ALLOCATION
OF
THE PACIFIC SARDINE
HARVEST GUIDELINE

AMENDMENT 11 TO THE COASTAL PELAGIC SPECIES FISHERY MANAGEMENT PLAN

ENVIRONMENTAL ASSESSMENT, REGULATORY IMPACT REVIEW & REGULATORY FLEXIBILITY ANALYSIS

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Cover Sheet
Amendment 11 Environmental Assessment

Proposed Action: The proposed action is to implement a comprehensive, long-term allocation framework to apportion the annual Pacific sardine harvest guideline (HG) among the various sectors of the sardine fishery. The environmental context is sardine stocks in the West Coast Exclusive Economic Zone (EEZ), harvesters and processors of the sardine resource on the West Coast, and the fishing communities within which they reside.

Type of Statement: Environmental Assessment

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Abstract:

The Pacific Fishery Management Council (Council) adopted the Coastal Pelagic Species (CPS) Fishery Management Plan (FMP) in 1998. The CPS FMP was implemented by National Marine Fisheries Service (NMFS) in December 1999 (64 FR 69888). The FMP originally contained an allocation formula based on the two subareas divided at 35° 40' N latitude (approximately Point Piedras Blancas, California, see Figure 1). This formula was incorporated into Federal management from existing California state law. The state law was designed to balance fishing opportunity between the Southern California-based fishery and the Monterey-based fishery. Subsequently, the Pacific sardine biomass expanded and fisheries developed in the Pacific Northwest. With this expansion, under the original formula, the northern area allocation was shared by Monterey-, Oregon-, and Washington-based fisheries. Oregon and Washington fishery interests expressed concern to the Council that the original allocation framework did not provide optimal harvest opportunity to the respective fishery sectors, because of both the size of the allocation shares and the timing of harvest opportunity. Ex-vessel landings in all sectors are driven by domestic and international market forces for sardines, as well as the availability and markets for other species of economic benefit to sardine vessels and processors (for example, market squid). The Northern California fishery and PNW fishery are also affected by adverse weather. In April 2003, the Council recommended to NMFS an interim framework for allocating sardine. The revised allocation system changes the subarea boundary to 39° N. latitude (Point Arena, California) and timing of allocation and reallocation of the HG. NMFS implemented the revised allocation framework on September 4, 2003 for the 2003–2005 fishing seasons, and also in 2005 (if the 2005 HG is at least 90% of the 2003 HG). (68 FR 52523). Using the best available information, the interim allocation framework was rapidly developed to address concerns in the short-term. At the time, it was understood that

more information and time would be needed to develop a more comprehensive, longer-term allocation framework, which is why the proposed action is needed.

This environmental assessment (EA) evaluates eight alternative allocation schemes to replace the interim allocation framework which has been in place for the 2003–2005 fishing seasons. These alternatives include No Action, which is the original formula currently in the FMP; Status Quo, which is the interim allocation formula; and six action alternatives, including the Council-preferred alternative. The purpose of this EA is to provide information to determine if significant impacts to the human environment are likely, which would be a reason for preparing an environmental impact statement. During scoping analysts identified four environmental components requiring such an evaluation: (1) incidental take of protected species, specifically salmon stocks listed under the Endangered Species Act (ESA) and incidentally caught in the sardine fishery; (2) changes in the regional pattern of exvessel revenue, affecting the harvest sector; (3) changes in the regional pattern of producer surplus, affecting buyers and processors; and (4) changes in the regional pattern of personal income, affecting fishing communities where sardine fisheries are located. The analysis in Chapter 4 of this EA concludes that the Council-preferred alternative will not have significant impacts on the human environment.

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Acronyms and Glossary

CDP	Census designated place
CEQ	Council on Environmental Quality
Council	Pacific Fishery Management Council
CPS	Coastal pelagic species are schooling fish, not associated with the ocean bottom, that migrate in coastal waters. They usually eat plankton and are the main food source for higher level predators such as tuna, salmon, most groundfish, and humans. Examples are herring, squid, anchovy, sardine, and mackerel.
CPSAS	Coastal Pelagic Species Advisory Subpanel
CPSMT	Coastal Pelagic Species Management Team
CWT	Coded-wire tags are small pieces of stainless steel wire that are injected into the snouts of juvenile salmon and steelhead. Each tag is etched with a binary code that identifies its release group.
CZMA	Coastal Zone Management Act. The main objective of the CZMA is to encourage and assist states in developing coastal zone management programs, to coordinate state activities, and to safeguard the regional and national interests in the coastal zone. It requires that any federal activity (including fishery management regulations) directly affecting the coastal zone of a state be consistent with that state's approved coastal zone management program, since activities that take place beyond the territorial sea may affect the coastal zone.
EA	Environmental assessment. As part of the National Environmental Policy Act (NEPA) process, an EA is a concise public document that provides evidence and analysis for determining whether to prepare an environmental impact statement (EIS) or a Finding of No Significant Impact.
EEZ	Exclusive Economic Zone
EIS	Environmental impact statement. As part of the National Environmental Policy Act (NEPA) process, an EIS is an analysis of the expected impacts resulting from the implementation of a fisheries management or development plan (or some other proposed action) on the environment. EISs are required for all fishery management plans as well as significant amendments to existing plans. The purpose of an EIS is to ensure the fishery management plan gives appropriate consideration to environmental values in order to prevent harm to the environment.

ENSO	*El Niño* Southern Oscillation. Abnormally warm ocean climate conditions, which in some years affect the eastern coast of Latin America (centered on Peru) often around Christmas time. The anomaly is accompanied by dramatic changes in species abundance and distribution, higher local rainfall and flooding, and massive deaths of fish and their predators. Many other climactic anomalies around the world are attributed to consequences of *El Niño*.
EO	Executive Order
ESA	Endangered Species Act. An act of federal law that provides for the conservation of endangered and threatened species of fish, wildlife, and plants. When preparing fishery management plans, councils are required to consult with the National Marine Fisheries Service and the U.S. Fish and Wildlife Service to determine whether the fishing under a fishery management plan is likely to jeopardize the continued existence of an ESA-listed species or to result in harm to its critical habitat.
ESU	Evolutionarily significant unit
FMP	Fishery Management Plan. A plan, and its amendments, that contains measures for conserving and managing specific fisheries and fish stocks.
FONSI	Finding of no significant impact. As part of the National Environmental Policy Act (NEPA) process, a finding of no significant impact (FONSI) is a document that explains why an action that is not otherwise excluded from the NEPA process, and for which an environmental impact statement (EIS) will not be prepared, will not have a significant effect on the human environment.
FRAM	Fishery Regulation Assessment Model. Typically used for salmon.
HG	Harvest guideline(s). A numerical harvest level that is a general objective, but not a quota. Attainment of a harvest guideline does not require a management response, but it does prompt review of the fishery.
H&G	Head and gut. Typically referring to sardines.
IQF	Individually quick freeze
IRFA	Initial regulatory flexibility analysis.
ITS	Incidental Take Statement
LCR	Lower Columbia River
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act. The Act established the 200-mile fishery conservation zone, the regional fishery management council system, and other provisions of U.S. marine fishery law.

MBTA	Migratory Bird Treat Act
MMPA	Marine Mammal Protection Act. The MMPA prohibits the harvest or harassment of marine mammals, although permits for incidental take of marine mammals while commercial fishing may be issued subject to regulation. (See "incidental take" for a definition of "take").
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSY	Maximum sustainable yield. An estimate of the largest average annual catch or yield that can be continuously taken over a long period from a stock under prevailing ecological and environmental conditions. Since MSY is a long-term average, it need not be specified annually, but may be reassessed periodically based on the best scientific information available.
NAO	NOAA Administrative Order
NEPA	National Environmental Protection Act
NMFS	National Marine Fisheries Service. A division of the U.S. Department of Commerce, National Ocean and Atmospheric Administration (NOAA). NMFS is responsible for conservation and management of offshore fisheries (and inland salmon). The NMFS Regional Director is a voting member of the Council.
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
OCN	Oregon coastal natural (coho)
OY	Optimum yield. The amount of fish that will provide the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities, and taking into account the protection of marine ecosystems. The OY is developed on the basis of the Maximum Sustained Yield from the fishery, taking into account relevant economic, social, and ecological factors. In the case of overfished fisheries, the OY provides for rebuilding to a level that is consistent with producing the Maximum Sustained Yield for the fishery.
PBR	Potential biological removal.
PDO	Pacific Decadal Oscillation
PNW	Pacific Northwest
PS	Producer surplus

PV	Percent value
RFA	Regulatory Flexibility Act. Regulatory Flexibility Act (see IRFA and FRFA above). See below. The Regulatory Flexibility Act (5 U.S.C. 601-612) requires federal agencies to consider the effects of their regulatory actions on small businesses and other small entities and to minimize any undue disproportionate burden.
RIR	Regulatory Impact Review. RIRs are prepared to determine whether a proposed regulatory action is "major." The RIR examines alternative management measures and their economic impacts.
SAFE	Stock Assessment and Fishery Evaluation. A SAFE document is a document prepared by the Council that provides a summary of the most recent biological condition of species in the fishery management unit, and the social and economic condition of the recreational and commercial fishing industries, including the fish processing sector. It summarizes, on a periodic basis, the best available information concerning the past, present, and possible future condition of the stocks and fisheries managed in the FMP.
SBA	Small Business Administration
Secretary	U.S. Secretary of Commerce
STT	Salmon Technical Team
USFWS	U.S. Fish and Wildlife Service
UWR	Upper Willamette River
WDFW	Washington Department of Fish and Wildlife

1.0 INTRODUCTION

1.1 The Proposed Action

The proposed action is to implement a comprehensive, long-term allocation framework to apportion the annual Pacific sardine HG among the various sectors of the sardine fishery. The Pacific sardine resource is healthy and abundant, supporting fisheries in California (Los Angeles harbor area and Monterey Bay area), in Oregon (Port of Astoria), and Washington (ports of Westport and Ilwaco). When considering the impacts of the proposed action on the human environment, the context is sardine stocks in the West Coast Exclusive Economic Zone (EEZ), harvesters and processors of the sardine resource on the West Coast, and the fishing communities within which they reside.

The purpose of the proposed action is to foster optimal resource utilization and equitably allocate harvest opportunity.

1.2 Why the Proposed Action is Needed

The Pacific Fishery Management Council (Council) adopted the Coastal Pelagic Species (CPS) Fishery Management Plan (FMP) in 1998. The CPS FMP was implemented by National Marine Fishery Service (NMFS) in December 1999 (64 FR 69888). The original Pacific sardine allocation formula in the FMP partitioned 33% of the annual HG to the northern subarea ("Subarea A") and 66% to the southern subarea ("Subarea B"). Nine months after the January 1 start of the fishery (i.e., October 1), the remaining HG was pooled and re-allocated 50%–50% to each subarea. The original boundary between the two subareas was 35° 40' N latitude (approximately Point Piedras Blancas, California, see Figure 1). This formula was incorporated into Federal management from existing California state law. The state law was designed to balance fishing opportunity between the Southern California-based fishery ("South") and the Monterey-based fishery ("North"). At the time of the FMP implementation, this was considered a Status Quo action (as the sardine fishery occurred, principally, in California) with no environmental impacts. No alternative allocation formulae were considered.

As the Pacific sardine biomass expanded, fisheries developed in the Pacific Northwest (PNW). With this expansion, under the original formula, the northern area allocation was shared by Monterey-, Oregon-, and Washington-based fisheries. Oregon and Washington fishery interests expressed concern to the Council that the original allocation framework did not provide optimal harvest opportunity to the respective fishery sectors. Each of the three sectors operates over a unique schedule. Generally, Southern California starts harvesting sardine January 1 and harvest increases steadily throughout the year; Northern California starts in August (tied to market squid availability) and harvest increases through January or February of the following year; and Oregon and Washington have a much more abbreviated season, which starts in June and ends in October. Because these sectors operate on very different schedules, annual allocations help to ensure that each sector receives a reasonable fishing opportunity. Exvessel landings in all sectors are driven by domestic and international market forces for sardines, as well as the availability and markets for other species of economic benefit to sardine vessels and processors (for example, market squid). The Northern California fishery and PNW fishery are also affected by adverse weather.

In April 2003, the Council recommended to NMFS an interim framework for allocating sardine. The revised allocation system: (1) changed the definition of Subarea A (northern subarea) and Subarea B (southern subarea) by moving the geographic boundary between the two areas from 35° 40' N. latitude (Point Piedras Blancas, California) to 39° N. latitude (Point Arena, California), (2) moved the date when Pacific sardine that remains unharvested is reallocated to Subarea A and Subarea B from October 1 to September 1, (3) changed the percentage of the unharvested sardine that is reallocated to Subarea A and Subarea B from 50% to both

subareas to 20% to Subarea A and 80% to Subarea B, and (4) reallocates all unharvested sardine that remains on December 1 coastwide.

The Council requested this allocation framework be in place for the 2003 and 2004 fishing seasons, and also in 2005 (if the 2005 HG is at least 90% of the 2003 HG). NMFS implemented the revised allocation framework by a regulation that was published on September 4, 2003 (68 FR 52523).

Using the best available information, the interim allocation framework was rapidly developed to address concerns in the short-term. At the time, it was understood that more information and time would be needed to develop a more comprehensive, longer-term allocation framework, which is why the proposed action is needed.

When adopting the final range of alternatives for public review in April 2005, the Council reserved the right to revisit the proposed action in the near-term because the Pacific sardine resource and the fisheries and markets that rely on them are dynamic and difficult to predict. There are no provisions in the proposed action that would preclude the Council from readdressing the allocation framework in the future, but in the interest of public review, the Council described two approaches to future review of the proposed action. Under the first approach, the Council would review the proposed action in a set number of years following implementation. The Council did not identify a specific review period but identified a range of three to five years for such a review. The second approach is based on the HG. The Council suggested a mechanism under which the allocation framework would be revisited if the HG falls below a given threshold. Similar to the first approach, the Council identified HG thresholds ranging from 75,000 mt to 100,000 mt; if the HG fell below the threshold the allocation scheme would be reviewed and potentially revised.

1.3 Determining the Scope of the Analysis

Regulations promulgated by the Council on Environmental Quality (CEQ) mandate scoping: "an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action" (40 CFR 1501.7). The Council process has been the mechanism for involving the public in this process. Amending the FMP to establish a permanent allocation framework was on the Council's agenda at their June, September, and November meetings in 2004. At the June meeting the Council directed staff and advisory bodies to begin work on an FMP amendment to implement the allocation framework.

The CPS Advisory Subpanel (CPSAS) met August 3–4, 2004, to develop a preliminary range of alternatives, which were reported to the Council in September. The CPS Management Team (CPSMT) met August 5 and, among other things, reviewed the advice provided in a May 18, 2004, letter from Mr. Rodney McInnis, Acting Regional Administrator, NMFS Southwest Region (SWR), to Council Chair Donald Hansen. Mr. McInnis recommended that an FMP amendment prepared in connection with the sardine allocation framework also address several other issues related to CPS management, including FMP harvest control rules, compatibility between California's proposed market squid FMP and the Council's CPS FMP, market squid overfishing definitions, CPS FMP bycatch provisions and pilot at-sea observer program, CPS essential fish habitat, and five-year review of the CPS FMP. He concluded by recommending, "the Council initiate scoping to determine if a full EIS process is warranted for the next amendment to the CPS FMP," based on an expanded scope for the FMP amendment and the fact that the last environmental impact statement (EIS) prepared in connection with the CPS FMP is more than five years old. On July 19, 2004, the Council and NMFS published a notice of intent (NOI) to prepare an EIS for this action (69 FR 42968).[1] However, in the

[1] The NOI established a time period for receiving comments on the intent to prepare an EIS. The Council received one comment letter during this time period, from the California Wetfish Producers Association. The letter presented

report of their August 5 meeting, the CPSMT concluded that the additional issues raised by Mr. McInnis should not be addressed in this FMP amendment. Relative to preparing an EIS, the CPSMT stated they were, "not aware of any evidence that a comprehensive review of the FMP is warranted. If NMFS believes a full programmatic FMP EIS for CPS … is needed, the CPSMT suggests it would take at least two years to develop…" By restricting the scope of the action to the specific issue of allocation, the action can be completed in a timely manner. Other issues raised in the letter will be addressed by other actions as appropriate.

The Council took up these issues at their September meeting when providing further guidance on the development of the FMP amendment. They reemphasized that the allocation framework was the highest priority and should be the focus of the current proposed action. The other issues raised by Mr. McInnis would be taken up in subsequent FMP amendments.

The CPSAS met again on September 28–29, 2004, to further refine the range of alternatives. Their report containing the more developed alternatives was presented at the November Council meeting. The Council approved them as a preliminary range to be analyzed by CPSMT members and agency staff. A draft alternatives analysis was presented to the Council at their April 2005 meeting. At that time the Council adopted a range of alternatives for public review. (Section 2.3 describes those alternatives the Council eliminated at that time, which are not further analyzed in this EA.) At their June 2005 meeting the Council chose a preferred alternative, which is similar to one of the alternatives made available for public review, Alternative 3, but was modified slightly to mitigate anticipated impacts.

CPSMT members and staff began their work by assessing the alternatives in order to identify environmental impacts and narrow the scope of the present analysis to the significant issues that will be analyzed in depth and eliminating from detailed study the issues which are not significant (40 CFR 1501.7). They used nine factors enumerated in National Oceanic and Atmospheric Administration (NOAA) National Environmental Policy Act (NEPA) guidance (NAO 216-6) §6.02, specific guidance on fishery management actions, in order to screen for potentially significant impacts and determine the scope of the analysis. These factors generally focus on components of the human environment[2] potentially affected by a fishery management action. (Regulations at 40 CFR 1508.27 list characteristics related to the intensity—or severity—of the impact, which were considered in the context of the environmental components listed below.) As part of this process NMFS and Council staff reviewed the EA for the interim allocation framework for 2003–2005 and the pursuant finding of no significant impact (FONSI) (both hereby incorporated by reference). This review assessed whether the impacts of the current proposed action would differ substantially from those of the interim allocation, increasing the likelihood of significant impacts.

The nine factors from NOAA Administrative Order (NAO) 216-6 §6.02 are listed below followed by an assessment of the likelihood of whether consideration of these environmental components may be eliminated from detailed discussion because the likelihood of significant impacts is remote.

a. The proposed action may be reasonably expected to jeopardize the sustainability of any target species that may be affected by the action.

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recommendations for the range and type of alternatives to be considered.

[2] Regulations (40 CFR 1508.14) state "Human environment shall be interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment."

The CPS FMP establishes an environmentally-based HG for sardines. The HG establishes a minimum threshold value of 150,000 mt for the stock biomass. Harvest of any biomass surplus to this cutoff value varies between 15% and 5%. Sea surface temperature, an environmental cue influencing stock productivity, is used as a variable in a formula to compute the actual harvest rate between these upper and lower bounds. If the HG is not exceeded, there is little risk that overfishing would occur; therefore, the sustainability of the target resource would not be jeopardized. As with the interim allocation framework, the proposed action will not change the fishery in such a way as to increase the risk that the HG would be exceeded.

b. The proposed action may be reasonably expected to jeopardize the sustainability of any non-target species.

The sardine fisheries affected by the proposed action have very low incidental catches of non-target species. The main incidental catch is of northern anchovy, a CPS fishery management unit species. Catch is monitored and accounted for in determining total harvest mortality on this stock. This ensures that incidental catch will not jeopardize the sustainability of these species. Other species are caught in very small quantities, with no likelihood of jeopardizing sustainability. Protected species (ESA listed, marine mammals and seabirds) are incidentally caught but considered separately under factor e below. The proposed action is not predicted to change incidental catch rates in such a way to jeopardize the sustainability of fish stocks other than protected species.

c. The proposed action may be reasonably expected to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat as defined under the Magnuson-Stevens Act (MSA) and identified in FMPs.

Fisheries affected by the proposed action are prosecuted in pelagic habitats, which, because of their physical characteristics, are not significantly affected by the fishing gear. The proposed action will not affect the way in which fisheries are prosecuted such that effects on habitat would change from current conditions.

d. The proposed action may be reasonably expected to have a substantial adverse impact on public health or safety.

The interim allocation EA discusses health and safety implications for that management regime as follows:

> The proposed action is anticipated to enhance safety at sea (NS-10) by advancing the reallocation date from October 1 to September 1. Waiting until October 1 to reallocate has the potential of inducing PNW fishers to fish in unsafe weather conditions. Ocean conditions off Oregon and Washington become increasingly rough in October. Also, crossing the Columbia River bar, always a hazardous exercise, becomes very dangerous during this time of year. (page 31)

The action alternatives considered under the current action either include reallocation on September 1 or have mechanisms to allow PNW fishers continued access to harvest opportunity in September. As a result, the proposed action will not affect safety in a manner substantially different from the interim allocation regime, and will not have significant impacts on safety. There are no public health implications stemming from the action.

e. The proposed action may be reasonably expected to adversely affect endangered or threatened species, marine mammals, or critical habitat of these species.

Adverse effects on threatened species may be considered in two contexts. First, sardine, the fishery target, is an important forage species for a wide range of marine animals, including protected species. Second, fisheries subject to the proposed action could incidentally catch protected species, contributing to human-

caused mortality. When developing the HG (see a above) the importance of CPS management unit species as forage fish was considered. The CPS FMP, as quoted in the interim allocation EA (PFMC 2003), notes:

> Sardines are important as forage to a large number of birds, marine mammals, and fish predators (including endangered species) although few data are available, because of the scarcity of sardine, until recently. Decisions about harvest formula options and the definition of overfishing for sardine must, therefore, consider sardine as forage. Forage and ecosystem-related goals and objectives are included in this FMP. (page 4)

As noted under a., above, the proposed action does not affect the calculation of the HG.

Section 2.2 of Appendix A to the CPS FMP reviews the incidental take of marine mammals, endangered salmon, and seabirds. CPS fisheries are categorized as Category II under the Marine Mammal Protection Act (MMPA), meaning that incidental mortality of marine mammals is less than 50% of the potential biological removal (PBR) level. Although quantitative data are limited, anecdotal information indicates that the most significant interaction is between pilot whales and the squid fishery, a fishery not affected by the proposed action.

NMFS conducted an informal Section 7 consultation, pursuant to the ESA, in 1998 and found that CPS fisheries would not jeopardize the continued existence of endangered salmon stocks. However, this occurred before the development of a significant sardine fishery off the mouth of the Columbia River, which is the major factor driving the development of the new allocation scheme considered as the proposed action. Listed salmon stocks (evolutionarily significant units) returning to the Columbia River system could be intercepted by sardine purse seine fisheries. Current data only identifies numbers of intercepted salmon at the species level, if that, which is insufficient to determine if listed stocks are being intercepted. For this reason NMFS decided to undertake a formal Section 7 consultation to determine if any stocks are being jeopardized. A jeopardy determination is also used as the threshold for identifying a significant impact to listed species in the NEPA context. The analysis in this draft document is based on the biological opinion prepared in the ESA consultation process.

f. The proposed action may be reasonably expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species.

The interim allocation EA discusses cumulative effects; the same factors would come into play in relation to the effects of the proposed action. For target and non-target species these factors are other fisheries taking CPS, especially Canadian and Mexican fisheries, and fluctuations in the ocean environment. For the target species, calculation of the HG takes these factors into account, so cumulative adverse effects are very unlikely. The non-target species with more than negligible harvest in the sardine fisheries is northern anchovy, another CPS monitored, although not actively managed, under the FMP. According to information in the most recent stock assessment and fishery evaluation (SAFE) document (PFMC 2005c), combined fishing mortality from all sources is well below the threshold that would constitute overfishing.

g. The proposed action may be expected to have a substantial impact on biodiversity and ecosystem function within the affected area (e.g., benthic productivity, predator-prey relationships, etc).

As noted above, sardines are an important prey item (forage) for a wide range of marine animals and the HG was developed to account for the role of sardines in the ecosystem as forage. Because the proposed action would not affect the HG, significant impacts ecosystem impacts are not predicted.

h. If significant social or economic impacts are interrelated with significant natural or physical environmental effects, then an EIS should discuss all of the effects on the human environment.

The effects of allocation are almost exclusively economic. Therefore, the environmental impact assessment also evaluates these types of effects for potential significance. However, social or economic impacts by themselves, if there are no interrelated significant natural or physical environmental effects, would not meet the threshold requirement for preparing an EIS.

i. A final factor to be considered in any determination of significance is the degree to which the effects on the quality of the human environment are likely to be highly controversial. Although no action should be deemed to be significant based solely on its controversial nature, this aspect should be used in weighing the decision on the proper type of environmental review needed to ensure full compliance with NEPA. Socioeconomic factors related to users of the resource should also be considered in determining controversy and significance.

Developing a new allocation scheme has been somewhat controversial because it has the potential of changing the distribution of socioeconomic benefits derived from sardine fisheries. This was an important factor in the initial determination to prepare an EIS. Although the EIS process includes a formal public comment opportunity, the Council process provides many opportunities for public comment and participation by stakeholders. This can help to make the decision-making process less controversial. The guidance states that no action should be deemed significant because of controversy alone; but an assessment of measurable non-significant impacts combined with the public expressing substantial concern could be a reason for preparing an EIS.

As mentioned above, additional factors for evaluating the intensity of impacts, in determining whether they are significant, are listed in 40 CFR 1508.27 (and NAO 216 6.01b). These factors are listed below with a summary of how they are addressed in this EA.

(1) Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial.

Both beneficial and adverse impacts are considered in the evaluation (Chapter 4).

(2) The degree to which the proposed action affects public health or safety.

As discussed above, the proposed action is not anticipated to significantly affect public health or safety.

(3) Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.

The proposed action affects the location and timing of the harvest of sardine within limits set to ensure stock sustainability and account for the role of this species in the ecosystem. Because of the nature of the fishery, as discussed above under c, the proposed action will not affect physical characteristics of the environment within the action area.

(4) The degree to which the effects on the quality of the human environment are likely to be highly controversial.

As discussed above, the proposed action is potentially controversial, and this factor is considered, while recognizing that controversy by itself is not a basis for concluding that the action has significant impacts. The Council process allows substantial participation by stakeholders likely to be affected by the proposed action, thus reducing the level of controversy.

(5) The degree to which the possible effects on the human environment are highly uncertain or involve

unique or unknown risks.

As discussed above, changes in the environmental regime affecting stock productivity result in some uncertainty about the future status of the fishery. The analysis in Chapter 4 addresses this uncertainty by evaluating how the allocation schemes described in the alternatives would perform across a range of allowable harvest levels (HGs). This allows decision-makers to consider the range of possible effects given this uncertainty.

(6) The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.

This action is consistent with past actions, such as the interim allocation formula currently in effect and will be revaluated within five years to assess its performance. The ability to evaluate the implemented allocation scheme and adjust it as necessary lessens its precedent-setting nature.

(7) Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.

Cumulative impacts are considered in the evaluation in Chapter 4

(8) The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.

Because of the action area and the nature of the proposed action, historic sites will not be affected by the proposed action.

(9) The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.

As discussed above, the potential effects of the proposed action on ESA-listed salmon species are evaluated in Chapter 4.

(10) Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.

The proposed action will not violate federal, state, or local laws. In addition, the Magnuson-Stevens Act and the CPS FMP provide a framework for ensuring that federal actions are consistent with state laws.

1.4 Decision to Prepare an EA as a basis For a Finding of No Significant Impact

As described in the chronology of events outlined above, a preliminary assessment by staff, in part based on the advice from Mr. McInnis, led to the decision to prepare an EIS. However, subsequent evaluation by the CPSMT and staff, considering the scope of the action, narrowed the scope of potential issues that need detailed evaluation. Three factors from NAO 216-6 §6.02 require further evaluation to adequately determine if potential impacts warrant preparation of an EIS:

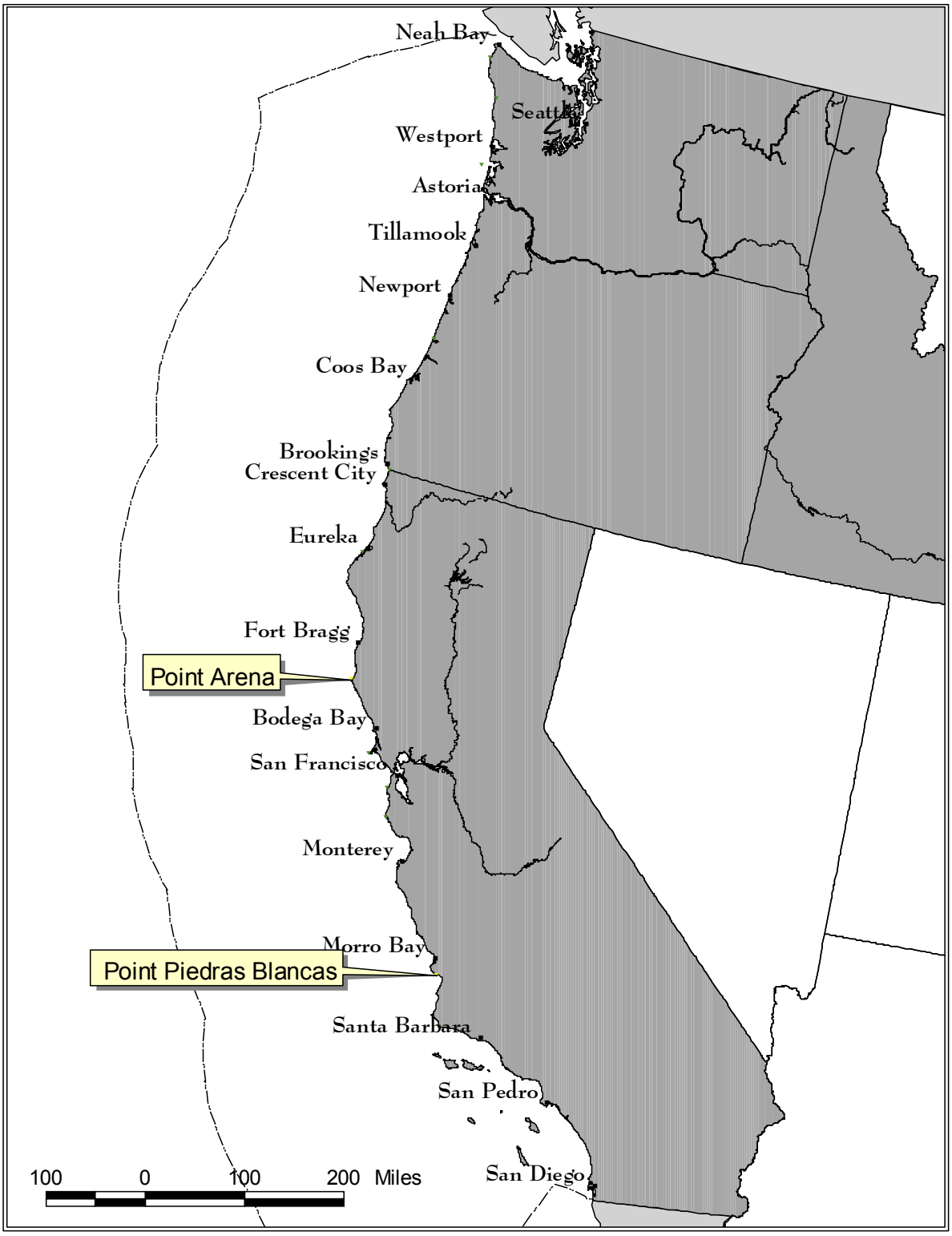
1. Salmon stocks listed under the ESA could be incidentally taken in numbers that would jeopardize their continued existence (factor e).

2. Allocation could affect the distribution of revenue and income across the regions designated in the allocation framework, engendering potentially significant economic impacts (factor h).
3. Because the action establishes a permanent allocation scheme, it could be highly controversial (factor i).

The analyses on listed salmon and economic impacts in this document, by disclosing whether significant impacts are predicted, can be used to determine if it is necessary to prepare an EIS. Formulating the preferred alternative involved substantial participation and negotiation by representatives from the fishery and affected communities through the Council's CPSAS. As a result, controversy over the Council's action was modest.

Regulations (40 CFR 1501.4) state that an agency shall prepare an EA to make its determination whether to prepare an EIS. The analysis in this EA predicts that the proposed action will not result in significant impacts to the human environment, supporting a FONSI by NMFS. (Because a notice of intent was published in the Federal Register, a second notice will be published to notify the public of the decision not to prepare an EIS.)

Figure 1–1. West Coast ports and sardine allocation subarea boundaries.



2.0 ALTERNATIVES

2.1 Development of the Alternatives

The CPSAS adopted the range of alternatives for sardine allocations at meetings in August and September 2004. At their November 2004 meeting the Council reviewed these alternatives and with some modifications and additions forwarded them to the CPSMT for preliminary analysis. They also identified the following program objectives, which can serve as a basis for evaluation.

- Strive for simplicity and flexibility in developing an allocation scheme.
- Transfer quota as needed.
- Utilize optimum yield.
- Implement a plan that balances maximizing value and historic dependence on sardine.
- Implement a plan that shares results in comparable impacts in both subareas at reduced HG levels.
- Implement a plan that produces a high probability of predictability and stability in the fishery.

2.2 Description of the Alternatives

Eight alternatives were forwarded for analysis including both a No Action alternative and a Status Quo alternative. Under the No Action alternative, the allocation framework would revert to the original FMP formula that was in place before the regulatory amendment was implemented in 2003. Under the Status Quo alternative the interim allocation is extended. NMFS and the Council will review any allocation framework decision after either three years time. The order of alternatives does not indicate rank or priority. All alternatives (except No Action) use Point Arena, California (39° N latitude) as the dividing line between the allocation subareas.

At their June 2005 meeting the Council chose a preferred alternative, which is a modification of one of the alternatives, Alternative 3, presented to them at that time. The Council-preferred alternative is the last of the alternatives described below.

In order to present the alternatives in a clear and comparable fashion the descriptions bullet the fishing season and the allocations and reallocations made at different points during the fishing season.

No Action: FMP Allocation Framework

The allocation subareas are divided at Point Piedras Blancas, California (35° 40° N latitude).

Season: January 1–December 31.

Initial allocation: On January 1, 33% of the HG is allocated to the Subarea A (north, which includes Monterey) and 66% to the Subarea B (Southern California).

Reallocation: On October 1 remaining unharvested portion of the HG is pooled and reallocated 50% to Subarea A (north) and 50% to Subarea B (south).

Status Quo: Interim Allocation Framework

Season: January 1–December 31.

Initial allocation: On January 1, 33% of the HG is allocated to the Subarea A (north) and 66% to Subarea B (south).

Reallocation: On September 1, 20% of the remaining unharvested portion of the HG is reallocated to the Subarea A (north) and 80% to Subarea B (south).

Second reallocation: On December 1, the remaining unharvested portion of the HG is reallocated coastwide.

Alternative 1: Coastwide Allocation In Two Periods

Season: January 1–December 31.

Initial allocation: On January 1; 50% of the HG is allocated coastwide.

Reallocation: On July 1, the remaining HG (50% plus any unharvested portion from the initial allocation) is allocated coastwide.

Alternative 2: Coastwide Allocation on June 1 (Not Analyzed in Detail, See Section 2.3)

Alternative 3: Coastwide Allocation In Three Periods

Season: January 1–December 31.

Initial allocation: On January 1, 40% of the HG is allocated coastwide

Reallocation: On July 1, 40% of the HG (plus any unharvested portion from the initial allocation) is allocated coastwide.

Second reallocation: On October 1, 20% of the HG (plus any unharvested portion from the first reallocation) is reallocated coastwide.

Alternative 4: Allocation Formula Depends on the Size of the HG

Season: January 1–December 31.

(a) The coastwide HG is greater than 100,000 mt:

Initial allocation: On January 1, 40% of the coastwide HG is allocated to the Subarea A (north) and 60% to the Subarea B (south).

Reallocation: On September 1, the remaining unharvested portion of the HG is pooled and allocated coastwide.

(b) The coastwide HG is less than 100,000 mt:

Initial allocation: On January 1, 33% of the coastwide HG is allocated to Subarea A (north) and 66% to the Subarea B (south).

Reallocation: On September 1, the remaining unharvested portion of the coastwide HG is pooled and 20% is allocated to Subarea A (north) and 80% to the Subarea B (south).

Second reallocation: On November 1, any remaining unharvested portion of the HG is again pooled and reallocated coastwide.

Alternative 5: Set-aside Released Incrementally During the Initial Allocation Period (Not Analyzed in Detail, See Section 2.3)

Alternative 6: Transfer of Unused Allocations Between Subareas

Season: January 1–December 31.

Initial allocation (for 2006 only): On January 1, 40% of the HG is allocated to the Subarea A (north) and 60% to the Subarea B (south).

Reallocation: on September 1, the remaining HG is pooled and allocated coastwide.

Transfer Rules For Computing Subsequent-Year Allocations

After the initial year (2006) these rules dictate the allocations to each subarea in each subsequent year:

Rule 1: The transfer of a portion of the HG from one subarea to the other, for the purpose of recomputing allocation percentages for the next year, occurs if the portion of a subarea allocation remaining uncaught at the end of the year is greater than the transfer limits described in Rule 2.

Rule 2: If the HG is greater than 100,000 mt, the transfer amount will be equal to ten percent of the coastwide HG for that year. When the coastwide HG is 100,000 mt or less, the transfer amount will be 5,000 mt.

Rule 3: The transfer amount is applied to the current-year allocation for each subarea. The resulting numerical values are then converted to percentages of the current-year coastwide HG and used to determine the initial allocation for the following year.

Rule 4: No subarea may initially be allocated more than 75% of the coastwide HG.

Rule 5: The September 1 coastwide reallocation always applies.

The box on the following page shows how the allocation formula would be computed over a series of years (using fictional values for the HG and subarea harvests).

Alternative 7: Equal Reallocation

Season: January 1–December 31.

Initial allocation: On January 1, 33% of the HG is allocated to the Subarea A (north) and 66% to the Subarea B (south).

Reallocation: On September 1, remaining HG is pooled and 50% of the HG is allocated to the Subarea A (north) and 50% to the Subarea B (south).

Second reallocation: On November 1, any remaining unharvested portion of the HG is again pooled and reallocated coastwide.

Council-preferred Alternative: Modification of Alternative 3

Season: January 1–December 31.

Initial allocation: On January 1, 35% of the HG is allocated coastwide.

Reallocation: On July 1, 40% of the HG (plus any unharvested portion from the initial allocation) is allocated

coastwide.

Second reallocation: On September 15, 25% of the HG (plus any unharvested portion from the first reallocation) is reallocated coastwide.

The Council recommended a formal review of the sardine allocation regime in June of 2008. This review would compare the performance of the fishery to the projections used to evaluate the Council-preferred Alternative including but not limited to; catch projections, catch shortages by sector, economic benefit analysis, and the utilization of the HG. The review would also consider all scientific and biological information collected between now and 2008 to assess any changes to the resource.

Example Computations of the Allocation Formula in Alternative 6

Example Year 1

Current-year HG: 150,000 mt
Transfer amount: 15,000 mt
Subarea A: 60,000 mt allocation (40%) - 45,000 mt catch = 15,000 mt uncaught
Subarea B: 90,000 mt allocation (60%) – 90,000 mt catch = 0 mt uncaught

The recomputed allocation formula for the next year would be:
Subarea A: (60,000 mt – 15,000 mt) / 150,000 mt = 30%
Subarea B: (90,000 mt + 15,000 mt) / 150,000 mt = 70%

Example Year 2

Current-year HG: 200,000 mt
Transfer amount: 20,000 mt
Subarea A: 60,000 mt allocation (30%) – 45,000 mt catch = 15,000 mt uncaught, which is less than the transfer amount
Subarea B: 140,000 mt allocation (70%) – 90,000 mt catch = 50,000 mt uncaught

The recomputed allocation formula for the next year would be:
Subarea A: (60,000 mt + 20,000) / 200,000 mt = 40%
Subarea B: (140,000 mt – 20,000 mt) / 200,000 mt = 60%

Example Year 3

Current-year HG: 75,000 mt
Transfer amount: 5,000 mt
Subarea A: 30,000 mt allocation (40%) – 5,000 mt catch = 25,000 mt uncaught
Subarea B: 45,000 mt allocation (60%) – 35,000 mt catch = 10,000 mt uncaught

In this case since the uncaught portion in both subareas is greater than the transfer amount, the transfers would cancel each other out and no change in the allocation formula would occur.

Example Year 4

Current-year HG: 75,000 mt
Transfer amount: 5,000 mt
Subarea A: 30,000 mt allocation (40%) – 5,000 mt catch = 25,000 mt uncaught
Subarea B: 45,000 mt allocation (60%) – 43,000 mt catch = 2,000 mt uncaught

The recomputed allocation formula for the next year would be:
Subarea A: (30,000 mt – 5,000 mt) / 75,000 mt = 33%
Subarea B: (45,000 mt + 5,000 mt) / 75,000 mt = 66%

Example Year 5

Current-year HG: 105,000 mt
Transfer amount: 10,500 mt
Subarea A: 35,000 mt allocation (33%) – 5,000 mt catch = 30,000 mt uncaught
Subarea B: 70,000 mt allocation (66%) – 70,000 mt catch = 0 mt uncaught

Since the recomputed allocation percentage for Subarea A is less than 25% ((30,000 mt - 15,000 mt) / 105,000 mt = 14%), the Subarea A allocation is 25% and the Subarea B allocation is 75%.

2.3 Alternatives Not Analyzed In Detail

At the November 2004 Council meeting, the Council approved a range of alternatives for preliminary analysis for public review and analysis by the CPSMT. This preliminary range of alternatives included the alternatives described in Section 2.2 as well as the two alternatives discussed below. The resulting analyses were presented to the Council, the Council advisory bodies, and the public at the April 2005 Council meeting. At this meeting, the Council adopted a range of alternatives for final consideration and analysis and eliminated the following two alternatives from further detailed analysis (see 40 CFR 1502.14(a)). This decision is supported by recommendations of both the CPSAS and the CPSMT.

Alternative 2: Coastwide Allocation on June 1

Season: June 1–May 31.

Initial allocation: On June 1, 100% of the HG is allocated coastwide with no subsequent reallocation.

The main reason the Council eliminated this alternative from further consideration lies with the timing of the availability of biological data critical to the assessment of Pacific sardine. Under the current schedule, the annual Pacific sardine egg surveys occur in April and the resulting index of egg production is typically preliminarily available in August and finalized in September. Stock assessment modeling follows in September and October with review and approval by the Council and the Scientific and Statistical Committee (SSC) in November. A final rule is then published in the *Federal Register* in time for the start of the fishery in January of the following year.

Opening the fishery in June would preclude the assessment authors from using the most recent April survey data. NMFS and the Council would have to base their stock productivity estimate and HG decision on data from the previous year. Given that Pacific sardine biomass responds quickly to changes in environmental conditions, an annual assessment using the most current and best available data is recommended. Additionally, if the fishery were opened in June, new survey information would be available shortly thereafter that could indicate a dramatic change in the population and create the potential for inseason review of the assessment.

Alternative 5: Set-aside Released Incrementally During the Initial Allocation Period

Twenty percent of the HG is set aside at the start of the year, to be released in increments during the initial allocation period (January 1–September 30). The remaining 80% of the HG is initially allocated 40% to Subarea A and 60% to Subarea B. The set-aside is released in increments to a subarea once more than 90% of the initial allocation has been caught in that subarea (i.e., in Subarea A 28.8% of the coastwide HG and in Subarea B 43.2% of the coastwide HG). A preliminary analysis evaluated the effect of different size increments, ranging from 2% to ten percent of the coastwide HG (i.e., ten percent–50% of the set-aside).

Season: January 1–December 31.

Initial allocation: On January 1, 32% of the coastwide HG is allocated to Subarea A (north) (40% of the 80% remaining HG after the set-aside is deducted) and 48% to the Subarea B (south) (60% of 80%), with incremental release of the remaining 20% set-aside as described above.

Reallocation: On October 1, the remaining unharvested portion of the HG (which includes any of the remaining set-aside) is pooled and reallocated coastwide.

Preliminary analysis of the this alternative indicated inefficient utilization of the HG, in other words, less of the HG would be harvested, compared to Status Quo. The possibility of adjusting the threshold for the release of the set aside to increase utilization of HG was considered. However, the issue of surplus HG combined with the regulatory complexity of this alternative led to its rejection.

3.0 AFFECTED ENVIRONMENT

3.1 Environmental Context for the Proposed Action

3.1.1 Status of Current Knowledge on Sardine Biomass

As noted in Section 1.3, the proposed action is not anticipated to have positive or negative biological impacts or create resource conservation concerns for Pacific sardine. Although CPS research has expanded, particularly in the PNW in recent years, the CPSMT concluded that insufficient data exists to determine the genetics and age structure of the Pacific sardine biomass on a coastwide basis and continues to identify the following among the highest priority research and data needs for CPS:

- Gain more information about the status of CPS resources in the north using egg pumps, trawl and sonar surveys, and spotter planes.

- Develop a coastwide (Mexico to British Columbia, Canada) synoptic survey of sardine and Pacific mackerel biomass; i.e., coordinate a coastwide sampling effort (during a specified time period) to reduce "double-counting" caused by migration.

- Increase fishery sampling for age structure (Pacific sardine and Pacific mackerel) in the northern and southern end of the range. Establish a program of port sample data exchange with Mexican scientists.

- Evaluate the role of CPS resources in the ecosystem, the influence of climatic/oceanographic conditions on CPS and define predatory-prey relationships.

- Collect detailed cost-earnings data to facilitate analyses for long-term changes to the sardine allocation structure.

None of the stocks managed under the CPS FMP are considered overfished. Impacts are anticipated to be limited to trade-offs among harvest opportunity (and associated revenue, employment, and other economic activity) provided to each of the fishery sectors and attainment of the coastwide HG (HG).

3.1.2 CPS and Their Habitats

The following description is excerpted from PFMC (2003).

Comprehensive information on the affected environment may be found in Appendix A and Appendix D to the CPS FMP. The California Current is the eastern boundary of the North Pacific great subtropical anticyclonic gyre. At the northern extreme, subarctic water is entrained to flow equatorward. The great shifts in ocean climate at the decadal to century scale control the eastern boundary along the coasts of Washington, Oregon, California, and Baja California. The California Current and the subarctic entrained waters are known as the "transition" zone. The mixing of these waters with seasonal coastal wind-driven upwelling yield highly structured waters with patches of high nutrient and high productivity. High nutrient levels result from a winter buildup of regenerated nutrients and new nutrients from a shoaling thermocline, an influx of high-nutrient, subarctic water, and small coastal intrusions of newly upwelled water. Pelagic fish species dominate the exploitable biomass of the system, with major concentrations of anchovy and squid ranging from close to the coastline to the offshore habitats of sardine and jack mackerel. The California Current ecosystem is essentially a region of transport, coastal jets, divergence, and upwelling.

Seasonal and interannual environmental variability within the California Current ecosystem are associated with variations in the Pacific Basin atmospheric pressure systems, which control the local winds and Ekman transport, and affect flows of the equatorward California Current, the poleward undercurrent, and the inshore countercurrent. Variations on time scales of several years to decades are associated with alterations in the tropical and Aleutian pressure systems, (i.e., the El Niño southern oscillation [ENSO] phenomenon and the Pacific Decadal Oscillation [PDO]). ENSO and PDO events markedly alter flow and temperature of currents in the California Current.

Species managed under the CPS FMP include: Pacific sardine, Pacific mackerel (*Scomber japonicus*), northern anchovy *(Engraulis mordax*), jack mackerel (*Trachurus symmetricus*), and market squid (*Loligo opalescens*). The CPS FMP divides management unit species into the categories of actively managed and monitored. HGs of actively managed species (Pacific sardine and Pacific mackerel) are based on formulas applied to current biomass estimates. No biomass estimates are calculated for species that are only monitored (jack mackerel, northern anchovy, and market squid). At public meetings each year, the biomass for actively managed species are reviewed by the Council's CPSMT. The biomass, HG, and status of the fisheries are then reviewed at a public meeting of the Council's CPSAS. This information is also reviewed by the Council's SSC. The Council reviews reports from the CPSMT, CPSAS, and SSC, then, after providing time for public comment, they make their HG recommendation to NMFS which implements management measures in the EEZ if they are found to be consistent with the Magnuson-Steven Act and other applicable law, including the ESA. The annual HG and season structure is published by NMFS in the *Federal Register* as soon as practicable before the beginning of the appropriate fishing season. The Pacific sardine season begins on January 1 and ends on December 31 of each year.

Anchovy, sardine, hake, jack mackerel, and Pacific mackerel achieve the largest populations in the California Current region as well as in other major eastern boundary currents. These populations are key to the trophic dynamics of the entire California Current ecosystem. Anchovy and sardines are the only fish in the ecosystem that consume large quantities of primary production (phytoplankton); all five of the species are significant consumers of zooplankton. These five species of fish, particularly mackerels and hake, and also squid are important predators of the early stages of fish. The juvenile stages of squid and these finfish species, and in many cases the adults, are important forage for seabirds, pinnipeds, cetaceans, and other fish.

Trophic interactions between CPS and higher-trophic-level fish are poorly understood, and it is unknown if predaceous fish populations are enhanced or hindered by large populations of CPS. Nor is it known if the value of CPS as forage to adult predators outweighs the negative effects of predation by CPS on larvae and juveniles of predator fish species plus competitive removal of phytoplankton, zooplankton, and other fish.

A complete description of CPS EFH may be found in Appendix D of the CPS FMP. In determining EFH for CPS, the estuarine and marine habitat necessary to provide sufficient production to support maximum sustained yield (MSY) and a healthy ecosystem were considered. Using presence/absence data, EFH is based on a thermal range bordered within the geographic area where a managed species occurs at any life stage, where the species has occurred historically during periods of similar environmental conditions, or where environmental conditions do not preclude colonization by the species. The specific description and identification of EFH for CPS finfish accommodates the fact the geographic range of all species varies widely over time in response to the temperature of the upper mixed layer of the ocean, particularly in the area north of 39° N latitude. This generalization is probably also true for market squid, but few data are available. Adult CPS finfish are generally not found at temperatures colder than 10° C or warmer than 26° C. Preferred temperatures (including minimum spawning temperatures) are generally above 13° C. Spawning is most common at 14° C to 16° C.

3.2 Protected Resources

A thorough description of the affected environment for protected species can be found in the EIS prepared for Amendment 8 to the Northern Anchovy FMP, now the CPS FMP (PFMC 1998). While the analysis provided in the EIS focused primarily on the fishery in southern California, most of the species that were identified occur along the entire U.S. West Coast and thus the analysis is applicable to fisheries currently managed under the CPS FMP. The 1998 EIS determined that protected species were not likely to be significantly affected by the alternatives proposed in Amendment 8 to the FMP.

In analyzing the possible effects of the current amendment alternatives it is necessary to consider how protected species may be affected. As noted in Section 1.3, the long-term sardine allocation amendment may affect species in two ways, direct take of the animals during the prosecution of the fishery (bycatch) or indirectly due to reductions in prey base (sardine) that serve as forage. Protected species include species protected by three federal laws, the ESA, the MMPA, and the Migratory Bird Treaty Act (MBTA).

Table 3-1 Species listed as endangered or threatened under the Endangered Species Act (ESA), which may be present in the action area and may be affected by the proposed action (NMFS 2005b).

Species	ESU	Status
Marine Mammals	–	
Blue whale (*Baleaenoptera musculus*)	–	Endangered
Fin whale (*Baleranoptera physalus*)	–	Endangered
Humpback whale (*Megaptera novaeangliae*)	–	Endangered
Sei whale (*Balaenoptera borealis*)	–	Endangered
Sperm whale (*Physeter macrocephalus*)	–	Endangered
Steller sea lion (*Eumetopias jubatus*)	–	Threatened
Sea Turtles		
Leatherback turtle (*Dermochelys coriacea*)	–	Endangered
Loggerhead turtle (*Caretta caretta*)	–	Endangered
Olive Ridley (*Lepidochelys olivacea*)	–	Endangered/Threatened
Green Sea Turtle (*Chelonia mydas*)	–	Endangered/Threatened
California least tern (*Sterna antillarum browni*)	–	Endangered
Brown pelican (*Pelicanus occidentalis*)	–	Endangered
Marbled murrelet (*Brachyramphus marmoratus*)	–	Threatened
Salmonids		
Chinook (*Oncorhynchus tshawytscha*)	Puget Sound	Threatened
	Sacramento River winter	Endangered
	Snake River Fall	Threatened
	Snake River Spring/Summer	Threatened
	Lower Columbia River	Threatened
	Upper Willamette River	Threatened
	Upper Columbia River Spring	Endangered
	Central Valley Spring	Threatened
	California Coastal	Threatened
Chum (Oncorhynchus keta)	Hood Canal Summer Run	Threatened
	Columbia River	Threatened
Coho (Oncorhynchus kistuch)	Central California Coastal	Endangered
	S. Oregon/N. CA Coastal	Threatened

Species	ESU	Status
	Lower Columbia River	Threatened
	Oregon Coast natural	Candidate (Threatened)
Sockeye (Oncorhynchus nerka)	Snake River	Endangered
	Ozette Lake	Threatened
Steelhead (Oncorhynchus mykiss)	Southern California	Endangered
	South-Central California	Threatened
	Central California Coast	Threatened
	Upper Columbia River	Endangered
	Snake River Basin	Threatened
	Lower Columbia River	Threatened
	California Central Valley	Threatened
	Upper Willamette River	Threatened
	Middle Columbia River	Threatened
	Northern California	Threatened

Of these species, only chinook and coho salmon have been observed incidentally taken in the sardine fishery off the coasts of Washington and Oregon. There has been only limited observer coverage on the sardine fishery in southern California, although port sampling suggests that there is no incidental catch of salmon or other listed species. See section 4.2.4.1 for further information on incidental take within the sardine fishery. This EA will focus on listed chinook and coho salmon that may be incidentally taken in the sardine fishery. Based on existing data, the take of other salmonids, such as chum and sockeye salmon and steelhead are assumed to be negligible or non-existent.

There are currently 26 salmonid evolutionarily significant units (ESUs) listed as either threatened or endangered under the ESA. These listings have been under review by NMFS since 2001 with proposed listings published in June, 2004 (69 FR 33102). A final rule on sixteen of the ESUs was published on June 28, 2005 (70 FR 37160). The final rule on Oregon Coast Natural coho salmon (OCN) has been delayed six months to provide NMFS with sufficient time to review the state of Oregon's final Oregon Coastal Coho Assessment (70 FR 37217). Similarly, final listing determinations for ten steelhead and trout ESUs have been delayed six months to provide sufficient review of recent scientific information (70 FR 37219). Critical habitat for salmon is being proposed in a NMFS proposed rule (69 FR 71880). The marine environment in which the sardine fishery occurs is not proposed for inclusion in critical habitat for any salmon ESUs; therefore, possible impacts of the alternatives on critical habitat will not be considered in this EA.

NMFS determined that four ESUs listed as threatened and one ESU proposed for listing (as threatened) may be incidentally taken and therefore directly affected by the sardine fishery as currently and proposed to be prosecuted. This determination was based upon using the salmon recreational fishery as a proxy for the sardine fishery in the PNW. The salmon recreational fishery occurs at generally the same time and area as the PNW sardine fishery. Thus, NMFS assumed that the encounter rates for various ESUs estimated in the salmon recreational fishery would be similar to those in the sardine fishery. This method is considered the best available given the limited salmon bycatch information available. Legal descriptions for each of the ESUs being considered in this EA follow. .

The Lower Columbia River (LCR) chinook ESU was originally listed as threatened on March 24, 1999 (64 FR 14308). Following a status review, the ESU was again listed as threatened on June 28, 2005 (70 FR 37160) and is defined as follows: LCR chinook salmon includes all naturally spawned populations of chinook salmon from the Columbia River and its tributaries from its mouth at the Pacific Ocean upstream to a transitional point between Washington and Oregon east of the Hood River and the White Salmon River, and

includes the Willamette River to Willamette Falls, Oregon, exclusive of spring-run chinook salmon in the Clackamas River. Seventeen artificial propagation programs are considered part of this ESU. Critical habitat for the LCR chinook ESU was designated on February 16, 2000 (65 FR 7764). The critical habitat designation was subsequently vacated by court order in May 2002.

The Snake River Fall (SRF) chinook salmon ESU was originally listed as threatened on the ESA on April 22, 1992 (57 FR 34639). Following a recent status review, the ESU was again listed as threatened on June 28, 2005 (70 FR 37160) and is defined as follows: The Snake River fall chinook salmon includes all naturally spawned populations of fall-run chinook salmon in the mainstem Snake River below Hells Canyon Dam, and in the Tucannon River, Grande Ronde River, Imnaha River, Salmon River, and Clearwater River subbasins. Four artificial propagation programs are considered to be part of the ESU. Critical habitat was established on December 28, 1993 (58 FR 68543). The critical habitat does not include any marine waters. NMFS has determined that marine waters do not warrant additional protection under a critical habitat designation.

The Upper Willamette River chinook salmon (UWR) was originally listed on the ESA on March 24, 1999 (64 FR 14308). Following a recent status review, the ESU was again listed as threatened on June 28, 2005 (70 FR 37160) and is defined as follows: The Upper Willamette River chinook ESU includes all naturally spawned populations of spring-run chinook salmon in the Clackamas River and in the Willamette River, and its tributaries above the Willamette Falls, Oregon. Seven artificial propagation programs are considered to be part of the ESU. Critical habitat for UWR was designated February 16, 2000 (65 FR 7764), but vacated by court order on April 30, 2002.

The LCR coho ESU has not been previously listed on the ESA and includes all naturally spawned populations of coho salmon in the Columbia River and its tributaries from the mouth of the Columbia up to and including the Big White Salmon and Hood Rivers, and includes the Willamette River to Willamette Falls, Oregon. Twenty-five artificial propagation programs are considered to be part of the ESU (70 FR 37160)

The OCN coho ESU includes all naturally spawning populations of coho salmon in Oregon coastal streams south of the Columbia River and north of Cape Blanco (63 FR 42587; August 10, 1998). Five artificial propagation programs are considered part of the ESU. As noted above, a final listing decision on OCN coho is expected to be published by December 2005.

There are also three seabirds listed as threatened or endangered under the ESA which may be present in the action area: the California least tern (Sterna antillarum browni), endangered; the brown pelican (Pelicanus occidentalis), endangered; and the marbled murrelet (Brachyramphus marmoratus), threatened. The list of seabirds is taken from a USFWS(USFWS) consultation on the implementation of Amendment 8 to the FMP (PFMC 1998).

In a memo dated June 10, 1999, the USFWS concurred with NOAA Fisheries that the proposed harvest of coastal pelagic species in accordance with Amendment 8 to the FMP would not precipitate significant declines in the biomass of CPS fisheries, and therefore would not significantly decrease the availability of CPS species as prey for listed seabirds. Therefore the effects of fishing under Amendment 8 on seabirds were considered insignificant. Further, the USFWS stated that incidental take of listed seabirds from fishing operations was not likely to occur because purse seines are small mesh that are unlikely to entangle seabirds. Therefore the USFWS concurred with NOAA Fisheries that fishing for CPS was not likely to adversely affect the California least tern, marbled murrelet, and brown pelican.

A number of non-ESA listed marine mammals in the area may be affected by the sardine fishery, these include: northern fur seal, California sea lion, harbor seal, Guadalupe fur seal, northern elephant seal, bottlenose dolphin, Pacific white-sided dolphin, common dolphin, harbor porpoise, Dall's porpoise, and minke whale. These species, like all marine mammals, are protected under the MMPA. In addition, a number

of non-ESA listed sea birds have been identified that forage on sardine and therefore may be affected directly or indirectly by the sardine fishery. These sea birds include grebes and loons, petrels and albatrosses, pelicans and cormorants, gulls, terns, auks, and some raptors (PFMC 1998).

3.3 Purse Seine Fleet

3.3.1 Description

The Pacific sardine fishery has been economically important since the early part of the 20th century off the West Coast of North America. The Pacific sardine fishery developed in response to demand for food during World War I. Landings increased from 1916 to 1936, and supported the largest fishery in the western hemisphere during the 1930s and 1940s. The fishery decline in the late 1940s and remained at extremely low levels of abundance until the 1970s. In 1986, the state of California lifted its 18-year moratorium on sardine harvest on the basis of sea-survey and other data indicating that the spawning biomass has returned to fishable levels. In January 2000, management authority for the U.S. Pacific sardine fishery was transferred to the Council when the CPS FMP was adopted. Around the same time that the CPS FMP was being developed (the mid-1990s), the Pacific sardine stock expanded its range northward up into the PNW, prompting the start of state managed fisheries in Oregon and Washington in the year 2000.

The gear traditionally used in the CPS fishery is a purse seine. A typical purse seine net measures 185 fathoms long, 22 fathoms deep, and 1,600 meshes deep with 1¼ inch mesh (Lutz and Pendelton 2000). There are 63 permits and 62 active vessels in the federally managed limited entry permitted portion (Southern subarea) of the CPS fishery. Vessels landing less than five metric tons of CPS per trip in the Southern subarea are exempt from limited entry requirements. In the open access area (Northern subarea), fishers must have individual state (Oregon and Washington) harvest permits to fish for Pacific sardine.

In Oregon, Pacific sardine is managed as a developmental fishery. In 2004, all 20 developmental fishery permits were issued. Permit stipulations include: permit is not transferable; logbook is required; observers are allowed on board; a grate must be placed over the hold to sort out larger fish; renewal of the permit is subject to meeting minimum annual landing requirements of five landings of sardines totaling 80,000 lb, or landings of at least $25,000 exvessel price.

In Washington, sardines are managed under the Emerging Commercial Fishery provisions, which provide for the harvest of a newly classified species, or harvest of a previously classified species in a new area or by new means. From 2000 through 2002, Washington Department of Fish and Wildlife (WDFW) had trial purse seine fisheries for Pacific sardines, under which the number of participants, by law, cannot be limited. Since participation could not be limited, the Washington fishery was managed to a state HG of 15,000 mt. Following an extensive public process, which included establishing and meeting with a formal Sardine Advisory Board, the Director of WDFW decided to advance the sardine fishery from a trial to an experimental fishery in 2003. Experimental fisheries, under the Emerging Commercial Fisheries legislation, require participation to be limited. In collaboration with the Sardine Advisory Board, WDFW developed and implemented an effort limitation program in 2003. A total of 17 fishing permits were issued; of these, ten vessels made landings during the season. Permit requirements require vessels to maintain logbooks and carry observers when requested, and to reimburse the agency, in part, for observer costs. In 2004, there were 17 fishers who met all of the criteria necessary to obtain a Washington sardine experimental fishery permit. The initial qualifying criteria included a cumulative total of 40 mt landed into Washington in the years 2000, 2001, and 2002, or landings in two of the three qualifying years. In addition to the minimum landing requirement, qualifying participants must have held a limited entry permit in 2003, paid any outstanding fees owed to the Department for observer coverage in the 2000-2003 sardine fisheries, and renewed their fishing license by April 1. As the number of qualifying fishers was less than 20, the Director had the discretion to

offer additional permits (up to a maximum of 25). A letter was sent to all fishers who had landed more than 40 mt of sardines into Washington (even those who did not hold permits in 2003) to solicit interest in the fishery. Four fishers indicated an interest in participating, which brought the number of permits issued in 2004 up to 21. Of these, 14 made landings during the season.

As of June 2005, no treaty tribe fisheries for CPS have occurred. The Makah Tribe of Washington has formally requested an allocation for sardine for 2006.

3.4 Buyers and Processors

3.4.1 Description

The major West Coast processors and buyers of CPS finfish are concentrated in the Los Angeles, Santa Barbara-Ventura, Monterey and Oregon-Washington Columbia River port areas. The exvessel markets for market squid are mainly in the Los Angeles, Santa Barbara-Ventura, and Monterey port areas.

In 2004, 29,533 mt of market squid were exported through West Coast customs districts with an export value of $37.0 million; a 34% increase in quantity, and a 28% increase in the real value of West Coast market squid exports from 2003. The primary country of export was China (33% of the total), which received 11,050 mt, 6% less than the quantity exported to China in 2003. Seventy-six percent of market squid exports went to China and four additional countries: Japan (5,090 mt), Spain (2,774 mt), the Philippines (1,930 mt), and Mexico (1,612 mt). Domestic sales were generally made to restaurants, Asian fresh fish markets, or for use as bait.

Seventy-seven percent (68,951 mt) of Pacific sardine landings were exported in 2004, a 23% increase from 2003. Most of the remaining landings were consumed domestically as canned Pacific sardine. Pacific sardine exports were valued at $60.7 million in 2004, up 49% from 2003. Almost 80% of Pacific sardine exports were in the frozen form, the balance was in the preserved form. Japan was the primary export market in 2004, receiving 31,197 mt, up 12% from 2003, and 45% of total exports. Australia was second with 9,896 mt, 14% of the total and a 14% increase from 2003. Japanese demand for Pacific sardine is for both human consumption and use as bait in its longline fisheries. West Coast Pacific sardine exports to Australia are primarily for feed in Australia's bluefin tuna farming operations.

The U.S. harvests and processes Pacific sardine for non-reduction uses, which include: 1) direct human consumption; 2) aquaculture feed (whole fish); 3) commercial fisheries bait; and, 4) sport fishery bait. Traditionally there have been two geographic subareas that comprise the Pacific sardine fishery off California: a southern subarea fishery that primarily includes the fleet based in the San Pedro - Los Angeles area, and a northern subarea fishery that includes the fleet based in Monterey Bay area. More recently Pacific sardine have become available in commercially fishable quantities in the Columbia River plume off Oregon and Washington, and the PNW fishery has reemerged. Each regional fishery targets Pacific sardine; California fisheries also target mackerel, market squid, and tunas when available. Exvessel landings in all sectors are driven by domestic and international market forces for sardines, as well as the availability and markets for other species of economic benefit to Pacific sardine vessels and processors. The decline of the sardine resource off Japan and Peru has resulted in increased market opportunities for Pacific sardines, particularly in Japan where there has been increased demand for sardine products from West Coast processors.

Because of their availability at the northern extent of the distribution, the PNW fishery has been harvesting relatively large sardines with high in oil content, which have been highly sought after for use as longline bait, particularly in Japan (whose own sardine fishery is in a state of collapse) where only the highest quality

sardines are considered for use as bait in their longline fisheries. As the longline bait market matured, processors in the PNW began turning their attention to market opportunities in Japan for sardines for human consumption. The amount destined for human consumption has grown rapidly in Japan and in other countries as additional food markets are developed, and the longline bait markets become saturated. In 2004 there were 13 processors receiving sardines in the PNW. For three of them, sardines accounted for over 99% of their total expenditures for raw fish, which would classify these three as sardine specialists (Table 3–2). The remaining ten Northwest processors were more diversified in their operations; sardines represented less than ten percent of their total raw fish expenditures during 2004. Collectively, these processors were most dependent on albacore tuna, groundfish and crab in 2004, based on their raw fish expenditures (Table 3–2). Virtually all of the sardines landed in the PNW processed into 10 kg frozen packs, the preferred product form for the large sardines exported as longline bait or for human consumption (Figure 3-1). The weighted average price for sardines processed in the PNW was $694.80 per metric ton in 2004.

In recent years, the sardines harvested off northern and southern California have been relatively small, with the sardines landed in San Pedro being generally smaller than those landed in Monterey. These smaller sardines have been primarily processed for human consumption, aquaculture and animal feed, small longline bait, and a number of specialty markets, depending on the size of the fish. California sardine processors process sardines for canning as pet food and for human consumption; individually quick freeze (IQF) sardines for human consumption and bait; head and gut (H&G) sardines for canning overseas; and block freeze sardines for canning overseas, for bait and for animal and fish feed. A small but significant amount is also marketed domestically to fresh fish retail markets and restaurants.

In 2004 there were ten sardine processors operating in Northern California. Two of these processors dealt only in CPS, with squid, followed by sardine, making up the bulk of their raw fish purchases. Squid and sardine also made up the largest share of raw fish purchase for the other eight Northern California processors; but they also purchased significant quantities of groundfish, salmon and other species in 2004 (Table 3–2). The primary sardine product forms processed in Northern California have been fresh sardine; IQF; frozen 2-, 10- and 15-kg packs; and 50-pound frozen blocks (Figure 3-1). The weighted average price for sardines processed in Northern California was $514.27 per metric ton in 2004.

There were 19 sardine processors in Southern California in 2004. Six purchased only CPS, with squid accounting for the largest share of their total raw fish expenditures followed by sardine. The other 13 purchased mainly squid and sardine, with lesser expenditures for other CPS and tuna (Table 3-2). Fresh and H&G sardines; IQF; frozen 2-, 10-, and 15-kg packs; and 50-pound frozen blocks were the primary sardine products produced by Southern California sardine processors during 2004 (Figure 3-1). The weighted average price per metric ton for sardines processed in Southern California in 2004 was $557.80.

Table 3-2. Distribution of raw fish expenditures by species for sardine processors, by sardine fishery sector, 2004.

	Percent of Total Expenditure											
Sector	**Anchovy**	**Crab**	**Ground-fish**	**Jack Mackerel**	**Other**	**Pacific Mackerel**	**Salmon**	**Sardine**	**Shrimp**	**Squid**	**Tuna**	**Grand Total**
Pacific Northwest												
CPS Only (3)[1]	0.0%	0.0%	0.0%	0.0%	0.1%	0.3%	0.0%	99.6%	0.0%	0.0%	0.0%	$2,783,386
CPS and Other (10)	0.2%	18.4%	25.6%	0.0%	3.2%	0.0%	4.7%	8.3%	7.3%	0.0%	32.2%	$40,163,585
Northern California												
CPS Only (2)	2.2%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	39.4%	0.0%	58.3%	0.0%	$460,151
CPS and Other (8)	5.3%	0.9%	14.5%	0.0%	1.9%	1.0%	8.1%	20.0%	0.0%	47.1%	1.3%	$5,299,875
Southern California												
CPS Only (6)	12.0%	0.0%	0.0%	0.3%	0.0%	0.4%	0.0%	17.7%	0.0%	69.6%	0.0%	$3,614,658
CPS and Other (13)	0.1%	0.0%	0.0%	2.7%	9.7%	5.1%	0.0%	22.6%	0.0%	54.3%	5.6%	$8,895,286

[1/]Number of processors in each category in parentheses.

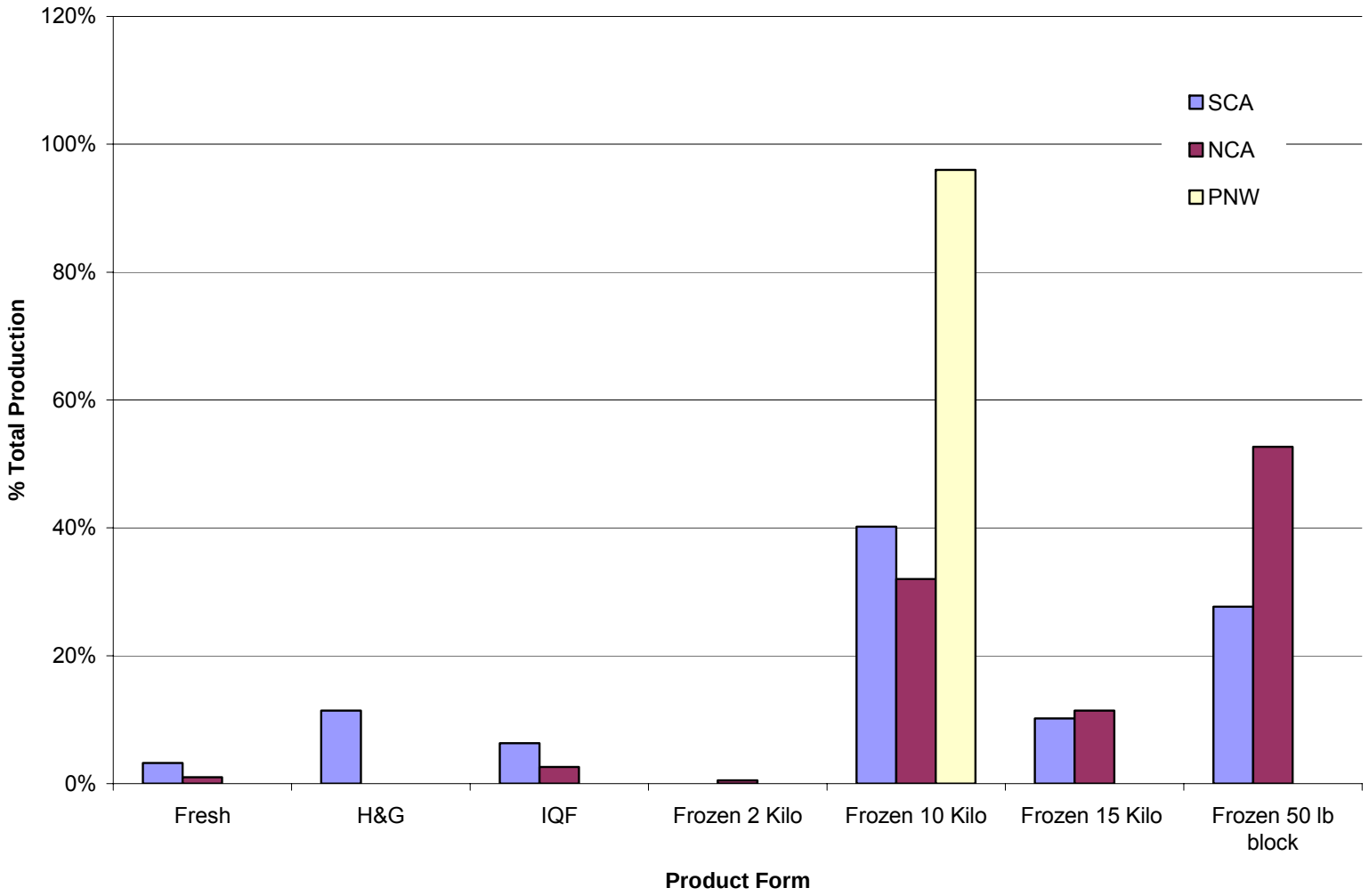


Figure 3-1. Sardine processed product mixes by fishery sector, 2003-2004.

3.5 Fishing Communities

Fishing communities, as defined in the Magnuson-Stevens Act, include not only the people who actually catch the fish, but also those who share a common dependency on directly related fisheries-dependent services and industries. In commercial fishing this may include boatyards, fish handlers, processors, and ice suppliers. Similarly, entities that depend on recreational fishing may include tackle shops, small marinas, lodging facilities catering to out-of-town anglers, and tourism bureaus advertising charter fishing opportunities. People employed in fishery management and enforcement make up another component of fishing communities.

Fishing communities on the West Coast depend on commercial and/or recreational fisheries for many species. Participants in these fisheries employ a variety of fishing gears and combinations of gears. Naturally, community patterns of fishery participation vary coastwide and seasonally, based on species availability, the regulatory environment, and oceanographic and weather conditions. Communities are characterized by the mix of fishery operations, fishing areas, habitat types, seasonal patterns, and target species. While each community is unique, there are many similarities. For example, all face danger, safety issues, dwindling resources, and a multitude of state and federal regulations.

Individuals make up unique communities with differing cultural heritages and economic characteristics. Examples include a Vietnamese fishing community of San Francisco Bay and an Italian fishing community in Southern California. In most areas, fishers with a variety of ethnic backgrounds come together to form the fishing communities within local areas, drawn together by their common interests in economic and physical survival in an uncertain and changing ocean and regulatory environment.

This section provides an overview of West Coast fishing communities organized around regions comprising port groups and ports consistent with the organization of fish landings data in the Pacific Coast Fisheries Information Network (PacFIN). Ports are coded in PacFIN using a two- or three-letter code, or PCID; landings data from several sites may be combined under one of these ports. The ports have been further aggregated into 18 port groups. These port groups are designed to reduce issues surrounding the disclosure of confidential information (which could be a problem with very disaggregated data). Because ports and port groups are also units of analysis when evaluating socioeconomic and demographic characteristics, their boundaries are consistent with major civil boundaries, such as county and state lines.

These geographic entities have been aggregated into seven larger regions, each comprising one or more port groups: Puget Sound, the Washington Coast, the northern Oregon Coast, the southern Oregon Coast, Northern California, Central California, and Southern California. Each subsection first describes the constituent port groups and ports and associated fleet characteristics. Socioeconomic and demographic characteristics are then summarized. Information is provided for those port groups where sardines are landed in sufficient quantities to indicate that targeted fisheries are based there. A criterion of greater than 1,000 mt in non-squid CPS landings was used to identify ports groups where impacts of the proposed action would likely occur. These are described within the context of the regional groups outlined above. The regions described here and the port groups with sardine landings are:

Regional Group	Port Groups
	Northern Subarea
Washington Coast	North Washington Coast
	Central and South Washington Coast*
North Oregon Coast	Astoria-Tillamook*
	Newport
	Southern Subarea
Central California	Bodega Bay
	San Francisco
	Monterey*
	Morro Bay
Southern California	Santa Barbara*
	Los Angeles*
	San Diego

*Port areas in 2002 with non-squid CPS landings greater than 1,000 mt.

3.5.1 Washington Coast (North Washington Coast and Central and South Washington Coast)

3.5.1.1 CPS Landings

The South and Central Washington Coast shows the only CPS landings of the three Washington port groups in 2002, with 15,833 mt (Table 3-3). Landings subsequently declined, to 8,934 mt in 2004. It is important to note, however, that the treaty Indian tribes participating in West Coast fisheries are located in the two coastal Washington port groups. Although not currently harvesting sardines, they have announced their intention to do so, according to their treaty rights. The South Washington Coast is also a major center for several fisheries, and measured by its $34.4 million in exvessel revenue from all fisheries in 2002, is the largest port area on the West Coast. High-value Dungeness crab is the big contributor to this total.

Westport and Ilwaco are the dominant ports for CPS in the Central and South Coast port group.

3.5.1.2 Community Demographics

Washington Coast demographics at a glance:

	North Coast		Central/South Coast	
	Value	Rank	Value	Rank
Total population:	58,855	7	39,574	11
Urban population	63.1%	12	60.5%	13
Non-white population:	9.8%	13	9.6%	14
Hispanic population:	2.3%	18	5.0%	14
Working age population (17-64):	58.1%	16	58.5	15
High school graduate and higher*:	87.7%	5	78.8%	15
Natural resource-related employment**:	1.92%	13	3.72%	3
Average household income:	$45,252	11	$40,188	15
Poverty rate:	12.6%	7	15.0%	4

(Values from Tables 8-10 through 8-16 for block group equivalent areas. Census data, 2000. *Some college, bachelor and graduate degrees. **Population employed in private sector natural resource-related occupation.)

These two port groups are sparsely populated, more rural areas. Both are less ethnically diverse than most of the other port groups; lower ranked port groups for this statistic are on the Oregon Coast. However, these regions have large Native American populations, at least proportionately, and rank third and seventh for this statistic. Both port groups also have a comparatively lower proportion of working age population. The North Coast port group includes some communities with a large number of retirees. Forty-six percent of the population in Sequim, for example, is 65 and older. The Central and South Coast port group is noticeably worse off in terms of other socioeconomic indicators of education and income. But Neah Bay, in the North Coast group, has the lowest median income, at $21,635 in 1999, of any of the ports that are also census places.

Earnings from and employment in fishing-related activities are important in the Washington Coast port groups. The South Coast ranked first for the proportion of total personal income that is derived from fishing activities at 4.8%, with the Central and North Coast regions ranking fifth and ninth in 2001. This is consistent with the employment-related census data discussed above. Groundfish-related revenues are a less important component of fisheries-related income and employment on the South Coast in comparison to the Central and North Coast regions. Fifty-nine percent of fisheries income was derived from groundfish-related activities on the North Coast, for example, as compared to only 7.4% on the South Coast in 2001.

3.5.2 North Oregon Coast (Astoria, Tillamook, and Newport)

3.5.2.1 CPS Landings

Astoria-Tillamook, grouped as one port area in the fishery-related tables (but split out in the demographic tables), shows the only appreciable CPS landings in Oregon with 22,710 mt in 2002, slightly less than half of all Council-managed fish species landed in this port group. Sardine landings increased to 36,111 mt in 2004.

3.5.2.2 Community Demographics

North Oregon coast demographics at a glance:

	Astoria		Tillamook		Newport	
	Value	Rank	Value	Rank	Value	Rank
Total population:	39,957	12	19,876	17	24,335	14
Urban population	71.51%	11	28.51%	18	61.21%	13
Non-white population:	7.4%	16	5.47%	18	10.4	11
Hispanic population:	5.1%	13	5.1%	12	4.8%	15
Working age population (17-64):	62.9%	11	59.8%	14	60.87	13
High school graduate and higher*:	85.0%	7	85.0%	8	85.3%	6
Natural resource-related employment**:	2.07%	11	7.31%	1	2.5%	9
Average household income:	$45,399	10	$42,730	13	$44,715	12
Poverty rate:	12.3%	10	11.4%	13	10.9%	14

(Values from Tables 8-10 through 8-16 for block group equivalent areas. Census data, 2000. *Some college, bachelor and graduate degrees. **Population employed in private sector natural resource-related occupation.)

These port groups are demographically quite similar. Tillamook is much more rural, ranking lowest for urban population of all the port groups. (Even looking at the value for census places, Tillamook ranks fourteenth in terms of urban population, with 70%.) It is also the least racially diverse port group and has the highest proportion of the population involved in natural resource-related occupations (farming, forestry, fishing, and hunting). Of these three areas, Newport has the highest percent nonwhite population, and Native Americans represent the largest share of this population with 3.2% of the total population. These port groups rank in the middle in terms of educational attainment. Although average income is comparatively modest, poverty rates also rank lower, which could suggest less wealth disparity in these areas. However, looking at rates for individual census places suggests pockets of poverty in some areas. The rate for Astoria is 15.2% while Siletz Bay in the Newport port group has a 15.7% poverty rate. Siletz Bay also has a large percentage of Native Americans: they make up 19.3% of the population. Median incomes range from a low of $31,074 for Seaside in the Astoria port group to a high of $40,250 in Nehalem Bay in the Tillamook port group, which has the lowest average income of the three.

Fishery-related income and employment are important in Astoria-Tillamook, which ranked fourth coastwide in terms of the contribution fisheries activities made to these economic indicators in 2001.

3.5.3 Central California (Bodega Bay, San Francisco, Monterey, and Morro Bay)

3.5.3.1 CPS Landings

In Central California, and Southern California especially (see below), CPS are a more significant component of commercial landings. In 2002, 13,881 mt of sardines were landed in this region. Monterey is the major port, accounting for about 98% of landings. Landings fell substantially in 2003, to 7,908 mt in 2003, but increased to 15,285 mt in 2004. San Francisco and Morro Bay landings were under 1,000 mt.

3.5.3.2 Community Demographics

Central California coast demographics at a glance:

	Bodega Bay		San Francisco		Monterey		Morro Bay	
	Value	Rank	Value	Rank	Value	Rank	Value	Rank
Total population:	15,592	18	1,484,046	1	112,344	6	40,812	10
Urban population	49.1%	16	99.7%	2	92.5%	6	87.7%	7
Non-white population:	11.0%	10	55.0%	1	20.1%	7	10.3%	12
Hispanic population:	9.2%	9	16.7%	4	16.0%	5	10.9%	8
Working age population (17-64):	73.9%	1	70.0%	3	72.2%	2	61.6%	12
High school graduate and higher*:	93.9%	1	80.1%	14	89.3%	3	91.2%	2
Natural resource-related employment**:	2.8%	6	0.1%	18	1.0%	14	2.4%	10
Average household income:	$108,183	1	$72,203	2	$67,623	3	$56,804	8
Poverty rate:	6.3%	18	12.3%	9	10.3%	15	9.9%	17

(Values from Tables 8-10 through 8-16 for block group equivalent areas. Census data, 2000. *Some college, bachelor and graduate degrees. **Population employed in private sector natural resource-related occupation.)

This region is more ethnically diverse, better educated and wealthier than port groups to the north. Like Seattle in Puget Sound, San Francisco and the Bay Metropolitan Area dominate this region in terms of population and economic activity. The sparsely populated Bodega Bay port group includes affluent Sausalito, just across the Golden Gate Bridge from San Francisco. Its median income of $87,469 places it above all other communities except for the Newport Coast census designated place (CDP) in Southern California. Yet all of these port groups compare positively in terms of the statistics measuring income and education, with Morro Bay somewhat of a laggard in comparison to the other three port groups. As might be expected, natural resource related employment is insignificant in the San Francisco port group and modest in the other three.

3.5.4 Southern California (Santa Barbara, Los Angeles, and San Diego)

3.5.4.1 CPS Landings

Los Angeles ranked second (behind the South Washington Coast) for exvessel revenue from all fisheries on the West Coast, and Santa Barbara ranked fourth in 2002. Southern California had the highest 2002 sardine landings on the West Coast at 44,464 mt. Los Angeles accounted for about 88% of these landings with most of the remaining landings being made at Santa Barbara. Some landings were also made at San Diego. This region registered a decline in landings after 2002, with 32,393.4 mt landed in 2004.

3.5.4.2 Community Demographics

Southern California coast demographics at a glance:

	Santa Barbara		Los Angeles		San Diego	
	Value	Rank	Value	Rank	Value	Rank
Total population:	400,353	5	703,511	4	1,336,350	2
Urban population	99.2%	3	100.0%	1	99.6%	3
Non-white population:	39.2%	3	46.9%	2	38.8%	4
Hispanic population:	45.8%	1	35.8%	2	26.0%	3
Working age population (17-64):	63.8%	10	63.8%	9	66.2%	5
High school graduate and higher*:	73.8%	17	75.1%	16	82.5%	12
Natural resource-related employment**:	3.4%	4	0.1%	17	0.2%	16
Average household income:	$63,423	5	$64,901	4	$61,947	6
Poverty rate:	9.9%	16	15.6%	3	11.9%	11

(Values from Tables 8-10 through 8-16 for block group equivalent areas. Census data, 2000. *Some college, bachelor and graduate degrees. **Population employed in private sector natural resource-related occupation.)

Coastal Southern California is overwhelmingly urban and the most racially and ethnically diverse region on the West Coast. Los Angeles is the preeminent urban center on the West Coast. As might be expected, these port groups rank at the top for the percent of the population that is Hispanic. The population value for the Los Angeles port group is somewhat misleading because it includes a small subset of the cities and communities in the Los Angeles area. In comparison, the combined population of Los Angeles and Orange counties is 7.7 million. The Los Angeles ports in particular show significant disparities in economic well-being. The Newport Coast CDP, for example, has the highest median income of the West Coast port areas—$164,653—and an average income of $264,648. This is more than four times the average income for the port group as a whole. To a lesser degree, there are these types of disparities in the Santa Barbara port group. Santa Barbara itself is a quite affluent city while the coastal areas in Ventura County to the south, also part of the port group, have fewer wealthy residents. Comparison of the median and average income values for Santa Barbara and the other ports in the port group reflect the differences in income distribution. There is a much greater difference between median income and average income in Santa Barbara compared to the other ports. For example, median household income in Santa Barbara is less than in Oxnard while average household income is greater.

The estimates of income and employment derived from fisheries are comparatively small for these port groups; Santa Barbara ranks higher than the other two but still in the bottom half of all West Coast port groups.

Table 3-3. Total Commercial Deliveries (including Tribal fisheries) of Council-Managed Species to West Coast Port Areas in 2002 (mt) (page 1 of 2)

	Washington					Oregon					
Species Group	Puget Sound	North WA Coast	South and Central WA Coast	Unsp. WA	WA TOTAL	Astoria-Tillamook	Newport	Coos Bay	Brookings	Unsp. OR	OR TOTAL
Pacific Sardine	0.0	0.0	15,833.0	0.0	15,833.0	22,711.0	0.0	0.0	0.0	0.0	22,711.0
Squid	0.0	0.0	0.5	0.0	0.5	0.4	0.3	1.9	0.0	0.0	2.6
Pacific Mackerel	0.0	0.0	248.0	0.0	248.0	127.0	0.0	0.0	0.0	0.0	127.0
Jack Mackerel	0.0	0.0	12.0	0.0	12.0	9.0	0.0	0.0	0.0	0.0	9.0
Anchovy	0.0	0.0	229.0	0.0	229.0	3.0	0.0	0.0	0.0	0.0	3.0
Groundfish	3,794.3	2,141.0	13,246.5	118.6	19,300.4	18,284.4	26,928.7	3,767.0	880.5	0.0	49,860.7
Pink Shrimp Trawl	0.0	0.0	4,573.5	0.0	4,573.5	6,621.5	5,237.1	5,912.0	1,088.9	0.0	18,859.4
Spot Prawn Trawl	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Spot Prawn Pot	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ridgeback Prawn Trawl	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pacific Halibut	19.4	185.2	12.8	47.3	264.6	15.9	112.6	18.0	9.3	1.1	156.8
California Halibut a/	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Salmon	210.6	1,015.9	194.3	3.0	1,423.9	939.8	33.9	212.1	0.0	0.9	1,186.7
Sea Cucumber	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
California Sheephead	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gillnet Complex b/	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.6
HMS	496.4	18.0	4,709.3	122.9	5,346.5	678.1	899.1	379.9	21.0	0.0	1,978.2
Dungeness Crab	257.4	130.0	5,400.2	779.2	6,566.7	340.1	1,563.6	1,063.2	272.3	0.0	3,239.3
Other Crustaceans	33.2	0.3	66.6	0.0	100.1	46.9	6.8	3.7	4.1	0.0	61.4
Other Species	101.0	103.1	4,031.1	0.0	4,235.2	269.7	320.1	406.0	341.8	0.0	1,337.6
Total Council-Managed	4,912.3	3,593.4	48,556.8	1,071.0	58,133.4	50,046.9	35,102.1	11,764.3	2,617.9	2.0	99,533.2

a/ Excluding California halibut caught in Gillnet Complex.

b/ Includes California halibut, white sea bass, sharks and white croaker.

Table 3-3. Total Commercial Deliveries (including Tribal fisheries) of Council-Managed Species to West Coast Port Areas in 2002 (mt) (page 2 of 2)

California

Species Group	Northern CA	San Francisco	Monterey	Morro Bay	Santa Barbara	Los Angeles	San Diego	Unsp. CA	CA TOTAL	At Sea TOTAL	Grand TOTAL
Pacific Sardine	0.0	172.0	13,607.0	102.0	5,065.0	39,308.0	91.0	0.0	58,345.0	0.0	96,889.0
Squid	3.9	865.0	25,067.0	356.5	11,814.0	28,137.0	1.0	0.0	72,944.2	10.4	72,957.7
Pacific Mackerel	0.0	0.1	0.5	0.0	0.5	3,368.0	0.0	0.0	3,369.1	0.0	3,369.1
Jack Mackerel	0.0	0.1	2.0	0.0	0.5	1,004.0	0.0	0.0	1,006.6	0.0	1,006.6
Anchovy	0.0	17.0	2,690.0	0.0	732.0	1,206.0	5.0	0.0	4,650.0	0.0	4,650.0
Groundfish	8,303.4	4,354.4	1,265.6	910.4	105.1	135.4	145.9	0.0	15,220.3	71,264.1	155,645.5
Pink Shrimp Trawl	1,869.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,869.5	0.0	25,302.4
Spot Prawn Trawl	2.8	23.6	11.4	39.9	21.4	0.2	0.0	0.0	99.2	0.0	99.2
Spot Prawn Pot	0.2	0.1	26.1	4.6	14.9	18.8	14.3	0.1	79.0	0.0	79.0
Ridgeback Prawn Trawl	0.0	0.0	0.0	0.8	212.6	1.7	0.0	0.0	215.2	0.0	215.2
Pacific Halibut	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	421.6
California Halibut a/	3.6	157.1	32.6	6.9	86.5	21.1	1.4	0.0	309.1	0.0	309.1
Salmon	76.4	1,891.5	0.0	81.9	0.0	0.0	0.0	0.0	2,049.8	0.0	4,660.4
Sea Cucumber	0.2	0.4	0.0	0.5	350.8	67.9	5.9	0.1	425.7	0.0	425.7
California Sheephead	0.0	0.3	0.0	0.3	23.0	17.0	11.7	0.0	52.2	0.0	52.2
Gillnet Complex b/	0.0	0.0	6.8	10.5	148.8	170.5	15.2	0.0	352.0	0.0	352.5
HMS	1,279.0	72.8	420.1	290.3	293.6	2,589.5	638.5	0.0	5,583.8	0.0	12,908.5
Dungeness Crab	3,776.1	1,859.2	48.8	14.5	0.1	0.0	0.0	0.0	5,698.6	0.0	15,504.6
Other Crustaceans	43.1	377.1	0.5	54.1	506.7	153.2	164.4	4.4	1,303.5	0.0	1,464.9
Other Species	2,221.4	3,839.7	85.4	19.9	2,145.2	1,366.9	509.8	25.6	10,213.8	851.9	16,638.6
Total Council-Managed	17,579.5	13,630.3	43,263.8	1,893.0	21,520.7	77,565.3	1,604.0	30.2	183,786.6	72,126.5	412,951.7

a/ Excluding California halibut caught in Gillnet Complex.

b/ Includes California halibut, white sea bass, sharks and white croaker.

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 Discussion of the Analytical Approach

The following analysis is based on evaluating the impacts of the alternatives on components of the human environment. As discussed in Chapter 1, CEQ regulations and agency guidance (NAO 216-6) were used to identify those environmental components where the proposed action could potentially have a significant impact. The components are protected species, the purse seine fleet, fish processors, and fishing communities. For each of these components evaluation criteria have been developed; each criterion represents a measure of impacts to the environment. Determining whether a given alternative would result in significant impacts is facilitated by identified thresholds; exceeding a threshold could represent a significant impact. Ideally, these thresholds would be derived from existing environmental laws, regulations, or standards. For socioeconomic impacts in particular it is difficult to identify existing thresholds; furthermore, as discussed in Chapter 1, regulations and agency guidance make it clear that for the purposes of NEPA socioeconomic impacts by themselves should not be a basis for a finding of significant impact. Although there are existing thresholds for the management of ESA-listed salmon, such as the conservation objectives in the Council's Salmon FMP, the data necessary to identify equivalent measurement criteria applicable to the proposed action are not available. Therefore, these thresholds are used to contrast the alternatives and provide some basis for evaluation. However, by the same token, exceeding any one threshold by itself would not necessarily be a reason for concluding that an alternative would have impacts so severe as to require further analysis in an EIS. Measurement criteria and their relation to corresponding thresholds have to be considered in their totality when making a judgment as to the potential for an alternative to result in significant impacts.

According to CEQ regulations impacts can be beneficial or adverse, so thresholds for both positive and negative impacts are identified. (Table 4-1 summarizes the evaluation criteria and thresholds used in this analysis.) Cumulative impacts result from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions. The description in Chapter 3 describes the affected environment or baseline conditions at the time the proposed action will be implemented. (Because of data limitations, the baseline may be represented by information during the time period immediately preceding implementation.) Some of these conditions are judged to persist into the future, potentially combining with the effects of the proposed action and contributing to the cumulative effect. These persistent effects account for the past and present actions identified in the definition of cumulative effects. Reasonably foreseeable future effects also may be identified. For each environmental component the direct effect of the proposed action is considered along with the persistent effects and the effects of reasonably foreseeable future actions to evaluate the cumulative effect of the proposed action. This culminates in an evaluation of any significant adverse impacts that may result under a given alternative.

The evaluation of impacts uses a five-year period (2005-2009) to evaluate effects. This period represents judgment on the part of the analysts about how long any allocation scheme adopted as part of this action is likely to stay in place. Although the proposed action is considered "long term," the Council is cognizant of the potential for conditions to change over time and anticipates the need to revisit allocation by the end of this period. For this reason the Council indicated their intent to review the allocation scheme within the five-year time frame when they identified their preferred alternative.

Table 4–1. Evaluation criteria and significance thresholds for the environmental components analyzed in this EA.

Environmental Component	Evaluation Criterion	Rating		
		Significantly Adverse	**Insignificant**	**Significantly Beneficial**
ESA-listed salmon	Incidental mortality of ESA-listed salmon in the sardine fishery	Impacts that potentially threaten the continued existence and recovery of listed stocks	Incidental mortality is not a significant factor contributing to the overall mortality of a listed stock	Effects that contribute to the growth and recovery of listed stocks
Purse Seine Fleet	Regional effect	PV exvessel revenue less than Status Quo value under any HG scenario	PV exvessel revenue ≥ Status Quo, < 150% of No Action	PV exvessel revenue 150% of No Action value under any HG scenario
	Disproportionate effects on either subarea	Either subarea's share of PV exvessel revenue < 40% under any HG scenario	Either subarea's share of PV exvessel revenue ≥ 40%	Both subarea's shares of PV exvessel revenue are greater than 48% under any HG scenario
	Constraints on harvest opportunity	Number of months with landings shortfall in either subarea >75% of the total number of months with shortfalls	Number of months with landings shortfall in either subarea ≤75% of the total number of months with shortfalls	There are no months with landings shortfalls in either subarea
	Foregone harvest opportunity	The unharvested portion of the HG is greater than what would occur under No Action	The unharvested portion of the HG is less than or equal to what would occur under No Action	There is no unharvested portion of the HG
Buyers and Processors	Overall efficiency	PV producer surplus less than Status Quo value under any HG scenario	PV producer surplus ≥ Status Quo, < 150% of No Action	PV producer surplus 150% of No Action value under any HG scenario
	Disproportionate effects on either subarea	Either subarea's share of PV producer surplus < 40% under any HG scenario	Either subarea's share of PV producer surplus ≥ 40% but both subarea shares are ≤ 48%	Both subarea's shares of PV producer surplus > 48% under any HG scenario
	Constraints on supply	Number of months with landings shortfall in either subarea >75% of the total number of months with shortfalls	Number of months with landings shortfall in either subarea ≤ 75% of the total number of months with shortfalls	There are no months with landings shortfalls in either subarea
	Foregone supply	The unharvested portion of the HG is greater than what would occur under No Action	The unharvested portion of the HG is less than or equal to what would occur under No Action	There is no unharvested portion of the HG
Fishing Communities	Change in personal income	Personal income region-wide declines by more than -5% relative to Status Quo	The change in personal income region-wide ≥ -5% but ≤ +5%	Region-wide personal income increases by more than 5% relative to Status Quo
	Disproportionate change in personal income	Personal income in either subarea declines by more than -ten percent	The change in personal income in either subarea ≥ -ten percent but not positive in both subareas	The change in personal income is positive in both subarea

4.2 Protected Resources

Protected resources include species protected by three federal laws, the ESA, the MMPA, and the MBTA. A complete list of species that may be affected by the proposed alternatives is provided in Section 3.2.

When analyzing effects of alternatives, both indirect and direct effects must be considered. One potentially significant indirect effect of the proposed action and alternatives was identified: the depletion of sardine as a prey resource for marine predators. The direct effect of the sardine fishery being carried out under any of these alternatives would be the incidental take of protected resources.

To determine effects of the proposed action and alternatives on protected species, NMFS considered how the alternatives differ from one another and how those differences would affect the amount of forage available, and how the alternatives may increase or decrease likely encounters with protected species compared with current conditions. These differences include the fishing effort anticipated under various alternatives and the spatial and temporal character of the fishery under the alternatives. It is a reasonable assumption that increases in landings, and therefore effort, may increase the likelihood of impacts on protected resources. Further, many protected marine species are migratory, moving seasonally to mate and forage. It is therefore, reasonable to assume that alternatives that substantially change the time of year or area of the fishery may result in encounters with protected species not currently encountered in the fishery. The sardine HG is determined through an annual process and is separate from the proposed action. Future harvest levels and regional landing patterns were projected based upon these various scenarios of low, medium, and high HGs (consistent with the socioeconomic analysis performed for this EA). The take of ESA listed salmon was evaluated using the high sardine HG scenario (200,000 mt) and by assuming 100% mortality of encountered salmon in order to project the highest potential level of salmon take. If the effect of the alternatives is not significant under this scenario, it is possible to conclude that the effects will not be significant under the other scenarios, where incidental take would be less.

Analyses of the landings under all alternatives suggest that the spatial and temporal distribution of effort is unlikely to change substantially from the fishery as currently prosecuted (Table 4-2). Therefore, it is likely that the protected resources currently affected by the sardine fishery will continue to be affected (or not affected) by the fishery under the proposed alternatives.

4.2.1 Evaluation Criteria

A number of resources were used to analyze the possible effects of the sardine allocation on protected resources, including biological opinions, informal section 7 consultations, NEPA documents, and observer records. Based upon this research, it is reasonable to believe that the most likely impact on protected resources is the direct effect of incidental take of ESA listed chinook and coho salmon. There is no evidence at this time of other protected species being incidentally taken in the sardine fishery. Based on the minimal changes in the spatial and temporal components of the fishery, as proposed under the alternatives, it seems unlikely that this will change. Further, it is unlikely that the alternatives will result in significant indirect effects on protected species. As described below in 4.2.4.2, the CPS FMP requires that a significant proportion of the entire CPS biomass be retained in the environment as potential forage for higher trophic level species. Any alternative for sardine allocation will be implemented under this same constraint.

Criterion: Incidental mortality of ESA-listed chinook and coho salmon.

Threshold: Impacts to ESA listed chinook and coho salmon that potentially threaten their continued existence of ESA-listed chinook and coho salmon ESUs in the action area and their ability to recover.

To determine the impacts of the alternatives on the ESA-listed chinook and coho ESUs, it was necessary to estimate the number of salmon taken under various alternatives, based on projected landings (2005-2009) developed for the socioeconomic analysis. The rates of bycatch of chinook and coho were calculated using the average rates of observed bycatch in the five-year Washington State observer program. The average rate of incidental take of chinook was 0.03 chinook salmon per metric ton of sardine landed; for coho the average rate was 0.06 coho salmon per metric ton landed. Because there is uncertainty regarding the survival rate for salmon released from a purse seine, all salmon encountered were assumed dead. The resulting estimates of incidental salmon take in the sardine fishery are found in Table 4-3.

In alternatives 1, 3, 4.a, 6, 7, and the Status Quo, the landings and calculated chinook and coho bycatch are the same under the maximum HG of 200,000 mt. For the sake of simplicity, only Status Quo, Alternative 4.b,

no action, and the Council-preferred Alternative are used in the rest of this analysis. The estimated number of chinook of each ESU that may be caught under the various landings estimated (under the highest HG of 200,000 mt) was estimated using encounter rates from the salmon recreational fishery. This yielded a rough estimate of which and how many salmon from each ESU may be taken by the sardine fishery.

One means of evaluating the impact of the takes of various ESUs is to estimate the harvest rate of these salmon ESUs by the sardine fishery and determine if this is sufficiently low to be an insignificant effect. This was done by estimating the numbers of each ESU within the salmon bycatch and comparing this to the inriver returns of spawning salmon in the ESU. This estimates a surrogate harvest rate from the sardine fishery. This is termed a surrogate harvest rate because it is based upon in-river returns of salmon; thus it does not include salmon taken in the ocean fishery. To accurately calculate the ocean harvest rate of the sardine fishery, it would be necessary to have the entire ocean salmon population estimate (escapement and catch). Therefore, it is likely that the actual relative harvest rate of salmon by the sardine fishery is lower than what was calculated for this analysis.

Another way to evaluate the significance of chinook bycatch under the proposed alternatives is to compare the estimated harvest rates to those already analyzed in the biological opinion for the 2005 sardine HG. The 2005 biological opinion calculated a "worse-case" estimate of take of each chinook ESU to estimate an incidental take statement (ITS). The high ITS assures ESA coverage of the sardine fishery. The biological opinion found that the 2005 HG was not likely to jeopardize the continued existence of the chinook ESUs taken as part of the 2005 sardine fishery. If the projected landings yield rates of chinook bycatch that are lower than those already analyzed in the biological opinion, it is reasonable to assume that the alternatives will not significantly affect listed chinook species.

Developing a threshold for measuring the relative impacts of the alternatives is complicated by the fact that the alternatives do not present substantial differences in the landings or the spatial and temporal components of the fishery. As noted above, the landings estimates were done as part of the economic analysis developed to evaluate alternatives. Landings were estimated within the regulatory constraints of the alternatives, assuming a maximum HG of 200,000 mt and a ten percent annual increase from 2005 to 2009. The projected landings at the 136,000 mt HG were very similar to the projected landings at 200,000 mt. As can be seen in Table 4-4, the landings at 200,000 mt HG are the same for Alternatives 1, 3, 4.a, 6, and 7. Only the no action and 4.b (HG of less than 100,000 mt) alternatives have significant differences in projected landings. At the 200,000 HG, the landings under no action are only slightly lower than the rest of the alternatives. As can be seen in Table 4.2, there is little difference in the projected distribution of effort by area and by month over the next five years. Therefore, the key to analyzing the effects of the alternatives is to determining whether the fishery would result in significant impacts on protected resources.

As noted above, if calculated mortality of ESA-listed salmon is sufficiently low, the effects of the sardine fishery alternatives could be considered insignificant. All of the ESUs considered likely to be affected by the alternatives are taken as either targeted or incidental take in commercial and recreational salmon fisheries. These fishery actions must undergo consultation under section 7(a)(2) of the ESA. A review of existing biological opinions and authorized levels of takes is informative in making a significance determination. Levels of take in fisheries provides a context for analyzing the potential take of chinook and coho that may be incidentally taken during operation of the sardine fishery under one of the proposed alternatives. However, the potential take of salmon must also be considered within the context of persistent and foreseeable future events and cumulative effects. Salmon in the PNW are affected by a variety of factors that challenge their viability which will be discussed in the effects sections below. However, many of these effects are not in the EEZ, and therefore, the Council has very little control over these actions.

4.2.2 Persistent Effects

The following sections are taken from the biological opinion prepared for the 2005 sardine HG (NMFS 2005b).

4.2.2.1 Harvest in groundfish fishery (whiting and bottom trawl)

A large number of chinook salmon and a few coho salmon are caught in the bottom trawl and whiting components of the groundfish fishery off the coasts of Washington, Oregon, and California. A number of section 7 consultations have been conducted to determine effects of the fishery on ESA-listed salmon. In each of the consultations, NMFS determined that the incidental take of salmon in the fishery would not jeopardize the continued existence of the ESUs under consideration. The 1999 groundfish FMP opinion included an incidental take statement that permits the bycatch of 11,000 chinook salmon in the whiting fishery (primarily mid-water trawl) and 9,000 chinook salmon in the bottom trawl component of the groundfish fishery (NMFS 1999). The levels of take of coho are sufficiently low to be considered insignificant (NMFS 1999).

4.2.2.2 Ocean salmon fishery

The take of ESUs in the ocean and inriver salmon fisheries has been analyzed by the NMFS NWR and SWR in a number of biological opinions. In each of these opinions, NMFS found that either the salmon fisheries would not jeopardize the continued existence of ESA-listed salmon or that jeopardy would be avoided if prescribed reasonable and prudent alternatives were implemented. The salmon fisheries, both ocean harvest and in-river harvest, are managed to meet management measures to protect listed salmon. See Table 4-5 for current ESA and FMP requirements for relevant salmon ESUs.

UWR and the spring run of the LCR chinook ESUs are generally not encountered in Pacific Fishery Management Council managed fisheries so escapement requirements are not applied to the fisheries either through the respective Fishery Management Plans or ESA constraints. LCR coho is a new ESU listed on the ESA in June 2005. In April 2005, a conference opinion was completed by the NWR on the effects of the salmon fishery, managed by the PFMC and U.S. Fraser Panel, on LCR coho. The conference opinion found no jeopardy and concluded that the take of LCR coho in the salmon fisheries would be similar to the level of take of OCN coho (NMFS 2005a).

4.2.3 Foreseeable Future Effects

4.2.3.1 Tribal CPS Fishery

Amendment 9 to the CPS FMP established a treaty Indian fishing rights framework for CPS species in usual and accustomed areas off the coast of Washington. The FMP states "An allocation or a regulation specific to the tribes shall be initiated by a written request from a Pacific Coast treaty Indian tribe to the NMFS Southwest Regional Administrator, at least 120 days prior to the start of the fishing season as specified at 50 CFR 660.510, and will be subject to public review according to the procedures in 50 CFR 660.508(d)" (PFMC 2000). With the resurgence of Pacific sardines, and their movement north along the West Coast, some of the PNW ocean fishing tribes have become interested in exercising their treaty fishing rights on CPS in their usual and accustomed grounds.

The Makah Indian Tribe submitted a letter on June 10, 2005 to NMFS, Southwest Regional Office pursuant to 50 CFR 660.518(d) and the CPS FMP requesting provisions for the treaty harvest of Pacific sardine in 2006. At the June Council meeting, the Council established the Ad Hoc Coastal Pelagic Species Tribal Allocation

Committee, composed of state, federal, and tribal representatives, to begin work on drafting the provisions of this proposed fishery. The tribal usual and accustomed grounds are generally farther north than the existing non-treaty CPS fisheries in the PNW, which occur predominately off the mouth of the Columbia River. If treaty Indian fisheries commence in the future, they could impact a different stock mix of salmon species and therefore have impacts different from those described for the current non-treaty fisheries in the PNW. These potential impacts will be evaluated during the implementation of the 2006 Pacific sardine HG and will likely initiate consultation under the ESA.

4.2.3.2 California Observer Program

NMFS started a pilot observer program in July 2004 on the California purse seine fishing vessels landing CPS in the limited entry fishery to corroborate bycatch rates derived from dock-side sampling by the California Department of Fish and Game. The pilot observer program's main focus is to gather data on total catch and bycatch, and on interactions between their fishing gear and protected species such as marine mammals, sea turtles, sea birds, and salmon. NMFS intends to continue this program and will assess impacts to protected species in California CPS fisheries as data become available.

4.2.4 Direct/Indirect Effects of the Alternatives

4.2.4.1 Direct effects

The most important direct effect of the sardine fishery alternatives is the incidental take of protected resources (species listed under the ESA, MMPA, or both) during the directed harvest of sardine. Sardine vessels and their landings are sampled dockside for the collection of fishery-dependent sardine data as well as the incidental take of non-target species. Landing species such as salmon is prohibited; they are thus unlikely to be sampled in a dockside program. Therefore, observers have been used on vessels to some degree in all three West Coast states with varied observer coverage.

Observers have been onboard vessels fishing for sardines in the PNW since the inception of the fishery as a trial fishery off the coasts of Oregon and Washington. In Oregon, there was 4%-7% observer coverage in 2000 and 2001. In Washington, observer coverage ranged from 24%-27% in 2000 through 2004 (the last year of the five-year observer program). In both of these states there are port sampling and logbook requirements.

In the southern subarea, a NMFS pilot observer program has been in place in the CPS purse seine fishery since July, 2004. The NMFS observer program is currently slated to continue into 2006. The CPS fisheries in California, including the sardine fishery, are subject to port sampling and require logbooks.

With regard to protected species other than salmon, observer program and logbooks data indicate little if any incidental take of protected resources in the sardine purse seine fishery. There have been no observed or recorded takes of the species of sea turtles and sea birds that occur in the action area. There have been interactions with California sea lions in the CPS fishery prosecuted in the southern subarea (Petersen 2005a). California sea lions are known to jump in and out of the nets before they are pursed, feeding on the fish caught within the net (Tanaka 2005). However, most of these interactions did not result in the lethal take of sea lions or any other marine mammals. Therefore, it is assumed that there are no direct effects of the proposed alternatives on protected species other than salmon: marine mammals, sea turtles, or sea birds.

Although the 1998 EIS for Amendment 8 discussed the possible effects of the Central California CPS fishery on salmon species, to date there is no evidence indicating salmon bycatch in the California sardine fishery. Fishing for Pacific sardine is rare in the northern California region of the northern subarea (Wick 2004). The State of California conducts portside catch sampling at San Pedro, California, and Monterey, California, the

two major ports for sardine landings. The sardine landings are sampled approximately 12 days per month; thus far salmon have not been observed (Laughlin 2005; Tanaka 2005).

In July 2004, NMFS began a pilot observer program on the entire CPS fishery. Between July 20, 2004 and May 4, 2005, approximately 56 vessel trips were observed, of which 18 vessel trips targeted Pacific sardine. The observed trips break down in the following areas: six trips from Los Angeles, three from Ventura, seven in Moss Landing, one in Dana Point, and one in San Diego. The preliminary data suggest no salmon bycatch in the California sector (Southern subarea) of the Pacific sardine fishery. This distribution of observer coverage reflects the effort in the fishery. In 2005 and 2006, NMFS plans to place observers on CPS fishing boats fishing off Moss Landing (Petersen 2005b). If bycatch of salmon is observed in this area of the sardine fishery, an ESA section 7 review would be initiated to evaluate the potential and consequences on ESA listed California salmon stocks that may be part of that bycatch. Until evidence of salmon bycatch in the California sardine fishery is provided, it is assumed not to occur and will not be addressed further in this analysis.

Bycatch of salmon has been recorded in the sardine purse seine fishery operating off the coasts Oregon and Washington, near the mouth of the Columbia River. The average rates of bycatch observed in the Washington based observer program were 0.03 chinook per mt of sardine landed and 0.06 coho per metric ton of sardine landed. Table 4-6 presents results from the five-year Washington state observer program. These differences in rates are reasonable given the tendency of both salmon species to feed on sardine and coho salmon's tendency to travel closer to the water's surface than chinook salmon (Dygert 2005). Rates of bycatch observed in the Washington state program are assumed to be representative of both Washington and Oregon as the fishery occurs is similar areas. The state of Oregon only had an observer program in their trial fishery in 2000 and 2001.

Identifying the specific ESUs represented in the chinook and coho bycatch is difficult. The states of Washington and Oregon do not allow retention of the salmon caught as bycatch (Wick 2004), so no genetic samples were taken from the salmon and no coded wire tags (CWTs) were collected. Either of these data would be necessary to determine with certainty the specific salmon ESUs taken in the sardine fishery. However, other data resources, such as the salmon counts at dams in the Columbia River and the CWT database used in the Fishery Regulation Assessment Model (FRAM) provide information on salmon stocks likely to be in the area and time of the sardine fishery and provide insight on which ESUs may be present in the salmon bycatch.

To identify the ESUs likely encountered in the sardine fishery, the Salmon Technical Team (STT) advised NMFS that the recreational salmon fishery north of Cape Falcon may be used as a proxy for the commercial sardine fishery off the coasts of Oregon and Washington (Simmons 2005). The recreational salmon fishery closely resembles the sardine fishery in area and season. Thus, the stock composition of chinook and coho salmon landed in this fishery provides insight into the stock composition of salmon likely to be encountered by the sardine fishery in the PNW. This is at best an approximation and the proportions of various ESUs caught in the salmon fishery may not mirror the bycatch in the sardine fishery. However, this method is considered the best available given the limited information.

Based upon the FRAM for the salmon recreational fishery off the mouth of the Columbia River, the following ESUs may be encountered in the sardine fishery off the coasts of Oregon and Washington: LCR chinook salmon, SRF chinook salmon, and UWR chinook salmon, OCN coho salmon, and LCR coho salmon. The chinook salmon and LCR coho ESUs are currently listed as threatened under the ESA. The OCN coho ESU is proposed for listing as threatened, with a final determination expected in December 2005.

The 2005 biological opinion on the 2005 sardine HG estimated the surrogate harvest rate of each chinook ESU likely to be taken in the sardine fishery. For each ESU, the rate was substantially below 1% of the returning spawning biomass. Given the generally increasing populations of chinook, this rate was not

considered likely to jeopardize the continued existence of the ESUs.

The OCN and LCR coho were not listed at the time the 2005 biological opinion for the sardine HG was written, but a similar analysis was conducted for this EA. As noted in the legal description above, the ESU includes only the naturally spawned populations of each of these coho ESUs and both are influenced by hatchery production, particularly LCR. It is estimated that OCN coho make up five percent of the coho encountered in the salmon recreational fishery while Columbia River coho make up 78% of the fishery, with less than ten percent naturally produced (LaVoy 2005). (In the conference opinion, it was estimated that approximately 2,000 natural coho spawners returned to the Clackamas and Sandy Rivers (the two rivers with appreciable natural production in the LCR ESU) while the returns of hatchery LCR coho ranged from 600,000 to one million fish.) The number of coho from each ESU that may be incidentally caught in the sardine fishery, operating under the proposed alternatives, was calculated using the projected landings for 2005 to 2009. To measure the impact of these takes on the entire ESU, the estimated takes were then compared to the estimated coho salmon return provided by the STT (PFMC 2005a). These yielded surrogate harvest rates for OCN coho of less than 0.1% and LCR coho of less than 0.7% (of the naturally spawning LCR coho). There was considerable debate over the estimated harvest rate of LCR coho, as the proportion of naturally spawning LCR is likely lower than ten percent.

Guidance on the management of LCR coho is forthcoming and is likely to be similar to the management approach taken for OCN coho. Amendment 13 to the salmon FMP was implemented to ensure that the take of listed OCN coho does not jeopardize their continued existence. OCN coho are managed with a variable ER (15-35%) based upon parental stock status and marine survival in a matrix model developed by the Oregon Department of Fish and Wildlife and incorporated in the salmon FMP under amendment 13. When the Council adopted Amendment 13 in 1997, they stipulated that it be reviewed and updated on a periodic basis. An ad hoc workgroup provided a review of Amendment 13 in November 2000. The workgroup's report recommended several changes to the original management matrix including a lower range of exploitation rates when spawner abundance and marine survival are very low. At its November 2000 meeting, the Council adopted the workgroup report as "expert biological advice to help guide Council management of OCN coho." For the 2005 season, the applicable spawner status is in the "high" category, and the marine survival index is in the "low" category. Under this circumstance, the workgroup report requires that the exploitation rate be limited to no more than 15.0%. In a recent conference opinion on the effects of the salmon fishery on LCR coho, it was recommended that LCR coho be managed with an ocean ER of no more than 15% on wild LCR coho. Similar to the OCN model, ERs are set based upon marine survival and seeding (in the Sandy and Clackamas). In 2005, the salmon fishery is being managed to projected marine and freshwater exploitation rate on OCN coho of 11.1% and a marine exploitation rate for LCR coho of ten percent (PFMC 2005b). While these numbers are informative, they can not be directly related to the sardine fishery bycatch as there is insufficient information to determine the number of wild coho that may be taken in the fishery.

Based upon the early and late timed runs of LCR coho, it is likely that hatchery LCR coho are being caught at a higher rate than wild LCR coho in the sardine fishery. The early run, which enters the Columbia River in mid-August, are largely hatchery stock. The late run of LCR coho enter Columbia River in late-September. A high percentage of the sardine fishery effort in the PNW occurs in the months of July and August; thus the coho being caught during the summer months are more likely to be of hatchery origin. Much of the sardine fishing effort has declined by mid-September when the wild LCR coho may be near the mouth of the Columbia River.

4.2.4.2 Indirect effects

No significant indirect effects are expected on protected resources as a result of fishing under the proposed alternatives, as a significant depletion of prey is not likely to occur. The environmental impact statement

prepared for Amendment 8 to the Northern Anchovy Fishery Management Plan (the former name of the current CPS FMP) provides an analysis on the methods used to calculate the annual HG and the reserve of CPS biomass left unharvested and available to predators as forage (PFMC 1998). Marine mammal predators known to eat sardines include: White sided dolphin, Common dolphin, Harbor porpoise, Sei whale, Northern elephant seal, and California sea lion (PFMC 1998), however other marine mammals may also prey upon sardines opportunistically. Virtually all species of grebes and loons, petrels and albatrosses, pelicans and cormorants, terns, auks, and raptors feed upon sardine. Among marine fish, chinook salmon, and coho salmon are known to feed upon sardines. While the sardine fishery has changed its geographic range since the 1998 EIS was written, the analysis of the biomass left for forage is still relevant and appropriate for the fishery as it is currently, and proposed to be, prosecuted. That is, substantial biomass is retained in the environment for marine predators, thus reducing the likelihood of a significant indirect impact of fishery alternatives.

Since the best available information does not demonstrate the likelihood of significant indirect effects on protected resources under any of the alternatives, indirect effects are not considered further in this EA.

4.2.5 Cumulative Effects

Numerous NEPA documents and NMFS biological opinions have addressed the factors affecting salmon survival, see NMFS (2003), Myers et al (1998), McClure et al (2003). Information from these and other documents is summarized below.

At-sea survival of salmon can be affected by both biotic and abiotic factors. Juvenile salmon are prey for marine birds, marine mammals, and larger fish. Adult salmon are prey to sea lions (NMFS 1997) and killer whales in the PNW (Ford 1998). The population of killer whales that specializes in salmon prey has recently been proposed for listing as a threatened species under the ESA (69 FR 76673).

There is evidence to suggest that salmon abundance is linked to variation in climate. Both short-term climate variability, due to the El Nino – Southern Oscillation phenomenon, and long-term climate variability, termed the Pacific Decadal Oscillation, appear to play a part in salmon survival and abundance. Recent strong returns of a variety of Washington and Oregon salmon stocks have been linked to favorable cooler ocean conditions that have been in place for the past six years. Prior to 1998, the waters off the contiguous U.S. West Coast were warmer and less favorable for salmon. The large scale shift in ocean water temperatures appears to affect the Pacific coast, off Washington, Oregon, and California differently than the waters off Alaska. When water temperatures are higher off the coast of the contiguous U.S., water temperatures off the coast of Alaska are lower. Fishing records indicate that in the past, these shifts in temperature and consequent salmon abundance, appear to last several decades (Mantua 1997). However, the long-term viability of salmon cannot be projected based on what is known about periods of good ocean conditions alone, as the relative importance of good ocean conditions is difficult to quantify (McClure 2003) and it is quite possible that the climate patterns observed in the twentieth century may not repeat in the twenty-first century due to long-term climate change (IPPC 2001; Mantua and R.C. Francis 2004).

The primary anthropogenic impacts on salmon are generally referred to as the four H's: hatcheries, habitat, hydro, and harvest. A review of these effects can be found in the Pacific Salmon FMP FPEIS (NMFS 2003) and a very brief review is offered here. Hatcheries serve a number of functions, including fishery enhancement, mitigation, supplementation, and conservation, and as such can supply additional fish to marine and in-river fisheries, in some situations, relieving harvest pressure on listed salmon. However, hatchery salmon may compete with wild salmon for resources, primarily food, in the marine environment, particularly if hatchery fish reach the marine environment at the same time as wild salmon. Hatcheries are managed by the respective states, tribes, and the USFWS; NMFS works with these agencies to improve operations to benefit listed salmon (DOC 2005). Similarly, NMFS is working with other Federal (USFWS, BPA, BOR,

ACOE, FERC), State, local, and Tribal interests to address other factors that affect salmon viability (i.e., hydroelectric dams and habitat) (DOC 2005). Salmon have complex life cycles, thus activities outside the action area can profoundly affect the status of the species within the marine environment.

4.2.6 Significance Determination

The very low rates of Chinook salmon taken in the sardine fishery and the consistency of these takes with an established ITS lead to a conclusion that the proposed action, as implemented under any of the alternatives, is not likely to result in significant impacts to ESA-listed chinook salmon

Although a section 7 consultation has not been initiated or completed for any of the sardine fishery alternatives proposed in this EA, for the purpose of NEPA it is still possible to determine whether the proposed action will result in significant impacts to ESA-listed coho salmon. The estimated OCN coho harvest rate in the sardine fishery is low (0.1%) and does not meet the threshold for a significant impact—threatening the continued existence to the ESU—even when considering cumulative effects on mortality. The estimated rate of harvest for LCR coho is slightly higher, but still less than 0.7%. Furthermore, there are mitigating factors within the fishery that suggest that the actual harvest rates on coho may be lower than the rates projected. Table 4-6 provides information on the trends in coho bycatch, which for the past three years has been well below the average rate of 0.06 coho/mt. Assuming that the rates of coho bycatch continue to decline, it is likely that the actual number of coho captured in the sardine fishery may be lower than the projected maximum bycatch of 4,334 coho estimated to be taken annually in the PNW sardine fishery. This impact is also not likely to threaten the continued existence of the stock and is therefore not significant.

Current mitigation measures in the PNW sardine fishery help to limit both coho and chinook salmon bycatch. In Washington State, sardine fishermen are required to dip-net salmon out of their purse seine nets. In Oregon, the fishermen generally do the same and Oregon vessels are required to install grates over the fish hold as a means of sorting out larger fish species. Neither state allows retention of salmon caught incidentally in the sardine fishery. As a result, the true mortality rate for salmon incidentally caught in the sardine fishery is likely to be less than the 100% assumed in this analysis.

Based on the information presented in this EA, none of the alternatives evaluated here, including the Council-preferred Alternative, are projected to have significant impacts on LCR coho. However, LCR coho were listed as a threatened species in June 2005 and OCN are proposed to be listed as threatened with a final decision expected in December 2005. As required by law, and to provide a further level of precaution, NMFS will conduct an ESA section 7 consultation on the Council-preferred Alternative, considering both these ESUs. If new information brought to light during this consultation indicates a problem with the projected incidental take of ESA-listed ESUs, reasonable and prudent alternatives could be adopted to mitigate the effects. As part of the continued prosecution of the sardine fishery, NMFS will monitor the annual harvest rate of chinook and coho in the sardine fishery, to ensure that the fishery is consistent with all applicable laws, including the ESA.

Table 4-2. Projected Pacific sardine landings in southern California, northern California, and Oregon/Washington by month (mt).

Southern California						
	2004	**2005**	**2006**	**2007**	**2008**	**2009**
Jan	4,319	4,751	5,226	5,749	6,323	6,956
Feb	1,498	1,648	1,813	1,994	2,193	2,413
Mar	3,533	3,886	4,275	4,702	5,173	5,690
Apr	2,931	3,224	3,547	3,901	4,291	4,720
May	1,200	1,320	1,452	1,597	1,757	1,933
Jun	1,751	1,926	2,119	2,331	2,564	2,820
Jul	2,517	2,769	3,046	3,350	3,685	4,054
Aug	4,349	4,784	5,262	5,789	6,367	7,004
Sep	3,383	3,721	4,093	4,503	4,953	5,448
Oct	3,461	3,807	4,188	4,607	5,067	5,574
Nov	1,649	1,814	1,995	2,195	2,414	2,656
Dec	1,512	1,663	1,830	2,012	2,214	2,435
Total	32,103	35,313	38,845	42,729	47,002	51,702
Northern California						
	2004	**2005**	**2006**	**2007**	**2008**	**2009**
Jan	2,023	2,225	2,448	2,693	2,962	3,258
Feb	116	128	140	154	170	187
Mar	6	7	7	8	9	10
Apr	0	0	0	0	0	0
May	0	0	0	0	0	0
Jun	0	0	0	0	0	0
Jul	563	619	681	749	824	907
Aug	2,799	3,079	3,387	3,725	4,098	4,508
Sep	679	747	822	904	994	1,094
Oct	5,115	5,627	6,189	6,808	7,489	8,238
Nov	3,984	4,382	4,821	5,303	5,833	6,416
Dec	910	1,001	1,101	1,211	1,332	1,466
Total	16,195	17,815	19,596	21,556	23,711	26,082
Oregon/Washington						
	2004	2005	2006	2007	2008	2009
Jan	0	0	0	0	0	0
Feb	0	0	0	0	0	0
Mar	0	0	0	0	0	0
Apr	0	0	0	0	0	0
May	0	0	0	0	0	0
Jun	2,438	2,682	2,950	3,245	3,569	3,926
Jul	12,918	14,210	15,631	17,194	18,913	20,805
Aug	16,836	18,520	20,372	22,409	24,650	27,115
Sep	8,326	9,159	10,074	11,082	12,190	13,409
Oct	3,362	3,698	4,068	4,475	4,922	5,415
Nov	762	838	922	1,014	1,116	1,227
Dec	212	233	257	282	310	341
Total	44,854	49,339	54,273	59,701	65,671	72,238
Baseline HG	**122,000**	**136,000**	**136,000**	**136,000**	**136,000**	**136,000**

Table 4-3. Estimated number of chinook and coho that may be incidentally taken in the sardine fishery under various alternatives with maximum HGs.

Status Quo. Alt 1, 3, 4.a, 6 & 7	200,000 mt	Chinook	Coho
2005	49,339	1,480	2,960
2006	54,273	1,628	3,256
2007	59,701	1,791	3,582
2008	65,671	1,970	3,940
2009	72,238	2,167	4,334
Alternative 4.b	HG less than 100,000 mt		
	90,000 mt		
2005	36,692	1,101	2,202
2006	35,821	1,075	2,149
2007	34,653	1,040	2,079
2008	33,677	1,010	2,021
2009	32,868	986	1,972
No action Alt	200,000 mt		
2005	49,339	1,480	2,960
2006	54,273	1,628	3,256
2007	59,701	1,791	3,582
2008	64,087	1,923	3,845
2009	64,332	1,930	3,860
Preferred Alt	200,000 mt		
	49,339	1,480	2,960
	54,273	1,628	3,256
	65,671	1,970	3,940
	65,671	1,970	3,940
	72,238	2,167	4,334

Table 4-4. Projected estimated Pacific Northwest sardine landings for alternatives at 200,000 mt HG (90,000 mt HG for Alt 4.b).

	Preferred Alt	Status Quo	Alt 1	Alt 3	Alt 4.a	Alt 4.b	Alt 6	Alt 7	No action
2005	49,339	49,339	49,339	49,339	49,339	36,692	49,339	49,339	49,339
2006	54,273	54,273	54,273	54,273	54,273	35,821	54,273	54,273	54,273
2007	65,671	59,701	59,701	59,701	59,701	34,653	59,701	59,701	59,701
2008	65,671	65,671	65,671	65,671	65,671	33,677	65,671	65,671	64,087
2009	72,238	72,238	72,238	72,238	72,238	32,868	72,238	72,238	64,332

Table 4-5. Escapement objectives applied to fisheries to protect ESA listed species (PFMC 2005c).

ESU	Component of ESU	ESA Management measure	2005 Management measures
LCR chinook	Cowlitz, Kalama, Lewis spring chinook	No specific requirements	Meet hatchery escapement goals
	Lower River hatchery fall chinook (tules)	Brood year adult equivalent exploitation rate on Coweeman tule of ≤49%	44.1% total ocean and freshwater adult equivalent (AEQ) rate.
	North Fork Lewis Fall (brights) chinook	5,700 annual spawning escapement	21,400 adults to the Columbia River mouth
UWR	Upper Willamette River spring run chinook	No specific requirements. Rare occurrence in council fisheries.	North of Falcon troll fisheries do not begin prior to June 26.
SRF	Snake River fall chinook	≥30% reduction from the 1988-1993 average adult equivalent age-3/age-4 exploitation rate for all ocean fisheries.	30.2% reduction from 1988-1993 average age 3 and 4 AEQ ocean exploitation rate.
OCN	Oregon Coast Natural coho	Exploitation rate of 13-35% depending on parent escapement and ocean survival trends within the FMP	11.1% marine and freshwater exploitation rate
LCR coho	Lower Columbia River natural	No ESA guidance, proposed listing. Guidance for 2005 season is ≤15% marine exploitation rate.	10.0% marine exploitation rate.

Table 4-6. Estimated rates of salmon bycatch in Pacific sardine experimental fishery (based on Culver and Henry, 2004)

Year	Landings	Chinook				Coho			
		alive	dead	total	rate/mt	alive	dead	total	rate/mt
2004	8799	35	225	260	0.030	19	105	124	0.014
2003	11604	92	262	354	0.031	81	231	312	0.027
2002	15212	150	356	506	0.033	61	765	826	0.054
2001	10837	449	170	619	0.057	571	504	1075	0.099
2000	4791	38	3	41	0.009	276	116	392	0.082
		average = .03 chinook/mt				average = .06 coho/mt			

4.3 Purse Seine Fleet

4.3.1 Evaluation Criteria

Four criteria (see Table 4-1) and associated thresholds are identified, based on the economic analysis described in Appendix A. Because sardine biomass size can vary considerably in response to environmental conditions, that analysis contains three "HG scenarios": a baseline, a low HG, and a high HG. The baseline scenario represents average conditions over the recent past while the other two scenarios are useful for evaluating the results of the allocation alternatives if sardine biomass changes substantially. The baseline scenario is used to evaluate the direct and indirect effects of the alternative because this represents how allocations are likely to play out under current environmental conditions. Ocean conditions are identified as a persistent effect (see below), which when combined with the proposed action, could result in cumulative effects. For this reason the high and low HG scenarios are used to evaluate cumulative effects. These scenarios assume the same HG in each year of the five-year analytical period, but it is more likely for the HG to vary from year to year. Depending on how ocean conditions affect stock biomass, the HG could trend up or down. The high and low HG scenarios should therefore be considered as a means to bound the range of possible effects of changes in stock biomass rather than likely future conditions of the entire five-year analytical period.

Four evaluation criteria are used to evaluate the impact of the alternatives on the sardine fleet. These criteria help to understand overall economic efficiency effects, the potential for allocation to disproportionately affect one of the two subareas, and foregone benefits in terms of foregone harvests beyond the constraint imposed by the HG.

1. Overall Efficiency

Criterion: Total present value (2005-2009) of exvessel revenue under each alternative.

Threshold: A significant adverse effect would occur if the regional present value (sub areas combined) of exvessel revenue is less than what would pertain under Status Quo.

A significant beneficial effect is assumed if the regional present value exvessel revenue is projected to be greater than 150% of the No Action value under any one of the three HG scenarios.

The rationale for this threshold is that if the alternative does not perform better than Status Quo (the scheme currently in place) there is no reason to change the allocation scheme. The threshold for a significant beneficial effect is arbitrary but represents a substantial increase over Status Quo.

2. Disproportionate Effect

Criterion: The present value of exvessel revenue (2005-2009) in each subarea as a percent of regional present value of exvessel revenue.

Threshold: The share of the present value of exvessel revenue is less than 40% in either subarea. This comparison is made under each HG scenario; effects under the low and high HG scenarios are considered foreseeable future effects (changes in ocean regime) as discussed below.

A significant beneficial effect occurs if the share in either subarea is greater than 48% under all HG scenarios.

The rationale for the threshold is that the 40% share is the approximate share of exvessel revenue in the Northern Subarea under the No Action allocation scheme but with the Status Quo subarea boundaries. An

alternative that would reduce the share in this subarea below what it enjoys under the current allocation scheme is counter to the objectives of the proposed action. Likewise, a reduction of the share enjoyed by the Southern Subarea below the 40% level would be disproportionate to current opportunity. The threshold for a significant beneficial effect is arbitrary but represents an even distribution of harvest opportunity between the two subareas, indicating that effects would not be disproportional in either subarea.

3. Constraints on Regional Harvest Opportunity

Criterion: The total number of months over the analytical period (2005-2009) in which landings shortfalls occur in each subarea

Threshold: The total number of months with landings shortfalls in either subarea is greater than 75% of the total number of months of landings shortfalls coastwide. This comparison is made under each HG scenario; effects under the low and high HG scenarios are considered foreseeable future effects (changes in ocean regime) as discussed below.

A significant beneficial effect occurs if no shortfalls or zero allocations occur during the projection period.

The rationale for this threshold is to indicate whether either subarea experiences disproportional constraints on harvest opportunity. The threshold value (75%) is arbitrary but represents an improvement over Status Quo, where all months with shortfalls occur in the Northern Subarea. The rationale for the beneficial impact threshold reflects a situation where the allocation scheme does not constrain harvest opportunity in either subarea.

4. Foregone Harvest Opportunity

Criterion: Projected coastwide unharvested portion of the HG over the analytical period (2005-2009).

Threshold: The coastwide unharvested portion of the HG is greater than it would be under Status Quo. This comparison is made under each HG scenario; effects under the low and high HG scenarios are considered foreseeable future effects (changes in ocean regime) as discussed below.

A significant beneficial effect would occur if there was no unharvested HG coastwide.

The rationale for this threshold is that if an alternative performed less well than Status Quo in terms of limiting harvest opportunity this would be a reason for not adopting it. The beneficial impact threshold reflects a situation where the allocation scenario does not constrain harvest opportunity.

4.3.2 Persistent Effects

Of the past and present effects identified in section 3.3.2, changes in ocean conditions or the environmental regime is an effect occurring in the past that is likely to continue affecting harvestable biomass in the future. The California Current ecosystem may be entering a cool phase regime with increased risk of lower stock productivity. The low HG scenario projects likely effects of lower stock productivity due to ecological conditions. Although considered less likely, ocean conditions could favor increased stock productivity and thus higher HGs. The high HG scenario is used to evaluate effects under favorable conditions.

4.3.3 Foreseeable Future Effects

Fishery management actions: Establishing annual HGs are foreseeable future management actions affecting allocation. The HG is determined using an environmentally-based formula accounting for the effect of ocean

conditions on stock productivity. For this reason, its value is related to ocean conditions, the persistent effect identified above and the cumulative effect of these actions can be evaluated using the HG scenarios.

Changes in potential supply to meet demand for fishery products: The economic analysis in Appendix A evaluates different assumptions about the growth in demand and whether allocation-related supply constraints would come into play. As discussed in Section 3.4.1, the types of products produced in each subarea and the markets supplied by them differ. The growth in the two subareas could differ as a result. Appendix A provides information on how demand-led growth would affect performance indicators such as exvessel revenue and producer surplus. There is insufficient information to determine which scenario is most likely. For this reason, the analyses in the EA are based on a uniform ten percent growth in supply for the entire region. This is a reasonable assumption given what is known about past performance for this fishery sector and macroeconomic conditions likely to pertain over the analytical period.

Tribal CPS Fishery: As described in section 4.2.3.1, Amendment 9 to the CPS FMP established a treaty Indian fishing rights framework for CPS species in usual and accustomed areas off the coast of Washington. The Makah Indian Tribe submitted a letter on June 10, 2005 to NMFS, Southwest Regional Office pursuant to 50 CFR 660.518(d) and the CPS FMP requesting provisions for the treaty harvest of Pacific sardine in 2006. At the June Council meeting, the Council established the Ad Hoc Coastal Pelagic Species Tribal Allocation Committee, composed of state, federal, and tribal representatives, to begin work on drafting the provisions for this proposed fishery. The tribal usual and accustomed grounds are generally further north than the existing non-treaty CPS fisheries in the PNW, which occur predominately off the mouth of the Columbia River. If treaty Indian fisheries commence in the future, it is reasonable to anticipate a future effect on the purse seine fleet. Depending on the outcome of deliberations between state, federal, and tribal governments, it is reasonable to anticipate that the applicant tribe will be allocated a share of the 2006 HG. This would affect the allocation to non-tribal fisheries in each subarea because the coastwide non-tribal HG would be reduced by the tribal share. After any such reduction, the allocation formula contained in any given alternative would be applied. The size of a potential tribal fishery in Washington is not yet known. However, the effect of the tribal share under average or beneficial environmental conditions is likely to be much smaller than the effects analyzed under the low HG scenario. Obviously, the effects of the tribal share would be amplified if unfavorable environmental conditions pertained. This could potentially lead to effects greater than those projected under the low HG scenario.

4.3.4 Direct/Indirect Effects of the Alternatives

Table 4-7 compares the effects of the alternatives in terms of the criteria described in Section 4.3.1 under the base HG scenario.

- Alternatives 1, 4a, and 6 are tied for the highest projected present value (PV) regional exvessel revenue at $60,132,468. No action has the lowest value at $51,301,346. PV regional exvessel revenue under the Council-preferred alternative ($59,705,180) is about a half million dollars less than under the highest projected value but greater than Status Quo by about $2.7 million.

- Alternatives 1, 4a, and 6 are projected to have the largest share of PV exvessel revenue in the Northern Subarea at 59.6%, comparing the action alternatives. No Action, which uses a different boundary line between the two subareas (including Monterey in the Northern Subarea) has as a result the lowest proportion in the Southern Subarea, 35.0%. If the No Action alternative shares were computed using the Status Quo and action alternatives subarea boundaries (allowing a more direct comparison with the other alternatives) there would be less of an imbalance. The Council-preferred alternative is results in a 59% share in the Northern Subarea and 41% in the south.

- Status Quo is projected to have the most number of months with landings shortfalls or zero allocation at 12 months, all of which occur in the Northern Subarea. Except for Alternative 7 all of the action alternatives, including the Council-preferred alternative have a total of 4 months of landings shortfalls, evenly divided between the two subareas.

- Alternatives 1, 3, 4a, and 6 are projected to result in the same level of unharvested HG at 73,095 mt, which is lower than Status Quo (95,461 mt) and No Action (147,518 mt). Of the action alternatives, the Council-preferred alternative has the highest amount of unharvested HG at 75,787 mt.

4.3.5 Cumulative Effects

Table 4-7 also compares the effects of the alternatives under the low and high HG scenarios. These scenarios reflect the potential for changed ocean conditions to affect the computation of the HG, which is a factor contributing to cumulative effects. The low HG scenario provides greater contrast for comparing the alternatives, allowing a more careful assessment of the allocation scenarios.

As would be expected, present value of regional exvessel revenue is lower across all alternatives in comparison to the base case and higher under the high HG. In terms of present value of exvessel revenue Alternative 1 performs the best ($36,613,034), the Council preferred alternative ranks third behind Alternative 6 with a value of $35,599,042. Alternative 4b performs the worst of the action alternatives. However, in terms of the share of regional exvessel revenue, Alternative 1 performs the worst with only 38.3% accruing in the Southern Subarea. Alternative 7 performs best with only a 1.6% difference between shares. The Council-preferred alternative performs moderately well, ranking fourth with a 12% difference between the regional shares.

By the same token, the number of months with landings shortfalls is greater overall across all alternatives under the low HG scenario. Under this scenario and No Action, the Northern Subarea experiences 27 months of landings shortfalls, representing 82% of the total number of months. No other alternatives exceed the threshold of 75% of shortfalls occurring in one subarea. Alternatives 1, 3, and the Council-preferred alternatives show an equal split in shortfall months between the two subareas. Alternative 4b performs the worst of the action alternatives with 63% of shortfalls in the Northern Subarea.

Under the high HG scenario no shortfalls are projected to occur under any of the alternatives, providing little contrast for comparison.

Except under No Action, all of the HG would be harvested under the low scenario while a large proportion would remain unharvested under the high scenario. Therefore, this metric provides little contrast for assessing these cumulative effects.

The high and low HG scenarios serve to bound the range of potential cumulative effects. The likelihood of either scenario is remote because it is unlikely for ocean conditions and/or stock biomass to remain in the condition that would require these HGs over the entire five year analytical period.

Appendix A includes an analysis of the effect of different assumptions about the potential growth in landings. Appendix B includes tables showing differential growth rates in the two subareas. For the purposes of this evaluation the base case growth rate of ten percent per year is used. Growth in landings could occur if harvests, or harvesting and processing capacity, increase in response to demand for product. Across the various scenarios, potential growth in landings could be constrained by HGs, increasing foregone harvest opportunity. If the actual growth in potential landings is higher, constraints could be reached more often, and less of the HG is likely to remain unharvested. If the growth rate is lower, the opposite would be true.

4.3.6 Significance Determination

No Action Alternative: Of the metrics described above, the No Action alternative is projected to result in regional exvessel revenue PV less than Status Quo and all landing shortfalls occurring in the Northern Subarea. However, these shortfalls occur October through November in each year, which are months when landings in the past have been very modest, because bad weather constrains harvest operations. Under No Action the Southern Subarea would have 35.0% share of regional exvessel revenue, below the 40% threshold. However, under No Action the boundary between the subareas is different and the Southern Subarea does not include Monterey as under the other alternatives. Recognizing the mitigating circumstances described here, the No Action alternative is projected to have potentially significant direct/indirect socioeconomic impacts on the purse seine fleet in that PV exvessel revenue is below Status Quo. Similar relative effects are projected considering cumulative effects by means of the HG scenarios. Under the low HG scenario the No Action alternative is favorable to the Southern Subarea in terms of the share of regional exvessel revenue but unfavorable under the high HG.

Status Quo Alternative: Since two of the threshold values are defined by the Status Quo, PV regional exvessel revenue and unharvested HG, by definition the Status Quo meets, but does not exceed, these thresholds. In terms of evaluation, this means that Status Quo does not improve on current condition, again by definition. Otherwise, Status Quo performs reasonably well in terms of the share of PV regional exvessel revenue in each subarea. Under both the base case and low HG scenarios it results in an more even split than the Council-preferred alternative. However in terms of both landings shortfall months and unharvested HG it performs poorly under these two scenarios. (Since the high HG scenario shows the same results for all alternatives except No Action, it does not provide sufficient contrast for comparison.)

Alternative 1: This alternative performs well under all of the metrics except for share of regional exvessel revenue. Under the low HG this metric falls below the 40% threshold. Otherwise, it ranks highest in terms of PV regional exvessel revenue under both the base case and low HG scenarios. It also results in less unharvested HG than Alternative 7 or the Council-preferred alternative. In general, this alternative provides regional socioeconomic benefits, but these are not distributed proportionately to the subareas.

Alternative 3: This alternative does not perform as well as Alternatives 1, 4a, and 6 in terms of PV regional exvessel revenue but performs well based on the other metrics. According to the evaluation criteria, this alternative does not result in significant adverse socioeconomic impacts.

Alternative 4a/4b. This alternative has different allocation schemes depending on the HG and is thus identified as either 4a or 4b depending on the HG scenario. It performs well across all metrics under the base case scenario and moderately well under the low HG scenario. Under the low HG scenario, Alternative 4b results in the lowest PV regional exvessel revenue of all the action alternatives but a more even share of revenue between the subareas in comparison to the other alternatives. According to the evaluation criteria, this alternative does not result in significant adverse socioeconomic impacts.

Alternative 6: This alternative results in the same projected metric values as Alternative 4a under the base case scenario. Under the low HG scenario it results in PV regional exvessel revenue second only to Alternative 1 and similarly the second most disproportionate split in this revenue between these subareas. It performs moderately well in terms of the distribution in landings shortfalls. According to the evaluation criteria, this alternative does not result in significant adverse socioeconomic impacts.

Alternative 7: This alternative is projected to result in the lowest PV regional exvessel revenue of all the action alternatives under the base case scenario; under the low HG scenario it is the second-lowest. In terms of the share of regional exvessel revenue it performs well with the most even split of the action alternatives under the base case and exceeding the threshold for significant beneficial effects under the low HG scenario.

In terms of landings shortfalls, it performs slightly worse than the other action alternatives. According to the evaluation criteria, this alternative does not result in significant adverse socioeconomic impacts.

Council-preferred alternative: This alternative performs moderately well based on the metrics under the HG scenarios. Under the base case scenario Alternatives 1, 4a, and 6 result in the same PV regional exvessel revenue, which is greater than the Council-preferred alternative. The Council-preferred alternative results in a slightly more even share in revenue between the two subareas and the same number proportion of landings shortfall months (two in each subarea). It results in the largest amount of unharvested HG of all the action alternatives under the base case. Under the low HG it performs moderately well in comparison to the other alternatives. According to the evaluation criteria, this alternative does not result in significant adverse socioeconomic impacts.

Table 4-7. Effects on the Purse Seine Fleet

Base case scenario

	Present Value of Regional Exvessel Revenue, 2005-2009	Share of Regional Exvessel Revenue (Present Value)		Number of Months With Landings Shortfalls		Unharvested HG (mt) (coastwide)
		Southern Subarea	Northern Subarea	Southern Subarea	Northern Subarea	
No Action	$51,301,346	35.0%	65.0%	0	9	147,518
Status Quo	$57,070,339	43.9%	56.1%	0	12	95,461
Alternative 1	$60,132,468	40.4%	59.6%	2	2	73,095
Alternative 3	$59,937,534	40.9%	59.1%	2	2	73,095
Alternative 4a	$60,132,468	40.4%	59.6%	2	2	73,095
Alternative 6	$60,132,468	40.4%	59.6%	2	2	73,095
Alternative 7	$59,607,905	41.4%	58.6%	2	4	75,348
Council-Preferred Alt.	$59,705,180	41.0%	59.0%	2	2	75,787

Low HG scenario

	Present Value of Regional Exvessel Revenue, 2005-2009	Share of Regional Exvessel Revenue (Present Value)		Number of Months With Landings Shortfalls		Unharvested HG (mt) (coastwide)
		Southern Subarea	Northern Subarea	Southern Subarea	Northern Subarea	
No Action	$33,554,411	50.4%	49.6%	6	27	3,273
Status Quo	$34,190,240	53.7%	46.3%	15	26	0
Alternative 1	$36,613,034	38.3%	61.7%	24	24	0
Alternative 3	$35,181,246	46.1%	53.9%	26	26	0
Alternative 4b	$34,210,988	54.1%	45.9%	15	26	0
Alternative 6	$36,136,552	41.4%	58.6%	22	25	0
Alternative 7	$34,966,020	49.2%	50.8%	17	26	0
Council-Preferred Alt.	$35,599,042	44.0%	56.0%	25	25	0

High HG scenario

	Present Value of Regional Exvessel Revenue, 2005-2009	Share of Regional Exvessel Revenue (Present Value)		Number of Months With Landings Shortfalls		Unharvested HG (mt) (coastwide)
		Southern Subarea	Northern Subarea	Southern Subarea	Northern Subarea	
No Action	$59,962,809	29.9%	70.1%	0	0	390,802
Status Quo	$61,073,690	41.0%	59.0%	0	0	380,539
Alternative 1	$61,073,691	41.0%	59.0%	0	0	380,539
Alternative 3	$61,073,692	41.0%	59.0%	0	0	380,539
Alternative 4a	$61,073,695	41.0%	59.0%	0	0	380,539
Alternative 6	$61,073,696	41.0%	59.0%	0	0	380,539
Alternative 7	$61,073,697	41.0%	59.0%	0	0	380,539
Council-Preferred Alt.	$61,073,694	41.0%	59.0%	0	0	380,539

4.4 Buyers and Processors

Four criteria (see Table 4.1) are used to evaluate the effects of the proposed action on buyers and processors. They are analogous to the criteria used for evaluating impacts to the fleet and also derived from the economic analysis described in Appendix A. But producer surplus is used instead of exvessel revenue as the metric in the first two criteria. As with the evaluation of impacts to the fleet, the three HG scenarios are used to assess direct/indirect impacts and cumulative impacts. Ocean conditions are a persistent effect that, as noted above, can determine the HG through the effect on sardine biomass. Deliveries from the fleet are the source of supply for buyers and processors; the HG affects supply through any constraints on landings.

The economic impacts of prescribed allocations in the sardine fishery include changes in net economic benefits to the nation associated with each allocation option relative to the Status Quo. Net economic benefits to the nation are the sum of producer surplus—net benefits to producers—and consumer surplus—net benefits to consumer—related to West Coast sardine harvesting and processing activities. If the inputs used to harvest and process sardines and the resulting landings and processed products are traded in competitive markets, then theoretically, consumer surplus and producer surplus can be measured or approximated by market demand and supply curves (Figure 4-1.).

The economic analysis of long-term allocation alternatives for the Pacific sardine HG estimated the incremental change in producer surplus (PS) for each fishery sector (PNW, Northern California, and Southern California) when comparing each of the proposed allocation alternatives to the Status Quo. Because markets for Pacific sardine are mainly overseas, benefits to consumers from a change in the sardine HG allocation regime would not accrue to U.S. citizens. Consequently there would be a negligible affect on net national benefits due to changes in consumer surplus; so net benefits were calculated only as the change in producer surplus associated with each alternative. The analysis focused on sardine processors under the assumption[3] that differences in net economic values and private profits between the two subareas were mainly determined at the exprocessor level.[4]

In the economic analysis of long-term sardine HG allocation alternatives, producer surplus is defined as total revenue minus total variable cost and essentially represents returns to fixed or capital costs. In the long run all costs are considered variable (e.g., investment in physical capacity can change over time) and producer surplus is solely attributable to entrepreneurial capacity or what might more conventionally considered profit. Therefore, part of the calculated producer surplus embodies the amount of fixed costs associated with processing sardines, which technically should be deducted from the estimates of producer surplus to obtain a more precise, long-run measure of net economic benefits.

In this regard, the analysis assumes that fixed costs are the same under the Status Quo and each of the long-run action alternatives, and therefore the fixed cost residual will cancel out and not affect estimates of changes in producer surplus. This further assumes that there would be no significant changes in the basic operations

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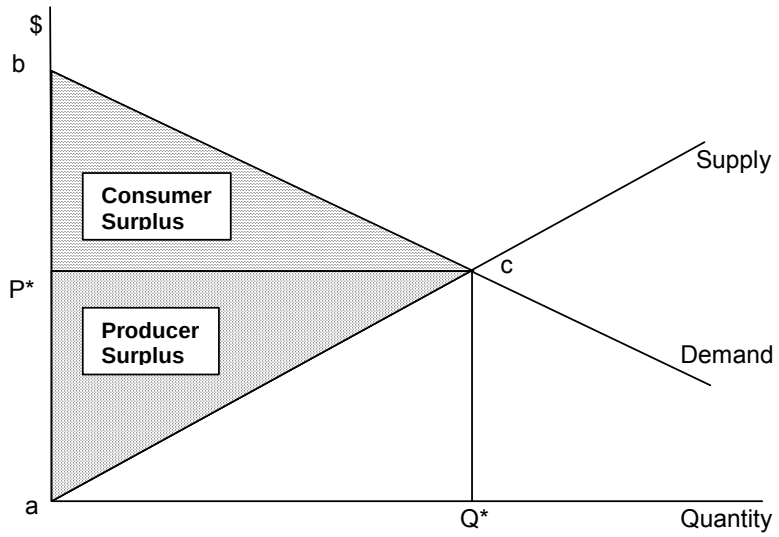
[3] Other assumptions underlying the analysis can be found in Appendix C.

[4] Economic theory of the fishery proposes that in the long run the average cost of harvesting sardines will be equal to the average revenue or exvessel price; producer surplus at the exvessel level will then be zero. This is not to say that some individual vessel owners may be realizing a profit as a result of superior fishing skills (intra-marginal rents). But, for the limited entry fishery as a whole economic profits will be completely dissipated as authorized vessels increase their individual harvesting capability in the anticipation of such rents Herrick, J., S.F., I. Strand, D. Squires, M. Miller, D. Lipton, J. Walden, and S. Freese. 1994. Application of benefit-cost analysis to fisheries allocation decisions: the case of Alaska walleye Pollock and Pacific cod. North American Journal of fisheries Management. 14:726-741..

of sardine processors, such as in investment in facilities or other restructuring, by processors over the analytical period (2005-2009) that would alter the costs of operations. Under these circumstances, all but the variable costs of sardine processing (in particular, the costs of labor, energy/utilities, raw fish, and other inputs that vary directly with the quantities of sardines processed) were considered fixed over the time horizon of the action, and therefore, would not effect estimates of producer surplus (i.e., only the variable costs of processing sardines were used in the calculations of producer surplus). This may not be that unreasonable given the estimates of processing and harvesting capacity in the fishery (as described in Herrick (2005) in Appendix C).

This procedure estimates both the sectoral changes and total changes in PS under each allocation alternative over the five-year time horizon, 2005-2009. Specifically, the year-end projected landings (in metric tons) for each fishery sector under each alternative, and HG scenario, were multiplied by a weighted average measure of PS per metric ton of processed product for each fishery sector to estimate the corresponding annual PS for each sector. The present value for each estimate of annual PS was calculated for the five-year time horizon using a social discount rate of 4.1%, assuming that the per unit measure of PS for each fishery sector remained constant over the time horizon. The present value of PS for each allocation alternative was then compared to the present value of producer surplus under the Status Quo alternative to estimate the incremental change in producer surplus under each alternative.

Figure 4-1. Analytical Framework for the Economic Analysis of Pacific Sardine Allocation Alternatives



Consumer Surplus = total willingness to pay - actual expenditure.

1. P* is the equilibrium price, per-unit expenditure, for the consumer.
2. Consumers willing to pay more than P* for quantities of X less than Q* but only have to pay P*, therefore receive a net benefit.
3. The area abcQ* is the total consumers are willing to pay for Q*, but only pay aP*cQ*.
4. The difference between the two areas, abcQ* - aP*cQ*, is the measure of consumer surplus, a net benefit to consumers.

Producer Surplus = industry total revenue - industry total variable costs

1. Producers receive aP*cQ* for output Q*.
2. The cost of producing Q* is acQ*.
3. The difference between the two areas, aP*cQ* - acQ* is the measure of producer surplus, a net benefit to producers.

Net Economic Benefit = Producer Surplus + Consumer Surplus

4.4.1 Evaluation Criteria

1. Overall Efficiency

Criterion: Total present value (2005-2009) of producer surplus under each alternative.

Threshold: A significant adverse effect would occur if the regional producer surplus (sub areas combined) of exvessel revenue is less than what would pertain under Status Quo.

A significant beneficial effect is assumed if the regional producer surplus is projected to be greater than 150% of the No Action value under any one of the three HG scenarios.

The rationale for this threshold is the same as that used to evaluate fleet impacts: if the alternative does not perform better than Status Quo (the scheme currently in place) there is no reason to change the allocation scheme. The threshold for a significant beneficial effect is arbitrary but represents a substantial increase over Status Quo.

2. Disproportionate Effect

Criterion: The present value of producer surplus (2005-2009) in each subarea as a percent of regional present value of producer surplus.

Threshold: The share of the present value of producer surplus is less than 40% in either subarea. This comparison is made under each HG scenario; effects under the low and high HG scenarios are considered foreseeable future effects (changes in ocean regime) as discussed below.

A significant beneficial effect occurs if the share in either subarea is greater than 48%.

The rationale for this threshold is the same as that used to evaluate fleet impacts: the 40% share is the approximate share of exvessel revenue in the Northern Subarea under the No Action allocation scheme but with the Status Quo subarea boundaries. An alternative that would reduce the share in this subarea below what it enjoys under the current allocation scheme is counter to the objectives of the proposed action. Likewise, a reduction of the share enjoyed by the Southern Subarea below the 40% level would be disproportionate to current opportunity. The threshold for a significant beneficial effect is arbitrary but represents an even distribution of harvest opportunity between the two subareas, indicating that effects would not be disproportional in either subarea.

3. Constraints on Supply

Criterion: The total number of months over the analytical period (2005-2009) in which landings shortfalls occur in each subarea

Threshold: The total number of months with landings shortfalls in either subarea is greater than 75% of the total number of months of landings shortfalls coastwide. This comparison is made under each HG scenario; effects under the low and high HG scenarios are considered foreseeable future effects (changes in ocean regime) as discussed below.

The rationale for this threshold is the same as that used to evaluate fleet impacts: it indicates whether either subarea experiences disproportional constraints on harvest opportunity. The threshold value (75%) is arbitrary but represents an improvement over Status Quo, where all months with shortfalls occur in the Northern Subarea. The rationale for the beneficial impact threshold reflects a situation where the allocation

scheme does not constrain harvest opportunity in either subarea.

4. Foregone Supply

Criterion: Projected coastwide unharvested portion of the HG over the analytical period (2005-2009).

Threshold: The coastwide unharvested portion of the HG is greater than it would be under Status Quo. This comparison is made under each HG scenario; effects under the low and high HG scenarios are considered foreseeable future effects (changes in ocean regime) as discussed below.

The rationale for this threshold is the same as that used to evaluate fleet impacts: if an alternative performed less well than Status Quo in terms of limiting harvest opportunity this would be a reason for not adopting it. The beneficial impact threshold reflects a situation where the allocation scenario does not constrain harvest opportunity.

4.4.2 Persistent Effects

Of the past and present effects identified in section 3.3.2, changes in ocean conditions or the environmental regime is an effect occurring in the past that is likely to continue affecting harvestable biomass in the future. This could cause non-demand-related effects on supply through HG constraints. The California Current ecosystem is entering a cool phase regime with increased risk of lower stock productivity. The low HG scenario projects likely effects of lower stock productivity due to ecological conditions. Although considered less likely, ocean conditions could favor increased stock productivity and thus higher HGs. The high HG scenario is used to evaluate effects under favorable conditions.

4.4.3 Foreseeable Future Effects

Fishery management actions: Establishing annual HGs are foreseeable future management actions affecting allocation. The HG is determined using an environmentally-based formula accounting for the effect of ocean conditions on stock productivity. For this reason, its value is related to ocean conditions, the persistent effect identified above and the cumulative effect of these actions can be evaluated using the HG scenarios.

Changes in potential supply to meet demand for fishery products: The economic analysis in Appendix A evaluates different assumptions about the growth in demand and how this whether allocation-related supply constraints would come into play.

4.4.4 Direct/Indirect Effects of the Alternatives

Table 4-8 compares the effects of the alternatives in terms of the criteria described in Section 4.4.1 under the base HG scenario.

- Alternatives 1, 4a, and 6 are tied for the highest projected PV regional producer surplus at $168 million. No action has the lowest value at $147 million. The Council-preferred alternative results in the second-highest level of PV regional producer surplus at $166.9 million. No Action has the lowest PV regional consumer surplus at $144 million.

- Alternatives 1, 4a, and 6 are projected to have the largest share of PV producer surplus in the Northern Subarea of the action alternatives at 57.2%. No Action, which uses a different boundary line between the two subareas (including Monterey in the Northern Subarea) has as a result the highest proportion of all alternatives, 64.5%. The Council-preferred alternative results in 56.6% in the Northern Subarea, tied with Alternative 3 and higher than Alternative 7 (56.6%).

- Status Quo is projected to have the most number of months with landings shortfalls or zero allocation at 12 months, all of which occur in the Northern Subarea. Except for Alternative 7 all of the action alternatives, including the Council-preferred alternative have a total of four months of landings shortfalls, evenly divided between the two subareas.

- Alternatives 1, 3, 4a, and 6 are projected to result in the same level of unharvested HG at 73,095 mt, which is lower than Status Quo (95,461 mt) and No Action (147,518 mt). Of the action alternatives, the Council-preferred alternative has the highest amount of unharvested HG at 75,787 mt.

4.4.5 Cumulative Effects

As with the evaluation of impacts to the purse seine fishery, the low and high HG scenarios are used to consider the cumulative effects of changes in the HG, which may be ultimately attributable to the effects of the environmental regime on harvestable biomass. Table 4-8 shows the results of the analysis. As noted above, the high HG scenario does not provide much contrast between the alternatives; for example, all alternatives except No Action are predicted to result regional producer surplus of $171.1 million.

Under the low HG scenario Alternative 1 shows the highest regional present value producer surplus at $100.7 million. Alternative 4b, at $95.7 million, is below the Status Quo value of $95.8 million, which would be a significant adverse effect if the low HG pertained in every year of the analytical period. The Council preferred alternative ranks third among the action alternatives at $98.8 million.

Under the low HG Alternatives 3 and 7 result in both subareas having a share of producer surplus greater than 48%, defined as a significant beneficial effect. Although No Action shows a similar beneficial effect, if it is evaluated using the boundary line applicable under the other alternatives. Alternative 1 results in the highest share in the Northern Subarea, 59.5%. The Council-preferred alternative performs moderately well with 53.7% of regional producer surplus accruing to the Northern Subarea. Generally, harvest constraints imposed by the low HG result in a more equitable division of producer surplus between the two subareas while unconstrained harvest favors the Northern Subarea.

The effects on supply constraints and foregone supply are the same as discussed under the evaluation of the impacts on the purse seine fleet since the same evaluation criteria are used. The No Action Alternative would have significant adverse impacts in that greater than 75% of the months with landing shortfalls would occur in the Northern Subarea.

4.4.6 Significance Determination

No Action: This alternative has similar performance characteristics as described for the purse seine fleet. It falls below the threshold for regional producer surplus. Recognizing the mitigating circumstances described above, the No Action alternative is projected to have potentially significant direct/indirect socioeconomic impacts on buyers and processors in that PV regional producer surplus is below Status Quo. Similar relative effects are projected considering cumulative effects by means of the HG scenarios. Under the low HG scenario the No Action alternative is favorable to the Southern Subarea in terms of the share of regional producer surplus but unfavorable under the high HG.

Status Quo Alternative: Since two of the threshold values are defined by the Status Quo, PV regional producer surplus and unharvested HG, by definition the Status Quo meets, but does not exceed, these thresholds. In terms of evaluation, this means that Status Quo does not improve on current condition, again by definition. Otherwise, Status Quo performs reasonably well in terms of the share of PV producer surplus in each subarea. Under both the base case and low HG scenarios it results in a more even split than the Council-preferred alternative. However, in terms of both landings shortfall months and unharvested HG it performs

poorly under these two scenarios. (Since the high HG scenario shows the same results for all alternatives except No Action, it does not provide sufficient contrast for comparison.)

Alternative 1: This alternative performs well under all of the metrics except for share of regional producer surplus, for which it ranks lowest of all the alternatives. Otherwise, it ranks highest in terms of PV regional producer surplus under both the base case and low HG scenarios. It also results in less unharvested HG than Alternative 7 or the Council-preferred alternative. In general, this alternative provides regional socioeconomic benefits, but these are not distributed proportionately to the subareas. According to the evaluation criteria, this alternative does not result in significant adverse socioeconomic impacts.

Alternative 3: This alternative does not perform as well as Alternatives 1, 4a, and 6 in terms of PV regional producer surplus but performs well based on the other metrics. Under the low HG the share of regional producer surplus shows a significant beneficial effect. According to the evaluation criteria, this alternative does not result in significant adverse socioeconomic impacts.

Alternative 4a/4b. This alternative has different allocation schemes depending on the HG and is thus identified as either 4a or 4b depending on the HG scenario. It performs well across all metrics under the base case scenario and moderately well under the low HG scenario. Under the low HG scenario, Alternative 4b results in the lowest PV producer surplus of all the action alternatives but a more even share of revenue between the subareas in comparison to Alternative 1. According to the evaluation criteria, this alternative does not result in significant adverse socioeconomic impacts.

Alternative 6: This alternative results in the same projected metric values as Alternative 4a under the base case scenario. Under the low HG scenario it results in PV regional producer surplus third behind Alternative 1 and Alternative 3. It has the same difference in the share between subareas as alternative 4b, but favors the Northern Subarea while Alternative 4b favors the south. The difference in the shares between subareas is less than Alternative 1 but greater than the other action alternatives. It performs moderately well in terms of the distribution in landings shortfalls. According to the evaluation criteria, this alternative does not result in significant adverse socioeconomic impacts.

Alternative 7: This alternative is projected to result in the lowest PV regional producer surplus of all the action alternatives under the base case scenario; under the low HG scenario it is the second-lowest. In terms of the share of regional producer surplus it performs well with the most even split of the action alternatives under the base case and exceeding the threshold for significant beneficial effects under the low HG scenario. In terms of landings shortfalls, it performs slightly worse than the other action alternatives. According to the evaluation criteria, this alternative does not result in significant adverse socioeconomic impacts.

Council-preferred alternative: This alternative performs moderately well based on the metrics under the HG scenarios. Under the base case scenario Alternatives 1, 4a, and 6 result in the same PV regional producer surplus, which is greater than the Council-preferred alternative. The Council-preferred alternative results in a slightly more even share in producer surplus between the two subareas and the same number proportion of landings shortfall months (two in each subarea). It results in the largest amount of unharvested HG of all the action alternatives under the base case. Under the low HG it performs moderately well in comparison to the other alternatives. According to the evaluation criteria, this alternative does not result in significant adverse socioeconomic impacts.

Table 4-8. Effects on Buyers and Processors

Base case scenario						
		Share of Regional Producer Surplus (Present Value)		Number of Months With Landings Shortfalls		
	Present Value Regional Producer Surplus (millions $), 2005-2009	Southern Subarea	Northern Subarea	Southern Subarea	Northern Subarea	Unharvested HG (mt) (coastwide)
No Action	$144.0	35.5%	64.5%	0	9	147,518
Status Quo	$159.9	46.5%	53.5%	0	12	95,461
Alternative 1	$168.0	42.8%	57.2%	2	2	73,095
Alternative 3	$167.6	43.4%	56.6%	2	2	73,095
Alternative 4a	$168.0	42.8%	57.2%	2	2	73,095
Alternative 6	$168.0	42.8%	57.2%	2	2	73,095
Alternative 7	$166.8	43.9%	56.1%	2	4	75,348
Council-Preferred Alt.	$166.9	43.4%	56.6%	2	2	75,787
Low HG scenario						
		Share of Regional Producer Surplus (Present Value)		Number of Months With Landings Shortfalls		
	Present Value Regional Producer Surplus (millions $), 2005-2009	Southern Subarea	Northern Subarea	Southern Subarea	Northern Subarea	Unharvested HG (mt) (coastwide)
No Action	$93.8	51.1%	48.9%	6	27	3,273
Status Quo	$95.8	56.2%	43.9%	15	26	0
Alternative 1	$100.7	40.5%	59.5%	24	24	0
Alternative 3	$97.9	48.6%	51.4%	26	26	0
Alternative 4b	$95.7	56.4%	43.6%	15	26	0
Alternative 6	$99.7	43.6%	56.4%	22	25	0
Alternative 7	$97.2	51.6%	48.4%	17	26	0
Council-Preferred Alt	$98.8	46.3%	53.7%	25	25	0
High HG scenario						
		Share of Regional Producer Surplus (Present Value)		Number of Months With Landings Shortfalls		
	Present Value Regional Producer Surplus (millions $), 2005-2009	Southern Subarea	Northern Subarea	Southern Subarea	Northern Subarea	Unharvested HG (mt) (coastwide)
No Action	$167.9	30.5%	69.6%	0	0	390,802
Status Quo	$171.1	43.5%	56.5%	0	0	380,539
Alternative 1	$171.1	43.5%	56.5%	0	0	380,539
Alternative 3	$171.1	43.5%	56.5%	0	0	380,539
Alternative 4a	$171.1	43.5%	56.5%	0	0	380,539
Alternative 6	$171.1	43.5%	56.5%	0	0	380,539
Alternative 7	$171.1	43.5%	56.5%	0	0	380,539
Council-Preferred Alt	$171.1	43.5%	56.5%	0	0	380,539

4.5 Fishing Communities

4.5.1 Evaluation Criteria

The following PacFIN port areas had 2002 non-squid CPS landings greater than 1,000 mt:

Northern Subarea

South and Central Washington, Astoria-Tillamook

Southern Subarea

Monterey, Santa Barbara, Los Angeles

1. Change in Personal Income

Criterion: Percent change in personal income from Status Quo at the regional level.

Threshold: Percent change in personal income from Status Quo at the regional level is negative. This comparison is made under each HG scenario; effects under the low and high HG scenarios are considered foreseeable future effects as discussed below.

A significant beneficial effect is if regional personal income show an increase greater than five percent.

The rationale for this threshold is that if personal income declines in comparison to the Status Quo then the alternative does not meet the objectives of the proposed action. The threshold for a beneficial impact is arbitrary but is meant to indicate a measurable positive effect on communities.

2. Disproportionate change in Personal Income

Criterion: Percent change in personal income from Status Quo by subarea.

Threshold: The difference in the change in personal income between the two subareas is greater than 20%. This comparison is made under each HG scenario; effects under the low and high HG scenarios are considered foreseeable future effects as discussed below.

A significant beneficial is if the difference in the change in personal income between the two subareas is less than five percent.

Although the threshold value is arbitrary, the rationale for this threshold is that it indicates a substantial difference in the effects on personal income in either subarea. The difference between the change in the two subareas focuses on relative change. For example, the even if the change in personal income was positive in both subareas, if the gain in one subarea was substantially greater a significant disproportionate effect would be identified. The threshold considers disproportionate change, for example where one subarea shows a decline even if the other shows gains. The rationale for the threshold for a significant beneficial impact is that whatever the effects to personal income, they are not disproportionate.

4.5.2 Persistent Effects

Macroeconomic and other socioeconomic conditions affecting wages, taxes, and general public and private investment at the community level are persistent effects that contribute to the overall level of personal income in communities in an ongoing manner.

4.5.3 Foreseeable Future Effects

As described in section 4.2.3.1, Amendment 9 to the CPS FMP established a treaty Indian fishing rights framework for CPS species in usual and accustomed areas off the coast of Washington. The Makah Indian Tribe submitted a letter on June 10, 2005 to NMFS, Southwest Regional Office pursuant to 50 CFR 660.518(d) and the CPS FMP requesting provisions for the treaty harvest of Pacific sardine in 2006. At the June Council meeting, the Council established the Ad Hoc Coastal Pelagic Species Tribal Allocation Committee, composed of state, federal, and tribal representatives, to begin work on drafting the provisions of this proposed fishery. The tribal usual and accustomed grounds are generally further north than the existing non-treaty CPS fisheries in the PNW which occur predominately off the mouth of the Columbia River. If treaty Indian fisheries commence in the future, it is reasonable to anticipate that port groups on the north and central Washington coast could experience changes in personal income.

4.5.4 Direct/Indirect Effects of the Alternatives

Table 4-9a shows the predicted changes in personal income by subarea and also by three regions, Southern California (Santa Barbara and Los Angeles port areas) Northern California (Monterey port area), and PNW (Astoria-Tillamook and Central and South Washington Coast port areas). For all alternatives except No Action the two California regions comprise the Southern Subarea and the PNW region comprises the Northern Subarea. Under No Action the Northern California region was part of the Northern Subarea.

All of the action alternatives show gains in personal impacts from Status Quo across the region. Alternatives 1, 4a, and 6 show the largest increase at 4.6%. No Action shows a decline of 9.2%. The Council-preferred alternative shows a gain of 4.0%

All of the action alternatives show substantial gains in personal income in the Northern Subarea, exceeding ten percent for all but Alternative 7. and declines in the Southern Subarea ranging from -3.1% for Alternatives 1, 4a, and 6 to -1.4 for Alterative 7. The difference in the change in personal income between the two subareas is 15% for Alternatives 1, 4a, and 6; 13.9% for No Action; 12.6 % for the Council-preferred alternative, and 10.4% for Alternative 7.

4.5.5 Cumulative Effects

As with the evaluation of impacts to the purse seine fleet and processors the economic analysis evaluates the effect of a change in HG, due to the status of the stock, on personal income. The low and high HG scenarios shown in Table 4-9a and Table 4-9b, are used to evaluate the cumulative effect of changing stock status on personal income. As noted earlier, these scenarios are intended to bound the range of potential effects, given that it is unlikely that HGs approximating those used in either scenario would pertain for all five years of the analytical period. Other external factors are likely to have a greater effect on personal income, including changes in other fisheries and larger regional economy. However, the data necessary to quantitatively predict how these factors could cumulatively affect personal income are unavailable.

As with the purse seine fishery and buyers and processors, the high HG scenario is not very informative because there is no difference between the action alternatives with respect to the metrics. For this reason, only the low HG scenario is considered in assessing cumulative effects.

Under the low HG scenario, region-wide personal income would increase relative to Status Quo for all

alternatives except Alternative 4b and No Action; which show declines of -0.2% and -1.1% respectively. Alternative 6 shows the greatest gain, at 2.8%. The Council-preferred alternative shows a gain of 1.7%.

Under the low HG scenario, most of the alternatives show a significant disproportionate effect on personal income based on the identified threshold. As under the base case, this mainly results from declines in the Southern Subarea and gains in the Northern Subarea relative to Status Quo. Alternative 1 has the biggest difference (66.7%) followed by Alternative 6 (52.6%), the Council-preferred alternative (41.9%), Alternative 3 (32.8%), Alternative 7 and No Action (19.1%) and Alternative 4b (0.8%). Only Alternative 7, No Action and Alternative 4b are below the threshold. The value for Alternative 4b shows a significant beneficial impact under this scenario.

One way to consider other macroeconomic factors that could affect personal income is to look at the demographic characteristics described in Section 3.5. These give some indication of relative conditions in the different communities. (Since this is based on 2000 census data, these indicators have likely changed in absolute terms. But underlying factors applying at the regional or local level may mean that they are still valid for comparative purposes.) The Central and South Washington Coast shows a pattern of demographic characteristics that may make this region more vulnerable to changes in income than other port areas. It has a relatively low average household income and high poverty rate. It also ranks third of all West Coast port areas in terms of natural resource related employment, although this is still a small component at 3.7% of the population. Los Angeles has a high poverty rate but also ranked high in comparison to other port areas in terms of average household income. This suggests more income disparity in this region. It has a very low level of natural resource related employment, but the population of this port area is larger than the other port areas. At a gross scale there may be more opportunities to make up for declines in personal income in the Southern Subarea than in the Northern Subarea, based on these indicators. However, fishery participants may have less mobility in terms of employment than those in other economic sectors.

4.5.6 Significance Determination

None of the action alternatives exceed the thresholds identified for the two evaluation criteria under the base case and high HG scenarios. The No Action alternative is predicted to result in a decline in personal income from the Status Quo of -16.2% in the Northern Subarea under the base case scenario, a significant impact. The difference between the changes in personal income in the two subareas exceeds 20% for Alternatives 1, 3, 6, and the Council-preferred alternative. Although this represents a significant impact if a HG approximating that used in the low HG scenario pertained over the five-year analytical period, this is unlikely.

Table 4-9a Present value (2005-2009) of changes in total regional personal Income[1] from Pacific sardine harvesting and processing activities, 2005-2009 in millions of dollars.

Base Case						
	Southern Subarea	Northern Subarea	Southern California	Northern California	Pacific Northwest	Total
Status Quo	$242.1	$252.8	$175.2	$66.9	$252.8	$494.9
No Action (w/ SQ SAs)	$236.6	$211.8	$175.1	$61.5	$211.8	$448.4
Alternative 1	$234.6	$283.0	$171.3	$63.3	$283.0	$517.6
Alternative 3	$237.1	$279.4	$171.2	$65.9	$279.4	$516.5
Alternative 4a	$234.6	$283.0	$171.3	$63.3	$283.0	$517.6
Alternative 6	$234.6	$283.0	$171.3	$63.3	$283.0	$517.6
Alternative 7	$238.6	$275.6	$172.7	$65.9	$275.6	$514.2
Council-preferred Alt.	$236.2	$278.4	$171.3	$64.9	$278.4	$514.5
Low HG						
	Southern Subarea	Northern Subarea	Southern California	Northern California	Pacific Northwest	Total
Status Quo	$179.0	$124.8	$140.1	$38.9	$124.8	$303.8
No Action (w/ SQ SAs)	$191.1	$109.4	$164.8	$26.3	$109.4	$300.5
Alternative 1	$136.2	$178.2	$115.3	$20.9	$178.2	$314.4
Alternative 3	$156.9	$149.7	$120.5	$36.4	$149.7	$306.6
Alternative 4b	$179.3	$124.0	$143.9	$35.4	$124.0	$303.3
Alternative 6	$145.3	$167.0	$122.3	$23.0	$167.0	$312.3
Alternative 7	$166.8	$140.2	$137.3	$29.5	$140.2	$307.0
Council-preferred Alt.	$151.3	$157.8	$119.9	$31.4	$157.8	$309.0
High HG						
	Southern Subarea	Northern Subarea	Southern California	Northern California	Pacific Northwest	Total
Status Quo	$242.1	$284.4	$175.1	$67.0	$284.4	$526.5
No Action (w/ SQ SAs)	$241.6	$276.0	$175.1	$66.5	$276.0	$517.6
Alternative 1	$242.1	$284.4	$175.1	$67.0	$284.4	$526.5
Alternative 3	$242.1	$284.4	$175.1	$67.0	$284.4	$526.5
Alternative 4a	$242.1	$284.4	$175.1	$67.0	$284.4	$526.5
Alternative 6	$242.1	$284.4	$175.1	$67.0	$284.4	$526.5
Alternative 7	$242.1	$284.4	$175.1	$67.0	$284.4	$526.5
Council-preferred Alt.	$242.1	$284.4	$175.1	$67.0	$284.4	$526.5

[1]Based on FEAM personal income impact coefficients per round lb. for Pacific sardine landings (based on 2000 PacFIN landings and 1998 regional IMPLAN data)

Table 4-9b Present value (2005-2009) of changes in total regional personal Income as a percent of the value under Status Quo.

Base Case						
	Southern Subarea	Northern Subarea	Southern California	Northern California	Pacific Northwest	Total
Status Quo	$242.1	$252.8	$175.2	$66.9	$252.8	$494.9
No Action (w/ SQ SAs)	-2.3%	-16.2%	-0.1%	-8.1%	-16.2%	-9.4%
Alternative 1	-3.1%	11.9%	-2.2%	-5.4%	11.9%	4.6%
Alternative 3	-2.1%	10.5%	-2.3%	-1.5%	10.5%	4.4%
Alternative 4a	-3.1%	11.9%	-2.2%	-5.4%	11.9%	4.6%
Alternative 6	-3.1%	11.9%	-2.2%	-5.4%	11.9%	4.6%
Alternative 7	-1.4%	9.0%	-1.4%	-1.5%	9.0%	3.9%
Council-preferred Alt.	-2.5%	10.1%	-2.2%	-3.1%	10.1%	4.0%
Low HG						
	Southern Subarea	Northern Subarea	Southern California	Northern California	Pacific Northwest	Total
Status Quo	$179.0	$124.8	$140.1	$38.9	$124.8	$303.8
No Action (w/ SQ SAs)	6.8%	-12.3%	17.6%	-32.4%	-12.3%	-1.1%
Alternative 1	-23.9%	42.8%	-17.7%	-46.3%	42.8%	3.5%
Alternative 3	-12.3%	20.0%	-14.0%	-6.4%	20.0%	0.9%
Alternative 4b	0.2%	-0.6%	2.7%	-9.0%	-0.6%	-0.2%
Alternative 6	-18.8%	33.8%	-12.7%	-40.9%	33.8%	2.8%
Alternative 7	-6.8%	12.3%	-2.0%	-24.2%	12.3%	1.1%
Council-preferred Alt.	-15.5%	26.4%	-14.4%	-19.4%	26.4%	1.7%
High HG						
	Southern Subarea	Northern Subarea	Southern California	Northern California	Pacific Northwest	Total
Status Quo	$175.1	$175.1	$175.1	$67.0	$284.4	$526.5
No Action (w/ SQ SAs)	-0.2%	-3.0%	0.0%	-0.7%	-3.0%	-1.7%
Alternative 1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Alternative 3	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Alternative 4a	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Alternative 6	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Alternative 7	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Council-preferred Alt.	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

4.6 Summary of the Impacts of the Alternatives

Table 4-10 summarizes the effects of the alternatives across the components of the socioeconomic environment, based on the evaluation criteria and thresholds outlined above. No significant adverse impacts to protected species are predicted under any of the alternatives.

No Action: The No Action alternative would have significant adverse impacts to the purse seine fleet, processors, and communities.

Status Quo: A conditionally significant adverse impact is identified for Status Quo in terms of constraints on regional harvest opportunity for the purse seine fleet and constraints on supply for processors. As discussed above, these constraints relate to a disproportionate number of months in the Northern Subarea where landings shortfalls would occur. As noted, these are months where landings are limited due to bad weather conditions. For this reason this adverse impact is rated conditional. Given this mitigating factor, the Status Quo alternative is not predicted to have significant adverse impacts.

Alternative 1: A disproportionate adverse impact on personal income under the low HG scenario was identified for this alternative, considered a cumulative impact. This alternative would also have a disproportionate effect on the share of exvessel revenue between the two subareas. These adverse impacts are rated conditional recognizing that it is unlikely that the low HG will pertain in every year of the analytical period. For this reason, the overall impacts of Alternative 1 are not predicted to be significantly adverse.

Alternative 3: A significant beneficial impact is identified in terms of the share of producer surplus between the two subareas. A disproportionate adverse impact on personal income under the low HG scenario was identified for this alternative, considered a cumulative impact. Both the beneficial and adverse impacts are considered cumulated and rated conditional recognizing that it is unlikely that the low HG will pertain in every year of the analytical period. For this reason, the overall impacts of Alternative 3 are not predicted to be significantly adverse.

Alternative 4: An adverse impact on processors (regional producer surplus) under the low HG scenario was identified for this alternative, considered a cumulative impact. This adverse impact is rated conditional recognizing that it is unlikely that the low HG will pertain in every year of the analytical period. Furthermore, regional producer surplus is only slightly below the thresholds identified for this evaluation criteria (producer surplus less than Status Quo). A conditionally significant beneficial impact was identified in terms of disproportionate change in personal income between the two subareas under the low HG. The beneficial cumulative impact was rated conditional recognizing that the low HG is unlikely to pertain in every year of the analytical period. For these reasons, the overall impacts of Alternative 4 are not predicted to be significantly adverse.

Alternative 6: A disproportionate adverse impact on personal income under the low HG scenario was identified for this alternative, considered a cumulative impact. This adverse impact is rated conditional recognizing that it is unlikely that the low HG will pertain in every year of the analytical period. For this reason, the overall impacts of Alternative 6 are not predicted to be significantly adverse.

Alternative 7: A significant beneficial impact was identified for this alternative in terms of the distribution of producer surplus between the two subareas. No significant adverse impacts are predicted for this alternative.

Council-preferred Alternative: A disproportionate adverse impact on personal income under the low HG scenario was identified for this alternative, considered a cumulative impact. This adverse impact is rated conditional recognizing that it is unlikely that the low HG will pertain in every year of the analytical period. For this reason, the overall impacts of the Council-preferred alternative are not predicted to be significantly adverse.

Table 4-10. Summary of the impacts of the alternatives on the socioeconomic environment.

Environmental Component	Evaluation Criterion								
		No Action	Status Quo	Alternative 1	Alternative 3	Alternative 4	Alternative 6	Alternative 7	Council-preferred
ESA-listed Salmon	Incident take	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu: I
Purse Seine Fleet	Regional effect	D/I: SA Cu: SA-C	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu: I
	Disproportionate effects on either subarea	D/I: SA-C Cu: SA-C	D/I: I Cu: I	D/I: I Cu: SA-C	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu: I
	Constraints on harvest opportunity	D/I: SA Cu: SA-C	D/I: SA-C Cu: I	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu: I
	Foregone harvest opportunity	D/I: SA Cu: SA-C	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu: I
Buyers and Processors	Overall efficiency	D/I: SA Cu:SA-C	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu: SA-C	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu: I
	Disproportionate effects on either subarea	D/I: SA-C Cu: SA-C	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu: SB-C	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu:SB-C	D/I: I Cu: I
	Constraints on supply	D/I: SA Cu: SA-C	D/I: SA-C Cu: I	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu: I
	Foregone supply	D/I: SA Cu: SA-C	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu: I
Fishing Communities	Change in personal income	D/I: SA Cu: SA-C	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu: I
	Disproportionate change in personal income	D/I: I Cu: I	D/I: I Cu: I	D/I: I Cu: SA-C	D/I: I Cu: SA-C	D/I: I Cu: SB-C	D/I: I Cu: SA-C	D/I: I Cu: I	D/I: I Cu: SA-C

D/I – Direct/Indirect Effect, CU – Cumulative Effect

I – Insignificant, SA – Significantly Adverse, SB – Significantly Beneficial, C – Conditional

5.0 CONSISTENCY WITH MSA NATIONAL STANDARDS

An FMP or plan amendment and any pursuant regulations must be consistent with ten national standards contained in the MSA (§301). These are:

National Standard 1 states that conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry.

The proposed action will not affect the determination of the HG, which is consistent with National Standard 1 promoting MSY harvest of the target species.

National Standard 2 states that conservation and management measures shall be based on the best scientific information available.

The proposed action was based on the best scientific information available.

National Standard 3 states that, to the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination.

The proposed action does not affect how the stock is managed. Although it affects the regional allocation of harvest opportunity this does not affect the overall biological management of the stock.

National Standard 4 states that conservation and management measures shall not discriminate between residents of different states. If it becomes necessary to allocate or assign fishing privileges among various United States fishers, such allocation shall be (A) fair and equitable to all such fishers; (B) reasonably calculated to promote conservation; and (C) carried out in such manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges.

The proposed measures will not discriminate between residents of different states.

National Standard 5 states that conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources; except that no such measure shall have economic allocation as its sole purpose.

The utilization of the fishery resources and fishery stability were established as goals of the proposed action (see Chapter 2) and were considered during the development of the alternatives.

National Standard 6 states that conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.

The proposed action is aimed at accommodating the differences between the seasonal timing of fisheries in the PNW and California and variations in market demand.

National Standard 7 states that conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.

The proposed action replaces an interim allocation scheme and will not duplicate any existing state or federal management measures.

National Standard 8 states that conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.

Section 4.5 describes the impacts to communities under the alternatives.

National Standard 9 states 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.

The proposed action will not have a substantial effect on bycatch rates in the fishery, which are very low. This EA evaluates how the proposed action will affect bycatch of salmon, including ESA-listed stocks, the only bycatch-related issue identified for this action. Information in the EA demonstrates this bycatch is limited and will not have significant impacts.

National Standard 10 states that conservation and management measures shall, to the extent practicable, promote the safety of human life at sea.

Section 1.3 provides information used to determine that the proposed action will not compromise safety and may reduce the likelihood of weather-related safety threats.

6.0 CROSS-CUTTING MANDATES

6.1 Other Federal Laws

6.1.1 Coastal Zone Management Act

Section 307(c)(1) of the federal Coastal Zone Management Act (CZMA) of 1972 requires all federal activities that directly affect the coastal zone be consistent with approved state coastal zone management programs to the maximum extent practicable. The Council-preferred Alternative would be implemented in a manner that is consistent to the maximum extent practicable with the enforceable policies of the approved coastal zone management programs of Washington, Oregon, and California. This determination has been submitted to the responsible state agencies for review under Section 307(c)(1) of the CZMA. The relationship of the groundfish FMP with the CZMA is discussed in Section 11.7.3 of the Groundfish FMP. The CPS FMP has been found to be consistent with the Washington, Oregon, and California coastal zone management programs. The recommended action is consistent and within the scope of the actions contemplated under the framework FMP.

Under the CZMA, each state develops its own coastal zone management program which is then submitted for federal approval. This has resulted in programs which vary widely from one state to the next. Sardine allocation is not expected to affect any state's coastal management program.

6.1.2 Endangered Species Act

NMFS is required under section 7(a)(2) of the ESA to insure that any action it carries out is not likely to jeopardize the continued existence of any endangered or threatened marine species or adversely modify designated critical habitat. To fulfill this obligation, NMFS will conduct a section 7 consultation to determine if the Pacific sardine fishery will jeopardize the continued existence of endangered or threatened species. Because NMFS will implement the proposed action and must protect protected marine species, it functions as both the action agency and the consulting agency during the section 7 consultation. However, different divisions within the agency fulfill these roles. Additionally, USFWS is responsible for, and was consulted regarding, potential impacts to seabirds.

Annual HGs and allocation formulas for Pacific sardine are developed by the Council which provides its recommendations to the U.S. Secretary of Commerce (Secretary). The Secretary and NMFS then implement the HG if it is found to be consistent with all applicable laws including the MSA and the ESA.

There have been five informal consultations on the effects of the CPS fishery on ESA-listed species since 1999. In each of the consultations, both the Protected Resources Division, Southwest Region and the USFWS, serving as the consulting agencies, concurred with the Sustainable Fisheries Division, SWR (the action agency), that the CPS fishery is not likely to adversely affect protected resources.

In early 2005, NMFS initiated a formal consultation which considered the impacts of the 2005 Pacific sardine HG on ESA listed species. The recent development of the sardine fisheries off the coasts of Oregon and Washington prompted review of possible impacts on ESA listed Columbia River basin chinook, namely Lower Columbia River, Snake River Fall, and Upper Willamette River chinook salmon. NMFS concluded that the harvest of Pacific sardine under the 2005 HG would not jeopardize the continued existence of ESA listed salmon (NMFS 2005b).

Impacts to protected species, including listed salmon species, in the California CPS fisheries is also of concern, and NMFS is expanding an observer program for CPS fisheries in California to monitor interactions with protected species. Additionally, a Washington coastal Indian tribe has formally requested entry into the Pacific sardine fishery in 2006. Potential impacts to ESA listed species in the proposed tribal fishery in Washington or observed interactions in California will likely initiate future ESA consultations.

6.1.3 Marine Mammal Protection Act

The MMPA of 1972 is the principle federal legislation that guides marine mammal species protection and conservation policy in the United States. Under the MMPA, NMFS is responsible for the management and conservation of 153 stocks of whales, dolphins, porpoise, as well as seals, sea lions, and fur seals; while the USFWS Service is responsible for walrus, sea otters, and the West Indian manatee.

Off the West Coast, the Steller sea lion (*Eumetopias jubatus*) eastern stock, Guadalupe fur seal (*Arctocephalus townsendi*), and Southern sea otter (*Enhydra lutris*) California stock are listed as threatened under the ESA. The sperm whale (*Physeter macrocephalus*) Washington, Oregon, and California stock, humpback whale (*Megaptera novaeangliae*) Washington, Oregon, and California - Mexico Stock, blue whale (*Balaenoptera musculus*) eastern north Pacific stock, and Fin whale (*Balaenoptera physalus*) Washington, Oregon, and California stock are listed as depleted under the MMPA. Any species listed as endangered or threatened under the ESA is automatically considered depleted under the MMPA.

CPS fisheries are categorized as Category II under the MMPA, meaning that incidental mortality of marine mammals is less than 50% of the PBR level. Although quantitative data are limited, anecdotal information indicates that the most significant interaction is between pilot whales and the squid fishery, a fishery not affected by the proposed action.

6.1.4 Migratory Bird Treaty Act

The MBTA of 1918 was designed to end the commercial trade of migratory birds and their feathers that, by the early years of the 20th century, had diminished the populations of many native bird species. The MBTA states that it is unlawful to take, kill, or possess migratory birds and their parts (including eggs, nests, and feathers) and is a shared agreement between the United States, Canada, Japan, Mexico, and Russia to protect a common migratory bird resource. The MBTA prohibits the directed take of seabirds, but the incidental take of seabirds does occur. The proposed action is unlikely to affect the incidental take of seabirds protected by the MBTA.

6.1.5 Paperwork Reduction Act

The proposed action does not require collection-of-information subject to the Paperwork Reduction Act.

6.1.6 Regulatory Flexibility Act

The purpose of the Regulatory Flexibility Act (RFA) is to relieve small businesses, small organizations, and small governmental entities of burdensome regulations and record-keeping requirements. Major goals of the RFA are; (1) to increase agency awareness and understanding of the impact of their regulations on small business, (2) to require agencies communicate and explain their findings to the public, and (3) to encourage agencies to use flexibility and to provide regulatory relief to small entities. The RFA emphasizes predicting impacts on small entities as a group distinct from other entities and the consideration of alternatives that may minimize the impacts while still achieving the stated objective of the action. An initial regulatory flexibility analysis (IRFA) is conducted unless it is determined that an action will not have a "significant economic impact on a substantial number of small entities." The RFA requires that an IRFA include elements that are

similar to those required by Executive Order (EO) 12866 and NEPA. Therefore, the IRFA has been combined with the RIR and NEPA analyses.

Section 6.3 (below) summarizes the analytical conclusions specific to the RFA and EO 12866.

6.2 Executive Orders

6.2.1 EO 12866 (Regulatory Impact Review)

EO 12866, Regulatory Planning and Review, was signed on September 30, 1993, and established guidelines for promulgating new regulations and reviewing existing regulations. The EO covers a variety of regulatory policy considerations and establishes procedural requirements for analysis of the benefits and costs of regulatory actions. Section 1 of the EO deals with the regulatory philosophy and principles that are to guide agency development of regulations. It stresses that in deciding whether and how to regulate, agencies should assess all of the costs and benefits across all regulatory alternatives. Based on this analysis, NMFS should choose those approaches that maximize net benefits to society, unless a statute requires another regulatory approach.

The RIR and IRFA determinations are part of the combined summary analysis in Section 6.3 of this document.

6.2.2 EO 12898 (Environmental Justice)

EO 12898 obligates federal agencies to identify and address "disproportionately high adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations in the United States" as part of any overall environmental impact analysis associated with an action. NOAA guidance, NAO 216-6, at §7.02, states that "consideration of EO 12898 should be specifically included in the NEPA documentation for decision-making purposes." Agencies should also encourage public participation—especially by affected communities—during scoping, as part of a broader strategy to address environmental justice issues.

The environmental justice analysis must first identify minority and low-income groups that live in the project area and may be affected by the action. Typically, census data are used to document the occurrence and distribution of these groups. Agencies should be cognizant of distinct cultural, social, economic, or occupational factors that could amplify the adverse effects of the proposed action. (For example, if a particular kind of fish is an important dietary component, fishery management actions affecting the availability, or price of that fish, could have a disproportionate effect.) In the case of Indian tribes, pertinent treaty or other special rights should be considered. Once communities have been identified and characterized, and potential adverse impacts of the alternatives are identified, the analysis must determine whether these impacts are disproportionate. Because of the context in which environmental justice is developed, health effects are usually considered, and three factors may be used in an evaluation: whether the effects are deemed significant, as the term is employed by NEPA; whether the rate or risk of exposure to the effect appreciably exceeds the rate for the general population or some other comparison group; and whether the group in question may be affected by cumulative or multiple sources of exposure. If disproportionately high adverse effects are identified, mitigation measures should be proposed. Community input into appropriate mitigation is encouraged.

Section 3.5 describes the demographic characteristics of the communities affected by the proposed action. This information can be used, to identify potential "communities of concern" because their populations have a lower income or a higher proportion of minorities than comparable communities in their region.

Section 3.5 describes the involvement of West Coast communities in the sardine fishery and their demographic characteristics. Generally, the proposed action is projected to increase socioecomic benefits in PNW fishing communities. In comparison to central and southern California, these communities have proportionately lower nonwhite population (although a higher percentage of Native Americans) but lower average incomes. Section 4.5 evaluates disproportionate socioeconomic impacts to communities at the broad scale of the management subarea and finds that the Council-preferred action will not result in significant disproportionate impacts to personal income unless resource productivity is poor for the entire five-year period the allocation scheme is projected to be in place. However, this information is not detailed enough to determine the specific effects on low income and minority populations.

It should be noted that fishery participants make up a small proportion of the total population in these communities, and their demographic characteristics may be different from the community as a whole. However, information specific to fishery participants is not available. Furthermore, different segments of the fishery-involved population may differ demographically. For example, workers in fish processing plants may be more often from a minority population while deckhands may be more frequently low income in comparison to vessel owners.

Participation in decisions about the proposed action by communities that could experience disproportionately high and adverse impacts is another important principle of the EO. The Council offers a range of opportunities for participation by those affected by its actions and disseminates information to affected communities about its proposals and their effects through several channels. In addition to Council membership, which includes representatives from the fishing industries affected by Council action, the CPSAS, a Council advisory body, draws membership from fishing communities affected by the proposed action. While no special provisions are made for membership to include representatives from low income and minority populations, concerns about disproportionate effects to minority and low income populations could be voiced through this body or to the Council directly. Although Council meetings are not held in isolated coastal communities for logistical reasons, they are held in different places up and down the West Coast to increase accessibility.

The Council disseminates information about issues and actions through several media. Although not specifically targeted at low income and minority populations, these materials are intended for consumption by affected populations. Materials include a newsletter, describing business conducted at Council meetings, notices for meetings of all Council bodies, and fact sheets intended for the general reader. The Council maintains a postal and electronic mailing list to disseminate this information. The Council also maintains a website (www.pcouncil.org) providing information about the Council, its meetings, and decisions taken. Most of the documents produced by the Council, including NEPA documents, can be downloaded from the website.

6.2.3 EO 13132 (Federalism)

EO 13132, which revoked EO 12612, an earlier federalism EO, enumerates eight fundamental federalism principles. The first of these principles states "Federalism is rooted in the belief that issues that are not national in scope or significance are most appropriately addressed by the level of government closest to the people." In this spirit, the EO directs agencies to consider the implications of policies that may limit the scope of or preempt states' legal authority. Preemptive action having such federalism implications is subject to a consultation process with the states; such actions should not create unfunded mandates for the states; and any final rule published must be accompanied by a federalism summary impact statement.

The Council process offers many opportunities for states (through their agencies, Council appointees, consultations, and meetings) to participate in the formulation of management measures. This process

encourages states to institute complementary measures to manage fisheries under their jurisdiction that may affect federally-managed stocks.

The proposed action does not have federalism implications subject to EO 13132.

6.2.4 EO 13175 (Consultation and Coordination With Indian Tribal Government)

EO 13175 is intended to ensure regular and meaningful consultation and collaboration with tribal officials in the development of federal policies that have tribal implications, to strengthen the United States government-to-government relationships with Indian tribes, and to reduce the imposition of unfunded mandates upon Indian tribes.

The Secretary recognizes the sovereign status and co-manager role of Indian tribes over shared federal and tribal fishery resources. At Section 302(b)(5), the Magnuson-Stevens Act reserves a seat on the Council for a representative of an Indian tribe with federally-recognized fishing rights from California, Oregon, Washington, or Idaho.

The U.S. government formally recognizes the four Washington coastal tribes (Makah, Quileute, Hoh, and Quinault) have treaty rights to fish for groundfish. In general terms, the quantification of those rights is 50% of the harvestable surplus of groundfish available in the tribes' Usual and accustomed fishing areas (described at 50 CFR 660.324). Each of the treaty tribes has the discretion to administer their fisheries and to establish their own policies to achieve program objectives.

Amendment 9 to the CPS FMP established a treaty Indian fishing rights framework for CPS species in usual and accustomed areas off the coast of Washington. The FMP states "An allocation or a regulation specific to the tribes shall be initiated by a written request from a Pacific Coast treaty Indian tribe to the NMFS Southwest Regional Administrator, at least 120 days prior to the start of the fishing season as specified at 50 CFR 660.510, and will be subject to public review according to the procedures in 50 CFR 660.508(d)" (PFMC 2000). With the resurgence of Pacific sardines, and their movement north along the West Coast, it is likely that some of the PNW ocean fishing tribes may wish to exercise their treaty fishing rights on CPS in their usual and accustomed grounds.

The Makah Indian Tribe submitted a letter on June 10, 2005 to NMFS, Southwest Regional Office pursuant to 50 CFR 660.518(d) and the CPS FMP requesting provisions for the treaty harvest of Pacific sardine in 2006. At the June Council meeting, the Council established the Ad Hoc Coastal Pelagic Species Tribal Allocation Committee, comprised of state, federal, and tribal representatives, to begin work on drafting the provisions of this proposed fishery.

6.2.5 EO 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds)

EO 13186 supplements the MBTA (above) by requiring federal agencies to work with the USFWS to develop memoranda of agreement to conserve migratory birds. NMFS is in the process of implementing a memorandum of understanding. The protocols developed by this consultation will guide agency regulatory actions and policy decisions in order to address this conservation goal. The EO also directs agencies to evaluate the effects of their actions on migratory birds in environmental documents prepared pursuant to the NEPA.

Section 4.2 in this EIS evaluates impacts to seabirds and concludes that the proposed action will not significantly impact seabirds.

6.3 Regulatory Impact Review and Regulatory Flexibility Analysis

In order to comply with EO 12866 and the RFA, this document also serves as an RIR and an IRFA. A summary of these analyses is presented below.

6.3.1 EO 12866 (Regulatory Impact Review)

EO 12866, Regulatory Planning and Review, was signed on September 30, 1993, and established guidelines for promulgating new regulations and reviewing existing regulations. The EO covers a variety of regulatory policy considerations and establishes procedural requirements for analysis of the benefits and costs of regulatory actions. Section 1 of the EO deals with the regulatory philosophy and principles that are to guide agency development of regulations. It stresses that in deciding whether and how to regulate, agencies should assess all of the costs and benefits across all regulatory alternatives. Based on this analysis, NMFS should choose those approaches that maximize net benefits to society, unless a statute requires another regulatory approach.

The regulatory principles in EO 12866 emphasize careful identification of the problem to be addressed. The agency is to identify and assess alternatives to direct regulation, including economic incentives such as user fees or marketable permits, to encourage the desired behavior. Each agency is to assess both the costs and the benefits of the intended regulation and, recognizing that some costs and benefits are difficult to quantify, propose or adopt a regulation only after reasoned determination the benefits of the intended regulation justify the costs. In reaching its decision agency must use the best reasonably obtainable information, including scientific, technical and economic data, about the need for and consequences of the intended regulation.

NMFS requires the preparation of an RIR for all regulatory actions of public interest; implementation of rebuilding plans includes the publication of strategic rebuilding parameters in federal regulations. The RIR provides a comprehensive review of the changes in net economic benefits to society associated with proposed regulatory actions. The analysis also provides a review of the problems and policy objectives prompting the regulatory proposals and an evaluation of the major alternatives that could be used to solve the problems. The purpose of the analysis is to ensure the regulatory agency systematically and comprehensively considers all available alternatives, so the public welfare can be enhanced in the most efficient and cost-effective way. The RIR addresses many of the items in the regulatory philosophy and principles of EO 12866.

The RIR analysis and an environmental analyses required by NEPA have many common elements and they have been combined in this document. The following table shows where the elements of an RIR, as required by EO 12866, are located.

Required RIR Elements	Corresponding Sections
Description of management objectives	Sections 1.1 & 1.2
Description of the fishery[a/]	Section 3.3
Statement of the problem	Section 1.2
Description of each alternative considered in the analysis	Chapter 2
An analysis of the expected economic effects of each alternative	Sections 4.3–4.5, Appendix A
a/ In addition to the information in this document, basic economic information is provided annually in the CPS Stock Assessment and Fishery Evaluation document.	

The RIR is designed to determine whether the proposed action could be considered a significant regulatory action according to EO 12866. The EO 12866 test requirements are used to assess whether or not an action would be a "significant regulatory action" and the expected outcomes of the proposed management alternative are discussed below. A regulatory program is "economically significant" if it is likely to result in the following effects:

1.a. Have an annual effect on the economy of $100 million or more, or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or state, local, or tribal governments or communities.

No.

1.b. Present a risk to long-term productivity.

No.

2. Create a serious inconsistency or otherwise interfere with action taken or planned by another agency.

No.

3. Materially alter the budgetary impact of entitlement, grants, user fees, or loan programs or the rights and obligations of recipients thereof.

No.

4. Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this EO.

No.

None of the proposed changes to the FMP implementing regulations would be a significant action according to Executive Order (E.O.) 12866. This action will not have a cumulative effect on the economy of $100 million or more, nor will it result in a major increase in costs to consumers, industries, governmental agencies, or geographical regions. No significant adverse impacts are anticipated on competition, employment, investments, productivity, innovation, or competitiveness of U.S.-based enterprises.

The key elements of an RIR have been thoroughly addressed in the EA above. It appears the proposed action in this amendment would not have any significant adverse economic effects on consumers and producers of CPS finfish. Conversely, economic effects are expected to be either neutral or positive relative to the Status Quo.

6.3.2 Impacts on Small Entities (Regulatory Flexibility Act, RFA)

The RFA requires government agencies to assess the effects that various regulatory alternatives would have on small entities, including small businesses, and to determine ways to minimize those effects. A fish-harvesting business is considered a "small" business by the Small Business Administration (SBA) if it has annual receipts not in excess of $3.5 million. For related fish-processing businesses, a small business is one that employs 500 or fewer persons. For marinas and charter/party boats, a small business is one with annual receipts not in excess of $5.0 million. Sardine harvesting vessels are expected to be the only types of small entities directly impacted by the proposed action.

The small entities that would be affected by the proposed action are the vessels that compose the West Coast CPS finish fleet. The financial impacts analysis focuses on the exvessel revenue affects of each allocation alternative on CPS finfish vessels. Because cost data are lacking for the harvesting operations of CPS finfish vessels, it was not possible to evaluate the financial impacts from estimated changes in sardine landings, under each allocation alternative, in terms of vessel profitability. Instead, financial impacts were evaluated based only on changes in sardine exvessel revenues relative to the Status Quo.

CPS finfish vessels typically harvest a number of other species, including anchovy, mackerel, squid, and tuna. However, since data on individual vessel operations were not readily available, no attempt was made to evaluate potential changes in fishing strategies by these vessels in response to different opportunities to harvest sardines under each of the allocation alternatives and what this would mean in terms of total exvessel revenues from all species.

Approximately 104 vessels were permitted to operate in the sardine fisheries off the U.S. West Coast in 2004; 63 vessels were permitted in the Federal CPS limited entry fishery off California (south of 39° N latitude), while 41 vessels were permitted in Oregon's and Washington's sardine fisheries (PFMC 2005c). All of these vessels would be considered small businesses under the SBA standards. Therefore, there would be no economic impacts resulting from disproportionality between small and large vessels under the proposed action. For purposes of the analysis of long-term Pacific sardine HG allocation alternatives, this means that in 2004 there were 63 vessels eligible to participate in the southern subarea fishery, and realistically only 41 vessels able to participate in the northern subarea fishery. Technically, vessels from California could fish in the EEZ off Oregon and Washington without a respective state issued limited entry permit, but would have to land their catches in California. However, given the current technology, and operational aspects of the sardine fishery this would not be practicable. Therefore, it is assumed that these 63 and 41 vessels will comprise the respective southern and northern subarea fleets over the 2005-2009 period of the analysis.

Under the preferred long-term allocation alternative, sardine landings for CPS for the entire West Coast were projected to increase: (1) 19,674 mt from the Status Quo over the 2005-2009 period, with a corresponding increase in exvessel revenues of $3,076,891, under a 136,000 mt HG, and a ten percent annual growth rate in landings for all fishery sectors over the 2005-2009 period (base case); (2) no change in total landings, but an increase of $1,514,553 in exvessel revenues under a 72,000 mt HG, and a ten percent annual growth rate in landings for all fishery sectors over the 2005-2009 period (low HG case); and, (3) no change in total landings or in total exvessel revenues under a 200,000 mt HG, and a ten percent annual growth rate in landings for all fishery sectors over the 2005-2009 period (high HG case) (Table 6-1).

For the preferred alternative, sardine landings in the northern subarea sardine fishery were estimated to be 28,141 mt greater, than the Status Quo, with ex-vessel revenues increasing by $3.8 million under the base case; a 34,592 mt increase in landings and an increase of $4.7 million in exvessel revenue under the low HG case; and, a no increase in landings or in exvessel revenue under the high HG case. Landings in the southern subarea sardine fishery would decrease by 8,467 mt and exvessel revenues would decrease by $743,181 relative to the Status Quo under the base case; a decrease of 26,011 mt in landings and $3.2 million in exvessel revenues under the low HG case; and, no changes under the high HG case (Table 6-1 and Table 6-2).

For the 63 CPS limited entry vessels that would be eligible to participate in the southern subarea sardine fishery, the 8,467 mt loss in landings over the period under the base case, preferred alternative, represents a potential decrease in exvessel revenues of $11,797 per vessel from the Status Quo, which would be 2.6% loss in each vessel's projected revenues. For the preferred alternative under the low HG case, vessels in the southern subarea fishery stand to lose $50,497 each, a 15.3 % decrease from the Status Quo, and under the high HG case there would be no change in vessel earnings from the Status Quo (Table 6-3). These estimates may understate the actual earnings impacts per vessel since only 61 vessels participated in the southern subarea fishery during 2004 (PFMC 2005).

For the 41 vessels that could participate in the northern subarea fishery each would stand to gain $93,173 in exvessel revenues over the period under the base case, preferred alternative, a 10.6 % increase from the Status Quo. For the preferred alternative under the low HG case, vessels in the northern subarea fishery gain $114,533 each, a 26.4 % increase from the Status Quo, and under the high HG case there would be no change from the Status Quo (Table 6-3). These estimates may understate the actual earnings impacts per vessel since only 34 vessels recorded landings in the northern subarea fishery during 2004(PFMC 2005c).

The Council considered six alternatives to the preferred alternative in addition to the Status Quo alternative. All alternatives resulted in exvessel revenue gains of various magnitudes for the fishery as a whole except the "No Action" alternative in all cases, and alternative 4.b under the low HG case. Although, the proposed alternative did not yield the greatest overall gain, with the least negative impacts to individual vessels from any one region, it was deemed most equitable by industry members when considered relative to the full range of conservation and management objectives constituting optimum yield under the Magnuson-Stevens Act.

Section 603 (b) of the RFA identifies the elements that should be included in the IRFA. These are bulleted below, followed by information that addresses each element.

- A description of the reasons why action by the agency is being considered.

The purpose and need for the proposed action are discussed in Sections 1.1 & 1.2.

- A succinct statement of the objectives of, and legal basis for, the proposed rule.

The description of need in Section 1.2 also outlines the objectives of the proposed action the legal basis for the proposed action (proposed rule).

- A description and, where feasible, an estimate of the number of small entities to which the proposed rule will apply.

Section 3.3, Section 3.4, and Section 3.5 describe the fishing sectors, processors, and communities.

- A description of the projected reporting, record-keeping, and other compliance requirements of the proposed rule, including an estimate of the classes of small entities that will be subject to the requirements of the report or record.

There are no new reporting or record-keeping requirements that are proposed as part of this action.

- An identification, to the extent practicable, of all relevant federal rules, which may duplicate, overlap, or conflict with the proposed rule.

No federal rules have been identified that duplicate, overlap, or conflict with the alternatives. Public comment is hereby solicited, identifying such rules.

- A description of any significant alternatives to the proposed rule that accomplish the stated objectives that would minimize any significant economic impact of the proposed rule on small entities.

This EA includes a range of alternatives and their socioeconomic impacts, which were considered by the Council.

Table 6-1. Changes in landings relative to the Status Quo alternative, metric tons 2005-2009.

Base case scenario

	Total	Southern California	Northern California	Pacific Northwest	Southern Subarea	Northern Subarea
Status Quo	584,538	215,591	102,648	266,299	318,239	266,299
No Action	-52,056	0	-8,598	-43,458	0	-52,056
Alternative 1	22,366	-4,957	-6,093	33,416	-11,050	33,416
Alternative 3	22,367	-5,070	-1,857	29,294	-6,927	29,294
Council-preferred Alternative	19,674	-4,928	-3,539	28,141	-8,467	28,141
Alternative 4a	22,366	-4,957	-6,093	33,416	-11,050	33,416
Alternative 6	22,366	-4,957	-6,093	33,416	-11,050	33,416
Alternative 7	20,114	-3,161	-1,753	25,028	-4,914	25,028

Low HG scenario

	Total	Southern California	Northern California	Pacific Northwest	Southern Subarea	Northern Subarea
Status Quo	360,000	176,130	52,947	130,923	229,077	130,923
No Action	-3,272	26,158	-13,247	-16,183	-26,789	23,517
Alternative 1	0	-34,696	-21,201	55,897	-55,897	55,897
Alternative 3	0	-28,276	2,265	26,010	-26,011	26,010
Council-preferred Alternative	0	-29,122	-5,470	34,592	-34,592	34,592
Alternative 4a	0	434	478	-912	912	-912
Alternative 6	0	-26,306	-17,962	44,268	-44,268	44,268
Alternative 7	0	-7,626	-8,159	15,785	-15,785	15,785

High HG scenario

	Total	Southern California	Northern California	Pacific Northwest	Southern Subarea	Northern Subarea
Status Quo	619,461	215,591	102,648	301,222	318,239	301,222
No Action	-10,263	0	-774	-9,489	-102,648	92,385
Alternative 1	0	0	0	0	0	0
Alternative 3	0	0	0	0	0	0
Council-preferred Alternative	0	0	0	0	0	0
Alternative 4a	0	0	0	0	0	0
Alternative 6	0	0	0	0	0	0
Alternative 7	0	0	0	0	0	0

Table 6-2. Changes in exvessel revenue to the Status Quo alternative, 2005-2009.

Base case scenario

	Total	Southern California	Northern California	Pacific Northwest	Southern Subarea	Northern Subarea
Status Quo	$64,573,301	$20,377,661	$8,045,550	$36,150,089	$28,423,212	$36,150,089
No Action	-$6,573,335	$0	-$673,911	-$5,899,424	$0	-$6,573,335
Alternative 1	$3,590,117	-$468,536	-$477,569	$4,536,222	-$946,105	$4,536,222
Alternative 3	$3,351,892	-$479,216	-$145,552	$3,976,661	-$624,768	$3,976,661
Council-preferred Alternative	$3,076,891	-$465,795	-$277,387	$3,820,073	-$743,181	$3,820,073
Alternative 4a	$3,590,117	-$468,536	-$477,569	$4,536,222	-$946,105	$4,536,222
Alternative 6	$3,590,117	-$468,536	-$477,569	$4,536,222	-$946,105	$4,536,222
Alternative 7	$2,961,373	-$298,778	-$137,400	$3,397,551	-$436,178	$3,397,551

Low HG scenario

	Total	Southern California	Northern California	Pacific Northwest	Southern Subarea	Northern Subarea
Status Quo	$38,570,591	$16,647,808	$4,149,986	$17,772,797	$20,797,793	$17,772,797
No Action	-$762,688	$2,472,454	-$1,038,300	-$2,196,842	$2,472,454	-$3,235,142
Alternative 1	$2,646,817	-$3,279,466	-$1,661,734	$7,588,018	-$4,941,200	$7,588,018
Alternative 3	$1,035,741	-$2,672,648	$177,531	$3,530,858	-$2,495,117	$3,530,858
Council-preferred Alternative	$1,514,553	-$2,752,611	-$428,699	$4,695,864	-$3,181,311	$4,695,864
Alternative 4a	-$45,317	$41,022	$37,466	-$123,804	$78,487	-$123,804
Alternative 6	$2,115,076	-$2,486,443	-$1,407,862	$6,009,381	-$3,894,305	$6,009,381
Alternative 7	$782,502	-$720,810	-$639,502	$2,142,814	-$1,360,312	$2,142,814

High HG Scenario

	Total	Southern California	Northern California	Pacific Northwest	Southern Subarea	Northern Subarea
Status Quo	$69,314,098	$20,377,661	$8,045,550	$40,890,887	$28,423,212	$40,890,887
No Action	-$1,348,798	$0	-$60,666	-$1,288,132	$0	-$1,348,798
Alternative 1	$0	$0	$0	$0	$0	$0
Alternative 3	$0	$0	$0	$0	$0	$0
Council-preferred Alternative	$0	$0	$0	$0	$0	$0
Alternative 4a	$0	$0	$0	$0	$0	$0
Alternative 6	$0	$0	$0	$0	$0	$0
Alternative 7	$0	$0	$0	$0	$0	$0

[1]Exvessel revenues calculated by multiplying projected annual landings 2005-2009 by 2004 weighted average exvessel prices for each fishery sector.

Table 6-3. Changes in landings and exvessel revenues per vessel under each long-term HG alternative relative to the Status Quo alternative, 2005-2009.

Base case scenario	Change in exvessel revenue from Status Quo Southern Subarea	Change in exvessel revenue from Status Quo Northern Subarea	% Change in exvessel revenue from Status Quo Southern Subarea	% Change in exvessel revenue from Status Quo Northern Subarea
Status Quo (absolute)	$451,162	$881,709	0.0%	0.0%
No Action	$0	-$160,325	0.0%	-18.2%
Alternative 1	-$15,018	$110,640	-3.3%	12.5%
Alternative 3	-$9,917	$96,992	-2.2%	11.0%
Council-preferred Alternative	-$11,797	$93,173	-2.6%	10.6%
Alternative 4a	-$15,018	$110,640	-3.3%	12.5%
Alternative 6	-$15,018	$110,640	-3.3%	12.5%
Alternative 7	-$6,923	$82,867	-1.5%	9.4%

Low HG scenario	Change in exvessel revenue from Status Quo Southern Subarea	Change in exvessel revenue from Status Quo Northern Subarea	% Change in exvessel revenue from Status Quo Southern Subarea	% Change in exvessel revenue from Status Quo Northern Subarea
Status Quo (absolute)	$330,124	$433,483	0.0%	0.0%
No Action	$39,245	-$78,906	11.9%	-18.2%
Alternative 1	-$78,432	$185,074	-23.8%	42.7%
Alternative 3	-$39,605	$86,118	-12.0%	19.9%
Council-preferred Alternative	-$50,497	$114,533	-15.3%	26.4%
Alternative 4b	$1,246	-$3,020	0.4%	-0.7%
Alternative 6	-$61,814	$146,570	-18.7%	33.8%
Alternative 7	-$21,592	$52,264	-6.5%	12.1%

High HG scenario	Change in exvessel revenue from Status Quo Southern Subarea	Change in exvessel revenue from Status Quo Northern Subarea	% Change in exvessel revenue from Status Quo Southern Subarea	% Change in exvessel revenue from Status Quo Northern Subarea
Status Quo (absolute)	$451,162	$997,339	0.0%	0.0%
No Action	$0	-$32,898	0.0%	-3.3%
Alternative 1	$0	$0	0.0%	0.0%
Alternative 3	$0	$0	0.0%	0.0%
Council-preferred Alternative	$0	$0	0.0%	0.0%
Alternative 4a	$0	$0	0.0%	0.0%
Alternative 6	$0	$0	0.0%	0.0%
Alternative 7	$0	$0	0.0%	0.0%

[1]Based on 63 permitted vessels in the southern subarea and 41 permitted vessels in the northern subarea during 2004.

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APPENDIX A

TO THE
ENVIRONMENTAL ASSESSMENT

ALLOCATION
OF
THE PACIFIC SARDINE
HARVEST GUIDELINE

AMENDMENT 11 TO THE COASTAL PELAGIC SPECIES FISHERY MANAGEMENT PLAN

Documents included in this appendix:

- Economic Evaluation of Long-Term Pacific Sardine Harvest Guideline Allocation Alternatives
- Sensitivity Analysis of Pacific Sardine Harvest Guideline Allocation Alternatives
- Survey Methodology and Results for Collection of Economic Data Used in the Analysis of Long-Term Allocation Options for the Pacific Sardine Harvest Guideline
- Comments on Survey Methodology and Results for Collection of Economic Data Used in the Analysis of Long-Term Allocation Options for the Pacific Sardine Harvest Guideline, Scientific and Statistical Committee, Economics Subcommittee

Economic Evaluation of Long-Term Pacific Sardine Harvest Guideline Allocation Alternatives

The economic analysis of alternative allocation schemes to partition the Pacific sardine harvest guideline (HG) estimates the incremental change in producer surplus/private profit (PS) for each fishery sector when comparing each of the proposed allocation alternatives to the status quo. The procedure used estimates both the distributional changes and total changes in PS under each option. Specifically, the year-end projected landings under the status quo for each fishery sector (Pacific Northwest, PNW; Northern California, NCA; Southern California, SCA) are subtracted from the corresponding projected year-end landings under each alternative. The differences in landings are multiplied by an estimate of PS per metric ton for each fishery sector to obtain estimates of the change in sectorial PS. The sectoral changes in PS are summed to obtain a subarea estimate of the total change in PS associated with the option.

It was assumed that there would be no significant changes in the basic operations of sardine processors during its term. There was not expected to be any significant changes in investment in facilities, or other restructuring by processors that would alter the costs of operations during the period of the selected action. Under these circumstances, all but the variable costs of sardine processing (in particular, the costs of labor, energy/utilities, raw fish, and other inputs that vary directly with the quantities of sardines processed) were considered fixed over the time horizon of the action, and therefore, would not effect estimates of PS (i.e., only the, variable costs of processing sardines were used in the calculations of PS). It was further assumed that each of the inputs were traded in perfectly competitive markets, and, therefore, their private cost will be equal to their social opportunity cost. Under this assumption, there would be no difference in measures of producer surplus and private profit. In other words the profits realized from sardine processing would be the same as the net benefits to the nation.

Establish Baseline Expected and Projected Actual Sardine Landings by Fishery Sector

Landings projections under each allocation alternative were based on 2004 monthly reported landings for each of the fishery sectors. The 2004 monthly landings were inflated by 10% annually through 2009 to account for expected growth in the regional fishery sectors over the next five years, 2005-2009 (Table 1). SCA and NCA combine to form the Southern Subarea and PNW the Northern Subarea under each allocation alternative, except for the No Action alternative where SCA is the Southern Subarea and NCA and the PNW combine to form the Northern Subarea..

The baseline expected landings were then subjected to the allocation constraints under each allocation alternative (status quo, no action, alternative 1, alternative 3 (including the original and the modified preferred alternative), alternatives 4.a and 4.b, alternative 6, and alternative 7). This gave a projection of actual monthly landings under each of the allocation alternatives, by fishery sector in each year of the 5-year period. These projected landings were compared to the expected landings for each fishery sector to identify months in each year, 2005-2009, in which there would be a shortfall in landings (instances where the expected subarea landings for a month are greater than the amount of subarea allocation available at the beginning of the month), the amount of the shortfall (the expected landings for the month minus the allocation available at the beginning of the month [where the projected actual landings equal the amount of allocation available at the

beginning of the month]), and months which would start out with no available allocation (without an allocation adjustment, these would be the months following a landings shortfall). Actual landings were projected under three harvest guideline (HG) scenarios: 1) low HG = 72,000 mt annually 2005-2009; 2) Base case HG = 136,000 mt annually 2005-2009; and, 3) high HG = 200,000 mt annually 2005-2009. Monthly projected actual landings were summarized annually by fishery sector, under each allocation alternative and HG scenario. Surplus HG was calculated as the difference between the annual HG and projected actual landings for the year.

Estimates of Producer Surplus

Projected actual landings under each allocation alternative were compared to the status quo alternative to determine differences in landings, landings shortfalls (cases where the actual projected landing is less than the expected landing, the number of months with shortfalls, the number of months with no initial allocation and differences in surplus HG. These comparisons were made by fishery sector for each of the HG cases.

The net economic benefit or PS was calculated as the difference between gross revenue from the sales of processed sardine products, and the total variable cost of producing those products (Table 2). Aggregate PS under each alternative was calculated by multiplying projected annual landings in metric tons for each fishery sector, under each alternative, by the estimated PS per metric ton for each fishery sector. These measures were then used to estimate the incremental changes in PS associated with the proposed allocation alternatives relative to the Status Quo alternative (more information can be found in this appendix, see *Survey Methodology and Results for Collection of Economic Data Used in the Analysis of Long-Term Allocation Options for the Pacific Sardine Harvest Guideline*).

The estimated PS per metric ton for each fishery sector was calculated as:

$$PS_r = \Sigma_i (APS_{ir} \times W_{ir})$$

where:

PS_r is the weighted average PS per metric ton for fishery sector *r*;
APS_{ir} is the average PS per metric ton for sardine product *i* in fishery sector *r* in 2004;
W_{ir} is the proportion of product *i* production of total production all products in fishery sector *r* for 2004.

The annual aggregate producer surplus was calculated as:

$$PS_R = Q_r \times PS_r$$

where:

Q_r are the projected actual annual landings for fishery sector *r*.

Annual PS was calculated for each fishery sector, under each alternative, and under each HG case, for each of the years 2005-2009. Each measure of PS was compared to its corresponding measure under the Status Quo alternative. The present value (PV) for each estimate of annual PS

was calculated for the 5-year time horizon using a social discount rate of 4.1%, assuming that the per unit measure of PS for each fishery sector remained constant over the time horizon.

Results

Results from the comparisons of each allocation alternative's projected landings and PS with the status quo alternative, by fishery sector and HG case, are summarized in Tables 3 through 7 and Figures 1 through 9.

For the Status Quo alternative: (1) total projected landings (2005-2009); (2) the total shortfall in landings (2005-2009); (3) the years and months with landings shortfalls and no beginning allocation; (4) the PV of PS (2005-2009); and, (5) the amount of surplus HG in each year 2005-2009 are estimated under each HG scenario (Table 3).

For each alternative, and the three HG cases (Tables 4, 5 and 6) show: (1) total projected landings (2005-2009) under the alternative; (2) the change in total projected landings from the Status Quo alternative (Figures 1, 4 and 7); (3) the total shortfall in landings (2005-2009) under the alternative; (4) the change in the total shortfall in landings from the Status Quo alternative; (5) the years and months with allocation shortfalls and no beginning allocation under the alternative (Table 7; Figures 2, 5 and 8); (6) the PV of PS under the alternative; (7) the change in PV of PS from the Status Quo alternative; (8) the amount of surplus HG in each year 2005-2009 under the alternative; and, (10) the change in the HG surplus relative to the Status Quo alternative (Figures 3, 6 and 9).

Table 8, Table 9, and Table 10 present projected present values of: (1) exvessel revenues; (2) producer surplus; and, (3) regional personal income by fishery sector and subarea for original Alternative 3 (40% HG available coastwide January 1; 40% HG [plus any remainder] available coastwide July 1; 20% HG [plus any remainder] available October 1), and Alternative 3 modified such that 35% HG available coastwide January 1; 40% HG (plus any remainder) available coastwide July 1; 25% HG (plus any remainder) available either September 1 or October 1. These modifications of Alternative 3 bracket the preferred alternative: 35% HG available coastwide January 1; 40% HG (plus any remainder) available coastwide July 1; 25% HG (plus any remainder) available September 15, to indicate the range of expected effects under the preferred alternative. The socioeconomic impacts of original Alternative 3 and the two modifications are projected under annual landings growth rates of 0 percent, 5 percent, 10 percent and 15 percent differentiated by region, and for each HG scenario. The present value measures were all calculated for the 2005-2009 period using a 4.1% discount rate. Exvessel revenues were projected using 2004 exvessel prices by fishery sector from the PacFIN Management Database. Producer surplus was projected using per unit values of: $237.13 per metric ton for SCA; $226.94 per metric ton for NCA; and, $320.89 per metric ton for PNW. Regional personal income was projected using marginal total income multipliers of: $.418 per pound landed in SCA; $.336 per pound landed in NCA; and, $.486 per pound landed in PNW.

Table 1. Baseline landings projections under 10% annual growth rate for long-term sardine HG allocation analyses, 2005-09.

Southern California Landings (mt)

Month	2004	2005	2006	2007	2008	2009
Jan	4,319	4,751	5,226	5,749	6,323	6,956
Feb	1,498	1,648	1,813	1,994	2,193	2,413
Mar	3,533	3,886	4,275	4,702	5,173	5,690
Apr	2,931	3,224	3,547	3,901	4,291	4,720
May	1,200	1,320	1,452	1,597	1,757	1,933
Jun	1,751	1,926	2,119	2,331	2,564	2,820
Jul	2,517	2,769	3,046	3,350	3,685	4,054
Aug	4,349	4,784	5,262	5,789	6,367	7,004
Sep	3,383	3,721	4,093	4,503	4,953	5,448
Oct	3,461	3,807	4,188	4,607	5,067	5,574
Nov	1,649	1,814	1,995	2,195	2,414	2,656
Dec	1,512	1,663	1,830	2,012	2,214	2,435
Total	32,103	35,313	38,845	42,729	47,002	51,702

Northern California Landings (mt)

Month	2004	2005	2006	2007	2008	2009
Jan	2,023	2,225	2,448	2,693	2,962	3,258
Feb	116	128	140	154	170	187
Mar	6	7	7	8	9	10
Apr	0	0	0	0	0	0
May	0	0	0	0	0	0
Jun	0	0	0	0	0	0
Jul	563	619	681	749	824	907
Aug	2,799	3,079	3,387	3,725	4,098	4,508
Sep	679	747	822	904	994	1,094
Oct	5,115	5,627	6,189	6,808	7,489	8,238
Nov	3,984	4,382	4,821	5,303	5,833	6,416
Dec	0	0	0	0	0	0
Total	15,285	16,814	18,495	20,344	22,379	24,617

Pacific Northwest Landings (mt)

Month	2004	2005	2006	2007	2008	2009
Jan	0	0	0	0	0	0
Feb	0	0	0	0	0	0
Mar	0	0	0	0	0	0
Apr	0	0	0	0	0	0
May	0	0	0	0	0	0
Jun	2,438	2,682	2,950	3,245	3,569	3,926
Jul	12,918	14,210	15,631	17,194	18,913	20,805
Aug	16,836	18,520	20,372	22,409	24,650	27,115
Sep	8,326	9,159	10,074	11,082	12,190	13,409
Oct	3,362	3,698	4,068	4,475	4,922	5,415
Nov	762	838	922	1,014	1,116	1,227
Dec	212	233	257	282	310	341
Total	44,854	49,339	54,273	59,701	65,671	72,238

Table 2. Itemized weighted average costs and revenues per metric ton of sardine processed product for each fishery sector.

	SCA	NCA	PNW
	Weighted Average	**Weighted Average**	**Weighted Average**
Gross Revenue	$557.80	$514.27	$694.80
Raw Fish[1]	$82.02	$77.82	$135.75
Processing Labor	$36.63	$23.74	$61.53
Supervisory	$3.17	$2.50	$11.51
Energy	$0.65	$0.00	$23.99
Packaging	$23.73	$19.53	$53.02
Waste	$0.23	$0.00	$9.70
Shipping Trucking	$97.50	$59.46	$28.11
Storage/Freezing	$45.77	$68.27	$13.03
Salt	$0.00	$0.00	$3.35
Unloading	$16.27	$19.88	$17.64
Ice	$14.71	$16.13	$16.29
Total Variable Cost	$320.67	$287.32	$373.91
Producer Surplus	$237.13	$226.94	$320.89

[1]Based on weighted exvessel revenues derived from the PacFIN management database.

Table 3. Summary of actual landings projections and cost-benefit analysis results for status quo allocation option, 2005-2009.

Base Case: HG=136,000mt

Area	Projected Landings (MT)	Shortfall in Landings (MT)	Number of Months with Landings Shortfalls	Number of months with No Allocation	Status Quo NPV Producer Surplus	Year	Status Quo HG	Surplus HG
Southern CA	223,563	0	0	0	$53,013,728	2005	136,000	32,227
Northern CA	108,759	0	0	0	$24,682,275	2006	136,000	24,185
OR/WA	266,299	-34,923	12	6	$85,453,802	2007	136,000	15,724
Southern SA	332,322	0	0	0	$77,696,004	2008	136,000	7,855
Northern SA	266,299	-34,923	12	6	$85,453,802	2009	136,000	1,387
Total	598,621	-34,923	12	6	$163,149,805			81,379

Low HG Case: HG=72,000mt

Area	Projected Landings (MT)	Shortfall in Landings (MT)	Number of Months with Landings Shortfalls	Number of months with No Allocation	Status Quo NPV Producer Surplus	Year	Status Quo HG	Surplus HG
Southern CA	173,047	-50,516	14	10	$41,034,907	2005	72,000	0
Northern CA	56,030	-52,730	14	10	$12,715,621	2006	72,000	0
OR/WA	130,923	-170,299	25	15	$42,012,411	2007	72,000	0
Southern SA	229,077	-103,245	14	10	$53,750,528	2008	72,000	0
Northern SA	130,923	-170,299	25	15	$42,012,411	2009	72,000	0
Total	360,000	-273,544	39	25	$95,762,939			0

High HG Case: HG=200,000mt

Area	Projected Landings (MT)	Shortfall in Landings (MT)	Number of Months with Landings Shortfalls	Number of months with No Allocation	Status Quo NPV Producer Surplus	Year	Status Quo HG	Surplus HG
Southern CA	223,563	0	0	0	$53,013,728	2005	200,000	96,227
Northern CA	108,759	0	0	0	$24,682,275	2006	200,000	85,850
OR/WA	301,222	0	0	0	$96,660,250	2007	200,000	74,435
Southern SA	332,322	0	0	0	$77,696,004	2008	200,000	61,878
Northern SA	301,222	0	0	0	$96,660,250	2009	200,000	48,066
Total	633,544	0	0	0	$174,356,254			366,456

Table 4. Summary of projected landings and cost-benefit analysis results for long-term sardine harvest guidline allocation options, 2005-2009. (Page 1 of 3)
Base Case (HG = 136,000 mt)
A. Status Quo Summary, 2005-2009.

Area	Status Quo Projected Landings (mt) 2005-2009	Status Quo Shortfall in Landings (mt) 2005-2009	Status Quo Mo/Yr of Shortfalls	Status Quo Mo/Yr with No Allocation	Status Quo NPV Producer Surplus	Year	Status Quo HG	Surplus HG
Southern CA	223,563	0			$53,013,728	2005	136,000	32,227
Northern CA	108,759	0			$24,682,275	2006	136,000	24,185
OR/WA	266,299	-34,923	10-11/06,10-11/07,8-11/08,8-11/09	11/06,11/07,10-11/08,10-11/09	$85,453,802	2007	136,000	15,724
Southern SA1	332,322	0			$77,696,004	2008	136,000	7,855
Northern SA2	266,299	-34,923	10-11/06,10-11/07,8-11/08,8-11/09	11/06,11/07,10-11/08,10-11/09	$85,453,802	2009	136,000	1,387
Total	598,621	-34,923			$163,149,805			81,379

B. No Action alternative (66% south, 33% north, 1/1; line at Pt. Piedras Blancas; Reallocate 50% south, 50% north 10/1), 2005-2009.

Area	No Action Projected Landings (mt) 2005-2009	Change in Landings (mt) from SQ	No Action Shortfall in Landings (mt) 2005-2009	Change in Shortfall from SQ	No Action Mo/Yr of Shortfalls	No Action Mo/Yr with No Allocation	No Action NPV Producer Surplus	Change in NPV of PS from SQ	Year	No Action HG	Surplus HG	Change in Surplus HG from SQ
Southern CA	223,563	0	0	0			$53,013,728	$0	2005	136,000	38,268	6,041
Northern CA	100,162	-8,598	-8,598	8,598	9/05,8/06,9/06,8/07,9/07,8/08,9/08,8/09,9/09	9/06,9/07,9/08,9/09	$22,731,070	-$1,951,205	2006	136,000	33,028	8,843
OR/WA	228,426	-43,459	-78,381	43,459	9/05,8/06,9/06,8/07,9/07,8/08,9/08,8/09,9/09	9/06,9/07,9/08,9/09	$71,508,134	-$13,945,668	2007	136,000	27,264	11,541
Southern SA[1]	223,563	0	0	0			$53,013,728	$0	2008	136,000	20,924	13,069
Northern SA[2]	328,588	-52,057	-86,979	52,057	9/05,8/06,9/06,8/07,9/07,8/08,9/08,8/09,9/09	9/06,9/07,9/08,9/09	$94,239,204	-$15,896,873	2009	136,000	13,950	12,563
Total	552,150	-52,057	-86,979	52,057			$147,252,932	-$15,896,873			133,435	52,057

[1]Under the no action alternative the Southern Subarea consists of Southern California.
[2]Under the no action alternative the Northern Subarea consists of Northern California, Oregon and Washington.

C. Alternative 1 (50% Coastwide 1/1; 50% + Rollover 7/1), 2005-2009.

Area	Alternative 1 Projected Landings (mt) 2005-2009	Change in Landings (mt) from SQ	Alternative 1 Shortfall in Landings (mt) 2005-2009	Change in Shortfall from SQ	Alternative 1 Mo/Yr of Shortfalls	Alternative 1 Mo/Yr with No Allocation	Alternative 1 NPV Producer Surplus	Change in NPV of PS from SQ	Year	Alternative 1 HG	Surplus HG	Change in Surplus HG from SQ
Southern CA	215,195	-8,367	-8,367	8,367	12/08,11/09,12/09	12/09	$51,029,565	-$1,984,163	2005	136,000	32,227	0
Northern CA	100,696	-8,064	-8,064	8,064	12/08,11/09,12/09	12/09	$22,852,251	-$1,830,024	2006	136,000	21,850	-2,335
OR/WA	299,597	33,298	-1,625	-33,298	12/08,11/09,12/09	12/09	$96,138,956	$10,685,155	2007	136,000	10,435	-5,289
Southern SA	315,891	-16,431	-16,431	16,431	12/08,11/09,12/09	12/09	$51,029,565	-$3,814,187	2008	136,000	0	-7,855
Northern SA	299,597	33,298	-1,625	-33,298	12/08,11/09,12/09	12/09	$118,991,207	$10,685,155	2009	136,000	0	-1,387
Total	615,488	16,867	-18,056	-16,867			$170,020,772	$6,870,967			64,512	-16,867

Table 4. Summary of projected landings and cost-benefit analysis results for long-term sardine harvest guidline allocation options, 2005-2009. (Page 2 of 3)
Base Case (HG = 136,000 mt)
D. Alternative 3 **Original** (**40% Coastwide 1/1; 40% + Rollover 7/1; 20% + Rollover 10/1**), 2005-2009.

Area	Alternative 3 Projected Landings (mt) 2005-2009	Change in Landings (mt) from SQ	Alternative 3 Shortfall in Landings (mt) 2005-2009	Change in Shortfall from SQ	Alternative 3 Mo/Yr of Shortfalls	Alternative 3 Mo/Yr with No Allocation	Alternative 3 NPV Producer Surplus	Change in NPV of PS from SQ	Year	Alternative 3 HG	Surplus HG	Change in Surplus HG from SQ
Southern CA	215,082	-8,481	-8,481	8,481	12/08,9/09,11-12/09	12/09	$51,002,644	-$2,011,084	2005	136,000	32,227	0
Northern CA	104,931	-3,828	-3,828	3,828	12/08,9/09,11-12/09	12/09	$23,813,486	-$868,790	2006	136,000	21,850	-2,335
OR/WA	295,475	29,176	-5,747	-29,176	12/08,9/09,11-12/09	12/09	$94,816,223	$9,362,421	2007	136,000	10,435	-5,289
Southern SA	320,013	-12,309	-12,309	12,309	12/08,9/09,11-12/09	12/09	$51,002,644	-$2,879,874	2008	136,000	0	-7,855
Northern SA	295,475	29,176	-5,747	-29,176	12/08,9/09,11-12/09	12/09	$118,629,708	$9,362,421	2009	136,000	0	-1,387
Total	615,488	16,867	-18,056	-16,867			$169,632,352	$6,482,547			64,512	-16,867

E. Alternative 3 (**35% Coastwide 1/1; 40% + Rollover 7/1; 25% + Rollover 9/1**), 2005-2009.

Area	Alternative 3 Projected Landings (mt) 2005-2009	Change in Landings (mt) from SQ	Alternative 3 Shortfall in Landings (mt) 2005-2009	Change in Shortfall from SQ	Alternative 3 Mo/Yr of Shortfalls	Alternative 3 Mo/Yr with No Allocation	Alternative 3 NPV Producer Surplus	Change in NPV of PS from SQ	Year	Alternative 3 HG	Surplus HG	Change in Surplus HG from SQ
Southern CA	210,634	-4,957	-4,957	4,957	11-12/09	12/09	$49,947,997	-$1,175,455	2005	136,000	34,534	0
Northern CA	96,555	-6,093	-6,093	6,093	11-12/09	12/09	$21,912,627	-$1,382,747	2006	136,000	24,387	-2,335
OR/WA	299,715	33,416	-1,507	-33,416	11-12/09	12/09	$96,176,732	$10,722,930	2007	136,000	13,226	-5,289
Southern SA	307,189	-11,050	-11,050	11,050	11-12/09	12/09	$49,947,997	-$2,558,202	2008	136,000	948	-9,977
Northern SA	299,715	33,416	-1,507	-33,416	11-12/09	12/09	$118,089,358	$10,722,930	2009	136,000	0	-4,765
Total	606,905	22,366	-12,557	-22,366			$168,037,356	$8,164,728			73,095	-22,366

F. Alternative 3 (**35% Coastwide 1/1; 40% + Rollover 7/1; 25% + Rollover 10/1**), 2005-2009.

Area	Alternative 3 Projected Landings (mt) 2005-2009	Change in Landings (mt) from SQ	Alternative 3 Shortfall in Landings (mt) 2005-2009	Change in Shortfall from SQ	Alternative 3 Mo/Yr of Shortfalls	Alternative 3 Mo/Yr with No Allocation	Alternative 3 NPV Producer Surplus	Change in NPV of PS from SQ	Year	Alternative 3 HG	Surplus HG	Change in Surplus HG from SQ
Southern CA	**210,692**	-4,899	-4,899	4,899	9/08,9/09		$49,961,656	-$1,161,796	2005	136,000	34,534	0
Northern CA	**101,665**	-983	-983	983	9/08,9/09		$23,072,208	-$223,166	2006	136,000	24,387	-2,335
OR/WA	**289,164**	22,865	-12,058	-22,865	9/08,9/09		$92,790,915	$7,337,113	2007	136,000	13,226	-5,289
Southern SA	**312,357**	-5,883	-5,883	5,883	9/08,9/09		$49,961,656	-$1,384,961	2008	136,000	4,635	-6,291
Northern SA	**289,164**	22,865	-12,058	-22,865	9/08,9/09		$115,863,123	$7,337,113	2009	136,000	1,698	-3,067
Total	**601,521**	16,982	-17,941	-16,982			$165,824,779	$5,952,151			78,479	-16,982

Table 4. Summary of projected landings and cost-benefit analysis results for long-term sardine harvest guidline allocation options, 2005-2009. (Page 3 of 3)
Base Case (HG = 136,000 mt)
G. Alternative 4.a (HG > 100,000 mt; 40% North, 60% South 1/1; Coastwide Rollover 9/1), 2005-2009.

Area	Alternative 4.a Projected Landings (mt) 2005-2009	Change in Landings (mt) from SQ	Alternative 4.a Shortfall in Landings (mt) 2005-2009	Change in Shortfall from SQ	Alternative 4.a Mo/Yr of Shortfalls	Alternative 4.a Mo/Yr with No Allocation	Alternative 4.a NPV Producer Surplus	Change in NPV of PS from SQ	Year	Alternative 4.a HG	Surplus HG	Change in Surplus HG from SQ
Southern CA	215,195	-8,367	-8,367	8,367	12/08;11-12/09	12	$51,029,565	-$1,984,163	2005	136,000	32,227	0
Northern CA	100,696	-8,064	-8,064	8,064	12/08;11-12/10	12	$22,852,251	-$1,830,024	2006	136,000	21,850	-2,335
OR/WA	299,597	33,298	-1,625	-33,298	12/08;11-12/11	12	$96,138,956	$10,685,155	2007	136,000	10,435	-5,289
Southern SA	315,891	-16,431	-16,431	16,431	12/08;11-12/12	12	$51,029,565	-$3,814,187	2008	136,000	0	-7,855
Northern SA	299,597	33,298	-1,625	-33,298	12/08;11-12/13	12	$118,991,207	$10,685,155	2009	136,000	0	-1,387
Total	615,488	16,867	-18,056	-16,867			$170,020,772	$6,870,967			64,512	-16,867

H. Alternative 6 (50% North, 50% South 1/1; Coastwide Rollover 9/1; Variable N/S Allocation Based on Prior Year's Use), 2005-2009.

Area	Alternative 6 Projected Landings (mt) 2005-2009	Change in Landings (mt) from SQ	Alternative 6 Shortfall in Landings (mt) 2005-2009	Change in Shortfall from SQ	Alternative 6 Mo/Yr of Shortfalls	Alternative 6 Mo/Yr with No Allocation	Alternative 6 NPV Producer Surplus	Change in NPV of PS from SQ	Year	Alternative 6 HG	Surplus HG	Change in Surplus HG from SQ
Southern CA	215,195	-8,367	-8,367	8,367	12/08,11-12/09	12/09	$51,029,565	-$1,984,163	2005	136,000	32,227	0
Northern CA	100,696	-8,064	-8,064	8,064	12/08,11-12/09	12/09	$22,852,251	-$1,830,024	2006	136,000	21,850	-2,335
OR/WA	299,597	33,298	-1,625	-33,298	12/08,11-12/09	12/09	$96,138,956	$10,685,155	2007	136,000	10,435	-5,289
Southern SA	315,891	-16,431	-16,431	16,431	12/08,11-12/09	12/09	$51,029,565	-$3,814,187	2008	136,000	0	-7,855
Northern SA	299,597	33,298	-1,625	-33,298	12/08,11-12/09	12/09	$118,991,207	$10,685,155	2009	136,000	0	-1,387
Total	615,488	16,867	-18,056	-16,867			$170,020,772	$6,870,967			64,512	-16,867

I. Alternative 7 (33% North, 66% South 1/1; 50% North, 50% South of Remaining 9/1, Coastwide Rollover 11/1), 2005-2009.

Area	Alternative 7 Projected Landings (mt) 2005-2009	Change in Landings (mt) from SQ	Alternative 7 Shortfall in Landings (mt) 2005-2009	Change in Shortfall from SQ	Alternative 7 Mo/Yr of Shortfalls	Alternative 7 Mo/Yr with No Allocation	Alternative 7 NPV Producer Surplus	Change in NPV of PS from SQ	Year	Alternative 7 HG	Surplus HG	Change in Surplus HG from SQ
Southern CA	218,490	-5,073	-5,073	5,073	11-12/09	12/09	$51,810,871	-$1,202,857	2005	136,000	32,227	0
Northern CA	105,540	-3,219	-3,219	3,219	11-12/09	12/09	$23,951,737	-$730,539	2006	136,000	21,850	-2,335
OR/WA	291,327	25,028	-9,895	-25,028	8/08,8/09,11-12/09	12/09	$93,485,119	$8,031,317	2007	136,000	10,435	-5,289
Southern SA	324,030	-8,292	-8,292	8,292	11-12/09	12/09	$51,810,871	-$1,933,396	2008	136,000	131	-7,725
Northern SA	291,327	25,028	-9,895	-25,028	8/08,8/09,11-12/09	12/09	$117,436,856	$8,031,317	2009	136,000	0	-1,387
Total	615,358	16,736	-18,186	-16,736			$169,247,727	$6,097,921			64,642	-16,736

Table 5. Summary of landings projections and cost-benefit analysis results for long-term sardine harvest guidline allocation options, 2005-2009. (Page 1 of 3)
High Harvest Guideline Case, HG = 200,000 mt
A. Status Quo Summary, 2005-2009.

Area	Status Quo Projected Landings 2005-2009	Status Quo Shortfall in Landings 2005-2009	Status Quo Mo/Yr of Shortfalls	Status Quo Mo/Yr with No Allocation	Status Quo NPV Producer Surplus	Year	No Action HG	Surplus HG
Southern CA	215,591	0			$51,123,452	2005	200,000	98,534
Northern CA	102,648	0			$23,295,374	2006	200,000	88,387
OR/WA	301,222	0			$96,660,250	2007	200,000	77,226
Southern SA1	318,239	0			$51,123,452	2008	200,000	64,948
Northern SA2	301,222	0			$119,955,624	2009	200,000	51,443
Total	619,461	0			$171,079,076			380,539

B. No Action alternative (66% south, 33% north, 1/1; line at Pt. Piedras Blancas; Reallocate 50% south, 50% north 10/1), 2005-2009.

Area	No Action Projected Landings 2005-2009	Change in Landings from SQ	No Action Shortfall in Landings 2005-2009	Change in Shortfall from SQ	No Action Mo/Yr of Shortfalls	No Action Mo/Yr with No Allocation	No Action NPV Producer Surplus	Change in NPV of PS from SQ	Year	No Action HG	Surplus HG	Change in Surplus HG from SQ
Southern CA	223,563	0	0	0			$53,013,728	$0	2005	200,000	96,227	0
Northern CA	107,985	-774	-774	774	9/08;9/09		$24,506,649	-$175,626	2006	200,000	85,850	0
OR/WA	291,733	-9,489	-9,489	9,489	9/08;9/09		$93,615,169	-$3,045,082	2007	200,000	74,435	0
Southern SA1	223,563	0	0	0			$53,013,728	$0	2008	200,000	63,591	1,713
Northern SA2	399,718	-10,263	-10,263	10,263	9/08;9/09		$118,121,818	-$3,220,708	2009	200,000	56,617	8,551
Total	623,281	-10,263	-10,263	10,263			$171,135,546	-$3,220,708			376,719	10,263

[1]Under the no action alternative the Southern Subarea consists of Southern California.

[2]Under the no action alternative the Northern Subarea consists of Northern California, Oregon and Washington.

C. Alternative 1 (50% Coastwide 1/1; 50% + Rollover 7/1), 2005-2009.

Area	Alternative 1 Projected Landings 2005-2009	Change in Landings from SQ	Alternative 1 Shortfall in Landings 2005-2009	Change in Shortfall from SQ	Alternative 1 Mo/Yr of Shortfalls	Alternative 1 Mo/Yr with No Allocation	Alternative 1 NPV Producer Surplus	Change in NPV of PS from SQ	Year	Alternative 1 HG	Surplus HG	Change in Surplus HG from SQ
Southern CA	215,591	0	0	0			$51,123,452	$0	2005	200,000	98,534	0
Northern CA	102,648	0	0	0			$23,295,374	$0	2006	200,000	88,387	0
OR/WA	301,222	0	0	0			$96,660,250	$0	2007	200,000	77,226	0
Southern SA	318,239	0	0	0			$51,123,452	$0	2008	200,000	64,948	0
Northern SA	301,222	0	0	0			$119,955,624	$0	2009	200,000	51,443	0
Total	619,461	0	0	0			$171,079,076	$0			380,539	0

Table 5. Summary of landings projections and cost-benefit analysis results for long-term sardine harvest guidline allocation options, 2005-2009. (Page 2 of 3)
High Harvest Guideline Case, HG = 200,000 mt

D. Alternative 3 **Original** (**40% Coastwide 1/1; 40% + Rollover 7/1; 20% + Rollover 10/1**), 2005-2009.

Area	Alternative 3 Projected Landings 2005-2009	Change in Landings from SQ	Alternative 3 Shortfall in Landings 2005-2009	Change in Shortfall from SQ	Alternative 3 Mo/Yr of Shortfalls	Alternative 3 Mo/Yr with No Allocation	Alternative 3 NPV Producer Surplus	Change in NPV of PS from SQ	Year	Alternative 3 HG	Surplus HG	Change in Surplus HG from SQ
Southern CA	215,591	0	0	0			$51,123,452	$0	2005	200,000	98,534	0
Northern CA	102,648	0	0	0			$23,295,374	$0	2006	200,000	88,387	0
OR/WA	301,222	0	0	0			$96,660,250	$0	2007	200,000	77,226	0
Southern SA	318,239	0	0	0			$51,123,452	$0	2008	200,000	64,948	0
Northern SA	301,222	0	0	0			$119,955,624	$0	2009	200,000	51,443	0
Total	619,461	0	0	0			$171,079,076	$0			380,539	0

E. Alternative 3 (**35% Coastwide 1/1; 40% + Rollover 7/1; 25% + Rollover 9/1**), 2005-2009.

Area	Alternative 3 Projected Landings (mt) 2005-2009	Change in Landings (mt) from SQ	Alternative 3 Shortfall in Landings (mt) 2005-2009	Change in Shortfall from SQ	Alternative 3 Mo/Yr of Shortfalls	Alternative 3 Mo/Yr with No Allocation	Alternative 3 NPV Producer Surplus	Change in NPV of PS from SQ	Year	Alternative 3 HG	Surplus HG	Change in Surplus HG from SQ
Southern CA	215,591	0	0	0			$51,123,452	$0	2005	200,000	98,534	0
Northern CA	102,648	0	0	0			$23,295,374	$0	2006	200,000	88,387	0
OR/WA	301,222	0	0	0			$96,660,250	$0	2007	200,000	77,226	0
Southern SA	318,239	0	0	0			$51,123,452	$0	2008	200,000	64,948	0
Northern SA	301,222	0	0	0			$119,955,624	$0	2009	200,000	51,443	0
Total	619,461	0	0	0			$171,079,076	$0			380,539	0

F. Alternative 3 (**35% Coastwide 1/1; 40% + Rollover 7/1; 25% + Rollover 10/1**), 2005-2009.

Area	Alternative 3 Projected Landings (mt) 2005-2009	Change in Landings (mt) from SQ	Alternative 3 Shortfall in Landings (mt) 2005-2009	Change in Shortfall from SQ	Alternative 3 Mo/Yr of Shortfalls	Alternative 3 Mo/Yr with No Allocation	Alternative 3 NPV Producer Surplus	Change in NPV of PS from SQ	Year	Alternative 3 HG	Surplus HG	Change in Surplus HG from SQ
Southern CA	215,591	0	0	0			$51,123,452	$0	2005	200,000	98,534	0
Northern CA	102,648	0	0	0			$23,295,374	$0	2006	200,000	88,387	0
OR/WA	301,222	0	0	0			$96,660,250	$0	2007	200,000	77,226	0
Southern SA	318,239	0	0	0			$51,123,452	$0	2008	200,000	64,948	0
Northern SA	301,222	0	0	0			$119,955,624	$0	2009	200,000	51,443	0
Total	619,461	0	0	0			$171,079,076	$0			380,539	0

Table 5. Summary of landings projections and cost-benefit analysis results for long-term sardine harvest guidline allocation options, 2005-2009. (Page 3 of 3)
High Harvest Guideline Case, HG = 200,000 mt

G. Alternative 4.a (HG > 100,000 mt; 40% North, 60% South 1/1; Coastwide Rollover 9/1), 2005-2009.

Area	Alternative 4.a Projected Landings 2005-2009	Change in Landings from SQ	Alternative 4.a Shortfall in Landings 2005-2009	Change in Shortfall from SQ	Alternative 4.a Mo/Yr of Shortfalls	Alternative 4.a Mo/Yr with No Allocation	Alternative 4.a NPV Producer Surplus	Change in NPV of PS from SQ	Year	Alternative 4.a HG	Surplus HG	Change in Surplus HG from SQ
Southern CA	215,591	0	0	0			$51,123,452	$0	2005	200,000	98,534	0
Northern CA	102,648	0	0	0			$23,295,374	$0	2006	200,000	88,387	0
OR/WA	301,222	0	0	0			$96,660,250	$0	2007	200,000	77,226	0
Southern SA	318,239	0	0	0			$51,123,452	$0	2008	200,000	64,948	0
Northern SA	301,222	0	0	0			$119,955,624	$0	2009	200,000	51,443	0
Total	619,461	0	0	0			$171,079,076	$0			380,539	0

H. Alternative 6 (50% North, 50% South 1/1; Coastwide Rollover 9/1; Variable N/S Allocation Based on Prior Year's Use), 2005-2009.

Area	Alternative 6 Projected Landings 2005-2009	Change in Landings from SQ	Alternative 6 Shortfall in Landings 2005-2009	Change in Shortfall from SQ	Alternative 6 Mo/Yr of Shortfalls	Alternative 6 Mo/Yr with No Allocation	Alternative 6 NPV Producer Surplus	Change in NPV of PS from SQ	Year	Alternative 6 HG	Surplus HG	Change in Surplus HG from SQ
Southern CA	215,591	0	0	0			$51,123,452	$0	2005	200,000	98,534	0
Northern CA	102,648	0	0	0			$23,295,374	$0	2006	200,000	88,387	0
OR/WA	301,222	0	0	0			$96,660,250	$0	2007	200,000	77,226	0
Southern SA	318,239	0	0	0			$51,123,452	$0	2008	200,000	64,948	0
Northern SA	301,222	0	0	0			$119,955,624	$0	2009	200,000	51,443	0
Total	619,461	0	0	0			$171,079,076	$0			380,539	0

I. Alternative 7 (33% North, 66% South 1/1; 50% North, 50% South of Remaining 9/1, Coastwide Rollover 11/1), 2005-2009.

Area	Alternative 7 Projected Landings 2005-2009	Change in Landings from SQ	Alternative 7 Shortfall in Landings 2005-2009	Change in Shortfall from SQ	Alternative 7 Mo/Yr of Shortfalls	Alternative 7 Mo/Yr with No Allocation	Alternative 7 NPV Producer Surplus	Change in NPV of PS from SQ	Year	Alternative 6 HG	Surplus HG	Change in Surplus HG from SQ
Southern CA	215,591	0	0	0			$51,123,452	$0	2005	200,000	98,534	0
Northern CA	102,648	0	0	0			$23,295,374	$0	2006	200,000	88,387	0
OR/WA	301,222	0	0	0			$96,660,250	$0	2007	200,000	77,226	0
Southern SA	318,239	0	0	0			$51,123,452	$0	2008	200,000	64,948	0
Northern SA	301,222	0	0	0			$119,955,624	$0	2009	200,000	51,443	0
Total	619,461	0	0	0			$171,079,076	$0			380,539	0

Table 6. Summary of landings projections and cost-benefit analysis results for long-term sardine harvest guidline allocation options, 2005-2009. (Page 1 of 3)
Low Harvest Guideline Case, HG = 72,000 mt
A. Status Quo Summary, 2005-2009.

Area	Projected Landings 2005-2009	Shortfall in Landings 2005-2009	Status Quo Mo/Yr of Shortfalls	Status Quo Mo/Yr with No Allocation	Status Quo NPV Producer Surplus	Year	Status Quo HG	Surplus HG
Southern CA	173,047	-50,516	11-12/05;10-12/06;10-12/07;10-12/08;10-12/09	12/05;11-12/06;11-12/07;11-12/08;10-12/09	41,034,907	2005	72,000	0
Northern CA	56,030	-52,730	11-12/05;10-12/06;10-12/07;10-12/08;10-12/09	12/05;11-12/06;11-12/07;11-12/08;10-12/09	12,715,621	2006	72,000	0
OR/WA	130,923	-170,299	8-12/05;8-12/05;8-12/06;8-12/07;8 12/08;8-12/09	10-12/05;10-12/06;10-12/07;10-12/08;8,10-12/09	42,012,411	2007	72,000	0
Southern SA	229,077	-103,245		12/05;11-12/06;11-12/07;11-12/08;10-12/09	53,750,528	2008	72,000	0
Northern SA	130,923	-170,299		10-12/05;10-12/06;10-12/07;10-12/08;8,10-12/09	42,012,411	2009	72,000	0
Total	360,000	-273,544			95,762,939			0

B. No Action alternative (66% south, 33% north, 1/1; line at Pt. Piedras Blancas; Reallocate 50% south, 50% north 10/1), 2005-2009.

Area	Projected Landings 2005-2009	Change in Landings from SQ	Shortfall in Landings 2005-2009	Change in Shortfall from SQ	Mo/Yr of Shortfalls	Mo/Yr with No Allocation	NPV Producer Surplus	Change in NPV of PS from SQ	Year	HG	Surplus HG	Change in Surplus HG from SQ
Southern CA	204,165	31,118	-19,398	-31,118	12/06;12/07;11,12/08;10-12/09	12/08;11,12/09	$48,413,858	$7,378,952	2005	72,000	1,396	1,396
Northern CA	39,700	-16,330	-69,059	16,330	8,9,11,12/05;8-12/06;7-12/07;7-12/08;7-12/09	9,12/05;9,11,12/06;8,9,11,12/07;8,9,11,12/08;8,9,11,12/09	$9,009,708	-$3,705,913	2006	72,000	0	0
OR/WA	139,842	-16,183	-186,482	16,183	8,9,11,12/05;8-12/06;7-12/07;7-12/08;7-12/09	9,12/05;9,11,12/06;8,9,11,12/07;8,9,11,12/08;8,9,11,12/09	$36,819,234	-$5,193,177	2007	72,000	0	0
Southern SA1	204,165	31,118	-19,398	-31,118	12/06;12/07;11,12/08;10-12/09	12/08;11,12/09	$48,413,858	$7,378,952	2008	72,000	0	0
Northern SA2	179,542	-32,513	-255,542	32,513	8,9,11,12/05;8-12/06;7-12/07;7-12/08;7-12/09	9,12/05;9,11,12/06;8,9,11,12/07;8,9,11,12/08;8,9,11,12/09	$45,828,942	-$8,899,090	2009	72,000	0	0
Total	383,707	-1,396	-274,939	1,396			$94,242,800	-$1,520,139			1,396	1,396

[1]Under the no action alternative the Southern Subarea consists of Southern California.
[2]Under the no action alternative the Northern Subarea consists of Northern California, Oregon and Washington.

C. Alternative 1 (50% Coastwide 1/1; 50% + Rollover 7/1), 2005-2009.

Area	Projected Landings 2005-2009	Change in Landings from SQ	Shortfall in Landings 2005-2009	Change in Shortfall from SQ	Mo/Yr of Shortfalls	Mo/Yr with No Allocation	NPV Producer Surplus	Change in NPV of PS from SQ	Year	HG	Surplus HG	Change in Surplus HG from SQ
Southern CA	141,434	-31,613	-82,129	31,613	9-12/05;8-12/06;8-12/07;8-12/08;8-12/09	11-12/05;11-12/06;11-12/07;10-12/08;10-12/09	$33,538,474	-$7,496,433	2005	72,000	0	0
Northern CA	31,746	-24,284	-77,013	24,284	9-12/05;8-12/06;8-12/07;8-12/08;8-12/09	11-12/05;11-12/06;11-12/07;10-12/08;10-12/09	$7,204,558	-$5,511,063	2006	72,000	0	0
OR/WA	196,565	55,897	-114,402	-55,897	9-12/05;8-12/06;8-12/07;8-12/08;8-12/09	11-12/05;11-12/06;11-12/07;10-12/08;10-12/09	$59,949,341	$17,936,930	2007	72,000	0	0
Southern SA	173,180	-55,897	-159,142	55,897	9-12/05;8-12/06;8-12/07;8-12/08;8-12/09	11-12/05;11-12/06;11-12/07;10-12/08;10-12/09	$33,538,474	-$13,007,496	2008	72,000	0	0
Northern SA	196,565	55,897	-114,402	-55,897	9-12/05;8-12/06;8-12/07;8-12/08;8-12/09	11-12/05;11-12/06;11-12/07;10-12/08;10-12/09	$67,153,900	$17,936,930	2009	72,000	0	0
Total	369,746	0	-273,544	0			$100,692,374	$4,929,434			0	0

Table 6. Summary of landings projections and cost-benefit analysis results for long-term sardine harvest guidline allocation options, 2005-2009. (Page 2 of 3)
Low Harvest Guideline Case, HG = 72,000 mt
D. Alternative 3 **Original** (**40% Coastwide 1/1; 40% + Rollover 7/1; 20% + Rollover 10/1**), 2005-2009.

Area	Projected Landings 2005-2009	Change in Landings from SQ	Shortfall in Landings 2005-2009	Change in Shortfall from SQ	Mo/Yr of Shortfalls	Mo/Yr with No Allocation	NPV Producer Surplus	Change in NPV of PS from SQ	Year	HG	Surplus HG	Change in Surplus HG from SQ
Southern CA	147,854	-24,016	-67,737	24,016	8-9,11-12/05;8-12/06;8-12/07;6,8-12/08;6,8-12/09	9,12-05;9,11-12/06;9,11-12/07;9,11-12/08;9,11-12/09	$35,060,835	-$5,695,055	2005	72,000	0	0
Northern CA	55,212	-1,993	-47,436	1,993	8-9,11-12/05;8-12/06;8-12/07;8-12/08;8-12/09	9,12-05;9,11-12/06;9,11-12/07;9,11-12/08;9,11-12/10	$12,530,141	-$452,408	2006	72,000	0	0
OR/WA	172,752	26,010	-144,288	-26,010	8-9,11-12/05;8-12/06;8-12/07;6,8-12/08;6,8-12/09	9,12-05;9,11-12/06;9,11-12/07;9,11-12/08;9,11-12/11	$50,358,980	$8,346,569	2007	72,000	0	0
Southern SA	203,067	-26,010	-115,173	26,010	8-9,11-12/05;8-12/06;8-12/07;6,8-12/08;6,8-12/09	9,12-05;9,11-12/06;9,11-12/07;9,11-12/08;9,11-12/12	$35,060,835	-$6,147,463	2008	72,000	0	0
Northern SA	172,752	26,010	-144,288	-26,010	8-9,11-12/05;8-12/06;8-12/07;6,8-12/08;6,8-12/09	9,12-05;9,11-12/06;9,11-12/07;9,11-12/08;9,11-12/13	$62,889,121	$8,346,569	2009	72,000	0	0
Total	375,819	0	-259,461	0			$97,949,956	$2,199,106			0	0

E. Alternative 3 (**35% Coastwide 1/1; 40% + Rollover 7/1; 25% + Rollover 9/1**), 2005-2009.

Area	Projected Landings 2005-2009	Change in Landings from SQ	Shortfall in Landings 2005-2009	Change in Shortfall from SQ	Mo/Yr of Shortfalls	Mo/Yr with No Allocation	NPV Producer Surplus	Change in NPV of PS from SQ	Year	HG	Surplus HG	Change in Surplus HG from SQ
Southern CA	146,503	-25,368	-69,089	25,368	8,10-12/05;8,10-12/06;6,8,10-12/07;6,8-12/08;6,8-12/09	11-12/05;11-12/06;11-12/07;10-12/08;10-12/09	$34,740,367	-$6,015,523	2005	72,000	0	0
Northern CA	31,250	-25,956	-71,398	25,956	8,10-12/05;8,10-12/06;6,8,10-12/07;6,8-12/08;6,8-12/09	11-12/05;11-12/06;11-12/07;10-12/08;10-12/09	$7,091,939	-$5,890,610	2006	72,000	0	0
OR/WA	194,053	51,325	-118,974	-51,325	8,10-12/05;8,10-12/06;6,8,10-12/07;6,8-12/08;6,8-12/09	11-12/05;11-12/06;11-12/07;10-12/08;10-12/09	$58,482,142	$16,469,731	2007	72,000	0	0
Southern SA	177,752	-51,324	-140,487	51,324	8,10-12/05;8,10-12/06;6,8,10-12/07;6,8-12/08;6,8-12/09	11-12/05;11-12/06;11-12/07;10-12/08;10-12/09	$34,740,367	-$11,906,133	2008	72,000	0	0
Northern SA	194,053	51,325	-118,974	-51,325	8,10-12/05;8,10-12/06;6,8,10-12/07;6,8-12/08;6,8-12/09	11-12/05;11-12/06;11-12/07;10-12/08;10-12/09	$65,574,082	$16,469,731	2009	72,000	0	0
Total	371,805	0	-259,461	0			$100,314,448	$4,563,598			0	0

F. Alternative 3 (**35% Coastwide 1/1; 40% + Rollover 7/1; 25% + Rollover 10/1**), 2005-2009.

Area	Projected Landings 2005-2009	Change in Landings from SQ	Shortfall in Landings 2005-2009	Change in Shortfall from SQ	Mo/Yr of Shortfalls	Mo/Yr with No Allocation	NPV Producer Surplus	Change in NPV of PS from SQ	Year	HG	Surplus HG	Change in Surplus HG from SQ
Southern CA	147,513	-24,357	-68,078	24,357	8-9,11-12/05;8-9,11-12/06;6,8-9,11-12/07;6,8-9,11-12/08;6,8-12/09	9,12/05;9,12/06;9,12/07;9,12/08;9,11-12/09	$34,979,966	-$5,775,924	2005	72,000	0	0
Northern CA	63,705	6,499	-38,943	-6,499	8-9,11-12/05;8-9,11-12/06;6,8-9,11-12/07;6,8-9,11-12/08;6,8-12/09	9,12/05;9,12/06;9,12/07;9,12/08;9,11-12/09	$14,457,522	$1,474,972	2006	72,000	0	0
OR/WA	166,699	17,859	-152,440	-17,859	8-9,11-12/05;8-9,11-12/06;6,8-9,11-12/07;6,8-9,11-12/08;6,8-12/09	9,12/05;9,12/06;9,12/07;9,12/08;9,11-12/09	$47,743,142	$5,730,730	2007	72,000	0	0
Southern SA	211,218	-17,858	-107,021	17,858	8-9,11-12/05;8-9,11-12/06;6,8-9,11-12/07;6,8-9,11-12/08;6,8-12/09	9,12/05;9,12/06;9,12/07;9,12/08;9,11-12/09	$34,979,966	-$4,300,951	2008	72,000	0	0
Northern SA	166,699	17,859	-152,440	-17,859	8-9,11-12/05;8-9,11-12/06;6,8-9,11-12/07;6,8-9,11-12/08;6,8-12/09	9,12/05;9,12/06;9,12/07;9,12/08;9,11-12/09	$62,200,663	$5,730,730	2009	72,000	0	0
Total	377,917	0	-259,461	0			$97,180,629	$1,429,779			0	0

Table 6. Summary of landings projections and cost-benefit analysis results for long-term sardine harvest guidline allocation options, 2005-2009. (Page 3 of 3)
Low Harvest Guideline Case, HG = 72,000 mt
G. Alternative 4.b (HG < 100,000 mt; 33% North, 66% South 1/1; 20% North, 80% South of Remaining 9/1, Coastwide Rollover 11/1), 2005-2009.

Area	Projected Landings 2005-2009	Change in Landings from SQ	Shortfall in Landings 2005-2009	Change in Shortfall from SQ	Mo/Yr of Shortfalls	Mo/Yr with No Allocation	NPV Producer Surplus	Change in NPV of PS from SQ	Year	HG	Surplus HG	Change in Surplus HG from SQ
Southern CA	176,564	3,517	-46,998	-3,517	11-12/05;10-12/06;10-12/07;10-12/08;9-12/09	12/05;11-12/06;11-12/07;11-12/08;10-12/09	$41,868,979	$834,072	2005	72,000	0	0
Northern CA	53,425	-2,605	-55,334	2,605	11-12/05;10-12/06;10-12/07;10-12/08;9-12/09	12/05;11-12/06;11-12/07;11-12/08;10-12/09	$12,124,491	-$591,130	2006	72,000	0	0
OR/WA	151,968	-913	-171,211	913	8-12/05;8-12/06;8-12/07;8-12/08;7-12/09	10,12/05;10-12/06;10-12/07;10-12/08;8,10-12/09	$41,719,564	-$292,848	2007	72,000	0	0
Southern SA	229,989	913	-102,332	-913	11-12/05;10-12/06;10-12/07;10-12/08;9-12/09	12/05;11-12/06;11-12/07;11-12/08;10-12/09	$41,868,979	$242,942	2008	72,000	0	0
Northern SA	151,968	-913	-171,211	913	8-12/05;8-12/06;8-12/07;8-12/08;7-12/09	10,12/05;10-12/06;10-12/07;10-12/08;8,10-12/09	$53,844,054	-$292,848	2009	72,000	0	0
Total	381,957	0	-273,544	0			$95,713,033	-$49,906			0	0

H. Alternative 6 (50% North, 50% South 1/1; Coastwide Rollover 9/1; Variable N/S Allocation Based on Prior Year's Use), 2005-2009.

Area	Projected Landings 2005-2009	Change in Landings from SQ	Shortfall in Landings 2005-2009	Change in Shortfall from SQ	Mo/Yr of Shortfalls	Mo/Yr with No Allocation	NPV Producer Surplus	Change in NPV of PS from SQ	Year	HG	Surplus HG	Change in Surplus HG from SQ
Southern CA	149,824	-23,223	-73,739	23,223	9-12/05;9-12/06;9-12/07;8-12/08;8-12/09	10-12/05;10-12/06;10-12/07;9-12/08;9-12/09	$35,528,007	-$5,506,900	2005	72,000	0	0
Northern CA	34,985	-21,045	-73,775	21,045	9-12/05;9-12/06;9-12/07;8-12/08;8-12/09	10-12/05;10-12/06;10-12/07;9-12/08;9-12/09	$7,939,593	-$4,776,029	2006	72,000	0	0
OR/WA	187,104	44,268	-126,031	-44,268	8-12/05;8-12/06;8-12/07;8-12/08;8-12/09	10-12/05;10-12/06;10-12/07;9-12/08;9-12/09	$56,217,721	$14,205,309	2007	72,000	0	0
Southern SA	184,809	-44,268	-147,513	44,268	9-12/05;9-12/06;9-12/07;8-12/08;8-12/09	10-12/05;10-12/06;10-12/07;9-12/08;9-12/09	$35,528,007	-$10,282,929	2008	72,000	0	0
Northern SA	187,104	44,268	-126,031	-44,268	8-12/05;8-12/06;8-12/07;8-12/08;8-12/09	10-12/05;10-12/06;10-12/07;9-12/08;9-12/09	$64,157,313	$14,205,309	2009	72,000	0	0
Total	371,913	0	-273,544	0			$99,685,320	$3,922,380			0	0

I. Alternative 7 (33% North, 66% South 1/1; 50% North, 50% South of Remaining 9/1, Coastwide Rollover 11/1), 2005-2009.

Area	Projected Landings 2005-2009	Change in Landings from SQ	Shortfall in Landings 2005-2009	Change in Shortfall from SQ	Mo/Yr of Shortfalls	Mo/Yr with No Allocation	NPV Producer Surplus	Change in NPV of PS from SQ	Year	HG	Surplus HG	Change in Surplus HG from SQ
Southern CA	168,504	-4,543	-55,059	4,543	10-12/05;10-12/06;10-12/07;9-12/08;9-12/09	11-12/05;11-12/06;11-12/07;10-12/08;10-12/09	$39,957,596	-$1,077,311	2005	72,000	0	0
Northern CA	44,788	-11,242	-63,971	11,242	10-12/05;10-12/06;10-12/07;9-12/08;9-12/09	11-12/05;11-12/06;11-12/07;10-12/08;10-12/09	$10,164,412	-$2,551,209	2006	72,000	0	0
OR/WA	163,350	15,785	-154,514	-15,785	8-12/05;8-12/06;8-12/07;8-12/08;7-12/09	10-12/05;10-12/06;10-12/07;10-12/08;8,10-12/09	$47,077,615	$5,065,204	2007	72,000	0	0
Southern SA	213,292	-15,785	-119,030	15,785	10-12/05;10-12/06;10-12/07;9-12/08;9-12/09	11-12/05;11-12/06;11-12/07;10-12/08;10-12/09	$39,957,596	-$3,628,520	2008	72,000	0	0
Northern SA	163,350	15,785	-154,514	-15,785	8-12/05;8-12/06;8-12/07;8-12/08;7-12/09	10-12/05;10-12/06;10-12/07;10-12/08;8,10-12/09	$57,242,027	$5,065,204	2009	72,000	0	0
Total	376,642	0	-273,544	0			$97,199,623	$1,436,684			0	0

Table 7. Quota shortages by year and month under different HG sceanarios, 2005-2009. (Page 1 of 3)
Low HG Case: HG = 72,000 mt
Alt: Status Quo

	Year	Months with Shortfall				Year	Months with 0 Allocation			
Area	**2005**	**2006**	**2007**	**2008**	**2009**	**2005**	**2006**	**2007**	**2008**	**2009**
SC	11-12	10-12	10-12	10-12	10-12	12	11-12	11-12	11-12	10-12
NC	11-12	10-12	10-12	10-12	10-12	12	11-12	11-12	11-12	10-12
OW	8-12	8-12	8-12	8-12	8-12	10-12	10-12	10-12	10-12	10-12

Alt: No Action

	Year	Months with Shortfall				Year	Months with 0 Allocation			
Area	**2005**	**2006**	**2007**	**2008**	**2009**	**2005**	**2006**	**2007**	**2008**	**2009**
SC		12	12	11-12	10-12				12	10-12
NC	8,9,11,12	8-12	7-12	7-12	7-12	9,12	9,11,12	8,9,11,12	8,9,11,12	8,9,11,12
OW	8,9,11,13	8-13	7-12	7-12	7-12	9,13	9,11,13	8,9,11,12	8,9,11,12	8,9,11,12

Alt: 1

	Year	Months with Shortfall				Year	Months with 0 Allocation			
Area	**2005**	**2006**	**2007**	**2008**	**2009**	**2005**	**2006**	**2007**	**2008**	**2009**
SC	9-12	8-12	8-12	8-12	8-12	10-12	9-12	9-12	9-12	9-12
NC	9-12	8-12	8-12	8-12	8-12	10-12	9-12	9-12	9-12	9-12
OW	9-12	8-12	8-12	8-12	8-12	10-12	9-12	9-12	9-12	9-12

Alt: 2

	Year	Months with Shortfall				Year	Months with 0 Allocation			
Area	**2005**	**2006**	**2007**	**2008**	**2009**	**2005**	**2006**	**2007**	**2008**	**2009**
SC	10-12	1-5, 10-12	1-5, 9-12	1-5,9-12	1-5,9-12	11-12	1-5,11-12	1-5, 10-12	1-5, 10-12	1-5, 10-12
NC	10-12	1-3, 10-12	1-3, 9-12	1-3, 9-12	1-3, 9-12	11-12	1-5, 11-12	1-5, 10-12	1-5, 10-12	1-5, 10-12
OW	10-12	10-12	9-12	9-12	9-12	11-12	1-5, 11-12	1-5, 10-12	1-5, 10-12	1-5, 10-12

Alt: 3

	Year	Months with Shortfall				Year	Months with 0 Allocation			
Area	**2005**	**2006**	**2007**	**2008**	**2009**	**2005**	**2006**	**2007**	**2008**	**2009**
SC	8,9,11,12	8-12	8-12	6,8-12	6, 8-12	9,12	9,11,12	9,11,12	9,11,12	9,11,12
NC	8,9,11,12	8-12	8-12	8-12	8-12	9,12	9,11,12	9,11,12	9,11,12	9,11,12
OW	8,9,11,12	8-12	8-12	6, 8-12	6, 8-12	9,12	9,11,12	9,11,12	9,11,12	9,11,12

Alt: 4.b

	Year	Months with Shortfall				Year	Months with 0 Allocation			
Area	**2005**	**2006**	**2007**	**2008**	**2009**	**2005**	**2006**	**2007**	**2008**	**2009**
SC	11-12	10-12	10-12	10-12	9-12	12	11-12	11-12	11-12	10-12
NC	11-12	10-12	10-12	10-12	9-12	12	11-12	11-12	11-12	10-12
OW	8-12	8-12	8-12	8-12	7-12	10,12	10-12	10-12	10-12	8, 10-12

Alt: 5

	Year	Months with Shortfall				Year	Months with 0 Allocation			
Area	**2005**	**2006**	**2007**	**2008**	**2009**	**2005**	**2006**	**2007**	**2008**	**2009**
SC	9-12	9-12	8-12	8-12	8-12	11-12	11-12	11-12	11-12	11-12
NC	9-12	9-12	8-12	8-12	8-12	11-12	11-12	11-12	11-12	11-12
OW	8-12	8-12	8-12	8-12	7-12	11-12	11-12	11-12	11-12	11-12

Alt: 6

	Year	Months with Shortfall				Year	Months with 0 Allocation			
Area	**2005**	**2006**	**2007**	**2008**	**2009**	**2005**	**2006**	**2007**	**2008**	**2009**
SC	9-12	9-12	9-12	8-12	8-12	10-12	10-12	10-12	9-12	9-12
NC	9-12	9-12	9-12	8-12	8-12	10-12	10-12	10-12	9-12	9-12
OW	8-12	8-12	8-12	8-12	8-12	10-12	10-12	10-12	9-12	9-12

Alt: 7

	Year	Months with Shortfall				Year	Months with 0 Allocation			
Area	**2005**	**2006**	**2007**	**2008**	**2009**	**2005**	**2006**	**2007**	**2008**	**2009**
SC	10-12	10-12	10-12	9-12	9-12	11-12	11-12	11-12	10-12	10-12
NC	10-12	10-12	10-12	9-12	9-12	11-12	11-12	11-12	10-12	10-12
OW	8-12	8-12	8-12	8-12	7-12	10-12	10-12	10-12	10-12	8, 10-12

Table 7. Quota shortages by year and month under different HG sceanarios, 2005-2009. (Page 2 of 3)
Base Case: HG = 136,000 mt

Alt: Status Quo

	Year	Months with Shortfall				Year	Months with 0 Allocation			
Area	**2005**	**2006**	**2007**	**2008**	**2009**	**2005**	**2006**	**2007**	**2008**	**2009**
SC										
NC										
OW		10-11	10-11	8-11	8-11		11	11	10-11	10-11

Alt: No Action

	Year	Months with Shortfall				Year	Months with 0 Allocation			
Area	**2005**	**2006**	**2007**	**2008**	**2009**	**2005**	**2006**	**2007**	**2008**	**2009**
SC										
NC	8	8-9	8-9	8-9	8-9		9	9	9	9
OW	8	8-9	8-9	8-9	8-9		9	9	9	9

Alt: 1

	Year	Months with Shortfall				Year	Months with 0 Allocation			
Area	**2005**	**2006**	**2007**	**2008**	**2009**	**2005**	**2006**	**2007**	**2008**	**2009**
SC				12	11-12					12
NC				12	11-12					12
OW				12	11-12					12

Alt: 2

	Year	Months with Shortfall				Year	Months with 0 Allocation			
Area	**2005**	**2006**	**2007**	**2008**	**2009**	**2005**	**2006**	**2007**	**2008**	**2009**
SC				4-5	1-5				5	2-5
NC				4-5	1-5				5	2-5
OW									5	2-5

Alt: 3

	Year	Months with Shortfall				Year	Months with 0 Allocation			
Area	**2005**	**2006**	**2007**	**2008**	**2009**	**2005**	**2006**	**2007**	**2008**	**2009**
SC				12	9, 11-12					12
NC				12	9, 11-12					12
OW				12	9, 11-12					12

Alt: 4.a

	Year	Months with Shortfall				Year	Months with 0 Allocation			
Area	**2005**	**2006**	**2007**	**2008**	**2009**	**2005**	**2006**	**2007**	**2008**	**2009**
SC				12	11-12					12
NC				12	11-12					12
OW				12	11-12					12

Alt: 5

	Year	Months with Shortfall				Year	Months with 0 Allocation			
Area	**2005**	**2006**	**2007**	**2008**	**2009**	**2005**	**2006**	**2007**	**2008**	**2009**
SC										
NC										
OW	9	9	9	8-9	8-9					

Alt: 6

	Year	Months with Shortfall				Year	Months with 0 Allocation			
Area	**2005**	**2006**	**2007**	**2008**	**2009**	**2005**	**2006**	**2007**	**2008**	**2009**
SC				12	11-12					12
NC				12	11-12					12
OW				12	11-12					12

Alt: 7

	Year	Months with Shortfall				Year	Months with 0 Allocation			
Area	**2005**	**2006**	**2007**	**2008**	**2009**	**2005**	**2006**	**2007**	**2008**	**2009**
SC					11-12					12
NC					11-12					12
OW				8	8, 11-12					12

Table 7. Quota shortages by year and month under different HG sceanarios, 2005-2009. (Page 3 of 3)
High HG Case: HG = 200,000 mt

Alt: Status Quo

	Year	Months with Shortfall				Year	Months with 0 Allocation			
Area	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
SC										
NC										
OW										

Alt: No Action

	Year	Months with Shortfall				Year	Months with 0 Allocation			
Area	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
SC										
NC				9	9					
OW				9	9					

Alt: 1

	Year	Months with Shortfall				Year	Months with 0 Allocation			
Area	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
SC										
NC										
OW										

Alt: 2

	Year	Months with Shortfall				Year	Months with 0 Allocation			
Area	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
SC										
NC										
OW										

Alt: 3

	Year	Months with Shortfall				Year	Months with 0 Allocation			
Area	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
SC										
NC										
OW										

Alt: 4.a

	Year	Months with Shortfall				Year	Months with 0 Allocation			
Area	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
SC										
NC										
OW										

Alt: 5

	Year	Months with Shortfall				Year	Months with 0 Allocation			
Area	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
SC										
NC										
OW					9					

Alt: 6

	Year	Months with Shortfall				Year	Months with 0 Allocation			
Area	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
SC										
NC										
OW										

Alt: 7

	Year	Months with Shortfall				Year	Months with 0 Allocation			
Area	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
SC										
NC										
OW										

Table 8. Projected present values[1] (PV) of exvessel revenues[2], producer surplus[3] and regional personal income[4] by fishery sector and subarea
Alternative 3: 40% HG available coastwide Jan 1; 40% HG (plus any remainder) available coastwide Jul 1; 20% HG (plus any remainder) available Oct 1. (Page 1 of 3)

Area	Harvest Guideline	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)
PNW	72,000	0.0%	$20.7	$55.0	$163.2	0.0%	$18.9	$50.2	$149.1	0.0%	$17.1	$45.2	$134.8	0.0%	$15.5	$40.9	$122.5
NCA	72,000	0.0%	$4.1	$13.5	$39.1	5.0%	$4.2	$13.8	$39.9	10.0%	$4.3	$14.1	$40.9	15.0%	$4.5	$14.8	$42.6
SCA	72,000	0.0%	$10.8	$30.6	$105.5	5.0%	$12.0	$33.9	$116.7	10.0%	$13.1	$37.2	$127.8	15.0%	$14.0	$39.7	$136.2
Northern SA	**72,000**	**0.0%**	**$20.7**	**$55.0**	**$163.2**	**0.0%**	**$18.9**	**$50.2**	**$149.1**	**0.0%**	**$17.1**	**$45.2**	**$134.8**	**0.0%**	**$15.5**	**$40.9**	**$122.5**
Southern SA	**72,000**	**0.0%**	**$15.0**	**$44.1**	**$144.7**	**5.0%**	**$16.2**	**$47.7**	**$156.6**	**10.0%**	**$17.4**	**$51.3**	**$168.7**	**15.0%**	**$18.5**	**$54.4**	**$178.8**
Total			$35.6	$99.1	$307.8		$35.1	$97.8	$305.7		$34.5	$96.5	$303.4		$34.0	$95.4	$301.3

Area	Harvest Guideline	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)
PNW	72,000	5.0%	$21.7	$57.9	$171.5	5.0%	$19.9	$53.0	$157.2	5.0%	$18.1	$47.9	$142.5	5.0%	$16.5	$43.5	$129.9
NCA	72,000	0.0%	$3.8	$12.5	$36.4	5.0%	$3.9	$12.9	$37.3	10.0%	$4.1	$13.3	$38.5	15.0%	$4.3	$14.0	$40.5
SCA	72,000	0.0%	$10.4	$29.5	$101.8	5.0%	$11.6	$32.8	$112.9	10.0%	$12.7	$36.1	$124.1	15.0%	$13.6	$38.6	$132.5
Northern SA	**72,000**	**5.0%**	**$21.7**	**$57.9**	**$171.5**	**5.0%**	**$19.9**	**$53.0**	**$157.2**	**5.0%**	**$18.1**	**$47.9**	**$142.5**	**5.0%**	**$16.5**	**$43.5**	**$129.9**
Southern SA	**72,000**	**0.0%**	**$14.3**	**$42.0**	**$138.2**	**5.0%**	**$15.5**	**$45.6**	**$150.2**	**10.0%**	**$16.8**	**$49.4**	**$162.6**	**15.0%**	**$17.9**	**$52.6**	**$173.0**
Total			$36.0	$99.9	$309.7		$35.4	$98.6	$307.4		$34.9	$97.3	$305.1		$34.3	$96.1	$302.8

Area	Harvest Guideline	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)
PNW	72,000	10.0%	$22.7	$60.6	$179.2	10.0%	$20.9	$55.6	$164.7	10.0%	$19.0	$50.4	$149.7	10.0%	$17.3	$45.9	$136.9
NCA	72,000	0.0%	$3.6	$11.6	$33.7	5.0%	$3.7	$12.0	$34.9	10.0%	$3.8	$12.5	$36.4	15.0%	$4.1	$13.3	$38.4
SCA	72,000	0.0%	$10.1	$28.5	$98.4	5.0%	$11.2	$31.8	$109.5	10.0%	$12.4	$35.1	$120.5	15.0%	$13.2	$37.6	$129.1
Northern SA	**72,000**	**10.0%**	**$22.7**	**$60.6**	**$179.2**	**10.0%**	**$20.9**	**$55.6**	**$164.7**	**10.0%**	**$19.0**	**$50.4**	**$149.7**	**10.0%**	**$17.3**	**$45.9**	**$136.9**
Southern SA	**72,000**	**0.0%**	**$13.7**	**$40.1**	**$132.2**	**5.0%**	**$14.9**	**$43.8**	**$144.4**	**10.0%**	**$16.2**	**$47.6**	**$156.9**	**15.0%**	**$17.3**	**$50.8**	**$167.5**
Total			$36.4	$100.7	$311.4		$35.8	$99.3	$309.1		$35.2	$97.9	$306.6		$34.6	$96.8	$304.3

Area	Harvest Guideline	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)
PNW	72,000	15.0%	$23.6	$63.1	$186.3	15.0%	$21.7	$57.9	$171.5	15.0%	$19.8	$52.6	$156.3	15.0%	$18.1	$48.1	$143.1
NCA	72,000	0.0%	$3.3	$10.7	$31.3	5.0%	$3.5	$11.2	$32.7	10.0%	$3.6	$11.9	$34.4	15.0%	$3.9	$12.6	$36.5
SCA	72,000	0.0%	$9.8	$27.6	$95.4	5.0%	$10.9	$30.8	$106.3	10.0%	$12.0	$34.1	$117.3	15.0%	$12.9	$36.7	$126.0
Northern SA	**72,000**	**15.0%**	**$23.6**	**$63.1**	**$186.3**	**15.0%**	**$21.7**	**$57.9**	**$171.5**	**15.0%**	**$19.8**	**$52.6**	**$156.3**	**15.0%**	**$18.1**	**$48.1**	**$143.1**
Southern SA	**72,000**	**0.0%**	**$13.1**	**$38.3**	**$126.7**	**5.0%**	**$14.4**	**$42.1**	**$139.1**	**10.0%**	**$15.7**	**$45.9**	**$151.7**	**15.0%**	**$16.8**	**$49.3**	**$162.5**
Total			$36.7	$101.3	$313.0		$36.1	$100.0	$310.5		$35.5	$98.6	$308.0		$34.9	$97.4	$305.7

[1]Present values (PV) calculated for the 2005-2009 period using a 4.1% discount rate.

[2]Exvessel revenues projected using 2004 exvessel prices by fishery sector from PacFIN.

[3]Producer surplus projected using per unit values of: $237.13 per metric ton for SCA; $226.94 per metric ton for NCA; and, $320.89 per metric ton for PNW.

[4]Regional personal income projected using marginal total income multipliers of: $.418 per pound landed in SCA; $.336 per pound landed in NCA; and, $.486 per pound landed in PNW

Table 8. Projected present values[1] (PV) of exvessel revenues[2], producer surplus[3] and regional personal income[4] by fishery sector and subarea
Alternative 3: 40% HG available coastwide Jan 1; 40% HG (plus any remainder) available coastwide Jul 1; 20% HG (plus any remainder) available Oct 1. (Page 2 of 3)

Area	Harvest Guideline	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)
PNW	136,000	0.0%	$27.0	$72.0	$213.3	0.0%	$27.0	$72.0	$213.3	0.0%	$27.0	$72.0	$213.3	0.0%	$27.0	$71.9	$213.1
NCA	136,000	0.0%	$5.3	$17.3	$50.3	5.0%	$6.1	$20.1	$58.1	10.0%	$7.1	$23.3	$67.0	15.0%	$8.1	$26.8	$76.7
SCA	136,000	0.0%	$13.5	$38.1	$131.3	5.0%	$15.6	$44.2	$151.8	10.0%	$18.0	$51.1	$175.1	15.0%	$20.4	$58.2	$198.9
Northern SA	**136,000**	**0.0%**	**$27.0**	**$72.0**	**$213.3**	**0.0%**	**$27.0**	**$72.0**	**$213.3**	**0.0%**	**$27.0**	**$72.0**	**$213.3**	**0.0%**	**$27.0**	**$71.9**	**$213.1**
Southern SA	**136,000**	**0.0%**	**$18.8**	**$55.4**	**$181.6**	**5.0%**	**$21.7**	**$64.3**	**$209.9**	**10.0%**	**$25.0**	**$74.4**	**$242.0**	**15.0%**	**$28.5**	**$85.0**	**$275.6**
Total			$45.8	$127.4	$394.9		$48.7	$136.3	$423.2		$52.1	$146.4	$455.4		$55.5	$156.9	$488.7

Area	Harvest Guideline	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)
PNW	136,000	5.0%	$31.2	$83.5	$246.6	5.0%	$31.2	$83.5	$246.6	5.0%	$31.2	$83.5	$246.6	5.0%	$30.7	$82.0	$242.5
NCA	136,000	0.0%	$5.3	$17.3	$50.3	5.0%	$6.1	$20.1	$58.1	10.0%	$7.1	$23.3	$67.0	15.0%	$7.8	$25.8	$74.2
SCA	136,000	0.0%	$13.5	$38.1	$131.3	5.0%	$15.6	$44.2	$151.8	10.0%	$18.0	$51.1	$175.1	15.0%	$20.0	$57.0	$195.0
Northern SA	**136,000**	**5.0%**	**$31.2**	**$83.5**	**$246.6**	**5.0%**	**$31.2**	**$83.5**	**$246.6**	**5.0%**	**$31.2**	**$83.5**	**$246.6**	**5.0%**	**$30.7**	**$82.0**	**$242.5**
Southern SA	**136,000**	**0.0%**	**$18.8**	**$55.4**	**$181.6**	**5.0%**	**$21.7**	**$64.3**	**$209.9**	**10.0%**	**$25.0**	**$74.4**	**$242.0**	**15.0%**	**$27.8**	**$82.8**	**$269.1**
Total			$50.0	$138.9	$428.2		$53.0	$147.8	$456.5		$56.3	$157.9	$488.6		$58.6	$164.8	$511.6

Area	Harvest Guideline	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)
PNW	136,000	10.0%	$36.0	$96.7	$284.4	10.0%	$36.0	$96.7	$284.4	10.0%	$35.4	$94.9	$279.4	10.0%	$34.0	$90.9	$268.4
NCA	136,000	0.0%	$5.3	$17.3	$50.3	5.0%	$6.1	$20.1	$58.1	10.0%	$7.0	$22.9	$65.9	15.0%	$7.6	$24.8	$71.5
SCA	136,000	0.0%	$13.5	$38.1	$131.3	5.0%	$15.6	$44.2	$151.8	10.0%	$17.6	$49.9	$171.2	15.0%	$19.3	$55.0	$188.5
Northern SA	**136,000**	**10.0%**	**$36.0**	**$96.7**	**$284.4**	**10.0%**	**$36.0**	**$96.7**	**$284.4**	**10.0%**	**$35.4**	**$94.9**	**$279.4**	**10.0%**	**$34.0**	**$90.9**	**$268.4**
Southern SA	**136,000**	**0.0%**	**$18.8**	**$55.4**	**$181.6**	**5.0%**	**$21.7**	**$64.3**	**$209.9**	**10.0%**	**$24.5**	**$72.8**	**$237.1**	**15.0%**	**$26.9**	**$79.8**	**$260.0**
Total			$54.8	$152.1	$466.0		$57.7	$161.0	$494.3		$59.9	$167.6	$516.5		$60.9	$170.7	$528.3

Area	Harvest Guideline	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)
PNW	136,000	15.0%	$41.1	$110.5	$324.1	15.0%	$40.3	$108.2	$317.8	15.0%	$38.7	$103.7	$305.4	15.0%	$36.9	$98.7	$291.5
NCA	136,000	0.0%	$5.3	$17.3	$50.2	5.0%	$6.1	$20.0	$57.8	10.0%	$6.8	$22.3	$64.3	15.0%	$7.3	$23.9	$69.0
SCA	136,000	0.0%	$13.4	$37.9	$130.8	5.0%	$15.3	$43.2	$148.8	10.0%	$16.9	$47.9	$164.8	15.0%	$18.6	$52.9	$181.5
Northern SA	**136,000**	**15.0%**	**$41.1**	**$110.5**	**$324.1**	**15.0%**	**$40.3**	**$108.2**	**$317.8**	**15.0%**	**$38.7**	**$103.7**	**$305.4**	**15.0%**	**$36.9**	**$98.7**	**$291.5**
Southern SA	**136,000**	**0.0%**	**$18.7**	**$55.2**	**$181.0**	**5.0%**	**$21.4**	**$63.2**	**$206.6**	**10.0%**	**$23.7**	**$70.2**	**$229.1**	**15.0%**	**$25.9**	**$76.8**	**$250.4**
Total			$59.8	$165.7	$505.1		$61.6	$171.4	$524.3		$62.4	$174.0	$534.5		$62.8	$175.5	$541.9

[1]Present values (PV) calculated for the 2005-2009 period using a 4.1% discount rate.

[2]Exvessel revenues projected using 2004 exvessel prices by fishery sector from PacFIN.

[3]Producer surplus projected using per unit values of: $237.13 per metric ton for SCA; $226.94 per metric ton for NCA; and, $320.89 per metric ton for PNW.

[4]Regional personal income projected using marginal total income multipliers of: $.418 per pound landed in SCA; $.336 per pound landed in NCA; and, $.486 per pound landed in PNW

Table 8. Projected present values[1] (PV) of exvessel revenues[2], producer surplus[3] and regional personal income[4] by fishery sector and subarea
Alternative 3: 40% HG available coastwide Jan 1; 40% HG (plus any remainder) available coastwide Jul 1; 20% HG (plus any remainder) available Oct 1. (Page 3 of 3)

Area	Harvest Guideline	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)
PNW	200,000	0.0%	$27.0	$72.0	$213.3	0.0%	$27.0	$72.0	$213.3	0.0%	$27.0	$72.0	$213.3	0.0%	$27.0	$72.0	$213.3
NCA	200,000	0.0%	$5.3	$17.3	$50.3	5.0%	$6.1	$20.1	$58.1	10.0%	$7.1	$23.3	$67.0	15.0%	$8.2	$26.9	$77.1
SCA	200,000	0.0%	$13.5	$38.1	$131.3	5.0%	$15.6	$44.2	$151.8	10.0%	$18.0	$51.1	$175.1	15.0%	$20.7	$59.0	$201.4
Northern SA	**200,000**	**0.0%**	**$27.0**	**$72.0**	**$213.3**	**0.0%**	**$27.0**	**$72.0**	**$213.3**	**0.0%**	**$27.0**	**$72.0**	**$213.3**	**0.0%**	**$27.0**	**$72.0**	**$213.3**
Southern SA	**200,000**	**0.0%**	**$18.8**	**$55.4**	**$181.6**	**5.0%**	**$21.7**	**$64.3**	**$209.9**	**10.0%**	**$25.0**	**$74.4**	**$242.0**	**15.0%**	**$28.8**	**$85.9**	**$278.5**
Total			$45.8	$127.4	$394.9		$48.7	$136.3	$423.2		$52.1	$146.4	$455.4		$55.8	$157.9	$491.8

Area	Harvest Guideline	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)
PNW	200,000	5.0%	$31.2	$83.5	$246.6	5.0%	$31.2	$83.5	$246.6	5.0%	$31.2	$83.5	$246.6	5.0%	$31.2	$83.5	$246.6
NCA	200,000	0.0%	$5.3	$17.3	$50.3	5.0%	$6.1	$20.1	$58.1	10.0%	$7.1	$23.3	$67.0	15.0%	$8.2	$26.9	$77.1
SCA	200,000	0.0%	$13.5	$38.1	$131.3	5.0%	$15.6	$44.2	$151.8	10.0%	$18.0	$51.1	$175.1	15.0%	$20.7	$59.0	$201.4
Northern SA	**200,000**	**5.0%**	**$31.2**	**$83.5**	**$246.6**	**5.0%**	**$31.2**	**$83.5**	**$246.6**	**5.0%**	**$31.2**	**$83.5**	**$246.6**	**5.0%**	**$31.2**	**$83.5**	**$246.6**
Southern SA	**200,000**	**0.0%**	**$18.8**	**$55.4**	**$181.6**	**5.0%**	**$21.7**	**$64.3**	**$209.9**	**10.0%**	**$25.0**	**$74.4**	**$242.0**	**15.0%**	**$28.8**	**$85.9**	**$278.5**
Total			$50.0	$138.9	$428.2		$53.0	$147.8	$456.5		$56.3	$157.9	$488.6		$60.1	$169.4	$525.1

Area	Harvest Guideline	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)
PNW	200,000	10.0%	$36.0	$96.7	$284.4	10.0%	$36.0	$96.7	$284.4	10.0%	$36.0	$96.7	$284.4	10.0%	$36.0	$96.7	$284.4
NCA	200,000	0.0%	$5.3	$17.3	$50.3	5.0%	$6.1	$20.1	$58.1	10.0%	$7.1	$23.3	$67.0	15.0%	$8.2	$26.9	$77.1
SCA	200,000	0.0%	$13.5	$38.1	$131.3	5.0%	$15.6	$44.2	$151.8	10.0%	$18.0	$51.1	$175.1	15.0%	$20.7	$59.0	$201.4
Northern SA	**200,000**	**10.0%**	**$36.0**	**$96.7**	**$284.4**	**10.0%**	**$36.0**	**$96.7**	**$284.4**	**10.0%**	**$36.0**	**$96.7**	**$284.4**	**10.0%**	**$36.0**	**$96.7**	**$284.4**
Southern SA	**200,000**	**0.0%**	**$18.8**	**$55.4**	**$181.6**	**5.0%**	**$21.7**	**$64.3**	**$209.9**	**10.0%**	**$25.0**	**$74.4**	**$242.0**	**15.0%**	**$28.8**	**$85.9**	**$278.5**
Total			$54.8	$152.1	$466.0		$57.7	$161.0	$494.3		$61.1	$171.1	$526.4		$64.8	$182.6	$562.8

Area	Harvest Guideline	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)
PNW	200,000	15.0%	$41.5	$111.6	$327.2	15.0%	$41.5	$111.6	$327.2	15.0%	$41.5	$111.6	$327.2	15.0%	$41.5	$111.6	$327.2
NCA	200,000	0.0%	$5.3	$17.3	$50.3	5.0%	$6.1	$20.1	$58.1	10.0%	$7.1	$23.3	$67.0	15.0%	$8.2	$26.9	$77.1
SCA	200,000	0.0%	$13.5	$38.1	$131.3	5.0%	$15.6	$44.2	$151.8	10.0%	$18.0	$51.1	$175.1	15.0%	$20.7	$59.0	$201.4
Northern SA	**200,000**	**15.0%**	**$41.5**	**$111.6**	**$327.2**	**15.0%**	**$41.5**	**$111.6**	**$327.2**	**15.0%**	**$41.5**	**$111.6**	**$327.2**	**15.0%**	**$41.5**	**$111.6**	**$327.2**
Southern SA	**200,000**	**0.0%**	**$18.8**	**$55.4**	**$181.6**	**5.0%**	**$21.7**	**$64.3**	**$209.9**	**10.0%**	**$25.0**	**$74.4**	**$242.0**	**15.0%**	**$28.8**	**$85.9**	**$278.5**
Total			$60.2	$167.0	$508.8		$63.2	$175.9	$537.1		$66.5	$186.0	$569.2		$70.3	$197.5	$605.7

[1]Present values (PV) calculated for the 2005-2009 period using a 4.1% discount rate.

[2]Exvessel revenues projected using 2004 exvessel prices by fishery sector from PacFIN.

[3]Producer surplus projected using per unit values of: $237.13 per metric ton for SCA; $226.94 per metric ton for NCA; and, $320.89 per metric ton for PNW.

[4]Regional personal income projected using marginal total income multipliers of: $.418 per pound landed in SCA; $.336 per pound landed in NCA; and, $.486 per pound landed in PNW

Table 9. Projected present values[1] (PV) of exvessel revenues[2], producer surplus[3] and regional personal income[4] by fishery sector and subarea

Modified Alternative 3: 35% HG available coastwide Jan 1; 40% HG (plus any remainder) available coastwide Jul 1; 25% HG (plus any remainder) available Sept 1. (Page 1 of 3)

Area	Harvest Guideline	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)
PNW	72,000	0.0%	$22.9	$61.0	$180.9	0.0%	$21.1	$56.1	$166.7	0.0%	$19.5	$51.5	$153.5	0.0%	$18.3	$48.5	$144.6
NCA	72,000	0.0%	$2.8	$9.0	$26.0	5.0%	$2.8	$9.1	$26.5	10.0%	$2.9	$9.4	$27.2	15.0%	$3.0	$9.7	$28.2
SCA	72,000	0.0%	$10.9	$30.9	$106.6	5.0%	$12.1	$34.4	$118.3	10.0%	$13.2	$37.5	$128.7	15.0%	$13.9	$39.3	$135.2
Northern SA	**72,000**	**0.0%**	**$22.9**	**$61.0**	**$180.9**	**0.0%**	**$21.1**	**$56.1**	**$166.7**	**0.0%**	**$19.5**	**$51.5**	**$153.5**	**0.0%**	**$18.3**	**$48.5**	**$144.6**
Southern SA	**72,000**	**0.0%**	**$13.7**	**$39.9**	**$132.6**	**5.0%**	**$14.9**	**$43.5**	**$144.7**	**10.0%**	**$16.1**	**$46.9**	**$155.9**	**15.0%**	**$16.8**	**$49.1**	**$163.3**
Total			$36.6	$100.9	$313.5		$36.0	$99.6	$311.4		$35.5	$98.4	$309.4		$35.2	$97.6	$307.9

Area	Harvest Guideline	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)
PNW	72,000	5.0%	$24.2	$64.6	$191.4	5.0%	$22.5	$59.7	$177.2	5.0%	$20.8	$55.2	$164.1	5.0%	$19.6	$52.1	$155.0
NCA	72,000	0.0%	$2.4	$7.7	$22.5	5.0%	$2.4	$7.9	$22.9	10.0%	$2.5	$8.1	$23.7	15.0%	$2.6	$8.6	$24.8
SCA	72,000	0.0%	$10.5	$29.5	$102.0	5.0%	$11.7	$33.0	$113.6	10.0%	$12.7	$36.1	$124.0	15.0%	$13.4	$37.9	$130.4
Northern SA	**72,000**	**5.0%**	**$24.2**	**$64.6**	**$191.4**	**5.0%**	**$22.5**	**$59.7**	**$177.2**	**5.0%**	**$20.8**	**$55.2**	**$164.1**	**5.0%**	**$19.6**	**$52.1**	**$155.0**
Southern SA	**72,000**	**0.0%**	**$12.8**	**$37.2**	**$124.5**	**5.0%**	**$14.1**	**$40.9**	**$136.5**	**10.0%**	**$15.2**	**$44.2**	**$147.7**	**15.0%**	**$16.0**	**$46.5**	**$155.2**
Total			$37.1	$101.9	$315.8		$36.5	$100.6	$313.8		$36.0	$99.4	$311.7		$35.6	$98.6	$310.2

Area	Harvest Guideline	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)
PNW	72,000	10.0%	$25.5	$68.1	$201.2	10.0%	$23.7	$63.2	$187.2	10.0%	$22.0	$58.5	$173.6	10.0%	$20.8	$55.2	$164.0
NCA	72,000	0.0%	$2.0	$6.5	$19.1	5.0%	$2.1	$6.7	$19.6	10.0%	$2.2	$7.1	$20.7	15.0%	$2.3	$7.6	$22.2
SCA	72,000	0.0%	$10.0	$28.3	$97.7	5.0%	$11.2	$31.7	$109.2	10.0%	$12.3	$34.7	$119.5	15.0%	$12.9	$36.6	$125.8
Northern SA	**72,000**	**10.0%**	**$25.5**	**$68.1**	**$201.2**	**10.0%**	**$23.7**	**$63.2**	**$187.2**	**10.0%**	**$22.0**	**$58.5**	**$173.6**	**10.0%**	**$20.8**	**$55.2**	**$164.0**
Southern SA	**72,000**	**0.0%**	**$12.0**	**$34.8**	**$116.8**	**5.0%**	**$13.3**	**$38.4**	**$128.8**	**10.0%**	**$14.4**	**$41.8**	**$140.2**	**15.0%**	**$15.3**	**$44.2**	**$148.0**
Total			$37.5	$102.8	$318.0		$37.0	$101.6	$316.0		$36.4	$100.3	$313.8		$36.0	$99.4	$312.1

Area	Harvest Guideline	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)
PNW	72,000	15.0%	$26.5	$70.9	$209.4	15.0%	$24.7	$65.9	$195.2	15.0%	$23.0	$61.1	$181.3	15.0%	$21.7	$57.8	$171.6
NCA	72,000	0.0%	$1.7	$5.6	$16.5	5.0%	$1.8	$5.9	$17.3	10.0%	$2.0	$6.4	$18.6	15.0%	$2.1	$7.0	$20.3
SCA	72,000	0.0%	$9.6	$27.1	$93.9	5.0%	$10.8	$30.5	$105.1	10.0%	$11.8	$33.5	$115.5	15.0%	$12.5	$35.3	$121.7
Northern SA	**72,000**	**15.0%**	**$26.5**	**$70.9**	**$209.4**	**15.0%**	**$24.7**	**$65.9**	**$195.2**	**15.0%**	**$23.0**	**$61.1**	**$181.3**	**15.0%**	**$21.7**	**$57.8**	**$171.6**
Southern SA	**72,000**	**0.0%**	**$11.4**	**$32.7**	**$110.4**	**5.0%**	**$12.6**	**$36.4**	**$122.5**	**10.0%**	**$13.8**	**$39.9**	**$134.1**	**15.0%**	**$14.6**	**$42.3**	**$142.0**
Total			$37.9	$103.6	$319.8		$37.3	$102.3	$317.6		$36.8	$101.0	$315.4		$36.4	$100.1	$313.6

[1]Present values (PV) calculated for the 2005-2009 period using a 4.1% discount rate.

[2]Exvessel revenues projected using 2004 exvessel prices by fishery sector from PacFIN.

[3]Producer surplus projected using per unit values of: $237.13 per metric ton for SCA; $226.94 per metric ton for NCA; and, $320.89 per metric ton for PNW.

[4]Regional personal income projected using marginal total income multipliers of: $.418 per pound landed in SCA; $.336 per pound landed in NCA; and, $.486 per pound landed in PNW

Table 9. Projected present values[1] (PV) of exvessel revenues[2], producer surplus[3] and regional personal income[4] by fishery sector and subarea

Modified Alternative 3: 35% HG available coastwide Jan 1; 40% HG (plus any remainder) available coastwide Jul 1; 25% HG (plus any remainder) available Sept 1. (Page 2 of 3)

Area	Harvest Guideline	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)
PNW	136,000	0.0%	$27.0	$72.0	$213.3	0.0%	$27.0	$72.0	$213.3	0.0%	$27.0	$72.0	$213.3	0.0%	$27.0	$71.9	$213.1
NCA	136,000	0.0%	$5.3	$17.3	$50.3	5.0%	$6.1	$20.1	$58.1	10.0%	$7.1	$23.3	$67.0	15.0%	$8.1	$26.8	$76.7
SCA	136,000	0.0%	$13.5	$38.1	$131.3	5.0%	$15.6	$44.2	$151.8	10.0%	$18.0	$51.1	$175.1	15.0%	$20.4	$58.2	$198.9
Northern SA	**136,000**	**0.0%**	**$27.0**	**$72.0**	**$213.3**	**0.0%**	**$27.0**	**$72.0**	**$213.3**	**0.0%**	**$27.0**	**$72.0**	**$213.3**	**0.0%**	**$27.0**	**$71.9**	**$213.1**
Southern SA	**136,000**	**0.0%**	**$18.8**	**$55.4**	**$181.6**	**5.0%**	**$21.7**	**$64.3**	**$209.9**	**10.0%**	**$25.0**	**$74.4**	**$242.0**	**15.0%**	**$28.5**	**$85.0**	**$275.6**
Total			$45.8	$127.4	$394.9		$48.7	$136.3	$423.2		$52.1	$146.4	$455.4		$55.5	$156.9	$488.7

Area	Harvest Guideline	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)
PNW	136,000	5.0%	$31.2	$83.5	$246.6	5.0%	$31.2	$83.5	$246.6	5.0%	$31.2	$83.5	$246.6	5.0%	$31.1	$83.0	$245.2
NCA	136,000	0.0%	$5.3	$17.3	$50.3	5.0%	$6.1	$20.1	$58.1	10.0%	$7.1	$23.3	$67.0	15.0%	$7.6	$25.0	$72.0
SCA	136,000	0.0%	$13.5	$38.1	$131.3	5.0%	$15.6	$44.2	$151.8	10.0%	$18.0	$51.1	$175.1	15.0%	$20.0	$57.1	$195.4
Northern SA	**136,000**	**5.0%**	**$31.2**	**$83.5**	**$246.6**	**5.0%**	**$31.2**	**$83.5**	**$246.6**	**5.0%**	**$31.2**	**$83.5**	**$246.6**	**5.0%**	**$31.1**	**$83.0**	**$245.2**
Southern SA	**136,000**	**0.0%**	**$18.8**	**$55.4**	**$181.6**	**5.0%**	**$21.7**	**$64.3**	**$209.9**	**10.0%**	**$25.0**	**$74.4**	**$242.0**	**15.0%**	**$27.7**	**$82.1**	**$267.3**
Total			$50.0	$138.9	$428.2		$53.0	$147.8	$456.5		$56.3	$157.9	$488.6		$58.7	$165.1	$512.6

Area	Harvest Guideline	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)
PNW	136,000	10.0%	$36.0	$96.7	$284.4	10.0%	$36.0	$96.7	$284.4	10.0%	$35.9	$96.2	$283.0	10.0%	$35.0	$93.8	$276.6
NCA	136,000	0.0%	$5.3	$17.3	$50.3	5.0%	$6.1	$20.1	$58.1	10.0%	$6.7	$21.9	$63.3	15.0%	$6.9	$22.5	$65.1
SCA	136,000	0.0%	$13.5	$38.1	$131.3	5.0%	$15.6	$44.2	$151.8	10.0%	$17.6	$49.9	$171.3	15.0%	$19.4	$55.3	$189.3
Northern SA	**136,000**	**10.0%**	**$36.0**	**$96.7**	**$284.4**	**10.0%**	**$36.0**	**$96.7**	**$284.4**	**10.0%**	**$35.9**	**$96.2**	**$283.0**	**10.0%**	**$35.0**	**$93.8**	**$276.6**
Southern SA	**136,000**	**0.0%**	**$18.8**	**$55.4**	**$181.6**	**5.0%**	**$21.7**	**$64.3**	**$209.9**	**10.0%**	**$24.3**	**$71.9**	**$234.6**	**15.0%**	**$26.3**	**$77.8**	**$254.4**
Total			$54.8	$152.1	$466.0		$57.7	$161.0	$494.3		$60.1	$168.0	$517.7		$61.4	$171.6	$531.0

Area	Harvest Guideline	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)
PNW	136,000	15.0%	$41.4	$111.5	$326.9	15.0%	$28.6	$75.7	$225.8	15.0%	$40.1	$107.7	$316.4	15.0%	$38.6	$103.4	$304.6
NCA	136,000	0.0%	$5.3	$17.3	$50.3	50.0%	$7.5	$24.5	$70.9	10.0%	$6.0	$19.5	$56.7	15.0%	$6.3	$20.4	$59.5
SCA	136,000	0.0%	$13.4	$37.8	$130.4	50.0%	$26.9	$76.5	$262.1	10.0%	$16.9	$47.9	$164.8	15.0%	$18.7	$53.0	$182.0
Northern SA	**136,000**	**15.0%**	**$41.4**	**$111.5**	**$326.9**	**15.0%**	**$28.6**	**$75.7**	**$225.8**	**15.0%**	**$40.1**	**$107.7**	**$316.4**	**15.0%**	**$38.6**	**$103.4**	**$304.6**
Southern SA	**136,000**	**0.0%**	**$18.7**	**$55.1**	**$180.7**	**50.0%**	**$34.4**	**$101.0**	**$333.0**	**10.0%**	**$22.9**	**$67.4**	**$221.5**	**15.0%**	**$25.0**	**$73.5**	**$241.4**
Total			$60.1	$166.6	$507.5		$63.0	$176.8	$558.9		$63.0	$175.1	$537.9		$63.6	$176.9	$546.1

[1]Present values (PV) calculated for the 2005-2009 period using a 4.1% discount rate.

[2]Exvessel revenues projected using 2004 exvessel prices by fishery sector from PacFIN.

[3]Producer surplus projected using per unit values of: $237.13 per metric ton for SCA; $226.94 per metric ton for NCA; and, $320.89 per metric ton for PNW.

[4]Regional personal income projected using marginal total income multipliers of: $.418 per pound landed in SCA; $.336 per pound landed in NCA; and, $.486 per pound landed in PNW

Table 9. Projected present values[1] (PV) of exvessel revenues[2], producer surplus[3] and regional personal income[4] by fishery sector and subarea

Modified Alternative 3: 35% HG available coastwide Jan 1; 40% HG (plus any remainder) available coastwide Jul 1; 25% HG (plus any remainder) available Sept 1. (Page 3 of 3)

Area	Harvest Guideline	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)
PNW	200,000	0.0%	$27.0	$72.0	$213.3	0.0%	$27.0	$72.0	$213.3	0.0%	$27.0	$72.0	$213.3	0.0%	$27.0	$72.0	$213.3
NCA	200,000	0.0%	$5.3	$17.3	$50.3	5.0%	$6.1	$20.1	$58.1	10.0%	$7.1	$23.3	$67.0	15.0%	$8.2	$26.9	$77.1
SCA	200,000	0.0%	$13.5	$38.1	$131.3	5.0%	$15.6	$44.2	$151.8	10.0%	$18.0	$51.1	$175.1	15.0%	$20.7	$59.0	$201.4
Northern SA	**200,000**	**0.0%**	**$27.0**	**$72.0**	**$213.3**	**0.0%**	**$27.0**	**$72.0**	**$213.3**	**0.0%**	**$27.0**	**$72.0**	**$213.3**	**0.0%**	**$27.0**	**$72.0**	**$213.3**
Southern SA	**200,000**	**0.0%**	**$18.8**	**$55.4**	**$181.6**	**5.0%**	**$21.7**	**$64.3**	**$209.9**	**10.0%**	**$25.0**	**$74.4**	**$242.0**	**15.0%**	**$28.8**	**$85.9**	**$278.5**
Total			$45.8	$127.4	$394.9		$48.7	$136.3	$423.2		$52.1	$146.4	$455.4		$55.8	$157.9	$491.8

Area	Harvest Guideline	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)
PNW	200,000	5.0%	$31.2	$83.5	$246.6	5.0%	$28.1	$74.5	$221.5	5.0%	$31.2	$83.5	$246.6	5.0%	$31.2	$83.5	$246.6
NCA	200,000	0.0%	$5.3	$17.3	$50.3	50.0%	$12.8	$42.2	$121.2	10.0%	$7.1	$23.3	$67.0	15.0%	$8.2	$26.9	$77.1
SCA	200,000	0.0%	$13.5	$38.1	$131.3	50.0%	$37.7	$108.2	$367.1	10.0%	$18.0	$51.1	$175.1	15.0%	$20.7	$59.0	$201.4
Northern SA	**200,000**	**5.0%**	**$31.2**	**$83.5**	**$246.6**	**5.0%**	**$28.1**	**$74.5**	**$221.5**	**5.0%**	**$31.2**	**$83.5**	**$246.6**	**5.0%**	**$31.2**	**$83.5**	**$246.6**
Southern SA	**200,000**	**0.0%**	**$18.8**	**$55.4**	**$181.6**	**50.0%**	**$50.5**	**$150.4**	**$488.3**	**10.0%**	**$25.0**	**$74.4**	**$242.0**	**15.0%**	**$28.8**	**$85.9**	**$278.5**
Total			$50.0	$138.9	$428.2		$78.5	$224.9	$709.8		$56.3	$157.9	$488.6		$60.1	$169.4	$525.1

Area	Harvest Guideline	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)
PNW	200,000	10.0%	$36.0	$96.7	$284.4	10.0%	$36.0	$96.7	$284.4	10.0%	$36.0	$96.7	$284.4	10.0%	$36.0	$96.7	$284.4
NCA	200,000	0.0%	$5.3	$17.3	$50.3	5.0%	$6.1	$20.1	$58.1	10.0%	$7.1	$23.3	$67.0	15.0%	$8.2	$26.9	$77.1
SCA	200,000	0.0%	$13.5	$38.1	$131.3	5.0%	$15.6	$44.2	$151.8	10.0%	$18.0	$51.1	$175.1	15.0%	$20.7	$59.0	$201.4
Northern SA	**200,000**	**10.0%**	**$36.0**	**$96.7**	**$284.4**	**10.0%**	**$36.0**	**$96.7**	**$284.4**	**10.0%**	**$36.0**	**$96.7**	**$284.4**	**10.0%**	**$36.0**	**$96.7**	**$284.4**
Southern SA	**200,000**	**0.0%**	**$18.8**	**$55.4**	**$181.6**	**5.0%**	**$21.7**	**$64.3**	**$209.9**	**10.0%**	**$25.0**	**$74.4**	**$242.0**	**15.0%**	**$28.8**	**$85.9**	**$278.5**
Total			$54.8	$152.1	$466.0		$57.7	$161.0	$494.3		$61.1	$171.1	$526.4		$64.8	$182.6	$562.8

Area	Harvest Guideline	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)
PNW	200,000	15.0%	$41.5	$111.6	$327.2	15.0%	$41.5	$111.6	$327.2	15.0%	$41.5	$111.6	$327.2	15.0%	$41.5	$111.6	$327.2
NCA	200,000	0.0%	$5.3	$17.3	$50.3	5.0%	$6.1	$20.1	$58.1	10.0%	$7.1	$23.3	$67.0	15.0%	$8.2	$26.9	$77.1
SCA	200,000	0.0%	$13.5	$38.1	$131.3	5.0%	$15.6	$44.2	$151.8	10.0%	$18.0	$51.1	$175.1	15.0%	$20.7	$59.0	$201.4
Northern SA	**200,000**	**15.0%**	**$41.5**	**$111.6**	**$327.2**	**15.0%**	**$41.5**	**$111.6**	**$327.2**	**15.0%**	**$41.5**	**$111.6**	**$327.2**	**15.0%**	**$41.5**	**$111.6**	**$327.2**
Southern SA	**200,000**	**0.0%**	**$18.8**	**$55.4**	**$181.6**	**5.0%**	**$21.7**	**$64.3**	**$209.9**	**10.0%**	**$25.0**	**$74.4**	**$242.0**	**15.0%**	**$28.8**	**$85.9**	**$278.5**
Total			$60.2	$167.0	$508.8		$63.2	$175.9	$537.1		$66.5	$186.0	$569.2		$70.3	$197.5	$605.7

[1]Present values (PV) calculated for the 2005-2009 period using a 4.1% discount rate.

[2]Exvessel revenues projected using 2004 exvessel prices by fishery sector from PacFIN.

[3]Producer surplus projected using per unit values of: $237.13 per metric ton for SCA; $226.94 per metric ton for NCA; and, $320.89 per metric ton for PNW.

[4]Regional personal income projected using marginal total income multipliers of: $.418 per pound landed in SCA; $.336 per pound landed in NCA; and, $.486 per pound landed in PNW

Table 10. Projected present values[1] (PV) of exvessel revenues[2], producer surplus[3] and regional personal income[4] by fishery sector and subarea

Alternative 3: 35% HG available coastwide Jan 1; 40% HG (plus any remainder) available coastwide Jul 1; 25% HG (plus any remainder) available Oct 1. (Page 1 of 3)

Area	Harvest Guideline	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)
PNW	72,000	0.0%	$19.4	$51.7	$153.2	0.0%	$17.7	$46.9	$139.4	0.0%	$16.1	$42.5	$126.7	0.0%	$14.9	$39.5	$117.9
NCA	72,000	0.0%	$4.8	$15.6	$45.1	5.0%	$4.9	$15.8	$45.9	10.0%	$5.0	$16.2	$46.9	15.0%	$5.1	$16.8	$48.6
SCA	72,000	0.0%	$10.9	$30.9	$106.7	5.0%	$12.1	$34.2	$117.6	10.0%	$13.0	$37.0	$127.2	15.0%	$13.6	$38.6	$132.7
Northern SA	**72,000**	**0.0%**	**$19.4**	**$51.7**	**$153.2**	**0.0%**	**$17.7**	**$46.9**	**$139.4**	**0.0%**	**$16.1**	**$42.5**	**$126.7**	**0.0%**	**$14.9**	**$39.5**	**$117.9**
Southern SA	**72,000**	**0.0%**	**$15.7**	**$46.5**	**$151.8**	**5.0%**	**$16.9**	**$50.0**	**$163.4**	**10.0%**	**$18.0**	**$53.2**	**$174.1**	**15.0%**	**$18.8**	**$55.4**	**$181.3**
Total			$35.1	$98.2	$305.0		$34.6	$96.9	$302.9		$34.1	$95.7	$300.8		$33.7	$94.9	$299.2

Area	Harvest Guideline	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)
PNW	72,000	5.0%	$20.4	$54.5	$161.3	5.0%	$18.7	$49.7	$147.4	5.0%	$17.0	$45.2	$134.5	5.0%	$15.9	$42.1	$125.4
NCA	72,000	0.0%	$4.5	$14.6	$42.4	5.0%	$4.6	$14.9	$43.2	10.0%	$4.7	$15.3	$44.4	15.0%	$4.9	$16.0	$46.3
SCA	72,000	0.0%	$10.6	$29.9	$103.1	5.0%	$11.7	$33.1	$114.1	10.0%	$12.7	$36.0	$123.7	15.0%	$13.2	$37.5	$129.1
Northern SA	**72,000**	**5.0%**	**$20.4**	**$54.5**	**$161.3**	**5.0%**	**$18.7**	**$49.7**	**$147.4**	**5.0%**	**$17.0**	**$45.2**	**$134.5**	**5.0%**	**$15.9**	**$42.1**	**$125.4**
Southern SA	**72,000**	**0.0%**	**$15.1**	**$44.5**	**$145.5**	**5.0%**	**$16.3**	**$48.0**	**$157.2**	**10.0%**	**$17.4**	**$51.3**	**$168.1**	**15.0%**	**$18.1**	**$53.5**	**$175.4**
Total			$35.5	$98.9	$306.8		$34.9	$97.7	$304.6		$34.4	$96.5	$302.5		$34.0	$95.6	$300.8

Area	Harvest Guideline	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)
PNW	72,000	10.0%	$21.4	$57.1	$168.9	10.0%	$19.6	$52.3	$155.0	10.0%	$18.0	$47.7	$141.9	10.0%	$16.8	$44.6	$132.7
NCA	72,000	0.0%	$4.2	$13.6	$39.7	5.0%	$4.3	$14.0	$40.6	10.0%	$4.4	$14.5	$42.0	15.0%	$4.7	$15.2	$44.0
SCA	72,000	0.0%	$10.2	$28.9	$99.9	5.0%	$11.4	$32.1	$110.7	10.0%	$12.3	$35.0	$120.3	15.0%	$12.9	$36.5	$125.7
Northern SA	**72,000**	**10.0%**	**$21.4**	**$57.1**	**$168.9**	**10.0%**	**$19.6**	**$52.3**	**$155.0**	**10.0%**	**$18.0**	**$47.7**	**$141.9**	**10.0%**	**$16.8**	**$44.6**	**$132.7**
Southern SA	**72,000**	**0.0%**	**$14.4**	**$42.5**	**$139.6**	**5.0%**	**$15.6**	**$46.1**	**$151.3**	**10.0%**	**$16.8**	**$49.4**	**$162.3**	**15.0%**	**$17.5**	**$51.7**	**$169.7**
Total			$35.8	$99.7	$308.5		$35.3	$98.4	$306.3		$34.8	$97.2	$304.2		$34.4	$96.3	$302.4

Area	Harvest Guideline	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)
PNW	72,000	15.0%	$22.3	$59.6	$176.1	15.0%	$20.6	$54.8	$162.3	15.0%	$18.8	$50.1	$148.6	15.0%	$17.6	$46.9	$139.2
NCA	72,000	0.0%	$3.9	$12.7	$37.1	5.0%	$4.0	$13.1	$38.1	10.0%	$4.2	$13.7	$39.8	15.0%	$4.4	$14.5	$41.9
SCA	72,000	0.0%	$9.9	$28.0	$97.0	5.0%	$11.0	$31.2	$107.6	10.0%	$12.0	$34.1	$117.3	15.0%	$12.6	$35.6	$122.7
Northern SA	**72,000**	**15.0%**	**$22.3**	**$59.6**	**$176.1**	**15.0%**	**$20.6**	**$54.8**	**$162.3**	**15.0%**	**$18.8**	**$50.1**	**$148.6**	**15.0%**	**$17.6**	**$46.9**	**$139.2**
Southern SA	**72,000**	**0.0%**	**$13.9**	**$40.7**	**$134.0**	**5.0%**	**$15.1**	**$44.3**	**$145.7**	**10.0%**	**$16.2**	**$47.7**	**$157.0**	**15.0%**	**$17.0**	**$50.1**	**$164.6**
Total			$36.2	$100.4	$310.1		$35.6	$99.1	$308.0		$35.1	$97.8	$305.6		$34.7	$97.0	$303.8

[1]Present values (PV) calculated for the 2005-2009 period using a 4.1% discount rate.

[2]Exvessel revenues projected using 2004 exvessel prices by fishery sector from PacFIN.

[3]Producer surplus projected using per unit values of: $237.13 per metric ton for SCA; $226.94 per metric ton for NCA; and, $320.89 per metric ton for PNW.

[4]Regional personal income projected using marginal total income multipliers of: $.418 per pound landed in SCA; $.336 per pound landed in NCA; and, $.486 per pound landed in PNW

Table 10. Projected present values[1] (PV) of exvessel revenues[2], producer surplus[3] and regional personal income[4] by fishery sector and subarea

Alternative 3: 35% HG available coastwide Jan 1; 40% HG (plus any remainder) available coastwide Jul 1; 25% HG (plus any remainder) available Oct 1. (Page 2 of 3)

Area	Harvest Guideline	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)
PNW	136,000	0.0%	$27.0	$72.0	$213.3	0.0%	$27.0	$72.0	$213.3	0.0%	$27.0	$72.0	$213.3	0.0%	$26.9	$71.6	$212.3
NCA	136,000	0.0%	$5.3	$17.3	$50.3	5.0%	$6.1	$20.1	$58.1	10.0%	$7.1	$23.3	$67.0	15.0%	$8.1	$26.9	$77.0
SCA	136,000	0.0%	$13.5	$38.1	$131.3	5.0%	$15.6	$44.2	$151.8	10.0%	$18.0	$51.1	$175.1	15.0%	$20.4	$58.4	$199.3
Northern SA	**136,000**	**0.0%**	**$27.0**	**$72.0**	**$213.3**	**0.0%**	**$27.0**	**$72.0**	**$213.3**	**0.0%**	**$27.0**	**$72.0**	**$213.3**	**0.0%**	**$26.9**	**$71.6**	**$212.3**
Southern SA	**136,000**	**0.0%**	**$18.8**	**$55.4**	**$181.6**	**5.0%**	**$21.7**	**$64.3**	**$209.9**	**10.0%**	**$25.0**	**$74.4**	**$242.0**	**15.0%**	**$28.6**	**$85.2**	**$276.3**
Total			$45.8	$127.4	$394.9		$48.7	$136.3	$423.2		$52.1	$146.4	$455.4		$55.5	$156.8	$488.6

Area	Harvest Guideline	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)
PNW	136,000	5.0%	$31.2	$83.5	$246.6	5.0%	$31.2	$83.5	$246.6	5.0%	$31.2	$83.4	$246.2	5.0%	$30.2	$80.5	$238.3
NCA	136,000	0.0%	$5.3	$17.3	$50.3	5.0%	$6.1	$20.1	$58.1	10.0%	$7.1	$23.3	$67.0	15.0%	$8.1	$26.6	$76.4
SCA	136,000	0.0%	$13.5	$38.1	$131.3	5.0%	$15.6	$44.2	$151.8	10.0%	$17.9	$51.1	$174.9	15.0%	$20.0	$57.0	$194.8
Northern SA	**136,000**	**5.0%**	**$31.2**	**$83.5**	**$246.6**	**5.0%**	**$31.2**	**$83.5**	**$246.6**	**5.0%**	**$31.2**	**$83.4**	**$246.2**	**5.0%**	**$30.2**	**$80.5**	**$238.3**
Southern SA	**136,000**	**0.0%**	**$18.8**	**$55.4**	**$181.6**	**5.0%**	**$21.7**	**$64.3**	**$209.9**	**10.0%**	**$25.0**	**$74.4**	**$241.8**	**15.0%**	**$28.1**	**$83.6**	**$271.2**
Total			$50.0	$138.9	$428.2		$53.0	$147.8	$456.5		$56.2	$157.7	$488.1		$58.3	$164.1	$509.5

Area	Harvest Guideline	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)
PNW	136,000	10.0%	$36.0	$96.7	$284.4	10.0%	$35.7	$95.8	$282.0	10.0%	$34.7	$92.8	$273.7	10.0%	$33.2	$88.5	$261.8
NCA	136,000	0.0%	$5.3	$17.3	$50.3	5.0%	$6.1	$20.1	$58.0	10.0%	$7.0	$23.1	$66.4	15.0%	$7.9	$26.1	$74.8
SCA	136,000	0.0%	$13.5	$38.1	$131.3	5.0%	$15.5	$44.0	$151.2	10.0%	$17.6	$50.0	$171.3	15.0%	$19.5	$55.4	$189.8
Northern SA	**136,000**	**10.0%**	**$36.0**	**$96.7**	**$284.4**	**10.0%**	**$35.7**	**$95.8**	**$282.0**	**10.0%**	**$34.7**	**$92.8**	**$273.7**	**10.0%**	**$33.2**	**$88.5**	**$261.8**
Southern SA	**136,000**	**0.0%**	**$18.8**	**$55.4**	**$181.6**	**5.0%**	**$21.6**	**$64.1**	**$209.1**	**10.0%**	**$24.6**	**$73.0**	**$237.7**	**15.0%**	**$27.4**	**$81.5**	**$264.6**
Total			$54.8	$152.1	$466.0		$57.4	$159.9	$491.2		$59.3	$165.8	$511.4		$60.6	$170.0	$526.4

Area	Harvest Guideline	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)
PNW	136,000	15.0%	$40.4	$108.6	$318.9	15.0%	$39.1	$105.0	$308.8	15.0%	$37.6	$100.6	$296.7	15.0%	$35.5	$94.9	$280.5
NCA	136,000	0.0%	$5.3	$17.3	$50.0	5.0%	$6.1	$19.9	$57.4	10.0%	$6.9	$22.7	$65.4	15.0%	$7.7	$25.3	$72.7
SCA	136,000	0.0%	$13.3	$37.6	$129.9	5.0%	$15.1	$42.9	$147.6	10.0%	$17.1	$48.6	$166.8	15.0%	$18.8	$53.5	$183.4
Northern SA	**136,000**	**15.0%**	**$40.4**	**$108.6**	**$318.9**	**15.0%**	**$39.1**	**$105.0**	**$308.8**	**15.0%**	**$37.6**	**$100.6**	**$296.7**	**15.0%**	**$35.5**	**$94.9**	**$280.5**
Southern SA	**136,000**	**0.0%**	**$18.6**	**$54.9**	**$179.9**	**5.0%**	**$21.2**	**$62.7**	**$205.1**	**10.0%**	**$24.0**	**$71.3**	**$232.2**	**15.0%**	**$26.5**	**$78.7**	**$256.1**
Total			$59.0	$163.5	$498.8		$60.3	$167.7	$513.9		$61.6	$171.9	$528.9		$62.0	$173.6	$536.6

[1]Present values (PV) calculated for the 2005-2009 period using a 4.1% discount rate.

[2]Exvessel revenues projected using 2004 exvessel prices by fishery sector from PacFIN.

[3]Producer surplus projected using per unit values of: $237.13 per metric ton for SCA; $226.94 per metric ton for NCA; and, $320.89 per metric ton for PNW.

[4]Regional personal income projected using marginal total income multipliers of: $.418 per pound landed in SCA; $.336 per pound landed in NCA; and, $.486 per pound landed in PNW

Table 10. Projected present values[1] (PV) of exvessel revenues[2], producer surplus[3] and regional personal income[4] by fishery sector and subarea

Alternative 3: 35% HG available coastwide Jan 1; 40% HG (plus any remainder) available coastwide Jul 1; 25% HG (plus any remainder) available Oct 1. (Page 3 of 3)

Area	Harvest Guideline	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)
PNW	200,000	0.0%	$27.0	$72.0	$213.3	0.0%	$27.0	$72.0	$213.3	0.0%	$27.0	$72.0	$213.3	0.0%	$0.0	$0.0	$0.0
NCA	200,000	0.0%	$5.3	$17.3	$50.3	5.0%	$6.1	$20.1	$58.1	10.0%	$7.1	$23.3	$67.0	0.0%	$0.0	$0.0	$0.0
SCA	200,000	0.0%	$13.5	$38.1	$131.3	5.0%	$15.6	$44.2	$151.8	10.0%	$18.0	$51.1	$175.1	0.0%	$0.0	$0.0	$0.0
Northern SA	**200,000**	**0.0%**	**$27.0**	**$72.0**	**$213.3**	**0.0%**	**$27.0**	**$72.0**	**$213.3**	**0.0%**	**$27.0**	**$72.0**	**$213.3**	**0.0%**	**$0.0**	**$0.0**	**$0.0**
Southern SA	**200,000**	**0.0%**	**$18.8**	**$55.4**	**$181.6**	**5.0%**	**$21.7**	**$64.3**	**$209.9**	**10.0%**	**$25.0**	**$74.4**	**$242.0**	**0.0%**	**$0.0**	**$0.0**	**$0.0**
Total			$45.8	$127.4	$394.9		$48.7	$136.3	$423.2		$52.1	$146.4	$455.4		$0.0	$0.0	$0.0

Area	Harvest Guideline	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)
PNW	200,000	5.0%	$31.2	$83.5	$246.6	5.0%	$31.2	$83.5	$246.6	5.0%	$31.2	$83.5	$246.6	5.0%	$31.2	$83.5	$246.6
NCA	200,000	0.0%	$5.3	$17.3	$50.3	5.0%	$6.1	$20.1	$58.1	10.0%	$7.1	$23.3	$67.0	15.0%	$8.2	$26.9	$77.1
SCA	200,000	0.0%	$13.5	$38.1	$131.3	5.0%	$15.6	$44.2	$151.8	10.0%	$18.0	$51.1	$175.1	15.0%	$20.7	$59.0	$201.4
Northern SA	**200,000**	**5.0%**	**$31.2**	**$83.5**	**$246.6**	**5.0%**	**$31.2**	**$83.5**	**$246.6**	**5.0%**	**$31.2**	**$83.5**	**$246.6**	**5.0%**	**$31.2**	**$83.5**	**$246.6**
Southern SA	**200,000**	**0.0%**	**$18.8**	**$55.4**	**$181.6**	**5.0%**	**$21.7**	**$64.3**	**$209.9**	**10.0%**	**$25.0**	**$74.4**	**$242.0**	**15.0%**	**$28.8**	**$85.9**	**$278.5**
Total			$50.0	$138.9	$428.2		$53.0	$147.8	$456.5		$56.3	$157.9	$488.6		$60.1	$169.4	$525.1

Area	Harvest Guideline	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)
PNW	200,000	10.0%	$36.0	$96.7	$284.4	10.0%	$36.0	$96.7	$284.4	10.0%	$36.0	$96.7	$284.4	10.0%	$36.0	$96.7	$284.4
NCA	200,000	0.0%	$5.3	$17.3	$50.3	5.0%	$6.1	$20.1	$58.1	10.0%	$7.1	$23.3	$67.0	15.0%	$8.2	$26.9	$77.1
SCA	200,000	0.0%	$13.5	$38.1	$131.3	5.0%	$15.6	$44.2	$151.8	10.0%	$18.0	$51.1	$175.1	15.0%	$20.7	$59.0	$201.4
Northern SA	**200,000**	**10.0%**	**$36.0**	**$96.7**	**$284.4**	**10.0%**	**$36.0**	**$96.7**	**$284.4**	**10.0%**	**$36.0**	**$96.7**	**$284.4**	**10.0%**	**$36.0**	**$96.7**	**$284.4**
Southern SA	**200,000**	**0.0%**	**$18.8**	**$55.4**	**$181.6**	**5.0%**	**$21.7**	**$64.3**	**$209.9**	**10.0%**	**$25.0**	**$74.4**	**$242.0**	**15.0%**	**$28.8**	**$85.9**	**$278.5**
Total			$54.8	$152.1	$466.0		$57.7	$161.0	$494.3		$61.1	$171.1	$526.4		$64.8	$182.6	$562.8

Area	Harvest Guideline	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)	Landings Growth	PV Exvessel Revenues (Million $)	PV Producer Surplus (Million $)	PV Regional Personal Income (Million $)
PNW	200,000	15.0%	$41.5	$111.6	$327.2	15.0%	$41.5	$111.6	$327.2	15.0%	$41.5	$111.6	$327.2	15.0%	$41.5	$111.6	$327.2
NCA	200,000	0.0%	$5.3	$17.3	$50.3	5.0%	$6.1	$20.1	$58.1	10.0%	$7.1	$23.3	$67.0	15.0%	$8.2	$26.9	$77.1
SCA	200,000	0.0%	$13.5	$38.1	$131.3	5.0%	$15.6	$44.2	$151.8	10.0%	$18.0	$51.1	$175.1	15.0%	$20.7	$59.0	$201.4
Northern SA	**200,000**	**15.0%**	**$41.5**	**$111.6**	**$327.2**	**15.0%**	**$41.5**	**$111.6**	**$327.2**	**15.0%**	**$41.5**	**$111.6**	**$327.2**	**15.0%**	**$41.5**	**$111.6**	**$327.2**
Southern SA	**200,000**	**0.0%**	**$18.8**	**$55.4**	**$181.6**	**5.0%**	**$21.7**	**$64.3**	**$209.9**	**10.0%**	**$25.0**	**$74.4**	**$242.0**	**15.0%**	**$28.8**	**$85.9**	**$278.5**
Total			$60.2	$167.0	$508.8		$63.2	$175.9	$537.1		$66.5	$186.0	$569.2		$70.3	$197.5	$605.7

[1]Present values (PV) calculated for the 2005-2009 period using a 4.1% discount rate.

[2]Exvessel revenues projected using 2004 exvessel prices by fishery sector from PacFIN.

[3]Producer surplus projected using per unit values of: $237.13 per metric ton for SCA; $226.94 per metric ton for NCA; and, $320.89 per metric ton for PNW.

[4]Regional personal income projected using marginal total income multipliers of: $.418 per pound landed in SCA; $.336 per pound landed in NCA; and, $.486 per pound landed in PNW

Figure 1. Change in producer surplus from the status quo under each alternative, by region, base case, 2005-2009.

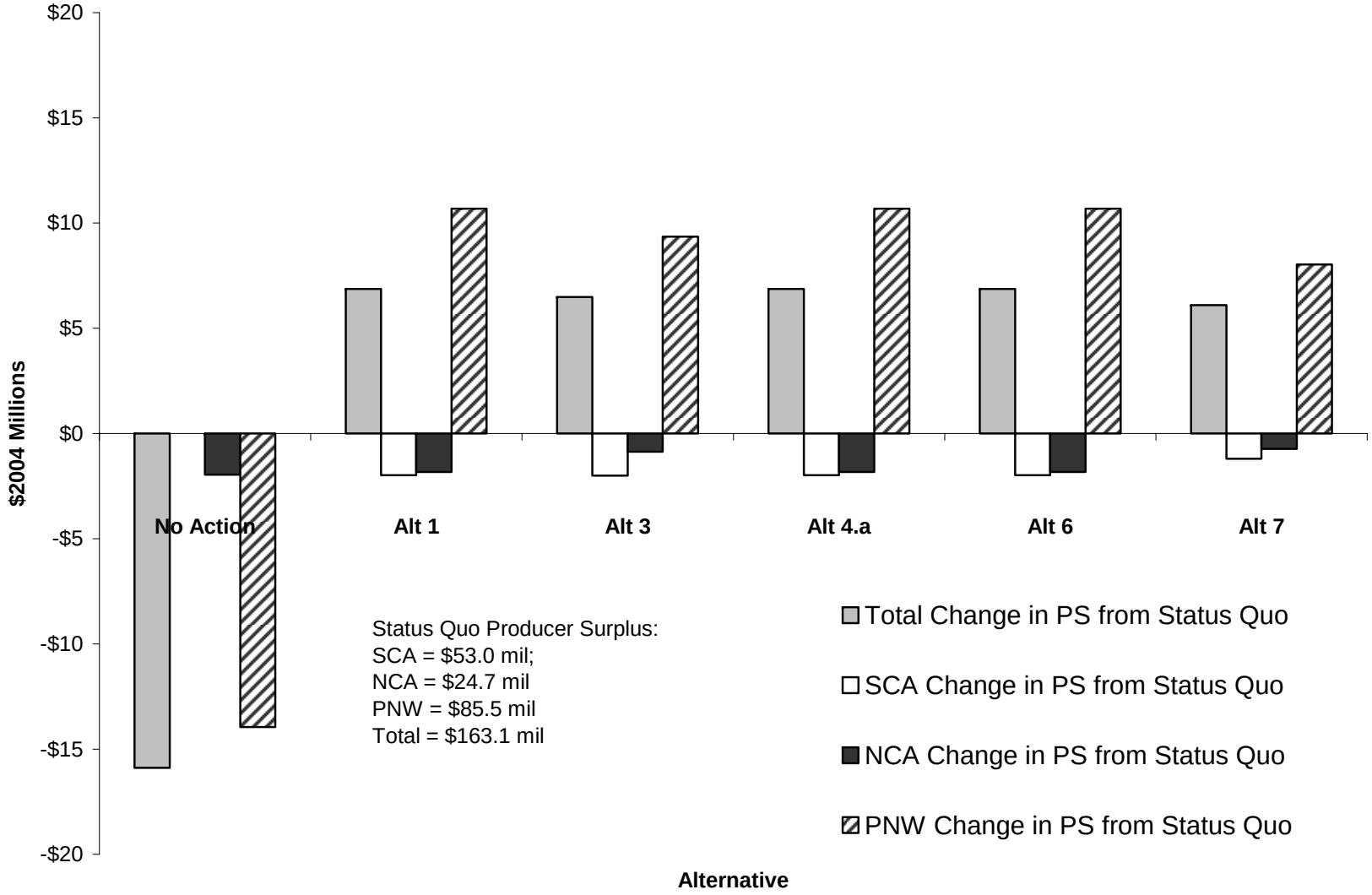


Figure 2. Change in the number of months with a landings shortfall and the number of months with a zero allocation for each allocation alternative relative to the status quo, by region, base case, 2005-2009.

Figure 3. Change in surplus harvest guideline (mt) from the status quo for each allocation alternative, base case, 2005-2009.

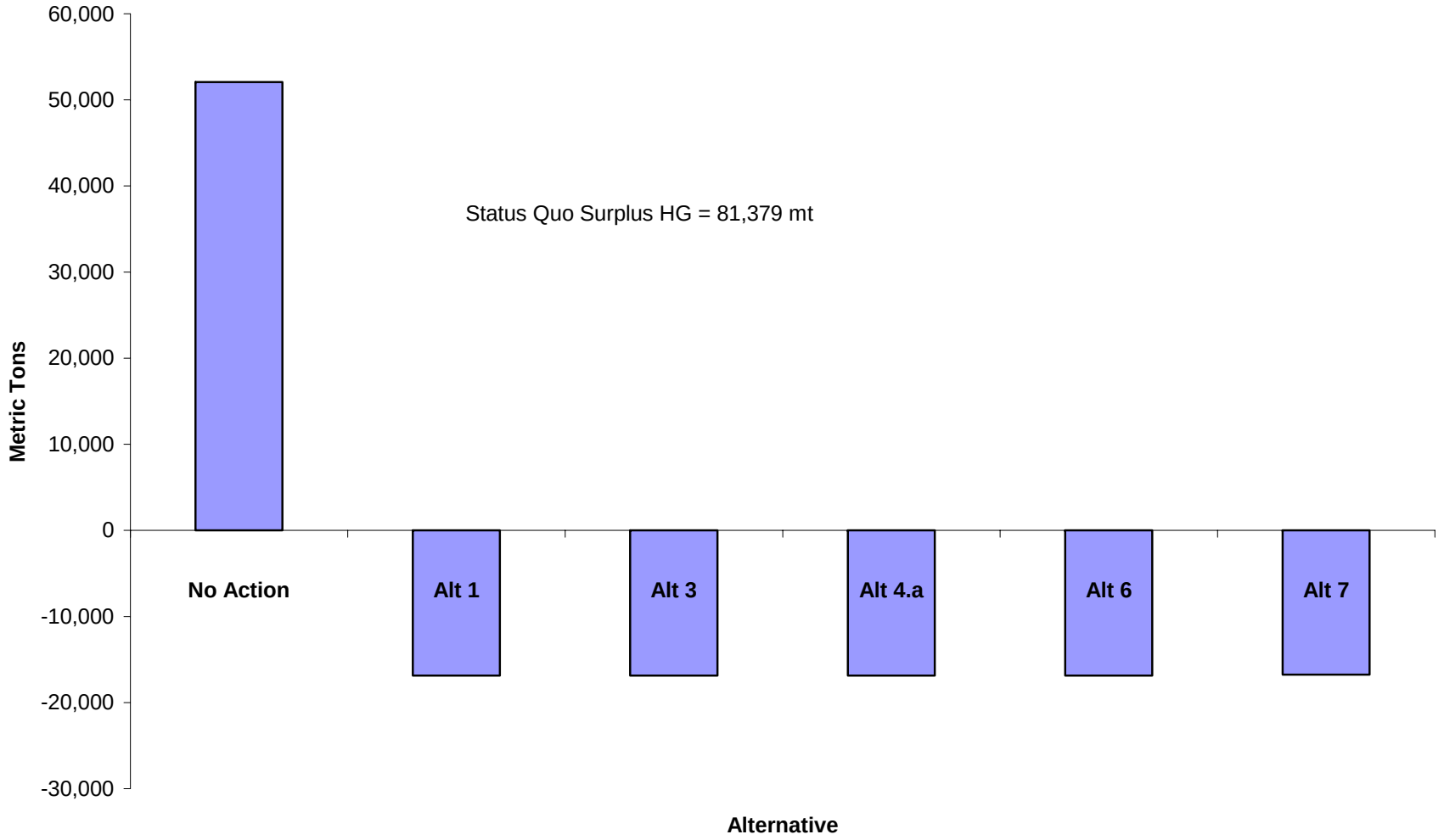


Figure 4. Change in producer surplus from the status quo under each alternative, by region, high harvest guideline case, 2005-2009

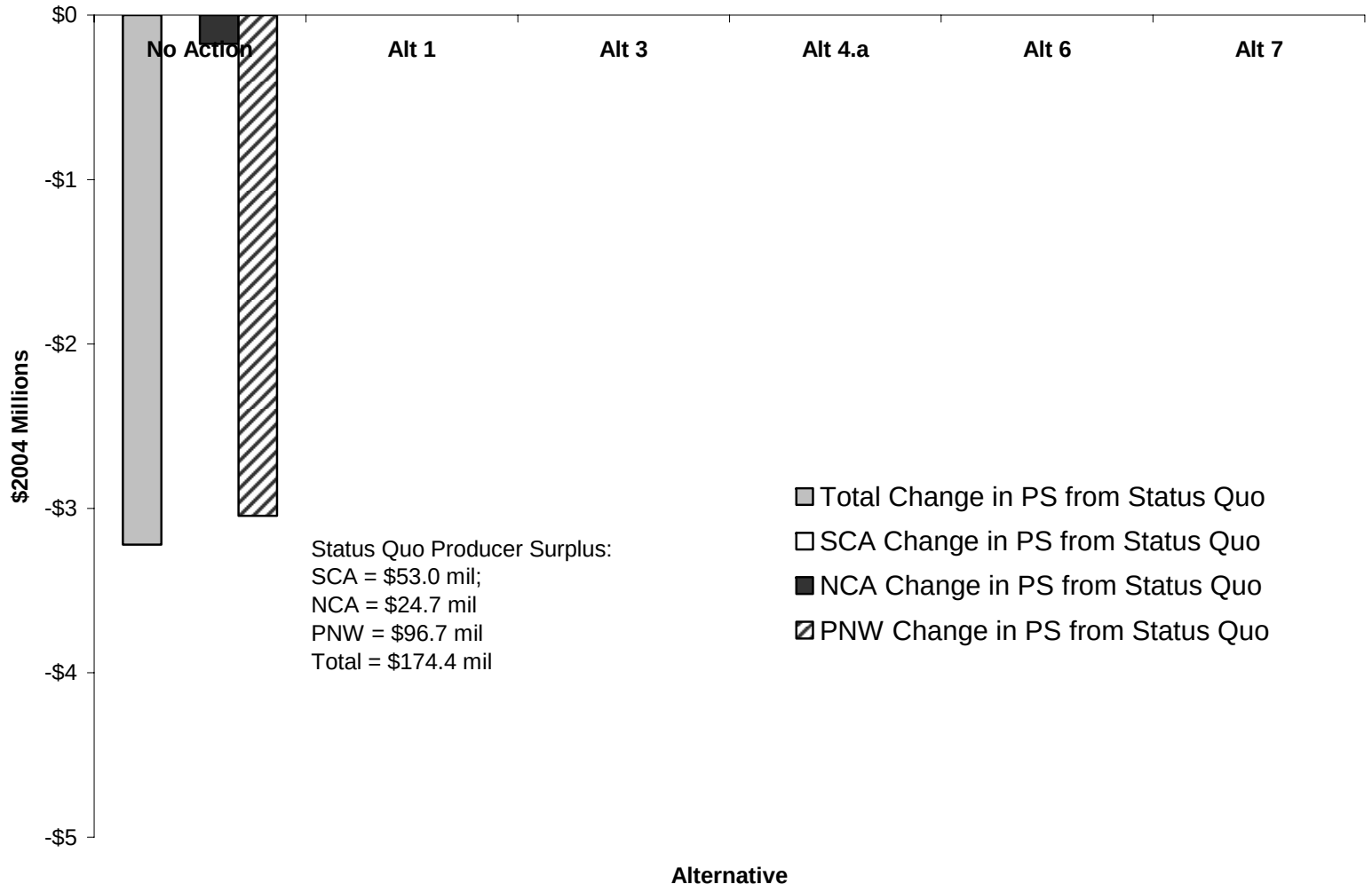


Figure 5. Change in the number of months with a landings shortfall and the number of months with a zero allocation, by region, for each allocation alternative relative to the status quo, high harvest guideline case, 2005-2009.

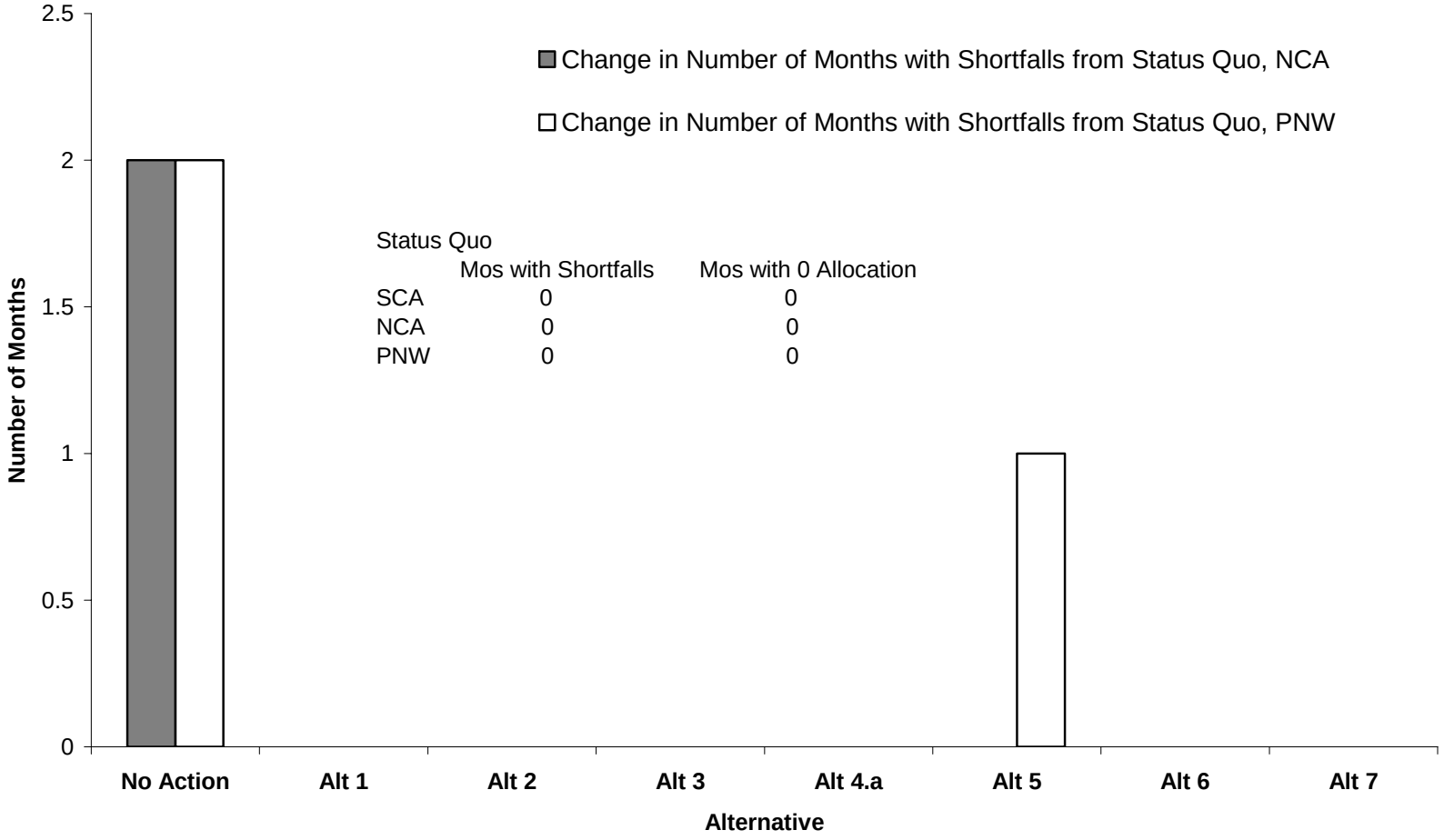


Figure 6. Change in surplus harvest guideline (mt) from the status quo for each allocation alternative, high harvest guideline case, 2005-2009.

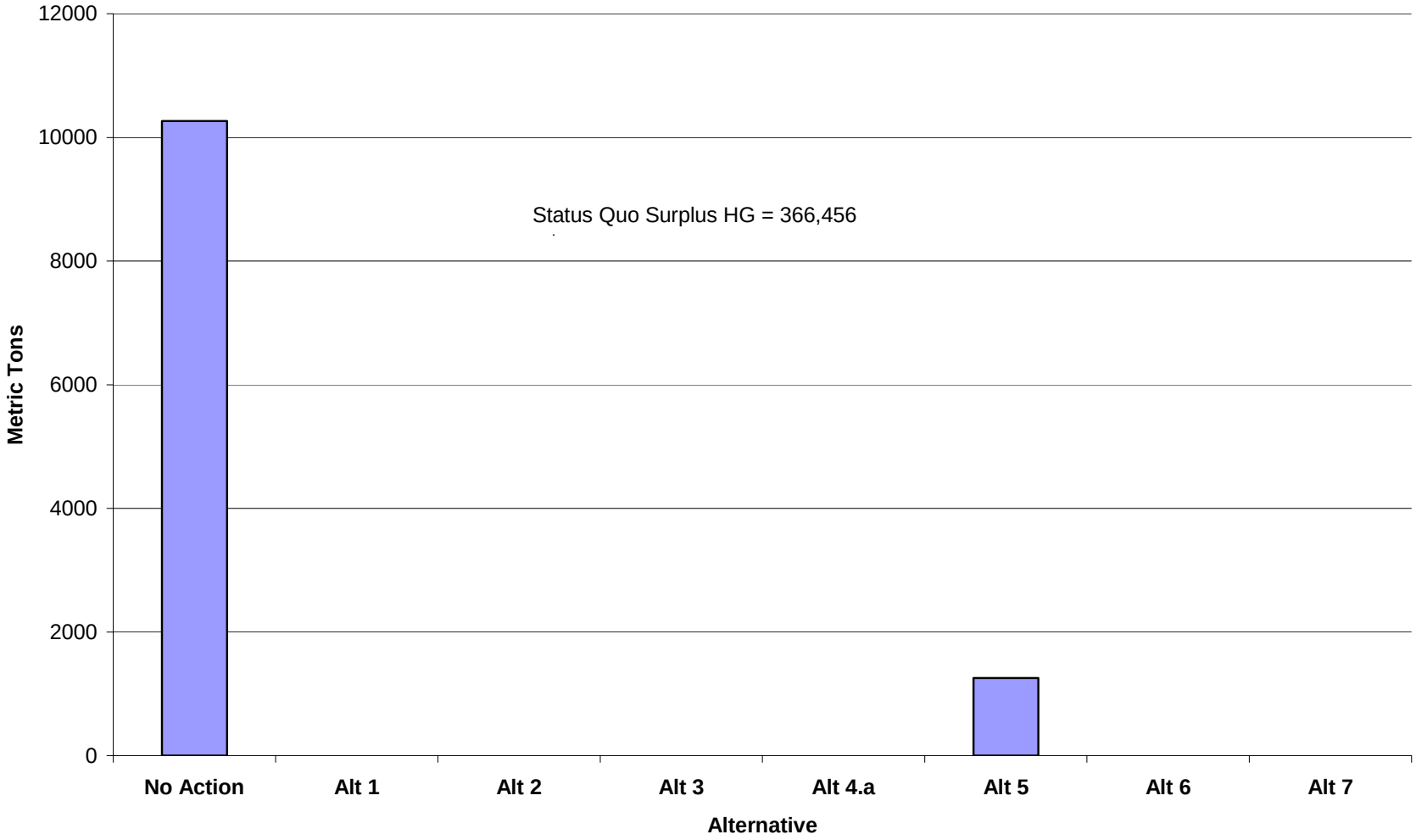


Figure 7. Change in producer surplus from the status quo under each alternative, by region, low harvest guideline case, 2005-2009.

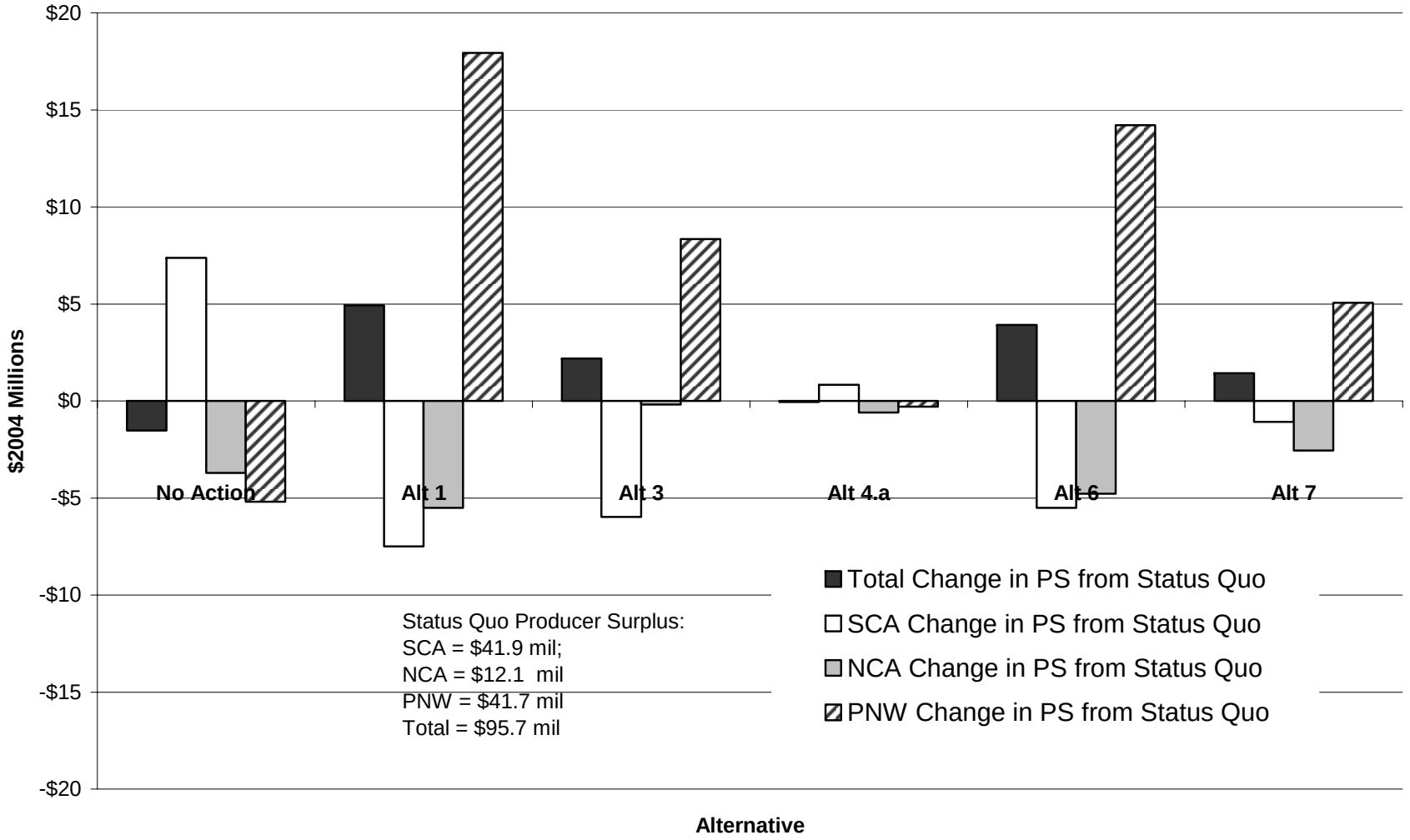


Figure 8. Change in the number of months with a landings shortfall and the number of months with a zero allocation, by region, for each allocation alternative relative to the status quo, low harvest guideline case, 2005-2009.

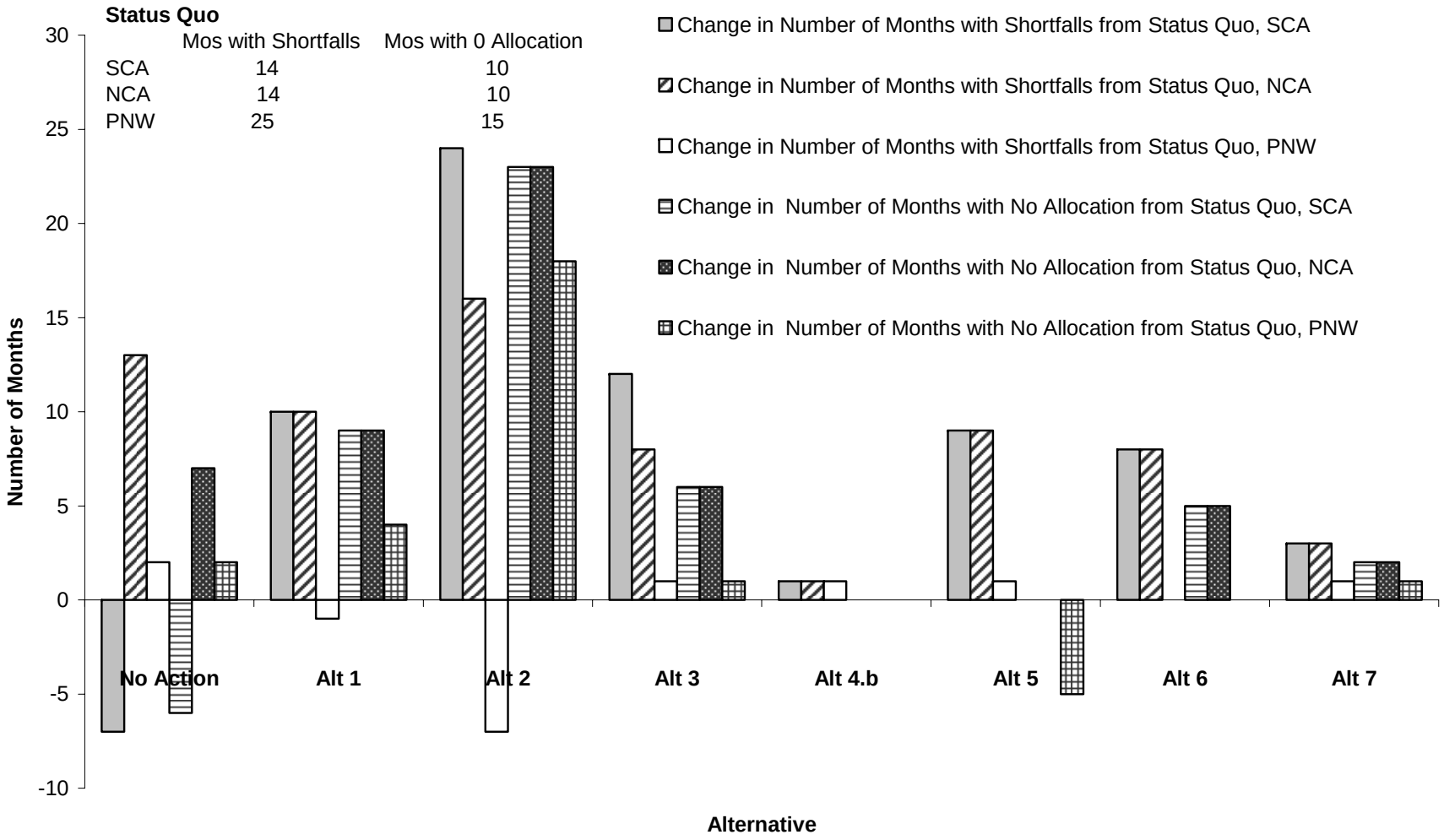
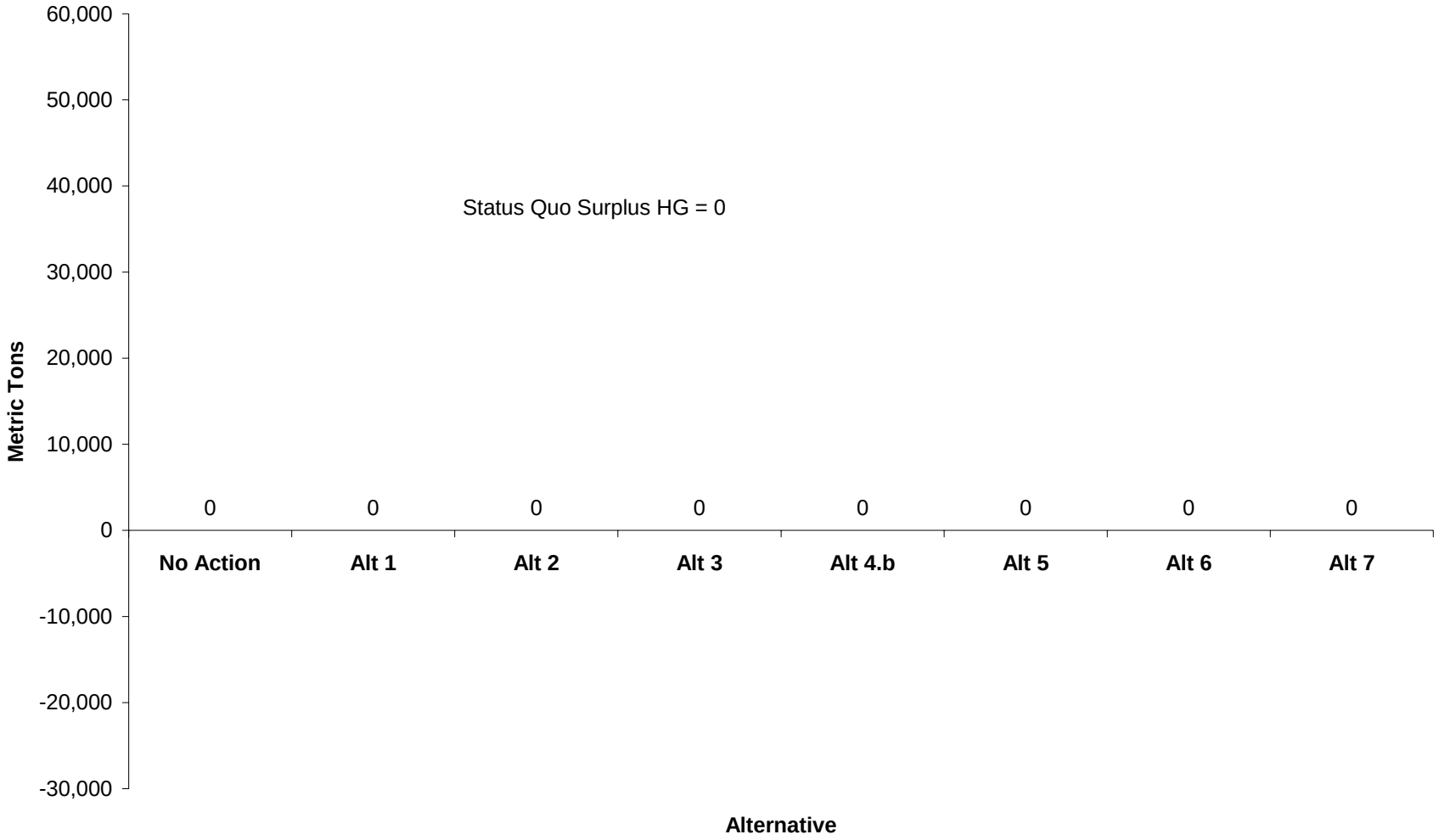


Figure 9. Change in surplus harvest guideline (mt) from the status quo for each allocation alternative, low harvest guideline case, 2005-2009.



Sensitivity Analysis of Pacific Sardine Harvest Guideline Allocation Alternatives

Background:

The Coastal Pelagic Species Management Team (CPSMT) presented results of preliminary economic analyses of the alternatives proposed to establish a long-term allocation framework for the Pacific sardine harvest guideline (HG) to the Council and its advisory groups at the June, 2005 Council meeting in Tacoma, Washington. Following its review, the Council requested the CPSMT to conduct a sensitivity analysis of the landings growth rates used in the model to project landings by fishery sector (Southern California, Northern California and Pacific Northwest) over the 2005-2009 time period.

The CPSMT proceeded to develop a range of scenarios for the sensitivity analysis that addressed the Council's concern over uncertainty in the growth in landings over the next five years. The range of scenarios also accounted for different trends in the direction of the HG over the five-year period. The allocation alternatives that were adopted for public review were subjected to a sensitivity analysis under the range of landings and HG "growth" scenarios.

Methodology:

The focus of the sensitivity analysis was on the uncertainty surrounding the landings growth rates and HG growth rates used in the model to project landings by each fishery sector under each allocation alternative over the next five years. Basically the sensitivity analysis replaced point estimates of these input parameters with probability distributions for the range of possible values for these parameters to characterize growth in the fisheries. A Monte Carlo simulation routine was then used to repeatedly sample these input distributions to generate probability distributions of possible landings projections and corresponding measures of processor producer surplus for each alternative under each growth scenario.

The first step in the analysis was to structure scenarios about what one might anticipate in terms of landings growth in the fisheries, and HG growth over the 2005-2009 period. The CPSMT considered three growth rates for landings: 1) 0 percent (no growth) in annual landings from the 2004 baseline; 2) 10 percent annual growth; and, 3) 15 percent annual growth. From a 2005 baseline of 136,000 mt the HG was projected to: 1) remain constant over the period; 2) decrease at a rate of 10 percent per year; and, 3) increase at 10 percent per year. The scenarios were developed applying these landings growth rates to the fisheries in combination with the HG projections (Table 1).

Table 1. Landings and HG growth scenarios

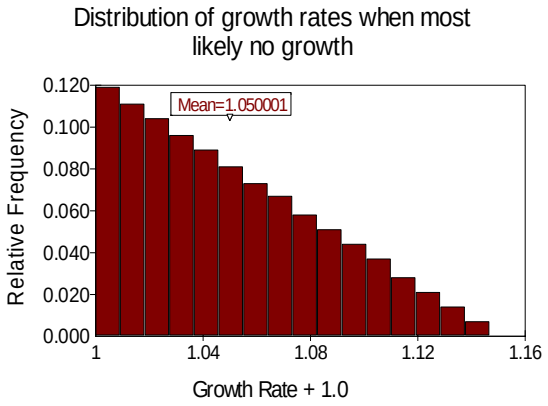
Scenarios	SCA Most Likely Growth[1]	NCA Most Likely Growth[1]	PNW Most Likely Growth[1]	HG Growth[2]
1	0%	0%	15%	-10%
2	10%	10%	10%	-10%
3	15%	15%	0%	-10%
4	0%	0%	15%	0%
5	10%	10%	10%	0%
6	15%	15%	0%	0%
7	0%	0%	15%	10%
8	10%	10%	10%	10%
9	15%	15%	0%	10%

[1]Most likely growth rate approaches the maximum or minimum growth rate. Max and Min growth rates are fixed.

[2] Most likely 136,000 mt HG, 0%/yr, +10%/yr, -10%/yr
Low 72,000 mt HG, 0%/yr, +10%/yr, -10%/yr
High 200,000 mt HG, 0%/yr, +10%/yr, -10%/yr

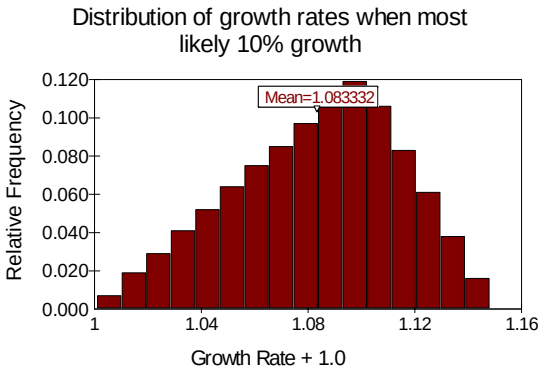
In the landings model, a triangular distribution[1] was used to specify the range of possible landings growth rates, based upon a minimum growth rate, a most likely growth rate, and a maximum growth rate. The minimum growth rate was always 0 percent and the maximum growth rate was always 15 percent, and depending on the scenario the most likely growth rate was either 0 percent, 10 percent or 15 percent. Therefore, the triangular distribution when the most likely growth rate in a fishery sector was: 1) 0 percent was specified as, Triangular(0, 0, 15); 10 percent, Triangular(0, 10, 15); and, 15 percent, Triangular(0, 15, 15) (Figure 1). The most likely growth rate approaches the maximum or minimum, where the maximum and minimum rates are fixed.

Zero growth - Triangular (1.0,1.0,1.15)



10% growth - Triangular (1.0,1.1,1.15)

[1] The triangular distribution is specified as: Triangular(minimum value, most likely value, maximum value) distribution



15% growth - Triangular (1.0,1.5,1.15)

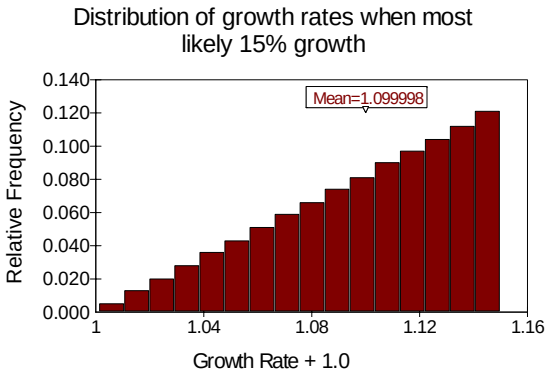


Figure 1. Landings growth rate distributions.

The HG was also specified as a triangular distribution. In this base case, the most likely HG was 136,000 mt fixed over the five-year period, with 72,000 mt as a minimum HG and 200,000 mt as a maximum HG (Triangular(72,000, 136,000, 200,000)) (Figure 2).

Triangular (72,000, 136,000, 200,000)

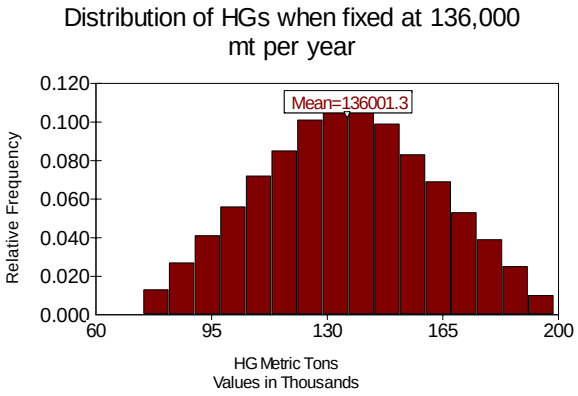
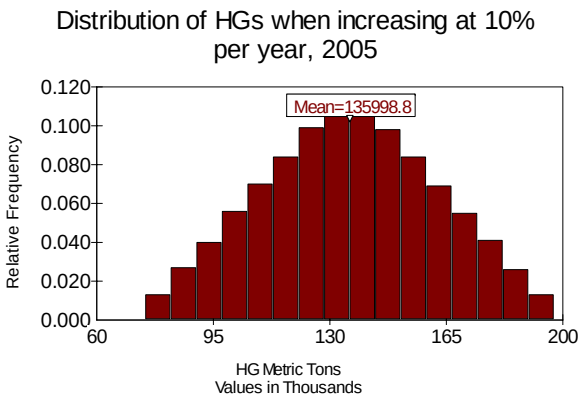
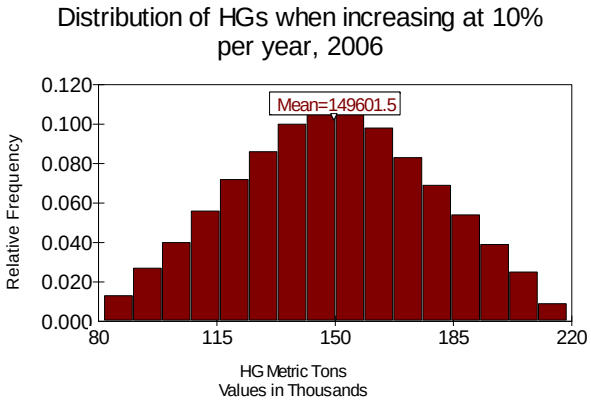


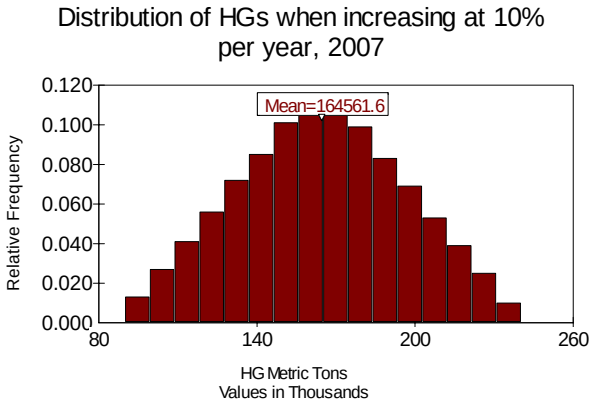
Figure 2. HG distribution when HG fixed at 136,000 mt, 2005-2009.

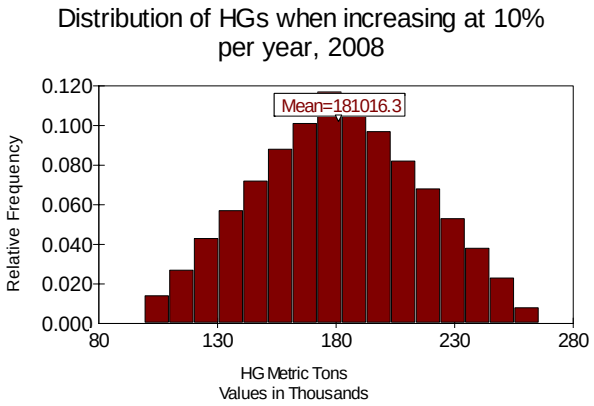
In the case where the HG was projected to increase at 10 percent per year over the period, the most likely value, 136,000 mt, the minimum HG, 72,000 mt, and the maximum HG, 200,000 mt were each increased 10 percent per year. Therefore the triangular distribution was shifting upward by 10 percent each year over the period (Figure 3).

Triangular(Base Low+10%, Base ML+10%, Base High+10%)









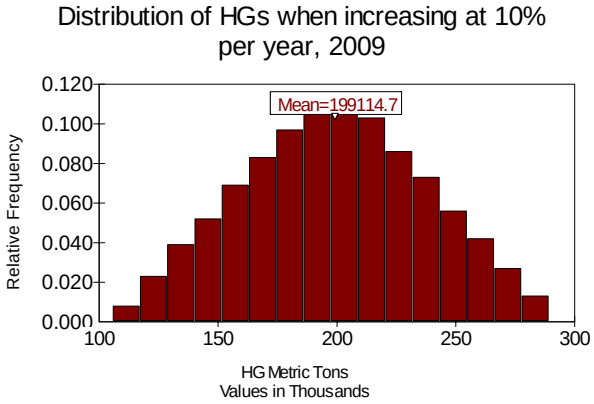
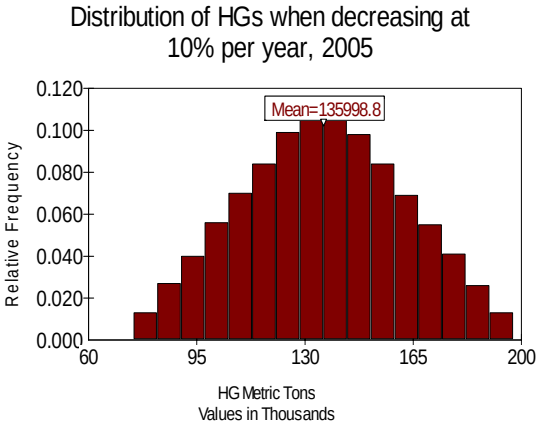


Figure 3. HG distribution when HG increasing at 10% per year, 2005-2009.

In the case of a 10 percent decrease in the HG over the period, the most likely value, 136,000 mt, the minimum HG, 72,000 mt, and the maximum HG, 200,000 mt were each reduced 10 percent per year. Therefore the triangular distribution was shifting downward by 10 percent each year over the period (Figure 4).

Triangular (Base Low-10%, Base ML-10%, Base High-10%)



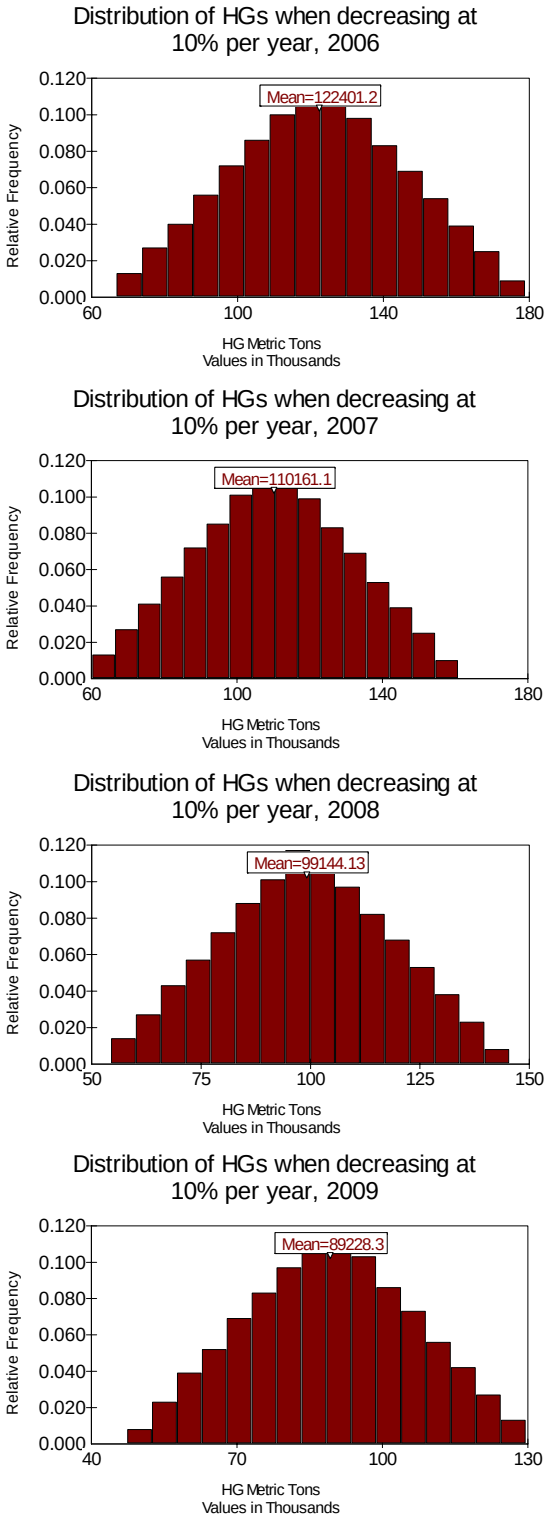
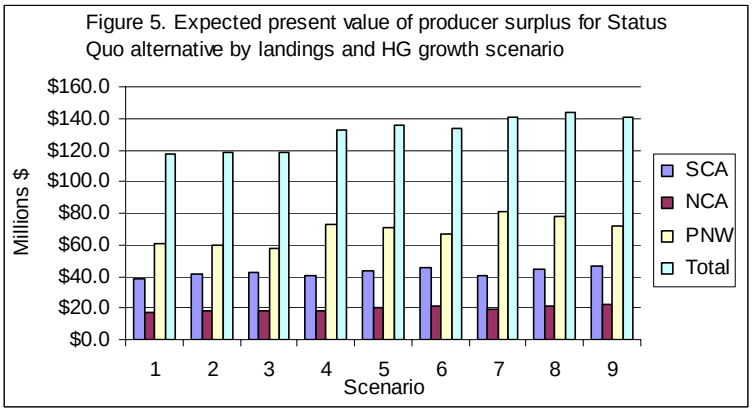
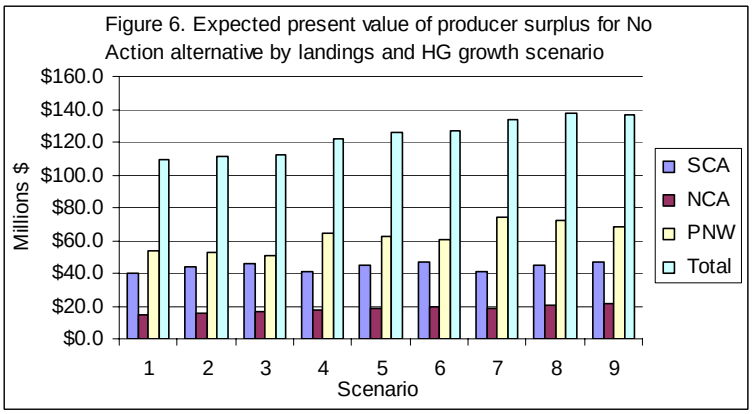


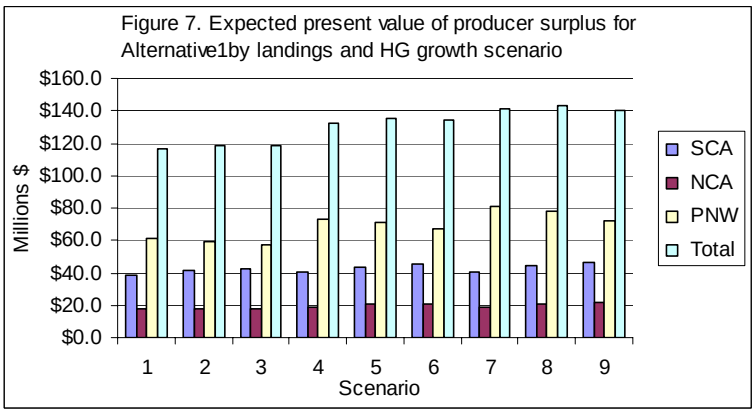
Figure 4. HG distribution when HG decreasing at 10% per year, 2005-2009.

The probability distributions for landings and HG growth, for the scenario under consideration, were repeatedly sampled using a Monte Carlo simulation routine to generate probability distributions for each of the model outputs, under each allocation

alternative, for each fishery sector. The results reported here are the expected values (distribution means) for estimated producer surplus by fishery sector, for each of the allocation alternatives under each growth scenario (Figures 5-12).







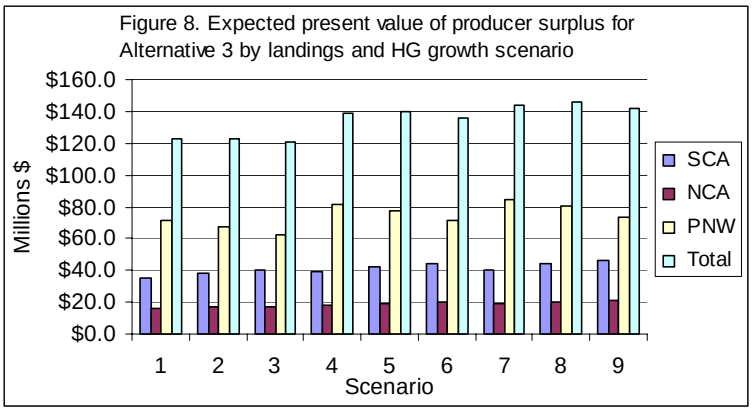


Figure 8. Expected present value of producer surplus for Alternative 3 by landings and HG growth scenario
$160.0
$140.0
$120.0
$100.0
$80.0
$60.0
$40.0
$20.0
$0.0
Millions $
1 2 3 4 5 6 7 8 9
Scenario
SCA
NCA
PNW
Total

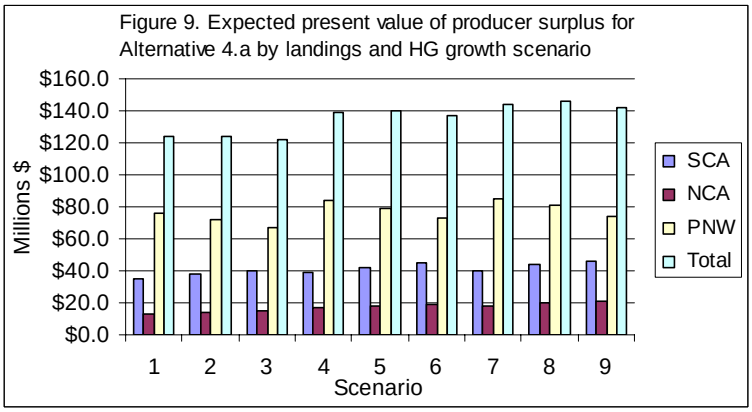


Figure 9. Expected present value of producer surplus for Alternative 4.a by landings and HG growth scenario
$160.0
$140.0
$120.0
$100.0
$80.0
$60.0
$40.0
$20.0
$0.0
Millions $
1 2 3 4 5 6 7 8 9
Scenario
SCA
NCA
PNW
Total

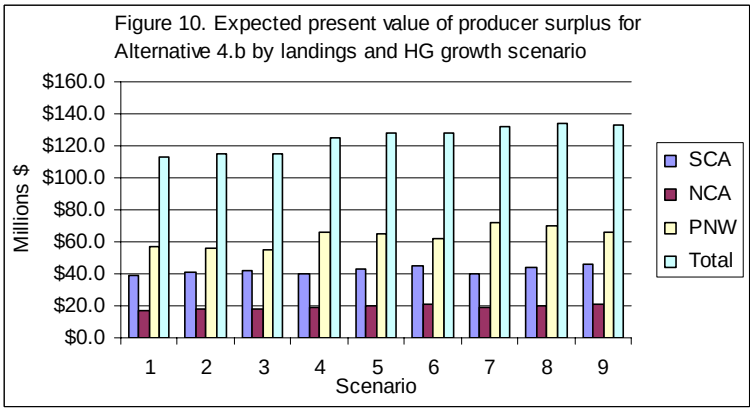
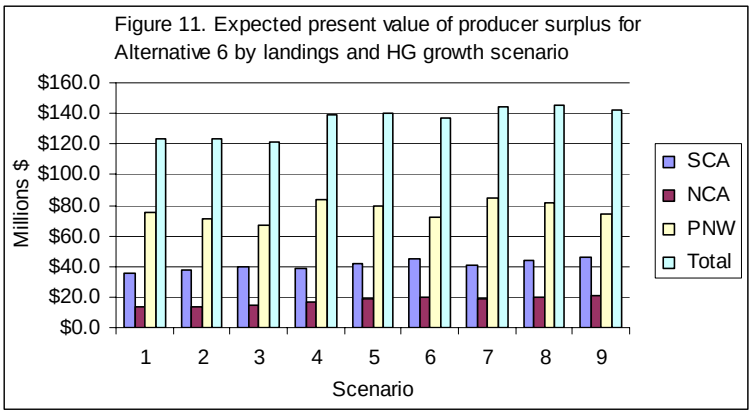
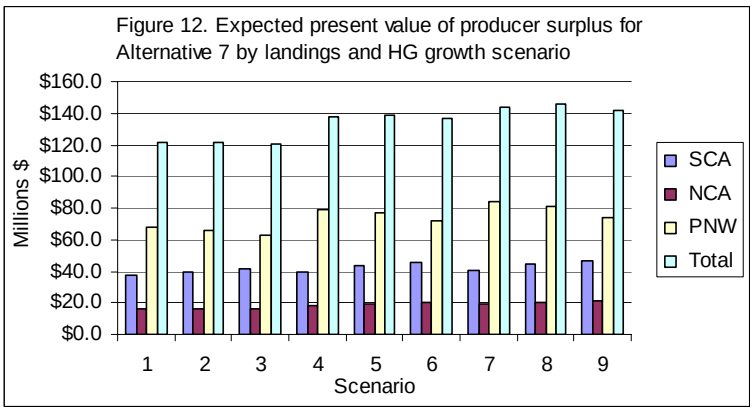


Figure 10. Expected present value of producer surplus for Alternative 4.b by landings and HG growth scenario
$160.0
$140.0
$120.0
$100.0
$80.0
$60.0
$40.0
$20.0
$0.0
Millions $
1 2 3 4 5 6 7 8 9
Scenario
SCA
NCA
PNW
Total





Discussion:

In every case, there was a 40 to 50 percent probability that the estimated present value of total producer surplus was within plus/minus $5.0 million of the expected value. Not surprisingly, the expected present value of total producer surplus was greatest across all alternatives when growth rates in the Pacific Northwest were 10 percent or greater, and the HG was increasing at 10 percent per year over the period; growth scenarios 7 and 8. In terms of the expected present value of total producer surplus Alternative 6 and Alternative 4.a generated the highest expected values, and were virtually identical across the range of growth scenarios. This suggests that if maximization of the present value of total producer surplus is the primary objective of allocation then either of these alternatives will likely serve the purpose given the range of possible outcomes.

The sensitivity of expected present values of total producer surplus to changes in the input parameters was evaluated using stepwise linear regression on the simulation results. In general the present value of total producer surplus was more sensitive to growth in landings than to trends in the HG. In most cases changes in producer surplus were most positively related to the growth rate for landings in the Pacific Northwest. In those cases where the HG was trending downward, the 2009 HG had a strong influence on the present value of total producer surplus.

Survey Methodology and Results for Collection of Economic Data Used in the Analysis of Long-Term Allocation Options for the Pacific Sardine Harvest Guideline

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Introduction

The Pacific Fishery Management Council is considering long-term changes to the framework for allocating the coastwide Pacific sardine harvest guideline between the northern and southern subareas of the fishery (currently the Pacific Northwest and California respectively). At the outset, the Council requested the industry to assemble and develop options for allocating the harvest guideline between geographic sectors of the fishery -- Pacific Northwest (PNW, Washington and Oregon), Northern California (Monterey area) and Southern California (San Pedro area). The rationale being, that given the annual harvest guideline, which is established to insure the ecological well being of the resource, and no market based mechanism to allocate the harvest guideline, the way in which the harvest guideline was to be directly allocated was a decision best left up to industry. The hope was that the fishery sectors would negotiate among themselves and reach an allocation agreement that would be satisfactory to all in terms of economic and community impact concerns. Industry did meet several times in attempt to reach an agreement on allocation. Industry failed to come up with a means that was preferred by all, and instead developed seven alternatives that would allocate the harvest guideline either on a seasonal, regional or combination seasonal-regional basis. The Council was then faced with selecting among these alternatives, as well as an alternative that represented the status quo and an alternative that represented no action. It turned to the CPS Management Team to provide an analysis of each alternative relative to the status quo.

An analysis of proposed changes in the harvest guideline allocation framework would primarily focus on the net economic benefits associated with alternative allocation options being considered. Consequently, an effort was undertaken to assemble detailed cost and earnings (C-E) data from west coast sardine processors in each sector of the fishery which would enable

[1] This document has been revised in response to a review by the Economics Subcommittee of the Scientific and Statistical Committee (SSC Economics Subcommittee May 24, 2005).

estimates of producer surplus and private profits in the fishery under each allocation option being proposed. The analysis focused on sardine processors since differences in net economic values and private profits between the two subareas are mainly determined at the exprocessor level. The data collection procedures and results are described and discussed below, followed by some concluding remarks.

Methodology

Shortcomings in the procedures used in developing the economic data for the current (2003-2005) interim Pacific sardine harvest guideline allocation arrangement weighed heavily in designing a survey methodology to assemble the economic data for evaluating the long-term allocation framework alternatives. In the interim allocation case, analysts were dealing with an exceedingly short time frame in which to assemble the necessary economic data, conduct the appropriate analyses and present the results to the Council at its April, 2003 meeting. In this case the data collection procedure was to solicit voluntary C-E data through a detailed questionnaire that was made available to all industry members in each fishery sector during January, 2003. This resulted in a non-random sample of processors replying to the solicitation, who responded with a wide range of values for the specific C-E data being sought. The returned questionnaires were not consistently and completely filled out across, and within, all fishery sectors, because the C-E items specified in the questionnaire did not universally apply to all processing operations. This required less than fully successful follow up to ensure that to the extent possible the values used in the analyses were realistic.

While every attempt was made to insure that the economic data would be representative of each fishery sector's sardine processing operations, the possibility of inherent biases in the data that were provided could not be ruled out. This mainly had to do with the contentiousness of the issue at hand strategically influencing the information provided by participants in the data collection exercise; i.e., strategic bias. Although there was no specific evidence, incentives for skewing the data in order to gain some strategic advantage were undeniably present in the sardine harvest guideline allocation case.

To validate the economic data, the cost-benefit/private profit analyses and the data used therein were subsequently reviewed by the CPS Advisory Subpanel (AP) and other industry members during the week of the April 2003 Council meeting. During this review there was considerable debate and disagreement over the C-E values used in the analyses. At the time there was no resolution to the disagreements over appropriate amounts for the C-E measures subject to dispute. Despite these concerns the data were used to conduct cost-benefit/private profit analyses of the interim allocation alternatives. The analyses were then presented to the Council with the stern warning that the data used in the analyses might not be representative of the economics of sardine processing in each of the fishery sectors.

Based upon the experience in collecting the economic data for the analyses of the interim allocation alternatives, a Delphi-like process was developed to obtain representative, unbiased economic data for evaluation of the long-term allocation alternatives. The basic protocol was to follow up on the interim allocation experience by convening sardine processors -- a panel of

experts -- from each fishery sector and to have them develop a reliable consensus opinion on representative values for the C-E variables of interest.[2]

The process was coordinated by representatives of fishing industry associations in California and the Pacific Northwest.[3] These coordinators were very knowledgeable of the fishery and had the trust of the sardine process in their respective sectors. They were able to interact with all of the processors in their respective sectors to get a full participation in fashioning a consensus on the C-E measures.

The course of action was to: (1) assembling regional panels of expert processors for the development of representative sardine processed product C-E data; (2) preparing a form to guide the process and to record values for the C-E data elements; (3) initial development of C-E profiles for processed sardine products in each sector; (4) review and assessment of the initial C-E profiles; (5) feedback; (6) opportunity for participants to revise their original responses; and, 7) final validation of data.

The data collection effort, steps (1)- (6) above, extended over the period December, 2004 through December, 2005. There were a number of consultations between the contractors and the principal investigator over this time to deal with problematic issues regarding the data collection, and to ensure consistency in the data collection protocol across fishery sectors. Most of these issues were resolved in a timely manner and C-E data were obtained independently for each geographic sector of the west coast sardine fishery. Step (7) was scheduled to occur during an AP and industry review of preliminary analytical results at an AP meeting scheduled for early March, 2005.

Results

The Delphi-like process achieved the following for each fishery sector:

1. Identification of the specific sardine processed products produced by each geographic sector's processors.

2. Estimates of the average annual expenditure on each of the fixed inputs that are required in the production of each sector's sardine products which included:[4]

    a. Insured value of plant;
    b. Lease expense for plant;
    c. Lease expense for equipment;
    d. Repair and maintenance expenses for plant;
    e. Repair and maintenance expenses for processing equipment;
    f. Insurance (plant insurance and other insurance associated with the operation of this plant, excluding insurance reported under variable costs);

[2] A feature of the conventional Delphi process is anonymity for all participants. This was not a strict requirement in this case, if it was deemed that a consensus could be amiably reached through a group roundtable.
[3] The coordinators were under contract to NMFS, SWFSC, La Jolla, with Sam Herrick as principle investigator.
[4] Elements of the fixed cost data were provided for all sectors except Northern California.

g. General and administrative expenses (including professional services and management fees);
h. Interest payments;
i. Depreciation and amortization;
j. All other fixed expenses (those that are independent of the level of production).

3. Estimates of the average expenditure on each of the variable inputs that are required to produce one full container load (FCL)[5] of each processed sardine product. These included:

    a. Raw fish;
    b. Processing labor;
    c. Processing labor benefits;
    d. Supervisory and technical support;
    e. Energy
    f. Product additives;
    g. Packaging;
    h. Waste disposal/treatment;
    i. Freight;
    j. Storage;
    k. Broker fees;
    l. Other sales costs;
    m. Any other variable input.

4. Estimates of the wholesale price, free on board, of each processed product.

5. Compile the economic data and create a C-E profile for a FCL of each processed product.

Survey coverage and the variable cost and earnings data obtained from each fishery sector are summarized below.

Pacific Northwest

For the Pacific northwest, there were 13 sardine processors who received sardine landings in 2004. Twelve of these processors took part in developing representative C-E data for the Pacific northwest for 2004 (Table 1). Together, these 12 processors accounted for over 98.0 percent of the Pacific northwest sardine landings in 2004. Of the 12 processors eight were considered large processors (> 500 mt of sardine receipts in 2004), and 4 were considered medium processors (> 50, but <= 500 mt of sardine receipts in 2004). Of the eight large processors, five process sardine exclusively.

Northern California

There are three sardine processors in northern California, and all three participated in developing representative C-E data for 2004 (Table 2). These three processors each received in excess of

[5] A full container load equals 22.7 metric tons.

500 mt of sardine in 2004, and accounted for 100.0 percent of the northern California landings in 2004.

Southern California

For the southern California sector there were six processors with sardine receipts in excess of 500 mt and one with receipts less than 500 mt in 2003, who were involved in developing the southern California C-E data for 2003 (Table 3). Together these processors accounted for 98.3 percent of the total southern California sardine landings in 2003.

Discussion

Methodology

Based on previous experience with the collection of these data for analysis of the current interim sardine allocation framework, the Delphi-like process was perceived as the preferred means of obtaining the desired information for analysis of the long-term allocation issue. When compared to administering a standardized survey instrument to individual processors (as was done for the interim framework), the Delphi-like process had several advantages. Assembling a voluntary panel of experts, and having them develop an acceptable format for enumerating the desired economic data greatly facilitated development of the data. Moreover, this approach provided a built in review of the data by virtue of the process.

In the case of the interim allocation analysis, industry review of the economic data used therein took place at the joint CPS Management Team - Advisory Subpanel meeting just prior to its presentation to the Council at the April, 2003 Council meeting. At that time there was vigorous debate amongst industry members present regarding the representativeness of those data. Consequently, the analytical results were subject to a number of caveats in that regard. With this in mind, and as part of the Delphi-like process, a final industry review of the data used in the economic evaluation of long-term allocation alternatives was to occur at joint CPS Management Team - Advisory Subpanel meeting planned for March 2003. This review would provide an opportunity for cross examination of the data provided by each fishery sector. Unfortunately, this meeting was not held, so, a final vetting of the economic data did not occur until the joint CPS Management Team - AP meeting on April 6, 2005. As in the prior case, and as expected this time around, there was rigorous debate amongst industry counterparts -- those it would seem most qualified to review the economic data provided by corresponding sectors of the fishery -- regarding the validity of the data used in the analysis.

Indeed, this review uncovered a major discrepancy in the data from the southern California sector. As it turned out, the wholesale prices for southern California processed sardine products included overseas freight costs, and were not FOB prices. The effect of this was to inflate the weighted average estimate of per unit producer surplus for southern California by the amount of the overseas freight charge. Adjustments were made accordingly to the southern California data (these revisions are incorporated in Tables 3), and the analysis was rerun using the revised dataset (Table 4) in time for presentation to the Council the following day, April 7, 2005. In this instance, the data collection protocol performed as anticipated.

While not exactly a peer review, [6] this appraisal did result in a consensus dataset for use in the analyses. To the extent that the industry review could be construed as a guise for negotiating a tacit resolution to the allocation issue then, in the sense that allocation is the province of industry, the consensus dataset may reflect what industry considers in their best interest. This seems to be consistent with the notion that given the harvest guideline (resource biological and ecological concerns having been addressed), industry should be allowed to determine how the harvest guideline is best allocated. It would follow then that an industry review of the data, and its use, would not be that unreasonable in this case.

Data Limitations

There are a number of other restrictions that using only processor variable cost and earnings data impose on the economic analyses of the proposed allocation alternatives. The data only allow estimates of producer surplus/short-run profits at the exprocessor level; any economic profits at the exvessel level are not included in estimates of processor producer surplus. In other words, if exvessel revenues -- which are variable costs to processors and therefore reduce processor producer surplus -- exceed harvesting costs, then true producer surplus for the sector is underestimated by this amount of producer surplus accruing to sardine harvesters. The lack of cost data at the harvesting level precludes estimation of exvessel producer surplus. However, there are several possible situations that may lessen this concern. First, economic theory of the fishery proposes that in the long run the average cost of harvesting sardines will be equal to the average revenue or exvessel price; producer surplus at the exvessel level will be zero.[7] If this is the case for sardine harvesters then there is no exvessel producer surplus to be concerned about, but without the cost data this can not be confirmed empirically. The second, concerns the degree of vertical integration within the fishery. If vessels are owned by processors, processor producer surplus will capture the total producer surplus for the sector. Thirdly, there may be exclusive exvessel supply arrangements between privately owned vessels and processors that result in the processor producer surplus being all-inclusive. Under these conditions it may be that supply of raw sardines is perfectly price-elastic; i.e., any amount will be supplied at the prevailing exvessel price. In this situation the marginal, and therefore average, cost of harvesting sardines would be constant and equal to exvessel price for any level of sardine harvest. Consequently, exvessel producer surplus is zero. Without conclusive evidence to support any of these circumstances, and to at least partially address potential changes in producer surplus at the exvessel level, exvessel revenue for each fishery sector was projected under each allocation alternative as a proxy for exvessel producer surplus (Table 5).

Another concern involves the fact that the economic data only represent sardine processing activity for the most recent year. However, they are intended to reflect, aggregate, average economic conditions in the long term in a very dynamic industry subject to numerous

[6] As pointed out by the Economics Subcommittee, the industry review of the data may not constitute a true peer review which requires that the reviewers not have a vested interest in the outcome, and that they be as interested in the methodology (i.e. technical aspects of the data collection process) as in the results of the work being reviewed.
[7] This is not to say that some individual vessel owners may be realizing a profit as a result of superior fishing skills (intra-marginal rents). But, for the limited entry fishery as a whole economic profits will be completely dissipated as authorized vessels increase their individual harvesting capability in the anticipation of such rents (Herrick et al. 1994).

uncertainties including, the environment, resource availability locally and globally and international market demand. Therefore it is virtually impossible to predict with any degree of certainty the volume, mix and economic value of sardine products that might be produced at any time in the future. Consequently estimates of producer surplus based on a constant per metric ton estimate of producer surplus from the data in hand should be considered realistic only as local approximations in the short run. This is because these estimates of producer surplus assume that revenues and variable costs are constant per unit output across allocation alternatives and that certain of the productive resources (capital stock) used to process raw sardines are fixed in amount over the time horizon being considered. In particular that plant processing capacity is fixed and capable of accommodating the expected growth in sardine landings in each fishery sector over the time horizon, and that there will be no need to invest in additional processing capacity (Table 6). To the extent that processing capacity is near full utilization in all fishery sectors one might expect per unit processing costs to increase as the processing capacity is more fully utilized; i.e., the marginal cost of producing each successive unit of output increases for the fixed capital stock as the variable resources used for production become relatively less efficient (i.e. diminishing returns to the variable resources).[8]

Changes in the prices of variable inputs (e.g. raw sardines)or prices of processed sardine products are also potential sources of variation among alternatives that would affect unit estimates of producer surplus in each fishery sector. Differences among alternatives in the type of processed sardine products available to markets would presumably affect demand, and therefore, market prices may respond differentially among alternatives. Similarly, substantial changes in demand for, or the availability of raw sardines could affect ex-vessel prices in each fishery sector, which would require adjustments to the unit estimates of producer surplus.

The SSC's Economics Subcommittee points out that While these economic effects on prices are indirect, and usually ignored in short-run analyses, markets would surely adjust to the proposed allocation of the sardine harvest guideline in the long run. Therefore, a long run analysis should be consider the possibility of differential effects on prices. An important simplifying case in this regard is the possibility of a perfectly elastic demand curve, in which case changes in landings among alternatives would not affect market prices for processed sardine products. Given that the market for sardines is global, and that there are a number of readily available close substitutes for processed sardine products, a perfectly elastic demand for processed sardine products might be a reasonable simplifying assumption.

The remarks above about the supply elasticity of raw sardines would apply here with regard to changes in demand for, or the availability of raw sardines and their affect on ex-vessel prices in each fishery sector. If the exvessel supply of sardines is perfectly price elastic then producer surplus is only realized at the exprocessor level. Given that there is sufficient harvesting capacity in the limited entry CPS finfish fishery south of 39^{o} north latitude, this could be the case in the California fishery sectors. Maximum harvesting capacity estimates for the limited entry CPS finfish fleet south of 39^{o} north latitude were 282,121 mt per year based on the average number of landings per year (PFMC 2002). In the Pacific Northwest fishery sector harvesting capacity is

[8] Over the long run the capital stock may be adjusted which shifts and or rotates the marginal cost or short-run supply curves. This in turn will affect the short-run producer surplus. The change in net economic benefits is given by the sum of the changes in short-run producer surplus minus the investment costs.

unknown, and hence an assumption of constant marginal costs among alternatives may not be plausible for Pacific Northwest sardine harvesters in the long run.

Lastly, the analysis of alternatives only considers the variable inputs and the associated variable costs of processing sardines in each fishery sector; i.e., those costs that are directly proportional to the amount of sardines processed. The per unit measure of producer surplus used in the analysis of alternatives is calculated as the market equilibrium price for processed sardine products net of per-unit variable costs such as expenditures on raw sardines, ice and storage, and transportation. Other costs including facilities, equipment, insurance, etc. are treated as fixed in the analysis. Therefore, part of the calculated producer surplus embodies the fixed costs associated with processing sardines, which technically should be deducted from the estimates of producer surplus to obtain a more precise measure. However, this fixed cost residual will cancel out and not affect estimates of change in producer surplus if the fixed costs are the same under the status quo and the proposed alternatives. This assumption may not be that unreasonable given the estimates of processing and harvesting capacity in the fishery.

There are a couple of complications that precluded a more inclusive treatment of the costs associated with sardine processing in this analysis. First, data on fixed processing costs were available for only two of the three fishery sectors addressed in the analysis. Second, even if the data were available for all three sectors, there are some theoretical issues related to how fixed costs are allocated among different processing activities when processing plants deal with more than one species (Terry et al. 1996). In most cases the companies that process sardines also process other species (Table 7). Therefore the problem is one of determining what share of the total fixed costs should be allocated to sardine processing. One possibility would to be allocate total fixed costs by the species revenue share.

Concluding Remarks

Fisheries economic data is not easy to get. Except for landings and exvessel prices it is generally not routinely collected for west coast fisheries. Consequently economic analyses of west coast fisheries will typically require special data collections. For a federal agency this entails identifying the population, or sub-population, designing a survey, a survey instrument, obtaining Paperwork Reduction Act clearance, finding someone capable of conducting the survey, and a lot of follow up, after which you may end up with some usable data.

The data collection effort described herein provided somewhat of an opportunity to streamline this process. The population of sardine processors on the west coast is relatively small and concentrated in three geographic areas. So, it seemed reasonable and feasible to survey the entire population. To avoid the difficulties of administering a questionnaire bring the processors together voluntarily, as panels of experts, and have them identify the relevant costs and earnings items associated with sardine processing in their geographic fishery sector and reach a consensus regarding the values of these items. Repeat the process as necessary to obtain sardine processing economic data that are representative of each fishery sector. Finally have a cross section of processors evaluate these data in order to get a dataset that is acceptable and useable for the analysis. Granted this process may leave much to be desired in terms of providing statistical properties for the data as would be derived from a full-blown survey. However it did offer,

compared to an earlier effort, an expedient and to a large degree, a defensible means of obtaining representative cost and earnings measures.

Although the use of these data in the analysis of alternatives was subject to a number of simplifying assumptions, some of these may be quite rational in the near term. Nonetheless, many of the issues surrounding the measures of producer surplus that led to these assumptions might be addressable through the development of quantifiable economic model. For analyses that focus on economic efficiency a priority for future work would be the formulation of a tractable and transparent bioeconomic model of the pacific sardine industry for use in evaluating the impacts of various policy alternatives on producer and consumer surplus.

Finally, there are a number of environmental, biological and other socioeconomic factors that effect patterns of landings in the fishery that are not quantitatively accounted for in the analysis. Variation in one or more of these could bring about crucial changes in the availability or demand for sardines across the fishery sectors within a relatively short period. Given the high degree of uncertainty, and the fact that the economic analysis of alternatives is essentially a short-term analysis, it is imperative that the long-term sardine harvest guideline allocation framework readily provide for review and revision should conditions in the fishery change significantly. Useful in this regard would be the bioeconomic model referred to above.

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Tables

TABLE 1. Average earnings and variable cost data per full container load (FCL) for Pacific northwest processed sardine products, 2004.

Item	Product Frozen 10 - 18 Kilo Pack
Share of Total Production	96.0%
Sales Revenues	
Av. Sales Price per FCL	$15,758.00
Pounds per FCL	50,000
Variable Production Costs	
Raw fish cost per FCL	$3,403.00
Fish landing tax per FCL	$46.00
Processing labor - total man hours per FCL	139
Wage rate per HR	$10.08
# employees required per FCL	78
Benefits	$1.83
Supervis-Tech - # HRS per FCL	6
Supervis.wage rate per HR	$43.50
Energy cost per FCL	$544.00
Energy requirement per FCL	5,280
Packaging cost per FCL	$1,202.50
Waste disposal per FCL	$220.00
Shipping-trucking per FCL	$637.50
Airfreight per FCL	$0.00
Storage cost per FCL	$295.50
Broker Fees	$510.00
Other variable costs (list)	n/a
Salt	$76.00
Unloading	$400.00
Ice	$369.50

TABLE 2. Average earnings and variable cost data per full container load (FCL) for northern California processed sardine products, 2004.

	Product					
Item	**Fresh**	**Frozen IQF**	**Frozen 2 Kilo**	**Frozen 10 Kilo**	**15 Kilo Nude Block w/ Liner**	**Frozen 50 lb Block**
Share of Total Production	1.0%	2.6%	0.5%	32.0%	11.4%	52.7%
Sales Revenues						
Sales Price per FCL	$23,500.00	$22,500.00	$16,500.00	$16,000.00	$12,500.00	$8,000.00
# lbs in FCL	50,000	50,000	50,000	50,000	50,000	50,000
Variable Production Costs						
Raw fish cost per FCL	$2,500.00	$2,500.00	$2,000.00	$2,500.00	$2,000.00	$2,500.00
DFG fish landing tax per FCL	$315.00	$315.00	$315.00	$315.00	$315.00	$315.00
Processing labor - total man hours	48	96	240	70	45	42
Wage rate per HR	$10.00	$10.00	$10.00	$10.00	$10.00	$10.00
# employees required	12	12	30	20	15	14
Benefits	n/a	n/a	n/a	n/a	n/a	n/a
Supervis-Tech - # HRS	4	8	8	3.5	3	3
Supervis.wage rate per HR	$17.00	$17.00	$17.00	$17.00	$17.00	$17.00
Energy cost per FCL (see storage below)	n/a	n/a	n/a	n/a	n/a	n/a
Energy requirement per FCL	n/a	n/a	n/a	n/a	n/a	n/a
Packaging cost per FCL	$2,500.00	$2,500.00	$2,500.00	$1,025.00	$110.00	$0.00
Waste disposal per FCL	n/a	n/a	n/a	n/a	n/a	n/a
Shipping-trucking per FCL	$3,000.00	$1,000.00	$2,300.00	$2,000.00	$1,000.00	$1,000.00
Airfreight per FCL	n/a	n/a	n/a	n/a	n/a	n/a
Storage/freezing per FCL (includes energy)	$500.00	$1,000.00	$1,000.00	$1,650.00	$1,700.00	$1,500.00
Broker Fees	n/a	n/a	n/a	n/a	n/a	n/a
Other variable costs (list)	n/a	n/a	n/a	n/a	n/a	n/a
Unloading+trucking to plant per FCL	$450.00	$450.00	$450.00	$450.00	$450.00	$450.00
Ice (averaged) per FCL	$365.00	$365.00	$365.00	$365.00	$365.00	$365.00

TABLE 3. Average earnings and variable cost data per full container load (FCL) for southern California processed sardine products, 2003.

	Product						
Item	**Fresh**	**H&G**	**Frozen IQF**	**Frozen 2 Kilo**	**Frozen 10 Kilo**	**15 Kilo Nude Block w/ Liner**	**Frozen 50 lb Block**
Share of Total Production	3.2%	11.4%	6.3%	0.0%	40.2%	10.2%	27.7%
Sales Revenues							
Sales Price per FCL	$18,500.00	$20,300.00	$22,500.00	$15,500.00	$14,000.00	$11,000.00	$6,300.00
# lbs in FCL	50,000	52,910	50,000	50,000	50,000	50,000	40,000
Variable Production Costs							
Raw fish cost per FCL	$2,500.00	$4,373.00	$2,500.00	$2,500.00	$2,500.00	$2,500.00	$1,600.00
DFG fish landing tax per FCL	$315.00	$551.00	$315.00	$315.00	$315.00	$315.00	$252.00
Processing labor - total man hours	48	424	240	240	30	24.0	22.5
Wage rate per HR	$10.00	$10.00	$10.00	$10.00	$10.00	$10.00	$10.00
# employees required	12	61	30	30	15	15	15
Benefits	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Supervis-Tech - # HRS	4	8	8	8	2	1.6	1.5
Supervis.wage rate per HR	$25.00	$25.00	$25.00	$25.00	$25.00	$25.00	$25.00
Energy cost per FCL	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00
Energy requirement per FCL	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Packaging cost per FCL	$2,500.00	$176.00	$1,000.00	$2,250.00	$850.00	$176.00	$60.00
Waste disposal per FCL	$5.00	$8.00	$5.00	$5.00	$5.00	$5.00	$5.00
Shipping-trucking per FCL	$1,000.00	$2,050.00	$2,500.00	$2,500.00	$2,500.00	$2,100.00	$2,100.00
Airfreight per FCL	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Storage/freezing per FCL (includes energy)	n/a	$1,150.00	$1,150.00	$1,150.00	$1,150.00	$1,150.00	$920.00
Broker Fees	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Other variable costs (list)	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Unloading+trucking to plant per FCL	$375.00	$375.00	$375.00	$375.00	$375.00	$375.00	$375.00
Ice per FCL	$625.00	$630.00	$800.00	$250.00	$250.00	$250.00	$250.00

Table 4. Itemized weighted average costs and revenues per metric ton of sardine product for each fishery sector.

	SCA	NCA	PNW
	Weighted Average	**Weighted Average**	**Weighted Average**
Rev	$557.80	$514.27	$694.80
Raw Fish[1]	$82.02	$77.82	$135.75
Processing Labor	$36.63	$23.74	$61.53
Supervisory	$3.17	$2.50	$11.51
Energy	$0.65	$0.00	$23.99
Packaging	$23.73	$19.53	$53.02
Waste	$0.23	$0.00	$9.70
Shipping Trucking	$97.50	$59.46	$28.11
Storage/Freezing	$45.77	$68.27	$13.03
Salt	$0.00	$0.00	$3.35
Unloading	$16.27	$19.88	$17.64
Ice	$14.71	$16.13	$16.29
Total Variable Cost	$320.67	$287.32	$373.91
Producer Surplus	$237.13	$226.94	$320.89

[1]Based on weighted exvessel revnues derived from the PacFIN management database.

Table 5. Present value of estimated exvessel revenue and it distribution by fishery sector under 10% growth in exvessel landings and base (136,000 mt), low (72,000 mt) and high (200,000 mt) harvest guidelines, 2005-2009

Base case scenario		Share of Regional Exvessel Revenue (Present Value)				
	Present Value of Regional Exvessel Revenue, 2005-2009	Southern California	Northern California	Pacific Northwest	Southern Subarea	Northern Subarea
No Action	$52,387,292	35.5%	13.2%	51.2%	35.5%	64.5%
Status Quo	$58,153,984	32.0%	12.9%	55.1%	44.9%	55.1%
Alternative 1	$60,808,683	29.5%	11.5%	59.0%	41.0%	59.0%
Alternative 2 (3)	$60,613,749	29.6%	12.0%	58.4%	41.6%	58.4%
Alternative 3a (4a)	$60,808,683	29.5%	11.5%	59.0%	41.0%	59.0%
Alternative 4 (6)	$60,808,683	29.5%	11.5%	59.0%	41.0%	59.0%
Alternative 5 (7)	$60,452,081	30.2%	12.1%	57.8%	42.2%	57.8%
Low HG scenario		Share of Regional Exvessel Revenue (Present Value)				
	Present Value of Regional Exvessel Revenue, 2005-2009	Southern California	Northern California	Pacific Northwest	Southern Subarea	Northern Subarea
No Action	$33,722,805	50.6%	8.3%	41.1%	50.6%	49.4%
Status Quo	$34,420,617	43.0%	11.0%	45.9%	54.1%	45.9%
Alternative 1	$36,613,034	32.3%	6.0%	61.7%	38.3%	61.7%
Alternative 2 (3)	$35,181,246	35.1%	10.9%	53.9%	46.1%	53.9%
Alternative 3a (4b)	$34,210,988	43.2%	10.9%	45.9%	54.1%	45.9%
Alternative 4 (6)	$36,136,552	34.7%	6.7%	58.6%	41.4%	58.6%
Alternative 5 (7)	$34,966,020	40.3%	8.9%	50.8%	49.2%	50.8%
High HG scenario		Share of Regional Exvessel Revenue (Present Value)				
	Present Value of Regional Exvessel Revenue, 2005-2009	Southern California	Northern California	Pacific Northwest	Southern Subarea	Northern Subarea
No Action	$61,048,755	30.5%	12.2%	57.3%	30.5%	69.5%
Status Quo	$62,159,636	30.0%	12.1%	58.0%	42.0%	58.0%
Alternative 1	$62,159,636	30.0%	12.1%	58.0%	42.0%	58.0%
Alternative 2 (3)	$62,159,636	30.0%	12.1%	58.0%	42.0%	58.0%
Alternative 3a (4a)	$62,159,636	30.0%	12.1%	58.0%	42.0%	58.0%
Alternative 4 (6)	$62,159,636	30.0%	12.1%	58.0%	42.0%	58.0%
Alternative 5 (7)	$62,159,636	30.0%	12.1%	58.0%	42.0%	58.0%

Table 6. Processing capacity estimates by fishery sector, 2005-2009.

Sector	Capacity MT per Day	Expected Landings	Number of Days to Process Expected Landings
PNW			
2005	1,190	49,339	41
2006	1,725	54,273	31
2007	1,725	59,701	35
2008	1,725	65,671	38
2009	1,725	72,238	42
NCA			
2005	1,100	17,815	16
2006	1,100	19,596	18
2007	1,100	21,556	20
2008	1,100	23,711	22
2009	1,100	26,082	24
SCA			
2005	1,950	36,619	19
2006	1,950	40,281	21
2007	1,950	44,309	23
2008	1,950	48,740	25
2009	1,950	53,614	27

Table 7. Distribution of raw fish expenditures by species for sardine processors in each sardine fishery sector, 2004.

	Percent of Total Expenditure											
Sector	**Anchovy**	**Crab**	**Ground-fish**	**Jack Mackerel**	**Other**	**Pacific Mackerel**	**Salmon**	**Sardine**	**Shrimp**	**Squid**	**Tuna**	**Grand Total**
Pacific Northwest												
CPS Only (3)[1]	0.0%	0.0%	0.0%	0.0%	0.1%	0.3%	0.0%	99.6%	0.0%	0.0%	0.0%	$2,783,386
CPS and Other (13)	0.2%	18.4%	25.6%	0.0%	3.2%	0.0%	4.7%	8.3%	7.3%	0.0%	32.2%	$40,163,585
Northern California												
CPS Only (3)	2.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	38.1%	0.0%	59.7%	0.0%	$449,469
CPS and Other (12)	5.3%	0.9%	14.4%	0.0%	1.9%	1.0%	8.0%	20.1%	0.0%	47.0%	1.3%	$5,310,557
Southern California												
CPS Only (15)	9.0%	0.0%	0.0%	0.6%	0.5%	2.3%	0.0%	17.7%	0.0%	69.9%	0.0%	$4,764,856
CPS and Other (19)	0.1%	0.2%	0.8%	2.0%	26.9%	3.5%	0.0%	16.7%	0.0%	44.3%	5.5%	$11,190,620

[1]Number of processors in each category in parentheses.

Comments on Survey Methodology and Results for Collection of Economic Data Used in the Analysis of Long-Term Allocation Options for the Pacific Sardine Harvest Guideline

SSC Economics Subcommittee
May 24, 2005

Introduction

At the April 2005 Council meeting, the SSC reviewed a document entitled "Allocation of the Pacific Sardine Harvest Guideline - Amendment 11 to the Coastal Pelagic Species Fishery Management Plan - Preliminary Alternatives Analysis (including Errata Sheet)" (hereafter referred to as "Amendment 11 Alternatives Analysis"). As part of that review, the SSC requested supporting documentation, which was not available at that time, for data and methods used in the analysis of alternatives. In response to the SSC request, Dr. Sam Herrick (CPS Team chair) prepared a working document dated May 2005 and entitled "Survey Methodology and Results for Collection of Economic Data Used in the Analysis of Long-Term Allocation Options for the Pacific Sardine Harvest Guideline" (hereafter referred to as "Survey Methodology"). This document was provided to the SSC Economics Subcommittee on May 10, 2005. The Subcommittee appreciates Dr. Herrick making this additional information available to the SSC.

According to the survey methodology, the purpose of collecting cost-earnings data from West Coast sardine processors is to analyze effects on producer surplus of proposed adjustments in the sardine harvest guidelines. The proposed adjustments involve changes in the allocation among three geographic regions: Southern California (San Pedro), Northern California (Monterey), and the Pacific Northwest (Oregon and Washington). The analysis of alternatives presented to the SSC in April 2005 was based on cost-earnings data for processors, and was intended to capture trade offs among alternatives in terms of changes to long run producer surplus for each geographic region.

Comments below focus on three specific aspects of the data collection method and use of the data in the analysis of alternatives:

1. Limitations and potential bias in the Delphi method used to collect economic data on processor operations;
2. Limitations of excluding ex-vessel profits, and basing producer surplus estimates for the industry on data from processors alone;

3. Limitations of basing producer surplus estimates on a narrow definition of variable costs, which excludes costs that vary from year to year, and are adjustable in the long run.

Comments pertaining to the three items above highlight important caveats to the current analysis of alternatives for the Pacific sardine fishery. Based on these caveats, the Economics Subcommittee concludes the current data and analysis of alternatives is not sufficient information for making an assessment or evaluation of "long-term allocation options" for the Pacific sardine fishery.

As explained below, even if processor data are accurate, which is currently unknown, the definition of producer surplus used in the analysis is most appropriate for economic conditions that would prevail in the short run. Additional factors, some included in the processor cost-earnings data, but excluded from the analysis of alternatives, need to be considered explicitly in a long run evaluation of changes to producer surplus for each geographic region.

Using the processor cost-earnings data alone for a short run analysis of alternatives would be incomplete because of changes in ex-vessel revenues, which currently are not included in the definition of producer surplus used in the survey methodology. Therefore, the Economics Subcommittee highlights the recommendation by the full SSC in April 2005 that effects on ex-vessel revenues from projected changes in landings be included in the analysis of alternatives. If available, operating costs for vessels could be subtracted from ex-vessel revenues to estimate producer surplus for harvesters.

Delphi Method

The data was developed under contract with fishing industry associations using a "Delphi type process" (Survey Methodology, May 2005, p. 1). Processor representatives from the 3 geographic regions participated in this process to develop estimates of processing costs and capacity for each area. The cost-earnings data were developed by three regional panels consisting of sardine processors who accounted for virtually all sardine landings in their respective regions. According to the survey methodology, the objective of this data collection effort was to develop representative cost-earnings data for CPS processed products, by geographic region, to:

- Profile the population of sardine processors in each region in terms of firm size, employment, and product mix;

- Estimate variable input requirements (e.g. labor, energy, ice, transport) and unit processing costs for each area;

- Estimate annual expenditures on "Fixed" inputs (e.g. insurance, lease payments on building, structures, equipment) for each area.

A Delphi process (generally speaking) is a method of structuring group communication to address a question that does not lend itself to precise analytical techniques, but can benefit from subjective judgments made collectively by a group of experts.

It is not clear why a Delphi process was an appropriate way to collect data for the analysis of sardine allocation alternatives: (1) While the Delphi method is suited to issues that cannot be addressed in a precise analytical manner, cost-earnings information is (by contrast) amenable to quantitative estimation via a standardized survey instrument. Given that such an instrument was in fact prepared, it is not clear why a Delphi method was used instead of asking processors to fill out the instrument on an individual basis (as is customary in standardized surveys). (2) While a basic premise of the Delphi method is that subjective judgment by experts can provide insight into an issue, the expectation in the case of sardine allocation was that such subjective judgment would yield biased information. For instance, the Survey Methodology document notes that "...there are likely to be inherent biases in the data that was [sic] acquired. This mainly has to do with the contentiousness of the issue at hand strategically influencing the information provided by participants in the data collection exercise; i.e., strategic bias" (Survey Methodology, May 2005, p. 4). Given this expectation of biased results using the Delphi method, it is not clear why the Delphi method was considered an appropriate information collection method.

The survey methodology gives two rationales for having regional panels rather than individual processors fill out the survey instrument:

(1) The panel approach “streamlined development of the data” (Survey Methodology, May 2005, p. 5).

The survey methodology does not define “streamlined development,” but any attempt at “streamlining” should be constrained by the need for valid data. In this regard, the data developed by the regional panels may well be representative of regional cost-earnings. However, unless adherence to an explicit and appropriate information collection protocol can be demonstrated, we have no independent basis for evaluating strengths and/or weaknesses of the data, identifying areas of uncertainty, or evaluating whether the data collected are in fact representative. For instance, some of the data used in the analysis presented at the April SSC meeting have been replaced by a different set of vales, based on concerns expressed by Northwest processors. On what basis can we judge the relative validity of the two sets of values?

(2) The panel approach provided a “built in peer review of data by virtue of the process” (Survey Methodology, May 2005, p. 5).

Processors may be well positioned to identify implausible data provided by other processors. However equating “intense debate amongst industry members regarding the validity of the data used in the analysis” to “an extremely rigorous peer review” (Survey Methodology, May 2005, p. 5) is not accurate. A true peer review requires that reviewers not have a vested interest in the outcome, and that they be at least as interested in the methodology (including, in this case, technical aspects of the Delphi method) as in the results of the work being reviewed.

Even non-statistical information collection methods such as the Delphi method require adherence to a particular information collection protocol. Unless the SSC knows what protocol was used to develop the processor data, and whether each regional panel adhered consistently to the protocol, the SSC will be unable to evaluate the validity of the data. Without a technical basis for evaluation, the SSC cannot distinguish cost-earnings profiles produced by regional panels from regional negotiating positions. This is particularly troublesome, given that processor debates regarding data validity occurred in the heat of the allocation issue, when the use to which the cost-earnings data would be put was clear to all parties.

Producer Surplus and Ex-Vessel Profits

Ex-vessel profits are not included in the producer surplus estimates used in the analysis of alternatives. Purchases of

unprocessed fish by processors are counted as a variable cost to producers in the analysis, and therefore, this source of ex-vessel revenues does not contribute to producer surplus. The assumption that ex-vessel revenues do not contribute to producer surplus is valid if, and only if, ex-vessel revenues exactly equal total economic costs of vessel operation (i.e. economic profits are zero).

If ex-vessel revenues exceed costs, then producer surplus in the analysis of alternatives underestimates true producer surplus. Vertical integration among processors and vessels is a related issue. Processors may own vessels, or have other special arrangements, and imputing purchases of raw fish by processors at observed ex-vessel prices could substantially underestimate true producer surplus. More generally, isolating possible behavioral responses to changes in a single fishery is restrictive given the suite of existing revenue sources and other possibilities that may be available to vessel operators.

To address the issue of changes in ex-vessel revenues affecting estimates of producer surplus, an analysis of changes in ex-vessel revenues among alternatives should be conducted, and included with the analysis of alternatives. At the April 2005 Council meeting, the SSC recommended that projected changes in ex-vessel revenues be added to the analysis of alternatives. Including these changes would provide another source of information to complement the current analysis of alternatives, which assumes that processor revenues net of a restricted set of costs are an adequate proxy for true producer surplus. However if vessel profits are positive, this proxy underestimates benchmark levels of producer surplus in each region. How this discrepancy affects estimates of changes in true producer surplus is not clear. Projecting changes in ex-vessel revenues for each geographical region would provide an independent source to alleviate concerns about relying solely on processor cost-earnings data for the analysis of alternatives.

Producer Surplus and Costs

The goal of analyzing long-term allocation options for Pacific sardine harvest guideline is to estimate the incremental change in producer surplus for each fishery sector when comparing each of the proposed allocation options to the status quo (Amendment 11: Alternatives Analysis, p.21, 2005). The formula for estimating the incremental change in producer surplus is obtained by multiplying the projected change in sardine landings by “an

estimate of producer surplus per metric ton for each fishery sector" (Amendment 11: Alternatives Analysis, p.21, 2005). This per metric ton estimate of producer surplus is constant across alternatives, and in particular, does not depend on the size of the change in landings under each scenario in each region.

The formula for calculating changes in producer surplus in the analysis of alternatives is consistent with the definition of long run producer surplus only if this formula is used as a local approximation. Producer surplus is the cumulative difference between the price received by producers at the market equilibrium quantity of output and the marginal cost of producing each successive unit of output. Generally, marginal costs increase with scale as less efficient resources are used for production. In the special case where marginal costs are constant, which is assumed implicitly in the formula for producer surplus, technology exhibits constant returns to scale. Therefore according to economic theory, long run economic profits and producer surplus are zero under every alternative.

The analysis of alternatives attempts to minimize variation in the per unit factor for producer surplus by including only costs that are directly proportional to the weight of sardines processed. The unit factor for producer surplus in the analysis of alternatives is formulated as the market equilibrium price for processed sardine products net of per-unit variable costs such as expenditures on raw sardines, ice and storage, and transportation. Other costs including facilities, equipment, insurance, etc. are not considered variable costs in the analysis, and thus, appear as a residual in producer surplus. This cost residual cancels and does not affect estimates of change in producer surplus, but only if these costs are the same under the status quo and the proposed alternatives. This assumption seems unlikely, given the dynamic nature of the CPS fishery and the long-term outlook of the analysis.

Changes in ex-vessel prices or prices of processed sardine products are potential sources of variation among alternatives that would affect unit estimates of producer surplus in each geographic region. Differences among alternatives in the type of processed sardine products available to markets would presumably affect demand, and therefore, market prices may respond differentially among alternatives. Similarly, substantial changes in demand for raw sardines in each geographic region could affect ex-vessel prices, which would require adjustments to the unit estimates of producer surplus.

While these economic effects on prices are indirect, and usually ignored in short run analyses, markets would surely adjust to the proposed allocation in the long run. Therefore, the possibility of differential effects on prices should be considered in a long run analysis. An important simplifying case to consider is the possibility of a perfectly elastic demand curve, which could be a reasonable approximation if close substitutes for processed sardine products are readily available. In this case, changes in landings among alternatives would not affect market prices for processed sardine products. Because the market for sardines is global, perfectly elastic demand for processed sardine products may be regarded as a reasonable simplifying assumption.

As noted above, economic relationships between processors and vessel operators (i.e. degree of vertical integration) are not explicit in the analysis of alternatives. Hence, assumptions about market demand and supply functions for raw sardines are not explicit either. Some comments above about the contribution of ex-vessel revenues to producer surplus could be addressed by assuming that supply of raw sardines is perfectly elastic. Then, ex-vessel prices would be equal to the marginal cost of producing a unit of raw sardines, which would be the same for any scale of sardine harvest. However, an assumption of constant marginal costs among alternatives does not seem plausible for sardine harvesters in the long run.

Recommendations for June 2005

1. Currently, producer surplus in the analysis of alternatives consists of processor revenues net of processor variable costs. Changes in ex-vessel revenues should be included in the analysis of alternatives to i) evaluate potential effects on producer surplus in the harvesting sector, and ii) provide a source independent of the processor cost-earnings data collected using the Delphi method.

2. Per unit estimates of producer surplus are valid as local approximations over a limited range of conditions in the short run that depend on many unknown parameters such as elasticity of demand for processed sardines, elasticity of supply for raw sardines, and input demand elasticities for raw sardines, and other inputs (e.g. capital, energy, labor, etc.). Estimating these elasticities is surely beyond the scope of the current analysis. However to link the analysis of alternatives explicitly to a long run version of producer

surplus, "fixed" inputs described in the Survey Methodology should be included in the analysis and results. In particular, additional tables showing estimated total (or average) annual expenditures on fixed inputs for the three geographical regions would be helpful.

3. Some aspects of the data collection methodology and analytical framework used for economic analysis are still unclear. While the Survey Methodology document is very helpful in this regard, details about the particular information collection protocol used with processors, and underlying assumptions in the market equilibrium model used in the analysis of alternatives, should be further clarified and explained.

Recommendations Beyond June 2005

Many issues associated with analysis of long run producer surplus could be addressed using a computable economic model. For analyses that focus on economic efficiency, a priority for future work should be the development of a computable economic, or bioeconomic, model (partial equilibrium) for the Pacific sardine industry to evaluate effects of various policy alternatives on producer and consumer surplus.

APPENDIX B

TO THE
DRAFT ENVIRONMENTAL ASSESSMENT

ALLOCATION
OF
THE PACIFIC SARDINE
HARVEST GUIDELINE

AMENDMENT 11 TO THE COASTAL PELAGIC SPECIES FISHERY MANAGEMENT PLAN

Projected Landings and Shortages for the Action Alternatives under Various Fishery Growth Rates and Pacific Sardine Harvest Guidelines

TABLE B-1.a Projected landings and shortages by Subarea for the **Status Quo Alternative** under a harvest guideline of **72,000 mt** and growth rates of 0%, 5%, 10%, and 15%.
Status Quo: 33% WA/OR, 66% CA Jan 1; any remainder 20% WA/OR, 80% CA Sept 1; any remainder Coastwide Dec 1

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total Catch - South	43,923	43,923	43,923	43,923	43,923	44,199	44,489	44,793	45,113	45,448	44,475	45,082	45,750	46,485	47,294	44,751	45,703	46,799	48,002	48,002
Total Catch - North	28,077	28,077	28,077	28,077	28,077	27,801	27,511	27,207	26,887	26,552	27,525	26,918	26,250	25,515	24,706	27,249	26,297	25,201	23,998	23,998
Shortage Date-South	Nov	Nov	Nov	Nov	Nov	Nov	Nov	Oct	Oct	Oct	Nov	Oct	Oct	Oct	Sep	Oct	Oct	Sep	Sep	Aug, Sep
Shortage Date - North	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep
Shortage Amount -South	3,465	3,465	3,465	3,465	3,465	5,558	7,756	10,064	12,488	15,032	7,652	12,257	17,323	22,896	29,025	9,745	16,967	25,273	34,880	47,312
Shortage Amount - North	16,777	16,777	16,777	16,777	16,777	17,053	17,343	17,647	17,967	18,302	17,329	17,936	18,604	19,339	20,148	17,605	18,557	19,653	20,856	20,856
Remaining HG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Total Catch - South	43,923	43,923	43,923	43,923	43,923	44,199	44,489	44,793	45,113	45,448	44,475	45,082	45,750	46,485	47,294	44,751	45,703	46,799	48,002	48,002
Total Catch - North	28,077	28,077	28,077	28,077	28,077	27,801	27,511	27,207	26,887	26,552	27,525	26,918	26,250	25,515	24,706	27,249	26,297	25,201	23,998	23,998
Shortage Date-South	Nov	Nov	Nov	Nov	Nov	Nov	Nov	Oct	Oct	Oct	Nov	Oct	Oct	Oct	Sep	Oct	Oct	Sep	Aug, Sep	Aug, Sep
Shortage Date - North	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep
Shortage Amount -South	3,465	3,465	3,465	3,465	3,465	5,558	7,756	10,064	12,488	15,032	7,652	12,257	17,323	22,896	29,025	9,745	16,967	25,273	34,880	47,312
Shortage Amount - North	19,020	21,374	23,847	26,443	29,169	19,296	21,940	24,717	27,633	30,695	19,572	22,534	25,674	29,006	32,540	19,848	23,155	26,723	30,523	33,249
Remaining HG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Total Catch - South	43,923	43,923	43,923	43,923	43,923	44,199	44,489	44,793	45,113	45,448	44,475	45,082	45,750	46,485	47,294	44,751	45,703	46,799	48,002	48,002
Total Catch - North	28,077	28,077	28,077	28,077	28,077	27,801	27,511	27,207	26,887	26,552	27,525	26,918	26,250	25,515	24,706	27,249	26,297	25,201	23,998	23,998
Shortage Date-South	Nov	Nov	Nov	Nov	Nov	Nov	Nov	Oct	Oct	Oct	Nov	Oct	Oct	Oct	Sep	Oct	Oct	Sep	Aug, Sep	Aug, Sep
Shortage Date - North	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Jul, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Jul, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Jul, Sep
Shortage Amount -South	3,465	3,465	3,465	3,465	3,465	5,558	7,756	10,064	12,488	15,032	7,652	12,257	17,323	22,896	29,025	9,745	16,967	25,273	34,880	47,312
Shortage Amount - North	21,262	26,196	31,624	37,594	44,161	21,538	26,762	32,494	38,783	45,686	21,814	27,356	33,451	40,156	47,531	22,090	27,977	34,499	41,673	48,240
Remaining HG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Total Catch - South	43,923	43,923	43,923	43,923	43,923	44,199	44,489	44,793	45,113	45,448	44,475	45,082	45,750	46,485	47,294	44,751	45,703	46,799	48,002	48,002
Total Catch - North	28,077	28,077	28,077	28,077	28,077	27,801	27,511	27,207	26,887	26,552	27,525	26,918	26,250	25,515	24,706	27,249	26,297	25,201	23,998	23,998
Shortage Date-South	Nov	Nov	Nov	Nov	Nov	Nov	Nov	Oct	Oct	Oct	Nov	Oct	Oct	Oct	Sep	Oct	Oct	Sep	Aug, Sep	Aug, Sep
Shortage Date - North	Aug, Sep	Aug, Sep	Aug, Sep	Jul, Sep	Jul, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Jul, Sep	Jul, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Jul, Sep	Jul, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Jul, Sep	Jul, Sep
Shortage Amount -South	3,465	3,465	3,465	3,465	3,465	5,558	7,756	10,064	12,488	15,032	7,652	12,257	17,323	22,896	29,025	9,745	16,967	25,273	34,880	47,312
Shortage Amount - North	23,505	31,242	40,140	50,373	62,140	23,781	31,808	41,010	51,563	63,666	24,057	32,402	41,968	52,935	65,511	24,333	33,023	43,016	54,452	66,220
Remaining HG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TABLE B-1.b Projected landings and shortages by Subarea for the **Status Quo Alternative** under a harvest guideline of **136,000 mt** and growth rates of 0%, 5%, 10%, and 15%.
Status Quo: 33% WA/OR, 66% CA Jan 1; any remainder 20% WA/OR, 80% CA Sept 1;
any remainder Coastwide Dec 1

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,319	54,496	62,671	72,071	82,882	94,029
Total Catch - North	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,274	44,854	44,854	44,769	43,509	41,971
Shortage Date-South																				Dec
Shortage Date - North															Nov			Nov	Oct	Oct, Dec
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,285
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	580	0	0	85	1,345	2,883
Remaining HG	43,758	43,758	43,758	43,758	43,758	41,389	38,901	36,288	33,546	30,666	39,019	33,807	28,073	21,765	15,407	36,650	28,475	19,160	9,609	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,319	54,496	62,671	72,071	82,882	87,036
Total Catch - North	47,097	49,452	51,737	53,240	54,818	47,097	49,452	50,867	52,051	53,293	47,097	49,147	49,910	50,678	51,448	47,097	48,526	48,862	49,105	48,964
Shortage Date-South																				Nov
Shortage Date - North			Nov	Oct	Oct			Oct	Oct	Oct		Nov	Oct	Oct	Sep		Oct	Oct	Sep	Sep, Dec
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8,278
Shortage Amount - North	0	0	187	1,280	2,428	0	0	1,057	2,470	3,953	0	305	2,014	3,842	5,799	0	926	3,062	5,415	8,282
Remaining HG	41,515	39,160	36,875	35,372	33,794	39,146	34,303	30,275	26,349	22,227	36,777	29,514	23,017	15,941	8,233	34,407	24,804	15,067	4,013	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,319	54,496	62,671	72,071	81,988	83,642
Total Catch - North	49,339	53,097	56,239	58,252	58,283	49,339	52,531	55,369	57,063	56,758	49,339	51,938	54,412	55,690	54,913	49,339	51,317	53,363	54,012	52,358
Shortage Date-South																			Dec	Nov
Shortage Date - North		Oct	Oct	Aug, Oct	Aug, Sep		Oct	Oct	Aug, Sep	Aug, Sep		Oct	Oct	Aug, Sep	Aug, Sep		Oct	Sep	Aug,Sep,Dec	Aug,Sep,Dec
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	894	11,673
Shortage Amount - North	0	1,176	3,461	7,418	13,954	0	1,742	4,332	8,608	15,480	0	2,335	5,289	9,981	17,325	0	2,956	6,337	11,659	19,879
Remaining HG	39,273	35,515	32,373	30,360	30,329	36,903	31,223	25,774	21,337	18,761	34,534	26,723	18,515	10,929	4,768	32,164	22,013	10,565	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,319	54,496	62,671	72,071	81,953	83,642
Total Catch - North	51,539	56,019	58,264	58,313	58,368	51,263	55,453	57,394	57,123	56,843	50,987	54,859	56,437	55,751	54,998	50,711	54,238	55,389	54,047	52,358
Shortage Date-South																			Dec	Nov
Shortage Date - North	Nov	Oct	Aug, Sep	Aug, Sep	Aug, Sep	Nov	Oct	Aug, Sep	Aug, Sep	Aug, Sep	Nov	Oct	Aug, Sep	Aug, Sep	Aug, Sep	Nov	Oct	Aug, Sep	Aug,Sep,Dec	Aug,Sep,Dec
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	929	11,673
Shortage Amount - North	43	3,301	9,953	20,137	31,849	319	3,867	10,823	21,327	33,374	595	4,460	11,780	22,699	35,220	871	5,081	12,829	24,403	37,859
Remaining HG	37,073	32,593	30,348	30,299	30,244	34,979	28,302	23,748	21,277	18,676	32,886	23,801	16,490	10,869	4,683	30,793	19,091	8,540	0	0

TABLE B-1.c Projected landings and shortages by Subarea for the **Status Quo Alternative** under a harvest guideline of **200,000 mt** and growth rates of 0%, 5%, 10%, and 15%.
Status Quo: 33% WA/OR, 66% CA Jan 1; any remainder 20% WA/OR, 80% CA Sept 1;
any remainder Coastwide Dec 1

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,319	54,496	62,671	72,071	82,882	95,314
Total Catch - North	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854
Shortage Date-South																				
Shortage Date - North																				
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Remaining HG	107,758	107,758	107,758	107,758	107,758	105,389	102,901	100,288	97,546	94,666	103,019	97,807	92,073	85,765	78,827	100,650	92,475	83,075	72,264	59,832

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,319	54,496	62,671	72,071	82,882	95,314
Total Catch - North	47,097	49,452	51,924	54,520	57,246	47,097	49,452	51,924	54,520	57,246	47,097	49,452	51,924	54,520	57,246	47,097	49,452	51,924	54,520	57,246
Shortage Date-South																				
Shortage Date - North																				
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Remaining HG	105,515	103,160	100,688	98,092	95,366	103,146	98,303	93,218	87,879	82,273	100,777	93,209	85,002	76,099	66,435	98,407	87,878	76,005	62,598	47,439

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10.00%	10.00%	10.00%	10.00%	10.00%	15%	15%	15%	15%	15%
Growth North	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10.00%	10.00%	10.00%	10.00%	10.00%	10%	10%	10%	10%	10%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,319	54,496	62,671	72,071	82,882	95,314
Total Catch - North	49,339	54,273	59,701	65,671	72,238	49,339	54,273	59,701	65,671	72,238	49,339	54,273	59,701	65,671	72,238	49,339	54,273	59,701	65,671	70,713
Shortage Date-South																				
Shortage Date - North																				Oct
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,525
Remaining HG	103,273	98,339	92,911	86,941	80,374	100,903	93,481	85,442	76,729	67,282	98,534	88,387	77,226	64,948	51,443	96,164	83,056	68,228	51,447	33,973

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,319	54,496	62,671	72,071	82,882	95,314
Total Catch - North	51,582	59,319	68,217	78,450	86,705	51,582	59,319	68,217	78,450	85,180	51,582	59,319	68,217	77,331	83,334	51,582	59,319	68,217	75,758	81,121
Shortage Date-South																				
Shortage Date - North					Oct					Oct				Nov	Oct				Oct	Sep
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shortage Amount - North	0	0	0	0	3,512	0	0	0	0	5,038	0	0	0	1,119	6,883	0	0	0	2,692	9,096
Remaining HG	101,030	93,293	84,395	74,162	65,907	98,661	88,435	76,925	63,950	54,340	96,291	83,341	68,709	53,289	40,347	93,922	78,010	59,711	41,360	23,564

TABLE B-2.a Projected landings and shortages by subarea for **Alternaive 1** under a harvest guideline of **72,000 mt** and growth rates of 0%, 5%, 10%, 15%.
Alt 1: 50% HG avail coastwide Jan 1; 50% HG (plus any remainder) avail coastwide Jul 1

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total Catch - South	31,606	31,606	31,606	31,606	31,606	32,651	33,713	34,790	35,882	36,988	33,663	35,780	37,949	40,183	42,570	34,643	37,802	41,130	44,671	48,104
Total Catch - North	40,394	40,394	40,394	40,394	40,394	39,349	38,287	37,210	36,118	35,012	38,337	36,220	34,051	31,817	29,430	37,357	34,198	30,870	27,329	23,896
Shortage Date-South	Nov	Nov	Nov	Nov	Nov	Nov	Nov	Oct	Oct	Oct	Nov	Nov	Oct	Oct	Sep	Oct	Oct	Sep	Aug	Aug
Shortage Date - North	Aug	Aug	Aug	Aug	Aug	Aug	Aug	Aug	Aug	Aug	Aug	Aug	Aug	Aug	Aug	Aug	Aug	Aug	Aug	Aug
Shortage Amount -South	15,782	15,782	15,782	15,782	15,782	17,106	18,532	20,067	21,718	23,493	18,464	21,560	25,124	29,198	33,749	19,853	24,869	30,941	38,211	47,211
Shortage Amount - North	4,460	4,460	4,460	4,460	4,460	5,505	6,567	7,644	8,736	9,842	6,517	8,634	10,803	13,037	15,424	7,497	10,656	13,984	17,525	20,958
Remaining HG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Total Catch - South	30,966	30,336	29,719	29,113	28,520	32,006	32,426	32,867	33,350	33,945	33,015	34,485	36,083	37,863	39,733	33,993	36,508	39,388	42,437	45,390
Total Catch - North	41,034	41,664	42,281	42,887	43,480	39,994	39,574	39,133	38,650	38,055	38,985	37,515	35,917	34,137	32,267	38,007	35,492	32,612	29,563	26,610
Shortage Date-South	Nov	Nov	Nov	Nov	Nov	Nov	Nov	Oct	Oct	Oct	Nov	Nov	Oct	Oct	Sep	Oct	Oct	Sep	Aug	Aug
Shortage Date - North	Aug	Aug	Aug	Aug	Aug	Aug	Aug	Aug	Aug	Aug	Aug	Aug	Aug	Aug	Aug	Aug	Aug	Aug	Aug	Aug
Shortage Amount -South	16,422	17,052	17,669	18,275	18,868	17,751	19,819	21,991	24,250	26,536	19,112	22,854	26,990	31,518	36,586	20,503	26,163	32,683	40,445	49,924
Shortage Amount - North	6,062	7,788	9,643	11,633	13,766	7,103	9,878	12,791	15,871	19,191	8,112	11,937	16,008	20,384	24,980	9,090	13,959	19,312	24,957	30,636
Remaining HG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Total Catch - South	43,923	29,169	43,923	43,923	43,923	31,401	31,239	31,200	31,290	31,436	32,406	33,296	34,480	35,782	37,215	33,382	35,411	37,792	40,402	42,904
Total Catch - North	28,077	42,831	28,077	28,077	28,077	40,599	40,761	40,800	40,710	40,564	39,594	38,704	37,520	36,218	34,785	38,618	36,589	34,208	31,598	29,096
Shortage Date-South	Nov	Nov	Nov	Nov	Nov	Nov	Nov	Oct	Oct	Oct	Nov	Oct	Oct	Oct	Sep	Oct	Oct	Sep	Aug	Aug
Shortage Date - North	Aug	Aug	Aug	Aug	Jul	Aug	Aug	Aug	Aug	Jul	Aug	Aug	Aug	Aug	Jul	Aug	Aug	Aug	Aug	Jul
Shortage Amount -South	3,465	3,465	3,465	3,465	3,465	18,356	21,007	23,657	26,310	29,044	19,721	24,043	28,593	33,598	39,104	21,115	27,260	34,279	42,480	52,410
Shortage Amount - North	21,262	26,196	31,624	37,594	44,161	8,741	13,512	18,901	24,961	31,674	9,746	15,570	22,181	29,453	37,453	10,721	17,684	25,493	34,073	43,142
Remaining HG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Total Catch - South	29,802	28,096	26,609	25,279	24,057	30,832	30,171	29,779	29,485	29,293	31,833	32,290	33,030	33,934	35,018	32,806	34,397	36,338	38,570	40,674
Total Catch - North	42,198	43,904	45,391	46,721	47,943	41,168	41,829	42,221	42,515	42,707	40,167	39,710	38,970	38,066	36,982	39,194	37,603	35,662	33,430	31,326
Shortage Date-South	Nov	Nov	Nov	Nov	Nov	Nov	Nov	Oct	Oct	Oct	Nov	Oct	Oct	Oct	Sep	Oct	Oct	Sep	Aug	Aug
Shortage Date - North	Aug	Aug	Aug	Jul	Jul	Aug	Aug	Aug	Jul	Jul	Aug	Aug	Aug	Jul	Jul	Aug	Aug	Aug	Jul	Jul
Shortage Amount -South	17,586	19,292	20,779	22,109	23,331	18,925	22,074	25,079	28,115	31,187	20,293	25,050	30,043	35,446	41,301	21,690	28,274	35,733	44,312	54,640
Shortage Amount - North	9,384	15,415	22,826	31,729	42,275	10,415	17,490	25,996	35,935	47,511	11,416	19,609	29,248	40,384	53,236	12,388	21,717	32,555	45,020	58,892
Remaining HG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TABLE B-2.b Projected landings and shortages by Subarea for the **Alternative 1** under a harvest guideline of **136,000 mt** and growth rates of 0%, 5%, 10%, and 15%.
Alt 1: 50% HG avail coastwide Jan 1; 50% HG (plus any remainder) avail coastwide Jul 1

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,319	54,496	62,671	72,071	82,882	91,416
Total Catch - North	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,584
Shortage Date-South																				Nov
Shortage Date - North																				Nov
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3,899
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	270
Remaining HG	43,758	43,758	43,758	43,758	43,758	41,389	38,901	36,288	33,546	30,666	39,019	33,807	28,073	21,765	14,827	36,650	28,475	19,075	8,264	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,319	54,496	62,671	72,071	81,604	80,185
Total Catch - North	47,097	49,452	51,924	54,520	57,246	47,097	49,452	51,924	54,520	57,246	47,097	49,452	51,924	54,520	57,246	47,097	49,452	51,924	54,396	55,815
Shortage Date-South																			Dec	Oct
Shortage Date - North																			Dec	Oct
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,278	15,129
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	125	1,432
Remaining HG	41,515	39,160	36,688	34,092	31,366	39,146	34,303	29,218	23,879	18,273	36,777	29,209	21,002	12,099	2,435	34,407	23,878	12,005	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	65,269	54,496	62,671	72,071	71,616	69,061
Total Catch - North	49,339	54,273	59,701	65,671	72,238	49,339	54,273	59,701	65,671	72,238	49,339	54,273	59,701	65,671	70,731	49,339	54,273	59,701	64,384	66,939
Shortage Date-South															Nov				Nov	Oct
Shortage Date - North															Nov				Nov	Oct
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11,050	0	0	0	11,266	26,254
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,507	0	0	0	1,287	5,298
Remaining HG	39,273	34,339	28,911	22,941	16,374	36,903	29,481	21,442	12,729	3,282	34,534	24,387	13,226	948	0	32,164	19,056	4,228	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Total Catch - South	47,388	47,388	47,388	47,388	46,136	49,757	52,245	54,858	57,559	49,124	52,127	57,339	63,073	59,207	53,352	54,496	62,671	68,304	62,389	60,680
Total Catch - North	51,582	59,319	68,217	78,450	89,864	51,582	59,319	68,217	78,441	86,876	51,582	59,319	68,217	76,793	82,648	51,582	59,319	67,696	73,611	75,320
Shortage Date-South					Dec				Dec	Oct				Nov	Oct			Nov	Oct	Sep
Shortage Date - North					Dec				Dec	Oct				Nov	Oct			Nov	Oct	Sep
Shortage Amount -South	0	0	0	0	1,252	0	0	0	42	11,356	0	0	0	10,174	22,967	0	0	3,768	20,493	34,634
Shortage Amount - North	0	0	0	0	353	0	0	0	8	3,341	0	0	0	1,657	7,570	0	0	521	4,838	14,898
Remaining HG	37,030	29,293	20,395	10,162	0	34,661	24,435	12,925	0	0	32,291	19,341	4,709	0	0	29,922	14,010	0	0	0

TABLE B-2.c Projected landings and shortages by Subarea for the **Alternative 1** under a harvest guideline of **200,000 mt** and growth rates of 0%, 5%, 10%, and 15%.
Alt 1: 50% HG avail coastwide Jan 1; 50% HG (plus any remainder) avail coastwide Jul 1

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,319	54,496	62,671	72,071	82,882	95,314
Total Catch - North	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854
Shortage Date-South																				
Shortage Date - North																				
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Remaining HG	107,758	107,758	107,758	107,758	107,758	105,389	102,901	100,288	97,546	94,666	103,019	97,807	92,073	85,765	78,827	100,650	92,475	83,075	72,264	59,832
	2005	**2006**	**2007**	**2008**	**2009**	**2005**	**2006**	**2007**	**2008**	**2009**	**2005**	**2006**	**2007**	**2008**	**2009**	**2005**	**2006**	**2007**	**2008**	**2009**
Harvest Guideline	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,319	54,496	62,671	72,071	82,882	95,314
Total Catch - North	47,097	49,452	51,924	54,520	57,246	47,097	49,452	51,924	54,520	57,246	47,097	49,452	51,924	54,520	57,246	47,097	49,452	51,924	54,520	57,246
Shortage Date-South																				
Shortage Date - North																				
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Remaining HG	105,515	103,160	100,688	98,092	95,366	103,146	98,303	93,218	87,879	82,273	100,777	93,209	85,002	76,099	66,435	98,407	87,878	76,005	62,598	47,439
	2005	**2006**	**2007**	**2008**	**2009**	**2005**	**2006**	**2007**	**2008**	**2009**	**2005**	**2006**	**2007**	**2008**	**2009**	**2005**	**2006**	**2007**	**2008**	**2009**
Harvest Guideline	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,319	54,496	62,671	72,071	82,882	95,314
Total Catch - North	49,339	54,273	59,701	65,671	72,238	49,339	54,273	59,701	65,671	72,238	49,339	54,273	59,701	65,671	72,238	49,339	54,273	59,701	65,671	72,238
Shortage Date-South																				
Shortage Date - North																				
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Remaining HG	103,273	98,339	92,911	86,941	80,374	100,903	93,481	85,442	76,729	67,282	98,534	88,387	77,226	64,948	51,443	96,164	83,056	68,228	51,447	32,448
	2005	**2006**	**2007**	**2008**	**2009**	**2005**	**2006**	**2007**	**2008**	**2009**	**2005**	**2006**	**2007**	**2008**	**2009**	**2005**	**2006**	**2007**	**2008**	**2009**
Harvest Guideline	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,319	54,496	62,671	72,071	82,882	95,314
Total Catch - North	51,582	59,319	68,217	78,450	90,217	51,582	59,319	68,217	78,450	90,217	51,582	59,319	68,217	78,450	90,217	51,582	59,319	68,217	78,450	90,217
Shortage Date-South																				
Shortage Date - North																				
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Remaining HG	101,030	93,293	84,395	74,162	62,395	98,661	88,435	76,925	63,950	49,302	96,291	83,341	68,709	52,169	33,464	93,922	78,010	59,711	38,668	14,468

TABLE B-3.a Projected landings and shortages by Subarea for the **Alternative 3** under a harvest guideline of **72,000 mt** and growth rates of 0%, 5%, 10%, and 15%.
Alt 3: 40% HG avail coastwide Jan 1; 40% HG (plus any remainder) avail coastwide Jul 1;
20% HG (plus any remainder) avail coastwide Oct 1

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total Catch - South	37,695	37,695	37,695	37,695	37,695	38,688	39,697	40,720	41,758	42,808	39,650	41,661	43,774	46,022	48,092	40,581	43,624	46,920	49,771	51,508
Total Catch - North	34,305	34,305	34,305	34,305	34,305	33,312	32,303	30,242	30,242	29,192	32,350	30,339	25,978	25,978	23,908	31,419	28,376	22,229	22,229	20,492
Shortage Date-South	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Nov	Aug, Oct	Jun,Aug,Oct	Jun,Aug,Oct	Apr,Aug,Nov
Shortage Date - North	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Nov	Aug, Oct	Jun,Aug,Oct	Jun,Aug,Oct	Jun,Aug,Oct
Shortage Amount -South	9,693	9,693	9,693	9,693	9,693	11,069	12,548	14,137	15,843	17,672	12,477	15,679	19,300	23,359	28,227	13,915	19,047	25,151	33,111	43,806
Shortage Amount - North	10,549	10,549	10,549	10,549	10,549	11,542	12,551	13,574	14,612	15,662	12,504	14,515	16,628	18,876	20,946	13,435	16,478	19,774	22,625	24,362
Remaining HG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Total Catch - South	37,094	36,495	35,900	35,308	34,720	38,087	38,499	38,931	39,403	39,998	39,049	40,471	42,098	43,855	45,406	39,982	42,502	45,265	47,705	48,979
Total Catch - North	34,906	35,505	36,692	36,692	37,280	33,913	33,501	32,597	32,597	32,002	32,951	31,529	28,145	28,145	26,594	32,018	29,498	24,295	24,295	23,021
Shortage Date-South	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Oct	Aug, Oct	Aug, Nov	Aug, Nov	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Nov	Aug, Oct	Jun,Aug,Oct	Jun,Aug,Oct	Apr,Aug,Oct
Shortage Date - North	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Oct	Aug, Oct	Aug, Nov	Aug, Nov	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Nov	Aug, Oct	Jun,Aug,Oct	Jun,Aug,Oct	Jun,Aug,Oct
Shortage Amount -South	10,294	10,893	11,488	12,080	12,668	11,670	13,746	15,926	18,197	20,483	13,077	16,869	20,975	25,526	30,913	14,514	20,169	26,806	35,177	46,335
Shortage Amount - North	12,190	13,947	15,824	17,829	19,966	13,184	15,950	18,855	21,924	25,244	14,146	17,922	22,023	26,375	30,652	15,079	19,953	25,189	30,225	34,225
Remaining HG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Total Catch - South	36,523	35,363	34,216	33,081	31,959	37,516	37,365	37,243	37,319	37,445	38,479	39,349	40,533	41,810	42,894	39,413	41,445	43,702	45,752	46,579
Total Catch - North	35,477	36,637	38,919	38,919	40,041	34,484	34,635	34,681	34,681	34,555	33,521	32,651	30,190	30,190	29,106	32,587	30,555	26,248	26,248	25,421
Shortage Date-South	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Nov	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Nov	Aug, Oct	Jun,Aug,Oct	Jun,Aug,Oct	Apr,Aug,Oct
Shortage Date - North	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Nov	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Nov	Aug, Oct	Jun,Aug,Oct	Jun,Aug,Oct	Jun,Aug,Oct
Shortage Amount -South	10,865	12,025	13,172	14,307	15,429	12,241	14,880	17,615	20,282	23,036	13,648	17,990	22,540	27,571	33,424	15,083	21,225	28,370	37,130	48,736
Shortage Amount - North	13,863	17,637	21,917	26,752	32,196	14,856	19,639	24,943	30,989	37,683	15,819	21,623	28,234	35,481	43,132	16,753	23,719	31,402	39,423	46,816
Remaining HG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Total Catch - South	35,981	34,293	32,632	31,009	29,599	36,973	36,291	35,766	35,411	35,138	37,936	38,342	39,074	39,863	40,777	38,871	40,450	42,231	43,920	44,689
Total Catch - North	36,019	37,707	40,991	40,991	42,401	35,027	35,709	36,589	36,589	36,862	34,064	33,658	32,137	32,137	31,223	33,129	31,550	28,080	28,080	27,311
Shortage Date-South	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Oct	Aug, Oct	Aug, Nov	Aug, Nov	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Nov	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Nov	Aug, Oct	Jun,Aug,Oct	Jun,Aug,Oct	Apr,Aug,Oct
Shortage Date - North	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Oct	Aug, Oct	Aug, Nov	Aug, Nov	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Nov	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Nov	Aug, Oct	Jun,Aug,Oct	Jun,Aug,Oct	Jun,Aug,Oct
Shortage Amount -South	11,407	13,095	14,756	16,379	17,789	12,784	15,955	19,091	22,189	25,342	14,190	18,998	23,999	29,518	35,542	15,625	22,221	29,841	38,962	50,625
Shortage Amount - North	15,563	21,612	28,849	37,459	47,816	16,555	23,610	31,984	41,861	53,356	17,519	25,661	35,292	46,313	58,994	18,454	27,769	38,448	50,370	62,907
Remaining HG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TABLE B-3.b Projected landings and shortages by Subarea for the **Alternative 3** under a harvest guideline of **136,000 mt** and growth rates of 0%, 5%, 10%, and 15%.
Alt 3: 40% HG avail coastwide Jan 1; 40% HG (plus any remainder) avail coastwide Jul 1;
20% HG (plus any remainder) avail coastwide Oct 1

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,319	54,496	62,671	72,071	82,882	91,416
Total Catch - North	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,584
Shortage Date-South																				Nov
Shortage Date - North																				Nov
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3,899
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	270
Remaining HG	43,758	43,758	43,758	43,758	43,758	41,389	38,901	36,288	33,546	30,666	39,019	33,807	28,073	21,765	14,827	36,650	28,475	19,075	8,264	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,319	54,496	62,671	72,071	81,604	83,284
Total Catch - North	47,097	49,452	54,520	54,520	57,246	47,097	49,452	54,520	54,520	57,246	47,097	49,452	54,520	54,520	57,246	47,097	49,452	54,396	54,396	52,716
Shortage Date-South																			Dec	Sep, Nov
Shortage Date - North																			Dec	Sep, Nov
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,278	12,030
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	125	4,530
Remaining HG	41,515	39,160	36,688	34,092	31,366	39,146	34,303	29,218	23,879	18,273	36,777	29,209	21,002	12,099	2,435	34,407	23,878	12,005	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	69,391	54,496	62,671	72,071	74,748	77,407
Total Catch - North	49,339	54,273	65,671	65,671	72,238	49,339	54,273	65,671	65,671	72,238	49,339	54,273	65,671	65,671	66,609	49,339	54,273	61,252	61,252	58,593
Shortage Date-South															Sep, Nov				Sep, Nov	Sep, Nov
Shortage Date - North															Sep, Nov				Sep, Nov	Sep, Nov
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6,928	0	0	0	8,134	17,907
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5,629	0	0	0	4,418	13,645
Remaining HG	39,273	34,339	28,911	22,941	16,374	36,903	29,481	21,442	12,729	3,282	34,534	24,387	13,226	948	0	32,164	19,056	4,228	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Total Catch - South	47,388	47,388	47,388	47,388	46,536	49,757	52,245	54,858	57,459	56,082	52,127	57,339	63,073	64,020	63,835	54,496	62,671	68,848	70,230	72,162
Total Catch - North	51,582	59,319	78,450	78,450	86,706	51,582	59,319	78,033	78,033	79,918	51,582	59,319	71,980	71,980	72,165	51,582	59,319	65,770	65,770	63,838
Shortage Date-South									Sep	Sep, Dec				Sep, Nov	Aug, Nov			Sep, Nov	Sep, Nov	Aug, Nov
Shortage Date - North									Sep	Sep, Dec				Sep, Nov	Aug, Nov			Sep, Nov	Sep, Nov	Aug, Nov
Shortage Amount -South	0	0	0	0	852	0	0	0	141	4,398	0	0	0	5,361	12,484	0	0	3,223	12,652	23,152
Shortage Amount - North	0	0	0	0	3,511	0	0	0	416	10,300	0	0	0	6,470	18,052	0	0	1,065	12,680	26,379
Remaining HG	37,030	29,293	20,395	10,162	2,758	34,661	24,435	12,925	507	0	32,291	19,341	4,709	0	0	29,922	14,010	0	0	0

TABLE B-3.c Projected landings and shortages by Subarea for the **Alternative 3** under a harvest guideline of **200,000 mt** and growth rates of 0%, 5%, 10%, and 15%.
Alt 3: 40% HG avail coastwide Jan 1; 40% HG (plus any remainder) avail coastwide Jul 1;
20% HG (plus any remainder) avail coastwide Oct 1

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,319	54,496	62,671	72,071	82,882	95,314
Total Catch - North	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854
Shortage Date-South																				
Shortage Date - North																				
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Remaining HG	107,758	107,758	107,758	107,758	107,758	105,389	102,901	100,288	97,546	94,666	103,019	97,807	92,073	85,765	78,827	100,650	92,475	83,075	72,264	59,832

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,319	54,496	62,671	72,071	82,882	95,314
Total Catch - North	47,097	49,452	54,520	54,520	57,246	47,097	49,452	54,520	54,520	57,246	47,097	49,452	54,520	54,520	57,246	47,097	49,452	54,520	54,520	57,246
Shortage Date-South																				
Shortage Date - North																				
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Remaining HG	105,515	103,160	100,688	98,092	95,366	103,146	98,303	93,218	87,879	82,273	100,777	93,209	85,002	76,099	66,435	98,407	87,878	76,005	62,598	47,439

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,710	57,981	63,779	70,157	77,173	54,496	62,671	72,071	82,882	95,314
Total Catch - North	49,339	54,273	65,671	65,671	72,238	49,339	54,273	65,671	65,671	72,238	49,339	54,273	59,701	65,671	72,238	49,339	54,273	65,671	65,671	72,238
Shortage Date-South																				
Shortage Date - North																				
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Remaining HG	103,273	98,339	92,911	86,941	80,374	100,903	93,481	85,442	76,729	67,282	98,534	88,387	77,226	64,948	51,443	96,164	83,056	68,228	51,447	32,448

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,319	54,496	62,671	72,071	82,882	95,314
Total Catch - North	51,582	59,319	78,450	78,450	90,217	51,582	59,319	78,450	78,450	90,217	51,582	59,319	78,450	78,450	90,217	51,582	59,319	78,450	78,450	90,217
Shortage Date-South																				
Shortage Date - North																				
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Remaining HG	101,030	93,293	84,395	74,162	62,395	98,661	88,435	76,925	63,950	49,302	96,291	83,341	68,709	52,169	33,464	93,922	78,010	59,711	38,668	14,468

TABLE B-4.a Projected landings and shortages by subarea for **Alternative 3-Modified to Sept. 1** under a harvest guideline of **72,000 mt** and growth rates of 0%, 5%, 10% and 15%
35% HG avail coastwide Jan 1; 40% HG (plus any remainder) avail coastwide Jul 1;
25% HG (plus any remainder) avail coastwide Sep 1

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total Catch - South	33,971	33,971	33,971	33,971	33,971	34,976	35,995	37,028	38,075	39,133	35,947	37,977	40,006	41,824	43,641	36,888	39,884	42,550	44,263	45,286
Total Catch - North	38,029	38,029	38,029	38,029	38,029	37,024	36,005	33,925	33,925	32,867	36,053	34,023	30,176	30,176	28,359	35,112	32,116	27,737	27,737	26,714
Shortage Date-South	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Jun,Aug,Oct	Jun,Aug,Oct	Jun,Aug,Oct	Aug, Oct	Jun,Aug,Oct	Jun,Aug,Oct	Apr,Aug,Oct	Apr,Aug,Oct
Shortage Date - North	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Jun,Aug,Oct	Jun,Aug,Oct	Jun,Aug,Oct	Aug, Oct	Jun,Aug,Oct	Jun,Aug,Oct	Jun,Aug,Oct	Jun,Aug,Oct
Shortage Amount -South	13,417	13,417	13,417	13,417	13,417	14,782	16,250	17,829	19,526	21,347	16,179	19,363	23,067	27,557	32,678	17,609	22,786	29,522	38,619	50,029
Shortage Amount - North	6,825	6,825	6,825	6,825	6,825	7,830	8,849	9,882	10,929	11,987	8,801	10,831	12,860	14,678	16,495	9,742	12,738	15,404	17,117	18,140
Remaining HG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	0	10%	10%	15%	15%	15%	15%	15%
Growth North	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Total Catch - South	33,215	32,460	31,707	30,956	30,207	34,218	34,478	34,751	35,037	35,327	35,189	36,461	37,696	38,776	39,884	36,129	38,346	40,286	41,225	41,671
Total Catch - North	38,785	39,540	41,044	41,044	41,793	37,782	37,522	36,963	36,963	36,673	36,811	35,539	33,224	33,224	32,116	35,871	33,654	30,775	30,775	30,329
Shortage Date-South	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Jun,Aug,Oct	Jun,Aug,Oct	Jun,Aug,Oct	Aug, Oct	Jun,Aug,Oct	Jun,Aug,Oct	Apr,Aug,Oct	Apr,Aug,Sep
Shortage Date - North	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Jun,Aug,Oct	Jun,Aug,Oct	Jun,Aug,Oct	Aug, Oct	Jun,Aug,Oct	Jun,Aug,Oct	Jun,Aug,Oct	Jun,Aug,Sep
Shortage Amount -South	14,173	14,928	15,681	16,432	17,181	15,539	17,767	20,107	22,564	25,154	16,938	20,879	25,378	30,605	36,435	18,367	24,324	31,785	41,657	53,643
Shortage Amount - North	8,312	9,912	11,631	13,476	15,453	9,315	11,929	14,675	17,557	20,573	10,286	13,912	17,620	21,296	25,130	11,226	15,798	20,210	23,745	26,918
Remaining HG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Total Catch - South	32,496	31,026	29,565	28,116	26,682	33,496	33,031	32,576	32,129	31,823	34,465	35,010	35,467	35,863	36,947	35,405	36,867	38,086	38,729	38,834
Total Catch - North	39,504	40,974	43,884	43,884	45,318	38,504	38,969	39,871	39,871	40,177	37,535	36,990	36,137	36,137	35,053	36,595	35,133	33,271	33,271	33,166
Shortage Date-South	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Sep	Aug, Oct	Aug, Oct	Jun,Aug,Oct	Jun,Aug,Oct	Jun,Aug,Sep	Aug, Oct	Jun,Aug,Oct	Jun,Aug,Oct	Apr,Aug,Sep	Apr,Aug,Sep
Shortage Date - North	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Sep	Aug, Oct	Aug, Oct	Jun,Aug,Oct	Jun,Aug,Oct	Jun,Aug,Sep	Aug, Oct	Jun,Aug,Oct	Jun,Aug,Oct	Jun,Aug,Sep	Jun,Aug,Sep
Shortage Amount -South	14,892	16,362	17,823	19,272	20,706	16,261	19,214	22,282	25,471	28,658	17,661	22,330	27,606	33,518	39,372	19,091	25,803	33,985	44,153	56,480
Shortage Amount - North	9,835	13,299	17,266	21,787	26,919	10,836	15,304	20,276	25,800	32,061	11,805	17,283	23,168	29,534	37,185	12,745	19,141	25,787	32,400	39,072
Remaining HG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Total Catch - South	31,809	29,663	27,541	25,689	24,434	32,807	31,651	30,504	29,922	29,629	33,774	33,621	33,351	33,924	34,851	34,713	35,445	36,283	36,733	36,647
Total Catch - North	40,191	42,337	46,311	46,311	47,566	39,193	40,349	42,078	42,078	42,371	38,226	38,379	38,076	38,076	37,149	37,287	36,555	35,267	35,267	35,353
Shortage Date-South	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Sep	Aug, Sep	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Sep	Aug, Sep	Aug, Oct	Aug, Oct	Jun,Aug,Sep	Jun,Aug,Sep	Jun,Jul,Sep	Aug, Oct	Jun,Aug,Oct	Jun,Aug,Sep	Apr,Aug,Sep	Apr,Jul,Sep
Shortage Date - North	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Sep	Aug, Sep	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Sep	Aug, Sep	Aug, Oct	Aug, Oct	Jun,Aug,Sep	Jun,Aug,Sep	Jun,Jul,Sep	Aug, Oct	Jun,Aug,Oct	Jun,Aug,Sep	Jun,Aug,Sep	Jun,Jul,Sep
Shortage Amount -South	15,579	17,725	19,847	21,699	22,954	16,951	20,594	24,354	27,678	30,852	18,353	23,719	29,722	35,457	41,467	19,783	27,225	35,788	46,149	58,667
Shortage Amount - North	11,391	16,982	23,759	32,139	42,651	12,389	18,971	26,721	36,372	47,846	13,356	20,940	29,569	40,374	53,069	14,295	22,765	32,501	43,183	54,864
Remaining HG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TABLE B-4.b Projected landings and shortages by subarea for **Alternative 3-Modified to Sept. 1** under a harvest guideline of **136,000 mt** and growth rates of 0%, 5%, 10% and 15%
35% HG avail coastwide Jan 1; 40% HG (plus any remainder) avail coastwide Jul 1;
25% HG (plus any remainder) avail coastwide Sep 1

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,319	54,496	62,671	72,071	82,882	91,416
Total Catch - North	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,584
Shortage Date-South																				Nov
Shortage Date - North																				Nov
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3,899
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	270
Remaining HG	43,758	43,758	43,758	43,758	43,758	41,389	38,901	36,288	33,546	30,666	39,019	33,807	28,073	21,765	14,827	36,650	28,475	19,075	8,264	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,319	54,496	62,671	72,071	81,604	80,185
Total Catch - North	47,097	49,452	54,520	54,520	57,246	47,097	49,452	54,520	54,520	57,246	47,097	49,452	54,520	54,520	57,246	47,097	49,452	54,396	54,396	55,815
Shortage Date-South																			Dec	Oct
Shortage Date - North																			Dec	Oct
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,278	15,129
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	125	1,432
Remaining HG	41,515	39,160	36,688	34,092	31,366	39,146	34,303	29,218	23,879	18,273	36,777	29,209	21,002	12,099	2,435	34,407	23,878	12,005	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10.00%	10.00%	10.00%	10.00%	10.00%	15%	15%	15%	15%	15%
Growth North	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10.00%	10.00%	10.00%	10.00%	10.00%	10%	10%	10%	10%	10%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	65,269	54,496	62,671	72,071	71,616	71,287
Total Catch - North	49,339	54,273	65,671	65,671	72,238	49,339	54,273	65,671	65,671	72,238	49,339	54,273	65,671	65,671	70,731	49,339	54,273	64,384	64,384	64,713
Shortage Date-South															Nov				Nov	Aug, Oct
Shortage Date - North															Nov				Nov	Aug, Oct
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11,050	0	0	0	11,266	24,028
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,507	0	0	0	1,287	7,524
Remaining HG	39,273	34,339	28,911	22,941	16,374	36,903	29,481	21,442	12,729	3,282	34,534	24,387	13,226	948	0	32,164	19,056	4,228	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Total Catch - South	47,388	47,388	47,388	47,388	46,136	49,757	52,245	54,858	57,559	49,124	52,127	57,339	63,073	59,207	56,362	54,496	62,671	68,304	63,475	64,773
Total Catch - North	51,582	59,319	78,450	78,450	89,864	51,582	59,319	78,441	78,441	86,876	51,582	59,319	76,793	76,793	79,638	51,582	59,319	72,525	72,525	71,227
Shortage Date-South					Dec				Dec	Oct				Nov	Aug, Oct			Nov	Aug, Oct	Aug, Oct
Shortage Date - North					Dec				Dec	Oct				Nov	Aug, Oct			Nov	Aug, Oct	Aug, Oct
Shortage Amount -South	0	0	0	0	1,252	0	0	0	42	11,356	0	0	0	10,174	19,957	0	0	3,768	19,407	30,541
Shortage Amount - North	0	0	0	0	353	0	0	0	8	3,341	0	0	0	1,657	10,580	0	0	521	5,925	18,990
Remaining HG	37,030	29,293	20,395	10,162	0	34,661	24,435	12,925	0	0	32,291	19,341	4,709	0	0	29,922	14,010	0	0	0

TABLE B-4.c Projected landings and shortages by subarea for **Alternative 3-Modified to Sept. 1** under a harvest guideline of **200,000 mt** and growth rates of 0%, 5%, 10% and 15%
35% HG avail coastwide Jan 1; 40% HG (plus any remainder) avail coastwide Jul 1;
25% HG (plus any remainder) avail coastwide Sep 1

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,319	54,496	62,671	72,071	82,882	95,314
Total Catch - North	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854
Shortage Date-South																				
Shortage Date - North																				
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Remaining HG	107,758	107,758	107,758	107,758	107,758	105,389	102,901	100,288	97,546	94,666	103,019	97,807	92,073	85,765	78,827	100,650	92,475	83,075	72,264	59,832

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,319	54,496	62,671	72,071	82,882	95,314
Total Catch - North	47,097	49,452	54,520	54,520	57,246	47,097	49,452	54,520	54,520	57,246	47,097	49,452	54,520	54,520	57,246	47,097	49,452	54,520	54,520	57,246
Shortage Date-South																				
Shortage Date - North																				
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Remaining HG	105,515	103,160	100,688	98,092	95,366	103,146	98,303	93,218	87,879	82,273	100,777	93,209	85,002	76,099	66,435	98,407	87,878	76,005	62,598	47,439

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,319	54,496	62,671	72,071	82,882	95,314
Total Catch - North	49,339	54,273	65,671	65,671	72,238	49,339	54,273	65,671	65,671	72,238	49,339	54,273	65,671	65,671	72,238	49,339	54,273	65,671	65,671	72,238
Shortage Date-South																				
Shortage Date - North																				
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Remaining HG	103,273	98,339	92,911	86,941	80,374	100,903	93,481	85,442	76,729	67,282	98,534	88,387	77,226	64,948	51,443	96,164	83,056	68,228	51,447	32,448

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,319	54,496	62,671	72,071	82,882	95,314
Total Catch - North	51,582	59,319	78,450	78,450	90,217	51,582	59,319	78,450	78,450	90,217	51,582	59,319	78,450	78,450	90,217	51,582	59,319	78,450	78,450	90,217
Shortage Date-South																				
Shortage Date - North																				
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Remaining HG	101,030	93,293	84,395	74,162	62,395	98,661	88,435	76,925	63,950	49,302	96,291	83,341	68,709	52,169	33,464	93,922	78,010	59,711	38,668	14,468

TABLE B-5.a Projected landings and shortages by subarea for **Alternative 3-Modified to Oct. 1** under a harvest guideline of **72,000 mt** and growth rates of 0%, 5%, 10% and 15%
35% HG avail coastwide Jan 1; 40% HG (plus any remainder) avail coastwide Jul 1;
25% HG (plus any remainder) avail coastwide Oct 1

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total Catch - South	39,793	39,793	39,793	39,793	39,793	40,767	41,756	42,757	43,772	44,798	41,709	43,677	45,644	47,399	49,154	42,621	45,526	48,100	49,763	50,921
Total Catch - North	32,207	32,207	32,207	32,207	32,207	31,233	30,244	28,228	28,228	27,202	30,291	28,323	24,601	24,601	22,846	29,379	26,474	22,237	22,237	21,079
Shortage Date-South	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Jun,Aug,Nov	Jun,Aug,Nov	Jun,Aug,Nov	Aug, Nov	Jun,Aug,Nov	Jun,Aug,Nov	Apr,Aug,Oct	Apr,Aug,Oct
Shortage Date - North	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Jun,Aug,Nov	Jun,Aug,Nov	Jun,Aug,Nov	Aug, Nov	Jun,Aug,Nov	Jun,Aug,Nov	Jun,Aug,Oct	Jun,Aug,Oct
Shortage Amount -South	7,595	7,595	7,595	7,595	7,595	8,990	10,490	12,100	13,829	15,682	10,417	13,663	17,430	21,982	27,165	11,875	17,145	23,971	33,118	44,393
Shortage Amount - North	12,647	12,647	12,647	12,647	12,647	13,621	14,610	15,611	16,626	17,652	14,563	16,531	18,498	20,253	22,008	15,475	18,380	20,954	22,617	23,775
Remaining HG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	0	10%	10%	15%	15%	15%	15%	15%
Growth North	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Total Catch - South	39,209	38,627	38,047	37,468	36,891	40,185	40,597	41,029	41,483	41,949	41,129	42,532	43,910	45,147	46,441	42,044	44,369	46,435	47,657	48,262
Total Catch - North	32,791	33,373	34,532	34,532	35,109	31,815	31,403	30,517	30,517	30,051	30,871	29,468	26,853	26,853	25,559	29,956	27,631	24,343	24,343	23,738
Shortage Date-South	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Jun,Aug,Nov	Jun,Aug,Nov	Jun,Aug,Nov	Aug, Nov	Jun,Aug,Nov	Jun,Aug,Nov	Apr,Aug,Oct	Apr,Aug,Oct
Shortage Date - North	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Jun,Aug,Nov	Jun,Aug,Nov	Jun,Aug,Nov	Aug, Nov	Jun,Aug,Nov	Jun,Aug,Nov	Jun,Aug,Oct	Jun,Aug,Oct
Shortage Amount -South	8,179	8,761	9,341	9,920	10,497	9,572	11,648	13,828	16,117	18,531	10,997	14,808	19,163	24,234	29,878	12,452	18,301	25,636	35,225	47,052
Shortage Amount - North	14,306	16,079	17,971	19,988	22,138	15,282	18,049	20,954	24,004	27,196	16,226	19,983	23,834	27,667	31,687	17,141	21,821	26,359	30,178	33,508
Remaining HG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Total Catch - South	38,654	37,522	36,396	35,277	3416362%	39,631	39,496	39,387	39,305	39,150	40,577	41,440	42,249	42,976	43,976	41,494	43,263	44,831	45,654	45,719
Total Catch - North	33,346	34,478	36,723	36,723	37,836	32,369	32,504	32,695	32,695	32,850	31,423	30,560	29,024	29,024	28,024	30,506	28,737	26,346	26,346	26,281
Shortage Date-South	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Jun,Aug,Nov	Aug, Nov	Aug, Nov	Jun,Aug,Nov	Jun,Aug,Nov	Jun,Aug,Nov	Aug, Nov	Jun,Aug,Nov	Jun,Aug,Nov	Apr,Aug,Oct	Apr,Aug,Oct
Shortage Date - North	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Jun,Aug,Nov	Aug, Nov	Aug, Nov	Jun,Aug,Nov	Jun,Aug,Nov	Jun,Aug,Oct	Aug, Nov	Jun,Aug,Nov	Jun,Aug,Nov	Jun,Aug,Oct	Jun,Aug,Oct
Shortage Amount -South	8,734	9,866	10,992	12,111	13,224	10,126	12,750	15,471	18,295	21,330	11,549	15,899	20,825	26,405	32,343	13,002	19,408	27,240	37,228	49,596
Shortage Amount - North	15,994	19,795	24,097	28,948	34,401	16,971	21,769	27,088	32,976	39,388	17,917	23,714	29,949	36,647	44,214	18,834	25,536	32,532	39,324	45,956
Remaining HG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Total Catch - South	38,125	36,472	34,832	33,205	31,589	39,103	38,447	37,823	37,208	36,560	40,051	40,398	40,655	40,963	41,879	40,970	42,202	43,312	43,762	43,676
Total Catch - North	33,875	35,528	38,795	38,795	40,411	32,897	33,553	34,792	34,792	35,440	31,949	31,602	31,037	31,037	30,121	31,030	29,798	28,238	28,238	28,324
Shortage Date-South	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Jun,Aug,Nov	Jun,Jul,Nov	Aug, Nov	Aug, Nov	Jun,Aug,Nov	Jun,Aug,Oct	Jun,Jul,Oct	Aug, Nov	Jun,Aug,Nov	Jun,Aug,Nov	Apr,Aug,Oct	Apr,Jul,Oct
Shortage Date - North	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Aug, Nov	Jun,Aug,Nov	Jun,Jul,Nov	Aug, Nov	Aug, Nov	Jun,Aug,Nov	Jun,Aug,Oct	Jun,Jul,Oct	Aug, Nov	Jun,Aug,Nov	Jun,Aug,Nov	Jun,Aug,Oct	Jun,Jul,Oct
Shortage Amount -South	9,263	10,916	12,556	14,183	15,799	10,654	13,798	17,035	20,392	23,921	12,076	16,941	22,418	28,418	34,440	13,527	20,469	28,759	39,120	51,639
Shortage Amount - North	17,707	23,791	31,049	39,655	49,806	18,685	25,766	34,040	43,658	54,777	19,633	27,718	36,873	47,413	60,096	20,552	29,522	39,529	50,212	61,893
Remaining HG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TABLE B-5.b Projected landings and shortages by subarea for **Alternative 3-Modified to Oct. 1** under a harvest guideline of **136,000 mt** and growth rates of 0%, 5%, 10% and 15%
35% HG avail coastwide Jan 1; 40% HG (plus any remainder) avail coastwide Jul 1;
25% HG (plus any remainder) avail coastwide Oct 1

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,319	54,496	62,671	72,071	82,882	92,390
Total Catch - North	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	43,610
Shortage Date-South																				Sep
Shortage Date - North																				Sep
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,924
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,244
Remaining HG	43,758	43,758	43,758	43,758	43,758	41,389	38,901	36,288	33,546	30,666	39,019	33,807	28,073	21,765	14,827	36,650	28,475	19,075	8,264	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,047	54,496	62,671	72,071	81,795	86,590
Total Catch - North	47,097	49,452	54,520	54,520	57,246	47,097	49,452	54,520	54,520	57,246	47,097	49,452	54,520	54,520	56,805	47,097	49,452	52,972	52,972	49,410
Shortage Date-South															Sep				Sep	Sep, Dec
Shortage Date - North															Sep				Sep	Sep, Dec
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	271	0	0	0	1,087	8,724
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	441	0	0	0	1,549	7,837
Remaining HG	41,515	39,160	36,688	34,092	31,366	39,146	34,303	29,218	23,879	18,273	36,777	29,209	21,002	12,099	3,147	34,407	23,878	12,005	1,233	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	59,457	52,127	57,339	63,073	68,172	71,645	54,496	62,671	72,039	78,203	81,141
Total Catch - North	49,339	54,273	65,671	65,671	72,238	49,339	54,273	65,671	65,671	69,591	49,339	54,273	63,193	63,193	62,657	49,339	54,273	57,642	57,642	54,859
Shortage Date-South										Sep				Sep	Sep			Sep	Sep	Aug, Nov
Shortage Date - North										Sep				Sep	Sep			Sep	Sep	Aug, Nov
Shortage Amount -South	0	0	0	0	0	0	0	0	0	1,023	0	0	0	1,209	4,674	0	0	33	4,679	14,173
Shortage Amount - North	0	0	0	0	0	0	0	0	0	2,647	0	0	0	2,477	9,581	0	0	58	8,029	17,379
Remaining HG	39,273	34,339	28,911	22,941	16,374	36,903	29,481	21,442	12,729	6,952	34,534	24,387	13,226	4,635	1,698	32,164	19,056	4,319	156	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Total Catch - South	47,388	47,388	47,388	47,272	45,209	49,757	52,245	54,858	55,737	55,773	52,127	57,339	62,543	64,965	67,914	54,496	62,671	69,519	74,060	76,125
Total Catch - North	51,582	59,319	78,033	78,033	81,233	51,582	59,319	72,955	72,955	75,012	51,582	59,319	67,636	67,636	68,086	51,582	59,319	61,940	61,940	59,875
Shortage Date-South				Sep	Sep				Sep	Sep			Sep	Sep	Aug			Sep	Aug, Dec	Aug, Nov
Shortage Date - North				Sep	Sep				Sep	Sep			Sep	Sep	Aug			Sep	Aug, Dec	Aug, Nov
Shortage Amount -South	0	0	0	116	2,179	0	0	0	1,863	4,707	0	0	530	4,416	8,405	0	0	2,552	8,822	19,189
Shortage Amount - North	0	0	0	417	8,984	0	0	0	5,495	15,205	0	0	1,242	10,814	22,132	0	0	5,232	16,510	30,343
Remaining HG	37,030	29,293	20,395	10,695	9,558	34,661	24,435	12,925	7,307	5,214	32,291	19,341	6,481	3,399	0	29,922	14,010	3,496	0	0

TABLE B-5.c Projected landings and shortages by subarea for **Alternative 3-Modified to Oct. 1** under a harvest guideline of **200,000 mt** and growth rates of 0%, 5%, 10% and 15%
35% HG avail coastwide Jan 1; 40% HG (plus any remainder) avail coastwide Jul 1;
25% HG (plus any remainder) avail coastwide Oct 1

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,319	54,496	62,671	72,071	82,882	95,314
Total Catch - North	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854
Shortage Date-South																				
Shortage Date - North																				
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Remaining HG	107,758	107,758	107,758	107,758	107,758	105,389	102,901	100,288	97,546	94,666	103,019	97,807	92,073	85,765	78,827	100,650	92,475	83,075	72,264	59,832

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,319	54,496	62,671	72,071	82,882	95,314
Total Catch - North	47,097	49,452	54,520	54,520	57,246	47,097	49,452	54,520	54,520	57,246	47,097	49,452	54,520	54,520	57,246	47,097	49,452	54,520	54,520	57,246
Shortage Date-South																				
Shortage Date - North																				
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Remaining HG	105,515	103,160	100,688	98,092	95,366	103,146	98,303	93,218	87,879	82,273	100,777	93,209	85,002	76,099	66,435	98,407	87,878	76,005	62,598	47,439

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,319	54,496	62,671	72,071	82,882	95,314
Total Catch - North	49,339	54,273	65,671	65,671	72,238	49,339	54,273	65,671	65,671	72,238	49,339	54,273	65,671	65,671	72,238	49,339	54,273	65,671	65,671	72,238
Shortage Date-South																				
Shortage Date - North																				
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Remaining HG	103,273	98,339	92,911	86,941	80,374	100,903	93,481	85,442	76,729	67,282	98,534	88,387	77,226	64,948	51,443	96,164	83,056	68,228	51,447	32,448

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,319	54,496	62,671	72,071	82,882	95,314
Total Catch - North	51,582	59,319	78,450	78,450	90,217	51,582	59,319	78,450	78,450	90,217	51,582	59,319	78,450	78,450	90,217	51,582	59,319	78,450	78,450	90,217
Shortage Date-South																				
Shortage Date - North																				
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Remaining HG	101,030	93,293	84,395	74,162	62,395	98,661	88,435	76,925	63,950	49,302	96,291	83,341	68,709	52,169	33,464	93,922	78,010	59,711	38,668	14,468

TABLE B-6.a Projected landings and shortages by Subarea for the **Alternative 4a** under a harvest guideline of **100,000 mt** and growth rates of 0%, 5%, 10%, and 15%.
Alt 4a: If HG > 100,000MT, 40% WA/OR, 60% CA Jan 1; any remainder Coastwide Sep 1

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	55,399	55,664	52,127	55,373	55,884	56,711	57,822	54,496	55,851	57,162	58,732	61,608
Total Catch - North	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,601	44,336	44,854	44,627	44,116	43,289	42,178	44,854	44,149	42,838	41,268	38,392
Shortage Date-South									Nov	Nov							Nov	Oct	Oct	Sep
Shortage Date - North									Nov	Nov							Nov	Oct	Oct	Sep
Shortage Amount -South	0	0	0	0	0	0	0	0	2,202	4,816	0	1,966	7,189	12,669	18,497	0	6,820	14,909	24,150	33,706
Shortage Amount - North	0	0	0	0	0	0	0	0	253	518	0	227	738	1,565	2,676	0	705	2,016	3,586	6,462
Remaining HG	7,758	7,758	7,758	7,758	7,758	5,389	2,901	288	0	0	3,019	0	0	0	0	650	0	0	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Total Catch - South	47,388	47,388	47,388	45,757	44,370	49,757	50,757	48,892	47,298	46,851	52,127	51,301	50,312	49,673	50,380	53,084	52,016	51,961	53,474	57,469
Total Catch - North	47,097	49,452	51,924	54,243	55,630	47,097	49,243	51,108	52,702	53,149	47,097	48,699	49,688	50,327	49,620	46,916	47,984	48,039	46,526	42,531
Shortage Date-South				Nov	Nov		Dec	Nov	Oct	Oct		Nov	Oct	Oct	Sep	Dec	Oct	Oct	Sep	Sep
Shortage Date - North				Nov	Aug, Nov		Dec	Nov	Oct	Aug, Oct		Nov	Oct	Oct	Aug, Sep	Dec	Oct	Oct	Sep	Aug, Sep
Shortage Amount -South	0	0	0	1,631	3,018	0	1,488	5,966	10,303	13,629	0	6,039	12,761	19,708	25,939	1,412	10,654	20,110	29,408	37,845
Shortage Amount - North	0	0	0	277	1,617	0	209	816	1,818	4,097	0	753	2,236	4,193	7,627	181	1,468	3,886	7,994	14,716
Remaining HG	5,515	3,160	688	0	0	3,146	0	0	0	0	777	0	0	0	0	0	0	0	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Total Catch - South	47,388	45,968	43,802	42,450	41,009	49,757	46,577	45,109	44,821	44,547	50,841	47,409	47,012	47,403	49,554	51,107	48,573	48,725	52,596	57,218
Total Catch - North	49,339	54,032	56,198	57,550	58,991	49,339	53,423	54,891	55,179	55,453	49,159	52,591	52,988	52,597	50,446	48,893	51,427	51,275	47,404	42,782
Shortage Date-South		Dec	Nov	Nov	Nov		Nov	Oct	Oct	Oct	Dec	Oct	Oct	Oct	Sep	Nov	Oct	Oct	Sep	Sep
Shortage Date - North		Dec	Aug, Nov	Aug, Nov	Aug, Nov		Nov	Aug, Oct	Aug, Oct	Aug, Oct	Dec	Oct	Aug, Oct	Aug, Oct	Aug, Sep	Nov	Oct	Aug, Oct	Aug, Sep	Aug. Sep
Shortage Amount -South	0	1,420	3,586	4,938	6,379	0	5,668	9,748	12,779	15,933	1,286	9,931	16,062	21,978	26,765	3,389	14,098	23,346	30,286	38,096
Shortage Amount - North	0	241	3,503	8,121	13,247	0	851	4,810	10,492	16,785	180	1,682	6,712	13,073	21,792	447	2,846	8,426	18,267	29,456
Remaining HG	3,273	0	0	0	0	903	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Total Catch - South	47,388	43,890	41,886	39,836	38,145	48,596	44,518	43,707	42,933	42,170	48,885	45,788	45,732	46,095	48,824	49,150	46,987	47,891	52,124	56,991
Total Catch - North	51,582	56,110	58,114	60,164	61,855	51,404	55,482	56,293	57,067	57,830	51,115	54,212	54,268	53,905	51,176	50,850	53,013	52,109	47,876	43,009
Shortage Date-South		Nov	Nov	Oct	Oct	Dec	Nov	Oct	Oct	Oct	Nov	Oct	Oct	Sep	Sep	Nov	Oct	Sep	Sep	Sep
Shortage Date - North		Aug, Nov	Aug, Nov	Aug, Oct	Aug, Oct	Dec	Aug, Nov	Aug, Oct	Aug, Oct	Aug, Oct	Nov	Aug, Oct	Aug, Oct	Aug. Sep	Aug, Sep	Nov	Aug, Oct	Aug, Sep	Aug, Sep	Aug, Sep
Shortage Amount -South	0	3,498	5,502	7,552	9,243	1,161	7,727	11,151	14,668	18,311	3,242	11,552	17,341	23,286	27,495	5,346	15,684	24,180	30,758	38,323
Shortage Amount - North	0	3,210	10,103	18,286	28,363	178	3,838	11,924	21,383	32,387	467	5,107	13,949	24,545	39,041	732	6,306	16,109	30,574	47,209
Remaining HG	1,030	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TABLE B-6.b Projected landings and shortages by Subarea for the **Alternative 4a** under a harvest guideline of **136,000 mt** and growth rates of 0%, 5%, 10%, and 15%.
Alt 4a: If HG > 100,000 Alt 4a: If Alt 4a: If HG > 100,000MT, 40% WA/OR, 60% CA Jan 1; any remainder Coastwide Sep 1

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,319	54,496	62,671	72,071	82,882	91,416
Total Catch - North	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,584
Shortage Date-South																				
Shortage Date - North																				
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3,899
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	270
Remaining HG	43,758	43,758	43,758	43,758	43,758	41,389	38,901	36,288	33,546	30,666	39,019	33,807	28,073	21,765	14,827	36,650	28,475	19,075	8,264	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,319	54,496	62,671	72,071	81,604	80,185
Total Catch - North	47,097	49,452	51,924	54,520	57,246	47,097	49,452	51,924	54,520	57,246	47,097	49,452	51,924	54,520	57,246	47,097	49,452	51,924	54,396	55,815
Shortage Date-South																			Dec	Oct
Shortage Date - North																			Dec	Oct
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,278	15,129
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	125	1,432
Remaining HG	41,515	39,160	36,688	34,092	31,366	39,146	34,303	29,218	23,879	18,273	36,777	29,209	21,002	12,099	2,435	34,407	23,878	12,005	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	65,269	54,496	62,671	72,071	71,616	69,061
Total Catch - North	49,339	54,273	59,701	65,671	72,238	49,339	54,273	59,701	65,671	72,238	49,339	54,273	59,701	65,671	70,731	49,339	54,273	59,701	64,384	66,939
Shortage Date-South															Nov				Nov	Oct
Shortage Date - North															Nov				Nov	Oct
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11,050	0	0	0	11,266	26,254
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,507	0	0	0	1,287	5,298
Remaining HG	39,273	34,339	28,911	22,941	16,374	36,903	29,481	21,442	12,729	3,282	34,534	24,387	13,226	948	0	32,164	19,056	4,228	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	56,909	52,127	57,339	63,073	60,846	60,300	54,496	62,671	68,304	63,756	64,527
Total Catch - North	51,582	59,319	68,217	76,546	79,868	51,582	59,319	68,217	76,546	79,091	51,582	59,319	68,217	75,154	75,700	51,582	59,319	67,696	72,244	71,473
Shortage Date-South										Nov				Nov	Oct			Nov	Oct	Oct
Shortage Date - North				Aug	Aug				Aug	Aug, Nov				Aug, Nov	Aug, Oct			Nov	Aug, Oct	Aug, Oct
Shortage Amount -South	0	0	0	0	0	0	0	0	0	3,572	0	0	0	8,534	16,019	0	0	3,768	19,126	30,787
Shortage Amount - North	0	0	0	1,904	10,350	0	0	0	1,904	11,126	0	0	0	3,296	14,518	0	0	521	6,206	18,744
Remaining HG	37,030	29,293	20,395	12,066	8,744	34,661	24,435	12,925	1,854	0	32,291	19,341	4,709	0	0	29,922	14,010	0	0	0

TABLE B-6.c Projected landings and shortages by Subarea for the **Alternative 4a** under a harvest guideline of **200,000 mt** and growth rates of 0%, 5%, 10%, and 15%.
Alt 4a: If HG > 100,000MT, 40% WA/OR, 60% CA Jan 1; any remainder Coastwide Sep 1

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,319	54,496	62,671	72,071	82,882	95,314
Total Catch - North	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854
Shortage Date-South																				
Shortage Date - North																				
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Remaining HG	107,758	107,758	107,758	107,758	107,758	105,389	102,901	100,288	97,546	94,666	103,019	97,807	92,073	85,765	78,827	100,650	92,475	83,075	72,264	59,832

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,319	54,496	62,671	72,071	82,882	95,314
Total Catch - North	47,097	49,452	51,924	54,520	57,246	47,097	49,452	51,924	54,520	57,246	47,097	49,452	51,924	54,520	57,246	47,097	49,452	51,924	54,520	57,246
Shortage Date-South																				
Shortage Date - North																				
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Remaining HG	105,515	103,160	100,688	98,092	95,366	103,146	98,303	93,218	87,879	82,273	100,777	93,209	85,002	76,099	66,435	98,407	87,878	76,005	62,598	47,439

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,319	54,496	62,671	72,071	82,882	95,314
Total Catch - North	49,339	54,273	59,701	65,671	72,238	49,339	54,273	59,701	65,671	72,238	49,339	54,273	59,701	65,671	72,238	49,339	54,273	59,701	65,671	72,238
Shortage Date-South																				
Shortage Date - North																				
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Remaining HG	103,273	98,339	92,911	86,941	80,374	100,903	93,481	85,442	76,729	67,282	98,534	88,387	77,226	64,948	51,443	96,164	83,056	68,228	51,447	32,448

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,319	54,496	62,671	72,071	82,882	95,314
Total Catch - North	51,582	59,319	68,217	78,450	90,217	51,582	59,319	68,217	78,450	90,217	51,582	59,319	68,217	78,450	90,217	51,582	59,319	68,217	78,450	90,217
Shortage Date-South																				
Shortage Date - North																				
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Remaining HG	101,030	93,293	84,395	74,162	62,395	98,661	88,435	76,925	63,950	49,302	96,291	83,341	68,709	52,169	33,464	93,922	78,010	59,711	38,668	14,468

TABLE B-7.a Projected landings and shortages by Subarea for the **Alternative 4b** under a harvest guideline of **72,000 mt** and growth rates of 0%, 5%, 10%, and 15%.
Alt 4b: If HG < 100,000MT, 33% WA/OR, 66% CA Jan 1; any remainder 20% WA/OR, 80% CA Sept 1; any remainder Coastwide Nov 1

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total Catch - South	43,484	43,484	43,484	43,484	43,484	43,977	44,476	44,793	45,113	45,448	44,452	45,082	45,750	46,485	47,294	44,751	45,703	46,799	48,002	48,002
Total Catch - North	28,516	28,516	28,516	28,516	28,516	28,023	27,524	27,207	26,887	26,552	27,548	26,918	26,250	25,515	24,706	27,249	26,297	25,201	23,998	23,998
Shortage Date-South	Nov	Nov	Nov	Nov	Nov	Nov	Nov	Oct	Oct	Oct	Nov	Oct	Oct	Oct	Sep	Oct	Oct	Sep	Aug	Aug
Shortage Date - North	Aug,Sep,Nov	Aug,Sep,Nov	Aug,Sep,Nov	Aug,Sep,Nov	Aug,Sep,Nov	Aug,Sep,Nov	Aug,Sep,Nov	Aug, Sep	Aug, Sep	Aug, Sep	Aug,Sep,Nov	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug	Aug
Shortage Amount -South	3,904	3,904	3,904	3,904	3,904	5,780	7,770	10,064	12,488	15,032	7,675	12,257	17,323	22,896	29,025	9,745	16,967	25,273	34,880	47,312
Shortage Amount - North	16,338	20,242	16,338	16,338	16,338	16,831	25,099	17,647	17,967	18,302	17,306	30,193	18,604	19,339	20,148	17,605	35,525	19,653	20,856	20,856
Remaining HG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Total Catch - South	43,465	43,445	43,425	43,403	43,381	43,967	44,474	44,793	45,113	45,448	44,451	45,082	45,750	46,485	47,294	44,751	45,703	46,799	48,002	48,002
Total Catch - North	28,535	28,555	28,575	28,597	28,619	28,033	27,526	27,207	26,887	26,552	27,549	26,918	26,250	25,515	24,706	27,249	26,297	25,201	23,998	23,998
Shortage Date-South	Nov	Nov	Nov	Nov	Nov	Nov	Nov	Oct	Oct	Oct	Nov	Oct	Oct	Oct	Sep	Oct	Oct	Sep	Aug	Aug
Shortage Date - North	Aug,Sep,Nov	Aug,Sep,Nov	Aug,Sep,Nov	Aug,Sep,Nov	Aug,Sep,Nov	Aug,Sep,Nov	Aug,Sep,Nov	Aug, Sep	Aug, Sep	Aug, Sep	Aug,Sep,Nov	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug	Aug
Shortage Amount -South	3,923	3,943	3,963	3,985	4,007	5,790	7,771	10,064	12,488	15,032	7,676	12,257	17,323	22,896	29,025	9,745	16,967	25,273	34,880	47,312
Shortage Amount - North	18,562	24,840	23,349	25,924	28,627	19,064	29,697	24,717	27,633	30,695	19,548	34,791	25,674	29,006	32,540	19,848	40,122	26,723	30,523	33,249
Remaining HG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Total Catch - South	43,446	43,405	43,361	43,315	43,265	43,958	44,473	44,793	45,113	45,448	44,450	45,082	45,750	46,485	47,294	44,751	45,703	46,799	48,002	48,002
Total Catch - North	28,554	28,595	28,639	28,685	28,735	28,042	27,527	27,207	26,887	26,552	27,550	26,918	26,250	25,515	24,706	27,249	26,297	25,201	23,998	23,998
Shortage Date-South	Nov	Nov	Nov	Nov	Nov	Nov	Nov	Oct	Oct	Oct	Nov	Oct	Oct	Oct	Sep	Oct	Oct	Sep	Aug	Aug
Shortage Date - North	Aug,Sep,Nov	Aug,Sep,Nov	Aug,Sep,Nov	Aug,Sep,Nov	Jul,Sep,Nov	Aug,Sep,Nov	Aug,Sep,Nov	Aug, Sep	Aug, Sep	Jul, Sep	Aug,Sep,Nov	Aug, Sep	Aug, Sep	Aug, Sep	Jul, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug	Jul
Shortage Amount -South	3,942	3,983	4,027	4,073	4,123	5,800	7,772	10,064	12,488	15,032	7,677	12,257	17,323	22,896	29,025	9,745	16,967	25,273	34,880	47,312
Shortage Amount - North	20,786	29,661	31,062	36,985	43,502	21,297	34,519	32,494	38,783	45,686	21,790	39,613	33,451	40,156	47,531	22,090	44,944	34,499	41,673	48,240
Remaining HG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Total Catch - South	43,428	43,364	43,295	43,219	43,136	43,948	44,472	44,793	45,113	45,448	44,449	45,082	45,750	46,485	47,294	44,751	45,703	46,799	48,002	48,002
Total Catch - North	28,572	28,636	28,705	28,781	28,864	28,052	27,528	27,207	26,887	26,552	27,551	26,918	26,250	25,515	24,706	27,249	26,297	25,201	23,998	23,998
Shortage Date-South	Nov	Nov	Nov	Nov	Nov	Nov	Nov	Oct	Oct	Oct	Nov	Oct	Oct	Oct	Sep	Oct	Oct	Sep	Aug	Aug
Shortage Date - North	Aug,Sep,Nov	Aug,Sep,Nov	Aug,Sep,Nov	Jul,Sep,Nov	Jul,Sep,Nov	Aug,Sep,Nov	Aug,Sep,Nov	Aug, Sep	Jul, Sep	Jul, Sep	Aug,Sep,Nov	Aug, Sep	Aug, Sep	Jul, Sep	Jul, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Jul	Jul
Shortage Amount -South	3,960	4,024	4,093	4,169	4,252	5,809	7,773	10,064	12,488	15,032	7,678	12,257	17,323	22,896	29,025	9,745	16,967	25,273	34,880	47,312
Shortage Amount - North	23,010	34,707	39,512	49,669	61,353	23,530	39,565	41,010	51,563	63,666	24,031	44,659	41,968	52,935	65,511	24,333	49,990	43,016	54,452	66,220
Remaining HG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TABLE B-7.b Projected landings and shortages by Subarea for the **Alternative 4b** under a harvest guideline of **90,000 mt** and growth rates of 0%, 5%, 10%, and 15%.
Alt 4b: If HG < 100,000MT, 33% WA/OR, 66% CA Jan 1; any remainder 20% WA/OR, 80% CA Sept 1; any remainder Coastwide Nov 1

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	53,575	54,133	54,695	52,127	54,081	55,186	56,086	56,894	53,499	55,111	56,399	57,659	59,107
Total Catch - North	37,451	37,451	37,451	37,451	37,451	37,175	36,885	36,425	35,867	35,305	36,899	35,919	34,814	33,914	33,106	36,501	34,889	33,601	32,341	30,893
Shortage Date-South								Dec	Nov	Nov		Nov	Nov	Oct	Oct	Dec	Nov	Oct	Oct	Sep
Shortage Date - North	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug,Sep,Dec	Aug,Sep,Nov	Aug,Sep,Nov	Aug, Sep	Aug,Sep,Nov	Aug,Sep,Nov	Aug,Sep,Oct	Aug,Sep,Oct	Aug,Sep,Dec	Aug,Sep,Nov	Aug, Oct	Aug, Oct	Aug, Sep
Shortage Amount -South	0	0	0	0	0	0	0	1,283	3,468	5,785	0	3,259	7,887	13,295	19,425	997	7,560	15,672	25,223	36,207
Shortage Amount - North	7,403	7,403	7,403	7,403	7,403	7,679	7,969	8,429	8,987	9,549	7,956	12,193	10,040	10,940	11,748	8,353	17,525	11,253	12,513	13,961
Remaining HG	5,161	5,161	5,161	5,161	5,161	3,068	870	0	0	0	975	0	0	0	0	0	0	0	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	53,462	54,022	54,609	52,127	54,026	55,163	56,086	56,894	53,461	55,093	56,399	57,659	59,107
Total Catch - North	37,499	37,550	37,604	37,661	37,720	37,223	36,985	36,538	35,978	35,391	36,947	35,974	34,837	33,914	33,106	36,539	34,907	33,601	32,341	30,893
Shortage Date-South								Dec	Nov	Nov		Nov	Nov	Oct	Oct	Dec	Nov	Oct	Oct	Sep
Shortage Date - North	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug,Sep,Dec	Aug,Sep,Nov	Aug,Sep,Nov	Aug, Sep	Aug,Sep,Nov	Aug,Sep,Nov	Aug,Sep,Oct	Aug,Sep,Oct	Aug,Sep,Dec	Aug,Sep,Nov	Aug, Oct	Aug, Oct	Aug, Sep
Shortage Amount -South	0	0	0	0	0	0	0	1,396	3,578	5,871	0	3,314	7,911	13,295	19,425	1,035	7,578	15,672	25,223	36,207
Shortage Amount - North	9,597	11,901	14,320	16,860	19,527	9,873	12,467	15,386	18,543	21,856	10,150	16,791	17,087	20,606	24,140	10,558	22,122	18,323	22,179	26,353
Remaining HG	5,113	5,062	5,008	4,951	4,892	3,019	770	0	0	0	926	0	0	0	0	0	0	0	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	53,342	53,901	54,511	52,127	53,969	55,138	56,086	56,894	53,424	55,075	56,399	57,659	59,107
Total Catch - North	37,548	37,655	37,773	37,903	38,045	37,272	37,089	36,658	36,099	35,489	36,996	36,031	34,862	33,914	33,106	36,576	34,925	33,601	32,341	30,893
Shortage Date-South								Dec	Nov	Nov		Nov	Nov	Oct	Oct	Dec	Nov	Oct	Oct	Sep
Shortage Date - North	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug,Sep,Dec	Aug,Sep,Nov	Aug,Sep,Nov	Aug, Sep	Aug,Sep,Nov	Aug,Sep,Nov	Aug,Sep,Oct	Aug,Sep,Oct	Aug,Sep,Dec	Aug,Sep,Nov	Aug,Sep,Oct	Aug,Sep,Oct	Aug,Sep
Shortage Amount -South	0	0	0	0	0	0	0	1,516	3,700	5,969	0	3,370	7,936	13,295	19,425	1,072	7,596	15,672	25,223	36,207
Shortage Amount - North	11,791	16,618	21,928	27,768	34,193	12,067	17,184	23,042	29,572	36,749	12,344	21,613	24,839	31,756	39,132	12,763	26,944	26,100	33,329	41,345
Remaining HG	5,064	4,957	4,839	4,709	4,567	2,971	665	0	0	0	877	0	0	0	0	0	0	0	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	53,215	53,769	54,401	52,127	53,911	55,112	56,086	56,894	53,387	55,056	56,399	57,659	59,107
Total Catch - North	37,597	37,765	37,958	38,180	38,436	37,321	37,199	36,785	36,231	35,599	37,045	36,089	34,888	33,914	33,106	36,613	34,944	33,601	32,341	30,893
Shortage Date-South								Dec	Nov	Nov		Nov	Nov	Oct	Oct	Dec	Nov	Oct	Oct	Sep
Shortage Date - North	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Jul, Sep	Aug, Sep	Aug, Sep	Aug,Sep,Dec	Aug,Sep,Nov	Jul,Sep,Nov	Aug, Sep	Aug,Sep,Nov	Aug,Sep,Nov	Aug,Sep,Oct	Jul,Sep,Oct	Aug,Sep,Dec	Aug,Sep,Nov	Aug,Sep,Oct	Aug,Sep,Oct	Aug,Sep
Shortage Amount -South	0	0	0	0	0	0	0	1,643	3,832	6,080	0	3,428	7,962	13,295	19,425	1,109	7,615	15,672	25,223	36,207
Shortage Amount - North	13,985	21,555	30,259	40,270	51,782	14,261	22,121	31,432	42,219	54,618	14,538	26,659	33,329	44,536	57,111	14,969	31,990	34,616	46,109	59,325
Remaining HG	5,015	4,847	4,654	4,432	4,176	2,922	556	0	0	0	829	0	0	0	0	0	0	0	0	0

TABLE B-8.a Projected landings and shortages by Subarea for the **Alternative 6a** under a harvest guideline of **100,000 mt** and growth rates of 0%, 5%, 10%, and 15%.
Alt 6a: 40% WA/OR, 60% CA Jan 1; any remainder Coastwide Sep 1;
transfer rules for HG > 100,000 MT

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	55,399	55,664	52,127	55,373	55,884	56,711	57,822	54,496	55,851	57,162	58,732	61,608
Total Catch - North	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,601	44,336	44,854	44,627	44,116	43,289	42,178	44,854	44,149	42,838	41,268	38,392
Shortage Date-South									Nov	Nov		Nov	Nov	Oct	Oct		Nov	Oct	Oct	Sep
Shortage Date - North									Nov	Nov		Nov	Nov	Oct	Oct		Nov	Oct	Oct	Sep
Shortage Amount -South	0	0	0	0	0	0	0	0	2,202	4,816	0	1,966	7,189	12,669	18,497	0	6,820	14,909	24,150	33,706
Shortage Amount - North	0	0	0	0	0	0	0	0	253	518	0	227	738	1,565	2,676	0	705	2,016	3,586	6,462
Remaining HG	7,758	7,758	7,758	7,758	7,758	5,389	2,901	288	0	0	3,019	0	0	0	0	650	0	0	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Total Catch - South	47,388	47,388	47,388	45,757	43,444	49,757	50,757	48,892	47,298	46,071	52,127	51,301	50,312	49,673	49,966	53,084	52,016	51,961	53,474	53,875
Total Catch - North	47,097	49,452	51,924	54,243	56,556	47,097	49,243	51,108	52,702	53,929	47,097	48,699	49,688	50,327	50,034	46,916	47,984	48,039	46,526	46,125
Shortage Date-South				Nov	Nov		Dec	Nov	Oct	Oct		Nov	Oct	Oct	Sep	Dec	Oct	Oct	Sep	Aug, Sep
Shortage Date - North				Nov	Nov		Dec	Nov	Oct	Oct		Nov	Oct	Oct	Sep	Dec	Oct	Oct	Sep	Sep
Shortage Amount -South	0	0	0	1,631	3,944	0	1,488	5,966	10,303	14,410	0	6,039	12,761	19,708	26,352	1,412	10,654	20,110	29,408	41,440
Shortage Amount - North	0	0	0	277	690	0	209	816	1,818	3,317	0	753	2,236	4,193	7,213	181	1,468	3,886	7,994	11,121
Remaining HG	5,515	3,160	688	0	0	3,146	0	0	0	0	777	0	0	0	0	0	0	0	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Total Catch - South	47,388	45,968	41,389	37,392	33,554	49,757	46,577	43,146	39,976	38,835	50,841	47,409	44,966	44,219	42,674	51,107	48,573	47,413	49,970	50,000
Total Catch - North	49,339	54,032	58,611	62,608	66,446	49,339	53,423	56,854	60,024	61,165	49,159	52,591	55,034	55,781	57,326	48,893	51,427	52,587	50,030	50,000
Shortage Date-South		Dec	Nov	Oct	Oct		Nov	Oct	Oct	Sep	Dec	Oct	Oct	Aug, Sep	Aug, Sep	Nov	Oct	Sep	Sep	Aug
Shortage Date - North		Dec	Nov	Oct	Oct		Nov	Oct	Oct	Sep	Dec	Oct	Oct	Sep	Sep	Nov	Oct	Sep	Sep	Aug
Shortage Amount -South	0	1,420	5,999	9,996	13,834	0	5,668	11,711	17,624	21,646	1,286	9,931	18,107	25,161	33,645	3,389	14,098	24,658	32,912	45,314
Shortage Amount - North	0	241	1,090	3,063	5,792	0	851	2,847	5,647	11,073	180	1,682	4,667	9,890	14,912	447	2,846	7,114	15,641	22,238
Remaining HG	3,273	0	0	0	0	903	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Total Catch - South	47,388	41,707	35,871	31,114	29,097	48,596	42,736	37,793	36,122	36,359	48,885	43,986	41,020	41,072	40,000	49,150	45,138	44,953	41,212	40,000
Total Catch - North	51,582	58,293	64,129	68,886	70,903	51,404	57,264	62,207	63,878	63,641	51,115	56,014	58,980	58,928	60,000	50,850	54,862	55,047	58,788	60,000
Shortage Date-South		Nov	Oct	Sep	Sep		Dec	Oct	Oct	Sep	Sep	Nov	Oct	Sep	Aug, Sep	Aug	Nov	Oct	Sep	Aug, Sep	Jul
Shortage Date - North		Nov	Oct	Sep	Sep		Dec	Oct	Oct	Sep	Aug	Nov	Oct	Sep	Sep	Aug	Nov	Oct	Sep	Sep	Aug
Shortage Amount -South	0	5,681	11,517	16,274	18,291	1,161	9,509	17,065	21,478	24,122	3,242	13,354	22,053	28,309	36,319	5,346	17,533	27,118	41,670	55,314
Shortage Amount - North	0	1,026	4,088	9,564	19,315	178	2,055	6,010	14,572	26,576	467	3,305	9,238	19,522	30,217	732	4,457	13,171	19,662	30,217
Remaining HG	1,030	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TABLE B-8.b Projected landings and shortages by Subarea for the **Alternative 6a** under a harvest guideline of **136,000 mt** and growth rates of 0%, 5%, 10%, and 15%.
Alt 6a: 40% WA/OR, 60% CA Jan 1; any remainder Coastwide Sep 1;
transfer rules for HG > 100,000 MT

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,319	54,496	62,671	72,071	82,882	91,416
Total Catch - North	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,584
Shortage Date-South																				Nov
Shortage Date - North																				Nov
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3,899
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	270
Remaining HG	43,758	43,758	43,758	43,758	43,758	41,389	38,901	36,288	33,546	30,666	39,019	33,807	28,073	21,765	14,827	36,650	28,475	19,075	8,264	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,319	54,496	62,671	72,071	81,604	80,185
Total Catch - North	47,097	49,452	51,924	54,520	57,246	47,097	49,452	51,924	54,520	57,246	47,097	49,452	51,924	54,520	57,246	47,097	49,452	51,924	54,396	55,815
Shortage Date-South																			Dec	Oct
Shortage Date - North																			Dec	Oct
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,278	15,129
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	125	1,432
Remaining HG	41,515	39,160	36,688	34,092	31,366	39,146	34,303	29,218	23,879	18,273	36,777	29,209	21,002	12,099	2,435	34,407	23,878	12,005	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Total Catch - South	47,388	47,388	47,388	47,388	47,388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	65,269	54,496	62,671	72,071	71,616	69,061
Total Catch - North	49,339	54,273	59,701	65,671	72,238	49,339	54,273	59,701	65,671	72,238	49,339	54,273	59,701	65,671	70,731	49,339	54,273	59,701	64,384	66,939
Shortage Date-South															Nov				Nov	Oct
Shortage Date - North															Nov				Nov	Oct
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11,050	0	0	0	11,266	26,254
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,507	0	0	0	1,287	5,298
Remaining HG	39,273	34,339	28,911	22,941	16,374	36,903	29,481	21,442	12,729	3,282	34,534	24,387	13,226	948	0	32,164	19,056	4,228	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Total Catch - South	47,388	47,388	47,388	47,388	46,136	49,757	52,245	54,858	57,559	49,124	52,127	57,339	63,073	59,207	53,352	54,496	62,671	68,304	62,389	60,680
Total Catch - North	51,582	59,319	68,217	78,450	89,864	51,582	59,319	68,217	78,441	86,876	51,582	59,319	68,217	76,793	82,648	51,582	59,319	67,696	73,611	75,320
Shortage Date-South					Dec				Dec	Oct				Nov	Oct			Nov	Oct	Sep
Shortage Date - North					Dec					Oct				Nov	Oct			Nov	Oct	Sep
Shortage Amount -South	0	0	0	0	1,252	0	0	0	42	11,356	0	0	0	10,174	22,967	0	0	3,768	20,493	34,634
Shortage Amount - North	0	0	0	0	353	0	0	0	8	3,341	0	0	0	1,657	7,570	0	0	521	4,838	14,898
Remaining HG	37,030	29,293	20,395	10,162	0	34,661	24,435	12,925	0	0	32,291	19,341	4,709	0	0	29,922	14,010	0	0	0

TABLE B-8.c Projected landings and shortages by Subarea for the **Alternative 6a** under a harvest guideline of **200,000 mt** and growth rates of 0%, 5%, 10%, and 15%.
Alt 6a: 40% WA/OR, 60% CA Jan 1; any remainder Coastwide Sep 1;
transfer rules for HG > 100,000 MT

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	200000	200000	200000	200000	200000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total Catch - South	47388	47388	47388	47388	47388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,319	54,496	62,671	72,071	82,882	95,314
Total Catch - North	44854	44854	44854	44854	44854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854
Shortage Date-South																				
Shortage Date - North																				
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Remaining HG	107758	107758	107758	107758	107758	105,389	102,901	100,288	97,546	94,666	103,019	97,807	92,073	85,765	78,827	100,650	92,475	83,075	72,264	59,832

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	200000	200000	200000	200000	200000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Total Catch - South	47388	47388	47388	47388	47388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,319	54,496	62,671	72,071	82,882	95,314
Total Catch - North	47096.7	49451.535	51924.112	54520.317	57246.333	47,097	49,452	51,924	54,520	57,246	47,097	49,452	51,924	54,520	57,246	47,097	49,452	51,924	54,520	57,246
Shortage Date-South																				
Shortage Date - North																				
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Remaining HG	105515.3	103160.47	100687.89	98091.683	95365.667	103,146	98,303	93,218	87,879	82,273	100,777	93,209	85,002	76,099	66,435	98,407	87,878	76,005	62,598	47,439

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	200000	200000	200000	200000	200000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Total Catch - South	47388	47388	47388	47388	47388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,319	54,496	62,671	72,071	82,882	95,314
Total Catch - North	49339.4	54273.34	59700.674	65670.741	72237.816	49,339	54,273	59,701	65,671	72,238	49,339	54,273	59,701	65,671	72,238	49,339	54,273	59,701	65,671	72,238
Shortage Date-South																				
Shortage Date - North																				
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Remaining HG	103272.6	98338.66	92911.326	86941.259	80374.184	100,903	93,481	85,442	76,729	67,282	98,534	88,387	77,226	64,948	51,443	96,164	83,056	68,228	51,447	32,448

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	200000	200000	200000	200000	200000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Total Catch - South	47388	47388	47388	47388	47388	49,757	52,245	54,858	57,600	60,480	52,127	57,339	63,073	69,381	76,319	54,496	62,671	72,071	82,882	95,314
Total Catch - North	51582.1	59319.415	68217.327	78449.926	90217.415	51,582	59,319	68,217	78,450	90,217	51,582	59,319	68,217	78,450	90,217	51,582	59,319	68,217	78,450	90,217
Shortage Date-South																				
Shortage Date - North																				
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Remaining HG	101029.9	93292.585	84394.673	74162.074	62394.585	98,661	88,435	76,925	63,950	49,302	96,291	83,341	68,709	52,169	33,464	93,922	78,010	59,711	38,668	14,468

TABLE B-9.a Projected landings and shortages by Subarea for the **Alternative 6b** under a harvest guideline of **72,000 mt** and growth rates of 0%, 5%, 10%, and 15%.
Alt 6b: 40% WA/OR, 60% CA Jan 1; any remainder Coastwide Sep 1;
transfer rules for HG < 100,000 MT

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total Catch - South	33,971	31,606	31,606	31,606	31,606	34,433	33,713	34,790	35,660	35,736	34,863	35,780	37,949	38,870	38,908	35,862	37,802	38,885	38,940	38,996
Total Catch - North	38,029	40,394	40,394	40,394	40,394	37,567	38,287	37,210	36,340	36,264	37,137	36,220	34,051	33,130	33,092	36,138	34,198	33,115	33,060	33,004
Shortage Date-South	Oct	Sep	Sep	Sep	Sep	Oct	Sep	Sep	Aug	Aug	Oct	Sep	Sep	Aug	Aug	Sep	Sep	Aug, Sep	Aug, Sep	Jul, Sep
Shortage Date - North	Aug, Oct	Sep	Sep	Sep	Sep	Aug, Oct	Sep	Sep	Sep	Sep	Aug, Oct	Sep	Sep	Sep	Sep	Aug, Sep	Sep	Sep	Sep	Sep
Shortage Amount -South	13,417	15,782	15,782	15,782	15,782	15,325	18,532	20,067	21,941	24,745	17,263	21,560	25,124	30,511	37,411	18,634	24,869	33,186	43,942	56,318
Shortage Amount - North	6,825	4,460	4,460	4,460	4,460	7,287	6,567	7,644	8,514	8,590	7,717	8,634	10,803	11,724	11,762	8,716	10,656	11,739	11,794	11,850
Remaining HG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Total Catch - South	33,644	30,855	29,719	29,113	28,520	34,118	32,981	32,867	33,200	33,200	34,707	35,075	37,266	38,200	38,200	35,735	37,132	38,200	38,200	38,200
Total Catch - North	38,356	41,145	42,281	42,887	43,480	37,882	39,019	39,133	38,800	38,800	37,293	36,925	34,734	33,800	33,800	36,265	34,868	33,800	33,800	33,800
Shortage Date-South	Oct	Sep	Sep	Sep	Sep	Oct	Sep	Sep	Aug	Aug	Sep	Sep	Sep	Aug	Aug	Sep	Sep	Aug	Aug	Jul
Shortage Date - North	Aug, Oct	Aug, Sep	Sep	Sep	Sep	Aug, Oct	Aug, Sep	Sep	Aug	Aug	Aug, Sep	Aug, Sep	Aug, Sep	Aug	Aug	Aug	Aug	Aug	Aug	Aug
Shortage Amount -South	13,744	16,533	17,669	18,275	18,868	15,640	19,264	21,991	24,400	27,280	17,420	22,264	25,807	31,181	38,119	18,761	25,538	33,871	44,682	57,114
Shortage Amount - North	8,741	8,307	9,643	11,633	13,766	9,214	10,432	12,791	15,720	18,446	9,803	12,527	17,190	20,720	23,446	10,831	14,584	18,124	20,720	23,446
Remaining HG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Total Catch - South	33,326	30,649	29,106	27,754	27,743	33,811	32,824	32,327	33,200	33,200	34,574	34,975	37,220	38,200	38,200	35,615	37,096	38,200	38,200	38,200
Total Catch - North	38,674	41,351	42,894	44,246	44,257	38,189	39,176	39,673	38,800	38,800	37,426	37,025	34,780	33,800	33,800	36,385	34,904	33,800	33,800	33,800
Shortage Date-South	Oct	Sep	Sep	Sep	Sep	Oct	Sep	Sep	Aug	Aug	Sep	Sep	Sep	Aug	Aug	Sep	Sep	Aug	Aug	Jul
Shortage Date - North	Aug, Oct	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Oct	Aug, Sep	Aug, Sep	Aug	Aug	Aug, Sep	Aug, Sep	Aug, Sep	Aug	Aug	Aug	Aug	Aug	Aug	Aug
Shortage Amount -South	14,062	16,739	18,282	19,634	19,645	15,946	19,421	22,531	24,400	27,280	17,553	22,364	25,853	31,181	38,119	18,882	25,574	33,871	44,682	57,114
Shortage Amount - North	10,665	12,923	16,806	21,424	27,981	11,151	15,098	20,027	26,871	33,438	11,913	17,249	24,921	31,871	38,438	12,954	19,370	25,901	31,871	38,438
Remaining HG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Total Catch - South	33,017	30,460	28,964	27,735	27,721	33,513	32,680	32,293	33,200	33,200	34,449	34,883	37,178	38,200	38,200	35,502	37,063	38,200	38,200	38,200
Total Catch - North	38,983	41,540	43,036	44,265	44,279	38,487	39,320	39,707	38,800	38,800	37,551	37,117	34,822	33,800	33,800	36,498	34,937	33,800	33,800	33,800
Shortage Date-South	Oct	Sep	Sep	Sep	Sep	Oct	Sep	Sep	Aug	Aug	Sep	Sep	Sep	Aug	Aug	Sep	Sep	Aug	Aug	Jul
Shortage Date - North	Aug, Oct	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Oct	Aug, Sep	Aug, Sep	Aug	Aug	Aug, Sep	Aug, Sep	Aug, Sep	Aug	Aug	Aug	Aug	Aug	Aug	Aug
Shortage Amount -South	14,371	16,928	18,424	19,653	19,667	16,245	19,566	22,564	24,400	27,280	17,678	22,457	25,895	31,181	38,119	18,995	25,608	33,871	44,682	57,114
Shortage Amount - North	12,599	17,780	25,181	34,185	45,939	13,095	19,999	28,510	39,650	51,417	14,031	22,202	33,396	44,650	56,417	15,084	24,382	34,417	44,650	56,417
Remaining HG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TABLE B-9.b Projected landings and shortages by Subarea for the **Alternative 6b** under a harvest guideline of **90,000 mt** and growth rates of 0%, 5%, 10%, and 15%.
Alt 6b: 40% WA/OR, 60% CA Jan 1; any remainder Coastwide Sep 1;
transfer rules for HG < 100,000 MT

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total Catch - South	45,420	45,420	45,420	45,420	45,420	45,679	45,929	46,238	46,802	47,352	45,917	46,750	47,814	48,823	50,332	46,161	47,744	49,211	52,668	53,362
Total Catch - North	44,580	44,580	44,580	44,580	44,580	44,321	44,071	43,762	43,198	42,648	44,083	43,250	42,186	41,177	39,668	43,839	42,256	40,789	37,332	36,638
Shortage Date-South	Nov	Nov	Nov	Nov	Nov	Nov	Nov	Oct	Oct	Oct	Nov	Oct	Oct	Oct	Sep	Oct	Oct	Oct	Sep	Aug, Sep
Shortage Date - North	Nov	Nov	Nov	Nov	Nov	Nov	Nov	Oct	Oct	Oct	Nov	Oct	Oct	Oct	Sep	Oct	Oct	Oct	Sep	Sep
Shortage Amount -South	1,968	1,968	1,968	1,968	1,968	4,078	6,317	8,620	10,799	13,129	6,210	10,590	15,260	20,557	25,987	8,336	14,927	22,860	30,214	41,952
Shortage Amount - North	274	274	274	274	274	533	783	1,092	1,656	2,206	771	1,604	2,668	3,677	5,186	1,015	2,598	4,065	7,522	8,216
Remaining HG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Total Catch - South	43,468	41,443	39,528	37,819	36,080	43,727	42,396	41,283	40,114	39,718	44,019	43,483	42,855	44,286	45,872	44,546	44,479	46,183	49,349	49,000
Total Catch - North	46,532	48,557	50,472	52,181	53,920	46,273	47,604	48,717	49,886	50,282	45,981	46,517	47,145	45,714	44,128	45,454	45,521	43,817	40,651	41,000
Shortage Date-South	Nov	Nov	Oct	Oct	Oct	Nov	Oct	Oct	Oct	Sep	Oct	Oct	Oct	Sep	Aug, Sep	Oct	Oct	Sep	Sep	Aug
Shortage Date - North						Nov	Oct	Oct	Oct	Sep	Oct	Oct	Oct	Sep	Sep	Oct	Oct	Sep	Sep	Aug
Shortage Amount -South	3,920	5,945	7,860	9,569	11,308	6,030	9,850	13,575	17,486	20,762	8,108	13,856	20,219	25,095	30,446	9,950	18,191	25,889	33,533	46,314
Shortage Amount - North	565	895	1,452	2,339	3,326	824	1,847	3,207	4,634	6,964	1,116	2,935	4,779	8,806	13,119	1,643	3,931	8,107	13,870	16,246
Remaining HG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Total Catch - South	41,539	37,979	34,561	31,420	30,058	41,884	39,150	36,483	36,239	36,282	42,446	40,225	40,156	41,592	44,000	42,972	41,564	43,834	45,000	45,000
Total Catch - North	48,461	52,021	55,439	58,580	59,942	48,116	50,850	53,517	53,761	53,718	47,554	49,775	49,844	48,408	46,000	47,028	48,436	46,166	45,000	45,000
Shortage Date-South	Nov	Oct	Oct	Sep	Sep	Oct	Oct	Sep	Sep	Sep	Oct	Oct	Sep	Sep	Aug	Oct	Sep	Sep	Aug	Aug
Shortage Date - North	Nov	Oct	Oct	Sep	Sep	Oct	Oct	Sep	Sep	Aug, Sep	Oct	Oct	Sep	Aug, Sep	Aug	Oct	Sep	Sep	Aug	Aug
Shortage Amount -South	5,849	9,409	12,827	15,968	17,330	7,873	13,095	18,374	21,361	24,198	9,681	17,114	22,918	27,789	32,319	11,524	21,106	28,237	37,882	50,314
Shortage Amount - North	879	2,252	4,261	7,090	12,296	1,224	3,423	6,184	11,910	18,520	1,785	4,499	9,856	17,262	26,238	2,312	5,838	13,534	20,671	27,238
Remaining HG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Total Catch - South	40,516	35,830	31,587	30,090	28,853	41,068	37,005	35,218	34,933	34,000	41,637	38,216	38,914	39,000	39,000	42,170	40,604	42,645	44,000	44,000
Total Catch - North	49,484	54,170	58,413	59,910	61,147	48,932	52,995	54,782	55,067	56,000	48,363	51,784	51,086	51,000	51,000	47,830	49,396	47,355	46,000	46,000
Shortage Date-South	Aug, Nov	Aug, Oct	Aug, Sep	Aug, Sep	Aug, Sep	Nov	Oct	Sep	Sep	Aug	Oct	Sep	Sep	Aug	Aug	Oct	Sep	Sep	Aug	Aug
Shortage Date - North	Aug, Nov	Aug, Oct	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Oct	Aug, Oct	Aug, Sep	Aug, Sep	Aug	Aug, Oct	Aug, Sep	Aug, Sep	Aug	Aug	Aug, Oct	Sep	Sep	Aug	Aug
Shortage Amount -South	6,872	11,558	15,801	17,298	18,535	8,689	15,240	19,640	22,667	26,480	10,490	19,124	24,160	30,381	37,319	12,326	22,067	29,426	38,882	51,314
Shortage Amount - North	2,098	5,150	9,804	18,540	29,071	2,650	6,324	13,435	23,383	34,217	3,219	7,535	17,131	27,450	39,217	3,752	9,923	20,862	32,450	44,217
Remaining HG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TABLE B-10.a Projected landings and shortages by Subarea for the **Alternative 7** under a harvest guideline of **72,000 mt** and growth rates of 0%, 5%, 10%, and 15%.
Alt 7: 33% WA/OR, 67% CA Jan 1; any remainder 50% WA/OR, 50% CA Sept 1;
any remainder avail coastwide Nov 1

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total Catch - South	37,802	37,802	37,802	37,802	37,802	38,493	39,217	39,978	40,777	41,616	39,183	40,701	42,371	44,208	46,229	39,873	42,254	44,992	48,000	48,000
Total Catch - North	34,197	34,197	34,197	34,197	34,197	33,507	32,783	32,022	31,223	30,384	32,817	31,299	29,629	27,792	25,771	32,127	29,746	27,008	24,000	24,000
Shortage Date-South	Oct	Oct	Oct	Oct	Oct	Oct	Oct	Oct	Oct	Oct	Oct	Oct	Oct	Sep	Sep	Oct	Oct	Sep	Aug	Aug
Shortage Date - North	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug	Aug
Shortage Amount -South	9,586	9,586	9,586	9,586	9,586	11,265	13,028	14,879	16,823	18,865	12,944	16,638	20,702	25,173	30,090	14,623	20,417	27,079	34,882	47,315
Shortage Amount - North	10,552	10,552	10,552	10,552	10,552	11,246	11,975	12,739	13,542	14,384	11,940	13,466	15,142	16,986	19,013	12,634	15,025	17,772	20,788	20,796
Remaining HG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Total Catch - South	37,802	37,802	37,802	37,802	37,802	38,493	39,217	39,978	40,777	41,616	39,183	40,701	42,371	44,208	46,229	39,873	42,254	44,992	48,000	48,000
Total Catch - North	34,197	34,197	34,197	34,197	34,197	33,507	32,783	32,022	31,223	30,384	32,817	31,299	29,629	27,792	25,771	32,127	29,746	27,008	24,000	24,000
Shortage Date-South	Oct	Oct	Oct	Oct	Oct	Oct	Oct	Oct	Oct	Oct	Oct	Oct	Oct	Sep	Sep	Oct	Oct	Sep	Aug	Aug
Shortage Date - North	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Oct	Aug, Sep	Aug, Oct	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Oct	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug	Aug
Shortage Amount -South	9,586	9,586	9,586	9,586	9,586	11,265	13,028	14,879	16,823	18,865	12,944	16,638	20,702	25,173	30,090	14,623	20,417	27,079	34,882	47,315
Shortage Amount - North	12,785	15,130	17,591	20,176	22,889	13,480	16,554	19,781	23,171	26,729	14,174	18,046	22,187	26,619	31,365	14,868	19,606	24,819	30,426	33,155
Remaining HG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Total Catch - South	37,802	37,802	37,802	37,802	37,802	38,493	39,217	39,978	40,777	41,616	39,183	40,701	42,371	44,208	46,229	39,873	42,254	44,992	48,000	48,000
Total Catch - North	34,197	34,197	34,197	34,197	34,197	33,507	32,783	32,022	31,223	30,384	32,817	31,299	29,629	27,792	25,771	32,127	29,746	27,008	24,000	24,000
Shortage Date-South	Oct	Oct	Oct	Oct	Oct	Oct	Oct	Oct	Oct	Oct	Oct	Oct	Oct	Sep	Sep	Oct	Oct	Sep	Aug	Aug
Shortage Date - North	Aug, Oct	Aug, Oct	Aug, Sep	Aug, Sep	Aug, Sep	Aug, Oct	Aug, Sep	Aug, Sep	Aug, Sep	Jul, Sep	Aug, Oct	Aug, Sep	Aug, Sep	Aug, Sep	Jul, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Aug	Jul
Shortage Amount -South	9,586	9,586	9,586	9,586	9,586	11,265	13,028	14,879	16,823	18,865	12,944	16,638	20,702	25,173	30,090	14,623	20,417	27,079	34,882	47,315
Shortage Amount - North	15,018	19,930	25,331	31,270	37,801	15,713	21,355	27,524	34,272	41,653	16,407	22,848	29,933	37,726	46,299	17,102	24,410	32,568	41,538	48,097
Remaining HG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Total Catch - South	37,802	37,802	37,802	37,802	37,802	38,493	39,217	39,978	40,777	41,616	39,183	40,701	42,371	44,208	46,229	39,873	42,254	44,992	48,000	48,000
Total Catch - North	34,197	34,197	34,197	34,197	34,197	33,507	32,783	32,022	31,223	30,384	32,817	31,299	29,629	27,792	25,771	32,127	29,746	27,008	24,000	24,000
Shortage Date-South	Oct	Oct	Oct	Oct	Oct	Oct	Oct	Oct	Oct	Oct	Oct	Oct	Oct	Sep	Sep	Oct	Oct	Sep	Aug	Aug
Shortage Date - North	Aug, Oct	Aug, Sep	Aug, Sep	Jul, Sep	Jul, Sep	Aug, Oct	Aug, Sep	Aug, Sep	Jul, Sep	Jul, Sep	Aug, Oct	Aug, Sep	Aug, Sep	Jul, Sep	Jul, Sep	Aug, Sep	Aug, Sep	Aug, Sep	Jul	Jul
Shortage Amount -South	9,586	9,586	9,586	9,586	9,586	11,265	13,028	14,879	16,823	18,865	12,944	16,638	20,702	25,173	30,090	14,623	20,417	27,079	34,882	47,315
Shortage Amount - North	17,251	24,951	33,803	43,977	55,673	17,946	26,378	36,000	46,987	59,539	18,641	27,873	38,413	50,449	64,198	19,335	29,435	41,051	54,267	66,008
Remaining HG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TABLE B-10.b Projected landings and shortages by Subarea for the **Alternative 7** under a harvest guideline of **136,000 mt** and growth rates of 0%, 5%, 10%, and 15%.
Alt 7: 33% WA/OR, 67% CA Jan 1; any remainder 50% WA/OR, 50% CA Sept 1;
any remainder avail coastwide Nov 1

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total Catch - South	47,918	47,918	47,918	47,918	47,918	50,288	52,777	55,390	58,134	61,015	52,659	57,873	63,608	69,917	76,856	55,029	63,205	72,608	83,420	91,873
Total Catch - North	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,666
Shortage Date-South																				Oct, Dec
Shortage Date - North																				Dec
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3,981
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	177
Remaining HG	43,758	43,758	43,758	43,758	43,757	41,388	38,901	36,288	33,545	30,665	39,019	33,806	28,072	21,765	14,826	36,650	28,475	19,075	8,264	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Total Catch - South	47,944	47,970	47,998	48,027	48,058	50,314	52,830	55,471	58,245	61,157	52,684	57,926	63,690	70,029	77,000	55,055	63,259	72,690	82,256	79,884
Total Catch - North	47,097	49,452	51,924	54,520	57,246	47,097	49,452	51,924	54,520	57,246	47,097	49,452	51,924	54,520	57,246	47,097	49,452	51,924	54,396	56,381
Shortage Date-South																			Dec	Oct,Nov
Shortage Date - North																			Dec	Nov
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,278	15,696
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	114	801
Remaining HG	41,515	39,160	36,688	34,092	31,365	39,146	34,303	29,218	23,879	18,272	36,776	29,209	21,002	12,099	2,434	34,407	23,878	12,005	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Total Catch - South	47,969	48,025	48,085	48,151	48,223	50,339	52,884	55,559	58,371	61,326	52,710	57,981	63,779	70,157	71,587	55,080	63,314	72,780	73,430	73,095
Total Catch - North	49,339	54,273	59,701	63,872	65,726	49,339	54,273	59,701	63,872	65,726	49,339	54,273	59,701	63,872	64,995	49,339	54,273	59,701	62,861	62,904
Shortage Date-South															Nov				Oct,Nov	Oct,Nov
Shortage Date - North				Aug	Aug				Aug	Aug				Aug	Aug, Nov				Aug, Nov	Aug,Oct,Nov
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5,314	0	0	0	9,743	22,220
Shortage Amount - North	0	0	0	1,799	6,512	0	0	0	1,799	6,512	0	0	0	1,799	7,164	0	0	0	2,716	9,193
Remaining HG	39,272	34,339	28,911	24,740	22,885	36,903	29,481	21,442	14,528	9,793	34,534	24,387	13,226	2,747	0	32,164	19,056	4,228	0	0

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000	136,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Total Catch - South	47,994	48,081	48,179	48,291	48,416	50,365	52,941	55,655	58,513	61,525	52,735	58,038	63,875	69,565	67,438	55,106	63,372	72,297	70,197	73,095
Total Catch - North	51,582	59,319	64,591	67,479	70,801	51,582	59,319	64,591	67,479	70,801	51,582	59,319	64,591	67,356	68,835	51,582	59,319	64,509	65,865	62,904
Shortage Date-South														Dec	Nov			Dec	Oct, Nov	Oct
Shortage Date - North			Aug	Aug	Aug			Aug	Aug	Aug			Aug	Aug, Dec	Aug,Oct,Nov			Aug, Dec	Aug, Nov	Aug, Oct
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	737	9,154	0	0	581	12,747	22,220
Shortage Amount - North	0	0	3,627	10,971	19,416	0	0	3,627	10,971	19,416	0	0	3,627	11,079	21,184	0	0	3,699	12,412	27,103
Remaining HG	37,030	29,292	24,021	21,133	17,810	34,660	24,435	16,552	10,920	4,718	32,291	19,341	8,336	0	0	29,922	14,010	0	0	0

TABLE B-10.c Projected landings and shortages by Subarea for the **Alternative 7** under a harvest guideline of **200,000 mt** and growth rates of 0%, 5%, 10%, and 15%.
Alt 7: 33% WA/OR, 67% CA Jan 1; any remainder 50% WA/OR, 50% CA Sept 1;
any remainder avail coastwide Nov 1

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total Catch - South	47,918	47,918	47,918	47,918	47,918	50,288	52,777	55,390	58,134	61,015	52,659	57,873	63,608	69,917	76,856	55,029	63,205	72,608	83,420	95,854
Total Catch - North	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854	44,854
Shortage Date-South																				
Shortage Date - North																				
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Remaining HG	107,758	107,758	107,758	107,758	107,757	105,388	102,901	100,288	97,545	94,664	103,019	97,806	92,072	85,765	78,826	100,650	92,475	83,075	72,264	59,830

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Total Catch - South	47,944	47,970	47,998	48,027	48,058	50,314	52,830	55,471	58,245	61,157	52,684	57,926	63,690	70,029	77,000	55,055	63,259	72,690	83,533	96,000
Total Catch - North	47,097	49,452	51,924	54,520	57,246	47,097	49,452	51,924	54,520	57,246	47,097	49,452	51,924	54,520	57,246	47,097	49,452	51,924	54,520	57,246
Shortage Date-South																				
Shortage Date - North																				
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Remaining HG	105,515	103,160	100,688	98,091	95,364	103,146	98,303	93,218	87,879	82,272	100,776	93,209	85,002	76,099	66,433	98,407	87,878	76,004	62,598	47,438

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Total Catch - South	47,969	48,025	48,085	48,151	48,223	50,339	52,884	55,559	58,371	61,326	52,710	57,981	63,779	70,157	77,173	55,080	63,314	72,780	83,663	96,174
Total Catch - North	49,339	54,273	59,701	65,671	72,238	49,339	54,273	59,701	65,671	72,238	49,339	54,273	59,701	65,671	72,238	49,339	54,273	59,701	65,671	72,238
Shortage Date-South																				
Shortage Date - North																				
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Remaining HG	103,272	98,338	92,911	86,941	80,373	100,903	93,481	85,442	76,729	67,280	98,534	88,387	77,226	64,948	51,442	96,164	83,056	68,228	51,447	32,447

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Harvest Guideline	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Growth South	0%	0%	0%	0%	0%	5%	5%	5%	5%	5%	10%	10%	10%	10%	10%	15%	15%	15%	15%	15%
Growth North	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Total Catch - South	47,994	48,081	48,179	48,291	48,416	50,365	52,941	55,655	58,513	61,525	52,735	58,038	63,875	70,301	77,375	55,106	63,372	72,877	83,809	96,380
Total Catch - North	51,582	59,319	68,217	78,450	90,217	51,582	59,319	68,217	78,450	90,217	51,582	59,319	68,217	78,450	90,217	51,582	59,319	68,217	78,450	90,217
Shortage Date-South																				
Shortage Date - North																				
Shortage Amount -South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shortage Amount - North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Remaining HG	101,030	93,292	84,394	74,162	62,393	98,660	88,435	76,925	63,949	49,301	96,291	83,341	68,709	52,169	33,462	93,922	78,010	59,711	38,668	14,467