species within the boundaries. Thus, these MPAs nearly eliminate encounter/bycatch of overfished species within the boundaries, and also bycatch of other fish. The use of trip (retention) limits outside the MPAs will continue to result in regulatory discard/bycatch of groundfish, both overfished and non-overfished species. Economic discard/bycatch of small or otherwise low-value groundfish will continue. The groundfish observer program will monitor a fraction of active commercial fishing vessels.

Alternative 2 would be expected to reduce regulatory bycatch of groundfish. The degree of reduction depends on how constraining current trip limits are; bycatch of species that are typically discarded for economic (non-regulatory) reasons would not be reduced significantly. Bycatch of non-groundfish would not be directly affected. However, reduced commercial trawl fishing effort would be expected to reduce fishing impacts. Because the groundfish trawl fleet has recently been reduced by 91 vessels, the amount of change from Alternative 2 would be substantially less than originally expected. The level of observer coverage would be increased, resulting in a larger fraction of active commercial fishing vessels being observed. This would improve catch and bycatch information.

Alternative 3 would be expected to reduce regulatory bycatch of groundfish to a similar degree as Alternative 2. Groundfish regulatory bycatch would be reduced as a result of larger trip limits. However, shorter fishing periods could result in different bycatch patterns, and could also increase a race for fish as fishers would fish harder at the beginning of the season to hedge against premature season

closure. Predicting fishing effort, which is required for developing trip limits, would be severely compromised. While it may be possible to maintain some groundfish product flow to markets over much of the year, no individual vessels would be permitted to operate for more than a few months each year.

Alternative 4 would substantially reduce groundfish regulatory discard/bycatch (compared to the status quo) by assigning every commercial limited entry vessel to one or more sectors. Annual fishing mortality allocations for each overfished species would be established for each sector. All vessels in a sector would be required to stop fishing for the remainder of the year if any of its caps were reached. Trip limits would continue to be established and, in addition, individual vessel fishing mortality caps could be established to prevent premature closure due to a few participating vessels with high bycatch rates. These catch limits would be similar to trip limits, except that a vessel reaching any cap would have to stop fishing for the remainder of the cumulative period. The observer program would be restructured to monitor bycatch in each sector, with data available inseason. Vessels carrying observers would have larger trip limits for non-overfished groundfish; vessels could provide an observer at their expense to gain access to the larger limits. Non-regulatory bycatch of groundfish and other species would not be significantly affected by this alternative unless all trip limits were defined as catch limits. In that case, vessels would retain a larger proportion of groundfish because all catch would apply towards the vessel limits.

Alternative 5 would establish a rights-based program of individual fishing quotas. These would be annual catch limit shares that could be traded or sold. Reaching any quota would require the vessel to stop fishing until it obtained additional quota. The observer program would be expanded to cover all commercial vessels participating in the quota program. The value of restricted species quota (RSQ) shares (for overfished species) would increase; initial shares for some severely depleted species (such as canary and yelloweye rockfish) would be less than 100 pounds. All catch of overfished species would have to be retained. This alternative would substantially reduce groundfish both regulatory and economic bycatch; encounter/bycatch and discard/bycatch would be reduced. The pace of fishing would likely slow substantially, providing greater opportunity to avoid bycatch of other species also. Catch and bycatch data on all species would be improved substantially. Gear regulations would be relaxed to allow and encourage experimentation and development of gear and techniques that would eventually reduce bycatch as much as technically feasible. Administration costs related to the observer and quota monitoring programs would increase substantially. This would be partially offset by a reduced pre-season process for developing trip limits and other management measures; the process of inseason trip limit adjustments would no longer be needed. Adverse impacts to the marine biological environment would be significantly reduced compared to Alternatives 1, 2, 3 and 4. Social and economic conditions would be significantly affected;

some changes would be beneficial, some would be adverse, depending on the individual and the quota program design.

Alternative 6 would establish large no-take marine reserves that would eliminate encounter/ bycatch of all species (both groundfish and non-groundfish) within the boundaries. Individual catch quotas, similar to those of Alternative 5, would be established. Groundfish discard caps would nearly eliminate groundfish discard/bycatch. However, unless exceptions were established, these discard caps would increase the mortality of bycatch that could not be avoided. In addition, disposal of unusable fish on land would increase. Observers would monitor catch and bycatch of all commercial vessels (except those without adequate space or facilities). Monitoring of recreational fisheries would also be increased. Commercial vessels would be required to use only gears that had been certified as low bycatch gear. This would substantially reduce bycatch in the short term compared to all other alternatives. However, Alternative 5 would be expected to develop more effective bycatch avoidance gears and methods over time because innovation would be allowed. Adverse impacts to the marine biological environment would be significantly reduced compared to Alternatives 1, 2, 3 and 4. Adverse impacts may or may not be reduced compared to Alternative 5. Social and economic conditions would be significantly affected, especially short-term adverse impacts resulting from no-take reserves, gear restrictions and discard prohibitions. Long-term beneficial effects would be faster rebuilding of overfished groundfish stocks, fish habitat renewal and growth, larger and more numerous fish near reserve boundaries, and areas where relatively un-fished ecosystems can develop.

Alternative 7 would substantially reduce groundfish regulatory discard/bycatch (compared to the status quo) by assigning every commercial limited entry vessel to one or more sectors. Annual fishing mortality allocations for each overfished species would be established for each sector. All vessels in a sector would be required to stop fishing for the remainder of the designated period if any of its caps were reached. Trip limits would continue to be used for each sector. In addition, individual vessels could gain access to larger trip limits for non-overfished groundfish by paying for full observer coverage. These vessels would be assigned non-tradeable restricted species quotas for overfished species and would stop fishing for groundfish if any catch limit were reached. This would guarantee that their sector would not be closed by other vessels that fail to reduce their catch and/or bycatch of overfished species. These catch limits could be of similar duration to trip limits, and would be similar to individual, non-transferable quotas that would expire at the end of the period. The observer program would be restructured to monitor bycatch in each sector and to provide catch and bycatch data inseason. Regulatory bycatch of overfished species would be reduced, especially by vessels that volunteer for catch limits. These vessels would also be likely to reduce non-regulatory (economic) bycatch/discard of groundfish because they would want to maximize their revenues before reaching any catch limit. For

vessels participating in sectors, regulatory and economic bycatch would be reduced over time as additional observer data became available. This would be especially true as observer data become available inseason. Bycatch of other groundfish species would not be significantly affected by this alternative unless all trip limits were defined as catch limits. In that case, vessels would retain a larger proportion of groundfish because all catch would apply towards the vessel limits.

ES.5 Practicability of Bycatch Minimization Methods

The Council determined that Alternative 7 minimizes bycatch to the extent practicable. The Council recognized that eliminating all groundfish bycatch is not practicable because it would require vessels to retain all fish caught or else not fish. By grouping vessels into sectors, and rewarding sectors that more effectively mitigate bycatch, vessels will be encouraged to develop methods and gears that better achieve the FMP's bycatch minimization objectives. Alternative 7 requires allocations to sectors and the subsequent monitoring and management by sector, both of which would increase management costs substantially. However, the Council believes the allocations are feasible and the observer program may be modified to achieve the desired results. Development of the monitoring infrastructure will take time, but will also lay important groundwork for development of dedicated access programs (individual fishing quotas). The Council found that Alternatives 5 and 6, which appear to be more environmentally preferred, are not practicable at this time for a variety of reasons.

Information and analysis provided in Chapters 3 and 4 of this EIS contributed to that determination.

Table E.S.2. Summary of how well alternatives achieve the stated purposes for the proposed action.

Purpose of Proposed Action	Alt 1 (no action)	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Account for total fishing mortality by species	The current observer program provides statistically reliable estimations of groundfish mortalities.	I+	I+	S+	S+	S+	S+
Establish monitoring and accounting mechanisms to keep total catch of each groundfish stock from exceeding the specified limits	Trip and bag limits, application of the bycatch model and inseason tracking of landings are moderately effective but less than 100% successful.	I+	I+	S+	S+	S+	S+
Reduce unwanted incidental catch and bycatch of groundfish and other species	Area closures (Rockfish Conservation Areas), seasons and gear restrictions reduce unwanted catch. Trip limits create regulatory bycatch (discard).	I	I	S+	S+	S+	S+
Reduce the mortality of animals taken as bycatch	Prohibited species must be returned to the sea as quickly as possible with minimum of injury.	U	U	U	U	S-	U
Provide incentives for fishers to reduce bycatch and flexibility/opportunity to develop bycatch reduction methods	Trip limits reduce the race for fish and provide some minimal opportunity and incentives to avoid bycatch.	I+	I-	CS+	S+	CS+	S+
Monitor incidental catch and bycatch in a manner that is accurate, timely, and not excessively costly	The current program minimizes user and agency costs of monitoring catch and bycatch at the expense of precision and timeliness.	I	I	S+/S-	S+/S-	S+/S-	S+/S-
Reduce unobserved fishing-caused mortalities of all fish	Area closures (RCAs), gear definitions and seasons mitigate potential mortalities.	I	I	CS+	S+	S+	CS+
Gather information on unassessed and/or non-commercial species to aid in development of ecosystem management approaches.	Over a period of years, information on non-commercial and unassessed stocks will improve.	I	I	CS+	S+	S+	CS+

Performance Ratings, compared to status quo/no action alternative:

Substantial Beneficial (S+): Substantial improvement from status quo expected.

Substantially Adverse (S-): Substantially increased costs or reduced effectiveness expected.

Conditionally Substantial Beneficial (CS+): Substantial improvement expected if certain conditions are met or events occur, or the probability of improvement is unknown.

Conditionally Substantial Adverse (CS-): Substantially increased costs expected if certain conditions met, or the probability of occurrence is unknown.

Insubstantial Beneficial (I+)/Insubstantial Adverse (I-): Changes are anticipated but not expected to be major.

Unknown (U): This determination is characterized by the absence of information sufficient to adequately assess the direction or magnitude of the impacts.

Table ES.3. Significance of effects on the biological environment.

Resource	Alt 1 (no action)	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Groundfish	The current bycatch program provides statistically reliable estimations of groundfish bycatch and bycatch mortalities and mitigates many potential impacts. Trip and bag limits, application of the bycatch model and inseason tracking of landings are moderately effective but less than 100% successful in preventing overfishing. Trip limits create regulatory bycatch of groundfish.	I+	I+	S+	S+	S+	S+
Other Relevant Fish, Shellfish and Squid	Impacts on species such as Pacific halibut are reduced from recent years due to large area closures to protect overfished groundfish (primarily rockfish).	U	U	S+	S+	S+	S+
Protected Species	Area closures (Rockfish Conservation Areas), seasons and gear restrictions reduce potential catches. Protected species must be returned to the sea as quickly as possible with minimum of injury.	I+	I-	CS+	CS+	CS+	CS+
Salmon	Salmon bycatch in the Pacific whiting fisheries is closely monitored. Voluntary bycatch avoidance methods have proven effective, especially in the at-sea sectors	U	U	I+	I+	CS+	I+
Seabirds	Few seabird interactions have been documented; seasons and area closures could increase or decrease interactions.	I+	I-	CS+	CS+	CS+	CS+
Marine Mammals	Few marine mammal takings have been documented, and all are within current standards.	I+	I-	S+/S-	CS+	CS+	S+/S-
Sea Turtles	No sea turtle interactions have been observed in the groundfish fisheries.						
Miscellaneous Species	Area closures (RCAs), gear definitions and seasons mitigate potential mortalities. Little information is available.	U	U	CS+	CS+	S+	CS+
Biological Associations	Over a period of years, information on non-commercial and unassessed stocks will improve. Little information is available at this time.	U	U	CS+	S+	S+	CS+

Significance Ratings, compared to status quo/no action alternative:

Significant Beneficial (S+): Significant improvement from status quo expected.

Significant Adverse (S-): Significantly increased adverse impacts or reduced effectiveness expected.

Conditionally Significant Beneficial (CS+): Significant beneficial impacts expected if certain conditions are met or events occur (such as full observer coverage), or the probability of impacts is unknown.

Conditionally Significant Adverse (CS-): Significantly increased adverse impacts expected if certain conditions met, or the probability of occurrence is unknown.

Insignificant Beneficial (I+)/Insignificant Adverse (I-): Minor impacts, if any, are anticipated.

Unknown (U): This determination is characterized by the absence of information sufficient to adequately assess the significance of the impacts.

Table E.S.4(a). Summary of effects of Alternatives 1 and 2 on the social and economic environment (Alternatives 3 - 7 in following tables).

	Alternative 1	Alternative 2
Incentives to Reduce Bycatch	Quota-induced discards may occur when fishers continue to harvest other species when the harvest guideline of a single species is reached and further landings of that species are prohibited. As trip limits become more restrictive and as more species come under trip-limit management, discards are expected to increase. In addition, discretionary discards of unmarketable species or sizes are thought to occur widely. However, in comparison to a race for fish allocation system, the current management regime provides harvesters a considerable amount of flexibility to reduce unwanted catch and discards.	Reducing the level of effort in the groundfish fisheries and increasing trip limits would likely reduce the level of groundfish bycatch (discard).
Commercial Harvesters	By spreading out fishing more evenly over the year, the current management regime helps maintain traditional fishing patterns. However, landings of major target species (other than Pacific whiting) are expected to continue to decline as OYs are reduced to protect overfished species. Declining harvests lead to significant decreases in total groundfish ex-vessel value.	Further fleet reduction would be expected to reduce (but not eliminate) extra capacity in the fishery and to restore the fleet to some minimum level of profitability.
Recreational Fishery	Landings of major target species are not expected to increase and may decline further if OYs are reduced to protect overfished species. Decreased harvests lead to significant decreases in recreational value.	Changes in landings of major species targeted in the recreational fishery would be expected to be insignificant.
Tribal Fishery	Changes in landings of major species targeted in tribal fisheries are expected to be insignificant.	Effects as described in Alternative 1
Buyers and Processors	The current management regime reduces the likelihood that processing lines will be idle by fostering a regular flow of product to buyers and processors. However, decreased deliveries of groundfish to processors and buyers will result in significant decrease in groundfish product value.	No significant changes in the total amount of fish delivered to processors is expected. With fewer vessels in the fishery, processors would have fewer boats to schedule for landings. The related reductions in time spent unloading vessels is expected to result in cost savings. However, processors in ports that experience a reduction in fleet size may be negatively affected if they are unable to obtain supplies of fish from alternative sources

Table E.S.4(a). Summary of effects of Alternatives 1 and 2 on the social and economic environment (Alternatives 3 - 7 in following tables).

	Alternative 1	Alternative 2
Communities	By maintaining year-round fishing and processing opportunities, the current management regime promotes year-round employment in communities. However, groundfish employment and labor income are expected to continue to decline, resulting in economic hardship for businesses involved in the groundfish fisheries. These businesses will likely continue to diversify to reduce dependence on groundfish fisheries.	The direction and magnitude of many of the economic effects on particular coastal communities are uncertain, as the distribution of the post-buyback fleet is uncertain. If further reduction in fleet capacity with higher trip limits were successful in increasing net revenues or profits to remaining commercial fishers, positive economic impacts on the communities where those fishers land their fish, home port and reside would be expected. On the other hand, some communities may experience a significant loss of vessels and a consequent decrease in income, jobs and taxes.
Consumers	The current management regime allows buyers and processors to provide a continuous flow of fish to fresh fish markets, thereby benefitting consumers. Consumers of fresh or live groundfish may be adversely affected by reduced commercial landings. However, changes in benefits to most consumers of groundfish products would be expected to be insignificant due to availability of substitute products.	Effects as described in Alternative 1
Fishing Vessel Safety	Some gains in fishing vessel safety are at least partially realized under the current management regime, as fishers are able to fish at a more leisurely pace and avoid fishing in dangerous weather or locations. However, safety of human life at sea may decrease if reduced profits induce vessel owners to forgo maintenance, take higher risks or hire inexperienced crews.	Increases in net revenue to harvesters resulting from increases in trip limits may enhance their ability to take fewer risks and use their best judgment in times of uncertainty, thereby increasing vessel safety.
Management and Enforcement Costs	The management regime is expected to continue to be contentious, difficult and expensive. Technological developments such as VMS may mitigate the rate at which management costs escalate.	Costs are expected to decrease, as fewer vessels are generally easier and less expensive to monitor.

Table E.S.4(b). Summary of effects of Alternatives 3 and 4 on the social and economic environment (Alternatives 1 and 2 on preceding table; Alternatives 5, 6 and 7 in following table).

	Alternative 3	Alternative 4
Incentives to Reduce Bycatch	If trip limits increase, the level of groundfish bycatch (discard) would be expected to decline.	While it would be in the best interest of all vessels within a sector to reduce the catch of overfished species, a race for fish could develop in which individual vessels eschew fishing practices that reduce bycatch in order to attain their landing limits as quickly as possible. Setting individual catch limits would prevent that. In addition, if cooperative patterns of behavior emerge, decreases in bycatch would be expected.
Commercial Harvesters	A combination of higher trip limits and a reduction in the length of the fishing season would be expected to lead to an overall reduction in variable fishing costs. With larger trip limits, revenues per trip are expected to increase. However, the overall impact of this alternative on costs and revenues would depend on when individual participants were allowed to fish. For example, fishers may be unable to fish for certain species at optimal times.	A reduction in harvest and exvessel revenues could result from early attainment of overfished species sector caps. However, the total amount of fish available for retained harvest would be expected to increase, as vessels would increase retention of groundfish, and the level of bycatch would be measured more accurately through expanded observer coverage. The economic benefit of increased landings must be weighed against the additional operating costs that vessel owners would incur from the expanded observer coverage. The allocation of catch limits to individual sectors could lead to economic benefits if private agreements allocating transferable harvesting privileges were negotiated.
Recreational Fishery	Effects as described in Alternative 2	This alternative may have a negative economic effect on recreational fishers if its sector catch limit were exceeded. The ability to detect excessive catches within the recreational sector would be enhanced by a CPFV observer program and expanded port/field sampling. The ability of the recreational sector to avoid a fishery closure by controlling catch of overfished species through an incentive program is likely to be limited, as there are many and diverse participants. Dividing the recreational sector into geographical (e.g., state-based) subsectors could mitigate some of the negative effects.
Tribal Fishery	Effects as described in Alternative 1	Changes in landings of major species targeted in tribal fisheries are expected to be insignificant.

Table E.S.4(b). Summary of effects of Alternatives 3 and 4 on the social and economic environment (Alternatives 1 and 2 on preceding table; Alternatives 5, 6 and 7 in following table).

	Alternative 3	Alternative 4
Buyers and Processors	Larger trip limits would not be expected to affect the total amount of fish that harvesters deliver to processors. However, with vessels taking longer and potentially fewer trips, processors would have fewer boats to schedule for landings and unloading, reducing their average costs. On the other hand, costs could increase if processors were unable to control the flow of product throughout the year and capital is idle during closed periods.	The economic effects on buyers and processing companies are unknown because of the uncertainty as to how well vessel owners within sectors can successfully manage bycatch. To the extent that commercial harvesters adopt bycatch-reducing fishing tactics, processors and buyers would be expected to benefit from higher catches. On the other hand, if an entire fishing sector is shut down, buyers and processors may experience significant shortages of fish.
Communities	The impacts are uncertain, as community patterns of fishery participation vary seasonally based on species availability as well as the regulatory environment and oceanographic and weather conditions. If larger trip limits resulted in increased net revenues or profits to fishers, positive economic impacts on the communities would be expected. On the other hand, seasonal closures could leave crew members at least temporarily unemployed.	To the extent that harvesting sectors are not shut down, no significant economic impact on communities is likely. However, if sector closures occurred, there would likely be negative impacts in fishing communities, particularly if processing plants were also closed.
Consumers	Consumers of fresh or live groundfish could be unable to obtain fish from the same sources for half of the year unless the harvest sectors were split into two groups, with one group of vessels active at any given time.	If no early closures of major harvesting sectors occur, the impact on consumers would be expected to be negligible. However, if major fishing sectors were shut down, consumers of fresh or live groundfish could be adversely affected.
Fishing Vessel Safety	The effects on vessel safety may be mixed. Increases in net revenue to harvesters resulting from increases in trip limits may lead to reductions in injury and loss of life because of harvesters incentives to take fewer risks and use their best judgment in times of uncertainty. However, set seasons make it more difficult for harvesters to make wise decisions as to when and where to fish.	The effects on vessel safety are uncertain. Possible increases in the profitability of harvesting operations could lead to reductions in injury and loss of life because of harvesters' enhanced ability to maintain equipment, take fewer risks and use their best judgment in times of uncertainty. If fishers within a sector perceive a greater likelihood of premature fishery closure, vessels would likely be more active early in the year (winter and early spring) when conditions may be more dangerous.

Table E.S.4(b). Summary of effects of Alternatives 3 and 4 on the social and economic environment (Alternatives 1 and 2 on preceding table; Alternatives 5, 6 and 7 in following table).

	Alternative 3	Alternative 4
Management and Enforcement Costs	Effects will vary depending on the way the seasonal closure is structured. Costs are expected to decline if there is no fishing activity to monitor for 6 months of the year. However, there will be increased costs if permit holders are divided into groups.	Costs would be expected to increase as catch limits were allocated over an increasing number of sectors. It would be necessary to obtain precise and reliable estimates of the quantities of target and non-target catches within each sector. An expanded port/field sampling program to improve estimates of recreational catch would entail a larger budget for the state and federal agencies currently involved in data collection.

Table E.S.4(c). Summary of effects of Alternatives 5, 6 and 7 on the social and economic environment. (Alternatives 1- 4 in preceding tables).

	Alternative 5	Alternative 6	Alternative 7
Incentives to Reduce Bycatch	The amount of fish discarded by each vessel would be counted against the vessel's limit. This measure provides strong economic incentives to reduce the catch of unwanted fish because it internalizes the costs of discarding fish.	Marine reserves would prohibit fishers from fishing in certain areas in order to reduce the probability that fish will be caught and discarded, while the 100% retention requirement would be the primary means of reducing groundfish bycatch (discard) outside of marine reserves. Prohibiting discard would produce a strong incentive to avoid unwanted catch because the costs of sorting, storing, transporting and disposing of fish that cannot be sold may be substantial. If vessel groundfish quotas are transferable, Alternative 6 would be similar to Alternative 5; if not transferable, negative effects would be much more significant and more similar to Alternative 4.	While it would be in the best interest of all vessels within a sector to reduce the catch of overfished species, individual vessels may forgo fishing practices that reduce bycatch in order to attain their landing limits as quickly as possible. Setting individual catch limits would prevent that. In addition, if cooperative patterns of behavior emerge, decreases in bycatch would be expected.
Commercial Harvesters	Current vessel owners as a group would likely benefit from a system that allocates freely transferable quota shares to vessel owners on the basis of catch histories. Moreover, the total amount of fish available for harvest would increase, as bycatch would be measured more	Some measures would significantly increase fishing costs, while others would reduce them. For example, 100% groundfish retention, full observer coverage, and establishment of marine reserves would increase average costs, whereas the establishment of ITQs for groundfish	A reduction in harvest and exvessel revenues could result from early attainment of overfished species sector caps. However, the total amount of fish available for retained harvest would be expected to increase, as vessels would increase retention of groundfish, and the level of bycatch

Table E.S.4(c). Summary of effects of Alternatives 5, 6 and 7 on the social and economic environment. (Alternatives 1- 4 in preceding tables).

	Alternative 5	Alternative 6	Alternative 7
	accurately through expanded observer coverage. Not all vessel owners would benefit equally, and the relative benefits would depend on the allocation formula. In addition, the economic benefits must be weighed against the additional operating costs that vessel owners would incur from the expanded observer coverage.	species would reduce costs.	would be measured more accurately through expanded observer coverage. The economic benefit of increased landings must be weighed against the additional operating costs that vessel owners would incur from the expanded observer coverage. Establishment of allocations among sectors could lead to economic benefits if private agreements allocating transferable harvesting privileges were negotiated.
Recreational Fishery	The creation of tradeable quota shares for the commercial fishing/processing sectors is not expected to apply to the recreational fishery. The possibility of creating ITQs for recreational fishers may exist, but any discussion of how such a allocation would be achieved or its effects on recreational fishers would be speculative.	Rights-based system effects would be as described in Alternative 5. Marine reserves could benefit recreational fishers over the long term if local catch rates and fish size increased due to spillage of adults out of the marine reserves. However, if marine reserves resulted in geographic redistribution of the commercial and recreational fleets, the concentration of fishing effort in the areas that remain open could lead to localized stock depletion, reduced recreational catch per unit effort, and reduction in the quality of the fishing experience.	This alternative may have a negative economic effect on recreational fishers if its sector catch limit were exceeded. The ability to detect excessive catches within the recreational sector would be enhanced by improved port/field sampling. Incentive programs are likely to be limited, as there are many and diverse participants. Dividing the recreational sector along geographical boundaries could mitigate some of the negative effects.
Tribal Fishery	Effects as described in Alternative 1	Effects as described in Alternative 1	Changes in landings of major species targeted in tribal fisheries are expected to be insignificant. However, potential effects of overfished species allocations are significant
Buyers and Processors	Buyers and processors would be expected to benefit from the anticipated increases in fish landings. The overall level of benefits and the distribution of benefits across processors may depend largely on the formula for allocating	The net economic effect on buyers and processors is uncertain. In general, buyers and processors would be expected to benefit from the anticipated increases in fish landings that result from the implementation of a rights-based	The economic effects on buyers and processing companies are uncertain because of the uncertainty as to how well vessel owners manage bycatch. To the extent that commercial harvesters adopt bycatch-reducing fishing

Table E.S.4(c). Summary of effects of Alternatives 5, 6 and 7 on the social and economic environment. (Alternatives 1- 4 in preceding tables).

	Alternative 5	Alternative 6	Alternative 7
	<p>quota shares. Arguments have been made that harvester-only ITQ programs may result in stranded capital in the processing sector and a shift in the balance of bargaining power toward harvesters. These potential adverse effects could be mitigated if processors were also allocated quota shares.</p>	<p>system. The 100% retention requirement could also result in a large increase in landings. However, it is uncertain how much of the additional fish retained would be marketable. Because of their lack of mobility, buyers and processors may be especially negatively affected by marine reserves. However, the effects of marine reserves on specific buyers and processing companies will depend in part on changes in local supply and how processors have adapted to current supply situations.</p>	<p>tactics, processors and buyers would be expected to benefit from higher catches. On the other hand, if an entire fishing sector is shutdown, buyers and processors may experience significant shortages of fish.</p>
Communities	<p>Consolidation of fishing and processing activities to fewer vessels and plants would likely result in reductions in the numbers of crew members and processing workers employed. Granting quota shares to community groups could help maintain existing harvesting and processing patterns and serve to meet concerns about employment in communities.</p>	<p>Effects of a right-based management system as described in Alternative 5. Marine reserves would be expected to help ensure harvests for future generations and the sustained participation of communities in groundfish fisheries. If, however, marine reserves resulted in substantial decreases in groundfish catches over the short term, the economic hardships that fishing families and other members of communities are experiencing under Alternative 1 (no action) would be exacerbated.</p>	<p>To the extent that harvesting sectors are not shut down, no significant economic impact on communities is likely. However, if sector closures occurred, there would likely be negative impacts in fishing communities, particularly if processing plants were also closed.</p>
Consumers	<p>Consumers would be expected to benefit from the anticipated increases in fish landings. There is some chance that consumers could be negatively affected, if a rights-based system leads to a decrease in the overall competitiveness of markets for certain groundfish products (e.g., live fish). The likelihood of this occurring would depend both</p>	<p>Consumers would benefit from the anticipated increased landings that result from a rights-based system. In addition, over the long term, marine reserves that effectively increase the size and variety of seafood species could make consumers better off. On the other hand, large marine reserves could substantially decrease seafood supply enough to make consumers</p>	<p>If supplies of fish remain consistent, the impact on consumers would be expected to be negligible. However, if major fishing sectors were shut down, consumers of fresh or live groundfish could be adversely affected.</p>

Table E.S.4(c). Summary of effects of Alternatives 5, 6 and 7 on the social and economic environment. (Alternatives 1- 4 in preceding tables).

	Alternative 5	Alternative 6	Alternative 7
	on the level of consolidation that might occur and the elasticity of demand for particular products.	worse off, at least in the short term. Marine reserves could have a positive effect on those consumers who derive non-consumptive benefits from marine ecosystems, including non-market benefits (e.g., existence value).	
Fishing Vessel Safety	Possible increases in the profitability of harvesting operations would likely lead to reductions in injury and loss of life because of harvesters' enhanced ability to maintain equipment, take fewer risks and use their best judgment in times of uncertainty.	The net effect of the various measures included in this alternative on fishing vessel safety is uncertain. The establishment of ITQs for groundfish species is expected to promote vessel safety by reducing the pressure to fish under dangerous conditions. On the other hand, the establishment of marine reserves may result in a reduction in fishing vessel safety if the closure of fishing grounds results in vessels fishing farther from port and possibly in more hazardous areas.	The effects on vessel safety are uncertain. Possible increases in the profitability of harvesting operations could lead to reductions in injury and loss of life because of harvesters' enhanced ability to maintain equipment, take fewer risks and use their best judgment in times of uncertainty. With individual vessel catch limits, some vessels will have more choice of when and where to fish. Winter and early spring fishing may increase if vessels in a sector anticipate premature closures.
Management and Enforcement Costs	The costs of monitoring, enforcement and administration would be expected to increase significantly. Cost recovery measures such as a fee on quota holders would be expected.	Full (100%) observer coverage would be required, which would facilitate enforcement of a full retention regulation. The enforcement costs of establishing marine reserves vary with several factors, including the location, number, size, and shape of the marine reserves and types of activities restricted and allowed.	Costs would be expected to increase with allocations to multiple sectors. It would be necessary to obtain precise and reliable estimates of the quantities of target and non-target catches within each sector. An expanded port/field sampling program to improve estimates of recreational catch would entail a larger budget for the state and federal agencies currently involved in data collection.

Table E.S.5(a). Summary of direct, indirect and cumulative effects of Alternatives 1, 2 and 3.

Resource Issue or Category	Alternative 1	Alternative 2	Alternative 3
Habitat: Trawl and other gear contacting the bottom damage benthic organisms and physical structure			
Direct/Indirect	No change from baseline	No change from baseline	No change from baseline
Cumulative	No change from baseline	No change from baseline	No change from baseline
Ecosystem/Biodiversity: Lowered abundance of particular species changes ecosystem structure, stock declines lead to local/regional extinction.			
Direct/Indirect	No change from baseline	No change from baseline	No change from baseline
Cumulative	No change from baseline	No change from baseline	No change from baseline
Groundfish: Bycatch and bycatch mortality of overfished and other groundfish			
Direct/Indirect	Catch rates of overfished species such as canary and bocaccio rockfish may delay or prevent rebuilding. Discard/bycatch of other groundfish could remain high due to constraints for overfished species.	Reduced fishing effort expected to reduce bycatch and bycatch mortality of overfished and other groundfish. Latent capacity remains and could negate any savings.	Effects may be similar to Alternative 1 if shortened season does not result in larger trip limits.
Cumulative	Canary and bocaccio rockfish may not be sustainable.	Higher probability of rebuilding overfished species. Reduced bycatch and bycatch mortality of other groundfish may allow fuller resource utilization but not necessarily increased abundance.	Effects may be similar to Alternative 1 if shortened season does not result in larger trip limits.
Protected species: Bycatch and bycatch mortality of Pacific halibut, Pacific salmon, marine birds and mammals.			
Direct/Indirect	No change from baseline	No change from baseline	Interactions are thought to be low, but may be completely absent during seasonal closures. Halibut bycatch depends on timing of seasonal closures.
Cumulative	No change from baseline	No change from baseline	Interactions with birds depend on timing of seasonal closures.
Accountability: Increased monitoring bycatch and bycatch mortality improves accountability.			
Direct/Indirect	Provides for statistically reliable measures of bycatch on an annual basis, but not inseason.	Marginal improvement in monitoring coverage of trips.	Marginal improvement in monitoring coverage of trips
Cumulative	Lack of timely inseason data may lead to unsustainable fisheries for some overfished species.	Similar to Alternative 1 - data cannot be used in-season.	Similar to Alternative 1 - data cannot be used in-season

Table E.S.5(b). Summary of direct, indirect and cumulative effects of Alternatives 4, 5, 6 and 7 for West Coast groundfish fisheries.

Resource Issue or Category	Alternative 4	Alternative 5	Alternative 6	Alternative 7
Habitat: Trawl and other gear contacting the bottom damage benthic organisms and physical structure				
Direct/Indirect	No change from baseline	Reduction in closed areas	Reduction in closed areas	No change from baseline
Cumulative	No change from baseline	Increased growth of living benthic habitat (sponges and corals) in closed areas.	Increased growth of living benthic habitat (sponges and corals) in closed areas.	No change from baseline
Ecosystem/Biodiversity: Lowered abundance of particular species changes ecosystem structure, stock declines lead to local/regional extinction.				
Direct/Indirect	No change from baseline	Increased growth and abundance of some species in closed areas	Increased growth and abundance of some species in closed areas	No change from baseline
Cumulative	No change from baseline	Increased biodiversity in closed areas	Increased biodiversity in closed areas	No change from baseline
Groundfish: Bycatch and bycatch mortality of overfished and other groundfish				
Direct/Indirect	Reduces bycatch and bycatch mortality of overfished species in particular - due to RSQ caps for overfished species.	Reduces bycatch and bycatch mortality of overfished and other groundfish through use of MPAs, RSQs and IFQs for overfished and other groundfish.	Reduces bycatch and bycatch mortality of all groundfish through use of no-take reserves, RSQs, IFQs, and 100% groundfish retention requirement.	Reduces bycatch and bycatch mortality of overfished species in particular - due to RSQ caps for overfished species.
Cumulative	Higher likelihood and rate of rebuilding, with possible exception of bocaccio rockfish.	Higher likelihood and rate of rebuilding of overfished groundfish, possible increases in other groundfish populations.	Highest likelihood and rate of rebuilding of overfished groundfish. Increased size and diversity of groundfish within closed areas.	Higher likelihood and rate of rebuilding, with possible exception of bocaccio rockfish.
Protected species: Bycatch and bycatch mortality of Pacific halibut, Pacific salmon, marine birds and mammals.				
Direct/Indirect	No change from baseline.	Small reductions in bycatch and bycatch mortality within protected areas.	Small reductions in bycatch and bycatch mortality within protected areas.	No change from baseline.
Cumulative	No change from baseline.	No change from baseline.	No change from baseline.	No change from baseline.

Table E.S.5(b). Summary of direct, indirect and cumulative effects of Alternatives 4, 5, 6 and 7 for West Coast groundfish fisheries.

Resource Issue or Category	Alternative 4	Alternative 5	Alternative 6	Alternative 7
Accountability: Increased monitoring bycatch and bycatch mortality improves accountability.				
Direct/Indirect	Significantly improved monitoring coverage. In-season data can be used to make in-season adjustments. Accurate in-season accounting of overfished stocks of groundfish.	Significantly improved monitoring coverage with 100% observer coverage of commercial fleet. Real-time accounting of groundfish. Discard/ bycatch of overfished groundfish nearly eliminated in commercial fisheries.	Significantly improved monitoring coverage with 100% observer coverage of commercial fleet. Real-time accounting of all groundfish catch. No groundfish discard/bycatch.	Significantly improved monitoring coverage. In-season data can be used to make in-season adjustments. Accurate in-season accounting of overfished stocks of groundfish.
Cumulative	Reduced risk and higher likelihood of rebuilding overfished stocks of groundfish.	Reduced risk and higher likelihood of rebuilding overfished groundfish stocks.	Reduced risk and higher likelihood of rebuilding overfished groundfish stocks.	Reduced risk and higher likelihood of rebuilding overfished stocks of groundfish.