Northwest Region Current Bycatch Priorities and Implementation Plan
National Marine Fisheries Service

[NOTE: This is a public, working document that will be revised in the future as additional bycatch minimization opportunities occur.]

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1.0 Introduction

In 1998, the National Marine Fisheries Service (NMFS or NOAA Fisheries) produced *Managing the Nation's Bycatch*, which provided a series of national goals for monitoring and managing bycatch. In addition to these national goals, *Managing the Nation's Bycatch* also specified regional goals for monitoring and managing bycatch and for keeping the public informed about and involved in the bycatch management process. For the fifth anniversary of *Managing the Nation's Bycatch*, the agency decided to evaluate its progress to date on meeting national and regional goals for bycatch monitoring and management. These national and regional goals were spurred by National Standard 9 of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act):

> *"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."*

Throughout 2003, NMFS has been working through a series of evaluative steps, articulated in the *NOAA Fisheries National Bycatch Strategy* (NMFS, 2003). The third step in the NMFS process for evaluating and improving its bycatch management program is for the NMFS regional offices to develop plans to improve regional implementation bycatch monitoring and management. These regional implementation plans are intended to implement National Standard 9, as it was articulated in *Managing the Nation's Bycatch:*

> *"The fundamental national goal of NMFS bycatch-related activities is to implement conservation and management measures for living marine resources that will minimize, to the extent practicable, bycatch and the mortality of bycatch that cannot be avoided."*

In *Managing the Nation's Bycatch,* NMFS defined "bycatch" as "discarded catch of any living marine resource, plus retained incidental catch and unobserved mortality due to a direct encounter with fishing gear. NMFS developed this expanded definition of bycatch so that its bycatch management measures would reflect the agency's responsibilities under a variety of laws: the Magnuson-Stevens Act, the Marine Mammal Protection Act (MMPA), the Endangered Species Act (ESA), the Migratory Bird Treaty Act (MBTA) and the Pacific Halibut Act. In reviewing and updating *Managing the Nation's Bycatch*, these regional implementation plans are intended to address the agency's bycatch minimization responsibilities under this suite of laws.

1.1 Northwest Region Fishery Management Responsibilities: Federal fisheries off the West Coast are managed by the NMFS Northwest and Southwest Regional Offices, in cooperation with the Pacific Fishery Management Council (Pacific Council), the states of California, Oregon, and Washington, Indian tribes with treaty rights to fish for federally managed fish, and interested members of the public. West Coast fisheries target salmon, bottomfish, highly migratory species such as tunas,

pelagic schooling species such as anchovy, sardines and squid, as well as shellfish like shrimp and crab. These fisheries are harvested using a variety of gear types (trawls, seines, pots, hook and line, etc.) that produced about 338,000 metric tons (mt) of harvest during 2002, and had an ex-vessel value of approximately $229 million (PacFIN 2003).

NMFS' Northwest Region is responsible for working with the Pacific Council to implement its Pacific Coast Groundfish Fishery Management Plan (Groundfish FMP), Pacific Coast Salmon FMP (Salmon FMP), and Pacific Halibut Catch Sharing Plan. This regional bycatch goal implementation plan will focus on fisheries targeting those three species or species groups and their effects on both targeted and protected species.

Groundfish: Over 80 species of groundfish are included in the Pacific Coast Groundfish FMP. Species groups managed under the Groundfish FMP include rockfish, roundfish (such as sablefish and whiting), flatfish (soles and flounders), sharks, skates, and other species. A variety of gear types are used to fish for groundfish, including trawl, hook-and-line, pot, and net gears. The primary economic management objective for West Coast groundfish is to provide a continuous, year-round flow of fresh fish to markets to produce a variety of benefits, including promoting continuous employment in coastal communities. However, fleet overcapitalization, increased effort, and either declining or stable total allowable catch have forced managers to significantly slow catch rates to spread the catch of each species or species complex for which there is a specified optimum yield (OY) over the entire year. The Pacific Council uses trip-landing limits as the vehicle to slow the catch rates. Because almost all species managed by trip limits are harvested in a multispecies mixture with other trip-limit species, vessels are forced to discard species once the trip limit for that species is reached, while the vessel continues to fish on the trip limit for other species. As trip limits become more restrictive and as more species come under trip-limit management, regulatory discards increase. Most species are managed under two-month cumulative trip-landing limits. Trip limit induced discards also can occur when fishermen continue to harvest other species when the OY of a single species is reached and further landings of that species are prohibited. Vessels discard groundfish at sea for many reasons, including discards made to comply with regulatory constraints and discards made because a portion of the catch is economically undesirable.

Salmon: Pacific salmon support important commercial, recreational, and tribal fisheries in the states of Washington, Oregon, California, and Idaho. Of the five species of Pacific salmon, Coho and Chinook are of primary importance to Pacific Council fisheries. In addition, pink salmon are abundant in alternate (odd-numbered) years in waters off of the state of Washington. Commercial, recreational, and tribal fishermen harvest salmon from the Pacific Ocean, Puget Sound, estuaries, and rivers along spawning migration routes using trolling gear, seines, gill nets, and hook-and-line. Although several specific populations of salmon have declined over the last century due to freshwater habitat degradation, excessive harvests, and hydropower activities, there have been recent increases in overall abundance of harvestable salmon due to more favorable ocean conditions.

The Salmon FMP requires the Pacific Council to manage fisheries consistent with standards developed by the NMFS regarding actions necessary to protect species listed under the ESA. Since 1989, NMFS has listed 26 evolutionarily significant units (ESU) of salmon and steelhead under the ESA. As the listings have occurred, NMFS has initiated formal section 7 consultations and issued biological opinions that consider the impacts to listed salmonid species, and some salmonid species proposed for listing, resulting from proposed implementation of the Salmon FMP, or in some cases, from proposed implementation of the annual management measures. NMFS has also reinitiated consultation on certain ESUs when new information has become available on the status of the stocks or on the impacts of the Salmon FMP on the stocks. Some biological opinions have concluded that implementation of the Salmon FMP is not likely to jeopardize the continued existence of certain listed ESUs. Other biological opinions have found the Salmon FMP is likely to jeopardize certain listed ESUs, and have identified reasonable and prudent alternatives (consultation standards) that would avoid the likelihood of jeopardizing the continued existence of the ESU under consideration. Currently 12 coho and chinook salmon ESUs listed under the ESA are considered of most concern as bycatch in the fisheries under the Salmon FMP. Sockeye and chum salmon and steelhead species are not typically caught in large numbers in ocean salmon fisheries, therefore impacts to the 14 remaining listed ESUs is very small. There are no pink salmon stocks listed under the ESA.

The Federally managed ocean salmon fisheries are divided into commercial troll and recreational fisheries. Both groups use hook-and-line gear. Inside-water commercial fisheries, which are managed by the states and treaty tribes and are thus not elsewhere discussed in this report, use gill nets and purse seines. Bycatch in the ocean commercial troll and recreational salmon fisheries has three major components. The first is the catch and discard of salmon species which can legally be kept, but which are below the size limit. The second is the catch and discard of salmon species, either coastwide or by management area, where the retention of some but not all species of salmon is allowed. This type of bycatch can occur, for example, when the quota for one species has been reached, but catch of another is still allowed, or where complete non-retention of a depressed or listed stock is required. The third type of bycatch mortality occurs in mark selective fisheries, where only hatchery raised salmon identified by an external mark (usually an adipose fin clip) can be retained and all other salmon of the same species (generally wild stocks) must be released.

In addition to salmon bycatch within the salmon fisheries, the salmon fisheries also incidentally take non-salmon species, including some overfished groundfish species. However, bycatch of fish other than salmon in the salmon fisheries is generally very limited, and there are regulations that allow for retention of most groundfish species and limited numbers of Pacific halibut that are caught incidentally while salmon fishing.

"Bycatch" for the purposes of Salmon FMP defined as: fish caught in an ocean salmon fishery which are not sold or kept for personal use and includes economic discards, regulatory discards, and fishery mortality due to an encounter with fishing gear that does not result in capture of fish. Bycatch does not include any fish that legally are retained in a fishery and kept for personal, tribal, or cultural use, or that

enter commerce through sale, barter, or trade. In addition, under the provisions of the Magnuson-Stevens Act, bycatch does not include targeted salmon released alive under a recreational catch-and-release fishery management program. Under the Salmon FMP, the primary bycatch that occurs is bycatch of salmon species. Therefore, the Pacific Council's conservation and management measures seek to minimize salmon bycatch and bycatch mortality (drop off and hooking mortality) to the greatest extent practical in all ocean fisheries. When bycatch cannot be avoided, priority is given to conservation and management measures that seek to minimize bycatch mortality and ensure the extended survival of such fish. These measures are developed in consideration of the biological and ecological impacts to the affected species, the social and economic impacts to the fishing industry and associated communities, and the impacts upon the fishing, management, and enforcement practices currently employed in ocean salmon fisheries.

During the salmon preseason planning process, management options are assessed for effects on the amount and type of salmon bycatch and bycatch mortality. Estimates of salmon bycatch and incidental mortalities associated with salmon fisheries are included in the modeling assessment of total fishery impact and assigned to the stock or stock complex projected to be impacted by the proposed management measure. The resultant fishery impact assessment reports for the ocean salmon fisheries specify the amount of salmon bycatch and bycatch mortality associated with each accompanying management option. The final analysis of Pacific Council-adopted management measures contains an assessment of the total salmon bycatch and bycatch mortality for Pacific Council salmon fisheries, and includes a comparison with the previous year's total bycatch and bycatch mortality levels.

Halibut: Pacific halibut is managed by the International Pacific Halibut Commission (IPHC,) a bilateral commission in which the U.S. cooperates with Canada to set Pacific halibut harvest levels in the Bering Sea and Gulf of Alaska, as well as off the Canadian and U.S. West Coasts. Off the U.S. West Coast, the Pacific Council's Catch Sharing Plan sets general principles for halibut management, which are then implemented by the state, tribal, and federal governments. The tribal commercial fisheries, tribal ceremonial and subsistence fisheries, the recreational fisheries, and the non-tribal commercial fisheries for halibut are all managed to ensure that halibut is taken under regulations that allow retention of other species caught in common with halibut. Halibut stocks are healthy and Northwest Region's primary bycatch concern with respect to halibut is the bycatch of halibut in groundfish and shrimp trawl fisheries. With the recent development of the West Coast Groundfish Observer Program, NMFS has notably improved its information on halibut bycatch in the groundfish trawl fishery. The agency's model for halibut bycatch in the groundfish trawl fisheries shows a sharp drop in halibut bycatch, 64% lower in 2002 than in 2001. This drop is likely due to two factors: incorporation of recent observer data into the model rather than reliance on early-1990s fisheries data and a decrease in on-the-grounds trawl hours in recent years associated with overall groundfish declines.

Because halibut management is directed by an international commission, and because regional management focuses on integrating halibut catch into fisheries for other co-occurring species, this regional plan will not further address halibut except as it might occur as bycatch in fisheries directed on

species other than halibut.

Marine Mammals: The waters off Washington, Oregon, and California (WOC) support a wide variety of marine mammals. Approximately thirty species, including seals and sea lions, sea otters, and whales, dolphins, and porpoise, occur within the EEZ. Many marine mammal species seasonally migrate through Pacific Coast waters, while others are year round residents.

Species Listed as Endangered Under the ESA
Sperm whale (*Physeter macrocephalus*),
Humpback whale (*Megaptera novaeangliae*),
Blue whale (*Balaenoptera musculus*), and
Fin whale (*Balaenoptera physalus*).

Species Listed as Threatened Under the ESA
Steller sea lion (*Eumetopias jubatus*)Eastern Stock,
Guadalupe fur seal (*Arctocephalus townsendi*), and
Southern sea otter (*Enhydra lutris*) California Stock.

Species Listed as Depleted under the MMPA
Northern fur seal (*Callorhinus ursinus*) Eastern Pacific Stock and

Under the MMPA on the West Coast, NMFS is responsible for the management of cetaceans and pinnipeds, while the U.S. Fish and Wildlife Service (FWS) manages sea otters. Stock assessment reports review new information every year for strategic stocks (those whose human-caused mortality and injury exceeds the potential biological removal (PBR)) and every three years for non-strategic stocks. Marine mammals whose abundance falls below the optimum sustainable population (OSP) are listed as "depleted" according to the MMPA.

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

Seabirds: The highly productive California Current System, an eastern boundary current that stretches from Baja Mexico to southern British Columbia, supports more than two million breeding seabirds and at least twice that number of migrant visitors. Tyler et al. (1993) reviewed seabird distribution and abundance in relation to oceanographic processes in the California Current System and found that over 100 species have been recorded within the EEZ including: albatross, shearwaters, petrels, storm-petrels, cormorants, pelicans, gulls, terns and alcids (murres, murrelets, guillemots, auklets and puffins). In addition to these "classic" seabird, millions of other birds are seasonally abundant in this oceanic habitat including: waterfowl,

Species Listed as Endangered Under the ESA

Short-tail albatross (*Phoebastria albatrus*),
California brown pelican (*Pelecanus occidentalis*),
and
California least tern (*Sterna antillarum browni*).

waterbirds (loons and grebes), and shorebirds (phalaropes).

The FWS is the primary Federal agency responsible for seabird conservation and management. Under the Magnuson-Stevens Act, NMFS is required to ensure fishery management actions comply with other laws designed to protect seabirds. NMFS is also required to consult with FWS if fishery management plan actions may affect seabird species listed as endangered or threatened.

Sea Turtles: Sea turtles are highly migratory and four of the six species found in U.S. waters have been sighted off the Pacific Coast. Little is known about the interactions between sea turtles and West Coast commercial fisheries. The directed fishing for sea turtles in WOC groundfish fisheries is prohibited, because of their ESA listings, but the incidental take of sea turtles by trawl gear may occur. The management and conservation of sea turtles is shared between NMFS and FWS.

Species Listed as Endangered Under the ESA
Green turtle (*Chelonia mydas*),
Leatherback turtle (*Dermochelys coriacea*), and
Olive ridely turtle (*Lepidochelys olivacea*).

Species Listed as Threatened Under the ESA

1.2 Structure of the Regional Bycatch Goal Implementation Plan: Regional bycatch goal implementation plans are intended to provide information on both bycatch management and bycatch monitoring. In addition to National Standard 9 and the national goal for NMFS bycatch-related activities, NMFS work on bycatch issues must address the requirement of the Magnuson-Stevens Act at §303 *Contents of Fishery Management Plans* at (a)(11), which requires that FMPs:

> *"Establish a standardized reporting methodology to assess the amount and types of bycatch occurring in the fishery, and include conservation and management measures that, to the extent practicable and in the following priority – (A) minimize bycatch; and (B) minimize the mortality of bycatch which cannot be avoided."*

In this section, the Magnuson-Stevens Act is recognizing one of the most basic challenges of bycatch management: the agency must be able to estimate how much bycatch is occurring if it is to meet the national goal of minimizing bycatch to the extent practicable. This regional bycatch goal implementation plan will address bycatch monitoring and bycatch management in the following sections.

> *2.0 Bycatch Reporting Methodologies* – in which the Plan will discuss Science Center efforts to standardize and enhance West Coast bycatch reporting methodologies
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> *3.0 Bycatch Research Needs* – in which the Plan will prioritize Science Center/Region bycatch-related research needs, such as gear modification and monitoring technology and methods.

4.0 Bycatch Management Measures – in which the Plan will discuss potential new bycatch management measures for West Coast fisheries within the Region's management responsibilities.

5.0 Education and Outreach Efforts – in which the Plan will describe Region/Science Center initiatives to make the public aware of bycatch issues and to involve the public in development of bycatch-reducing technologies.

2.0 Bycatch Reporting Methodologies

Several different agencies collect data used for West Coast bycatch management. NMFS is responsible for collecting and analyzing the majority of these data. However, the states and the Pacific States Marine Fisheries Commission play key supporting roles in collection of indispensable ancillary data. As this a regional plan, other agencies' roles must be considered in NMFS' planning for monitoring and reducing bycatch.

Generally speaking, any fishery may face a range of bycatch issues, including: marine mammal takes, sea turtles takes, takes of threatened or endangered non-marine mammal species, and/or interception of overfished fish species. Bycatch issues for nine federally-managed West Coast marine fisheries are discussed within this document. Five of the fisheries target groundfish: at-sea hake/whiting, shoreside hake/whiting, bottom trawl, fixed gear (limited entry fixed gear and open access nontrawl) and recreational. In addition to these groundfish fisheries, there are commercial and recreational fisheries for Pacific salmon as well as commercial and recreational fisheries for Pacific halibut. There are no standardized methodologies or data collection for the West Coast salmon fisheries as a collective whole. Any initiative to create a bycatch observation program would cost in the millions of dollars, and would be complicated by cross-jurisdictional issues of state, tribal, and treaty fisheries that also take place in areas adjacent to the Pacific ocean salmon fisheries. As mentioned above, Pacific halibut is managed by the IPHC, but NMFS' state and tribal science partners collect data on halibut fisheries.

From preliminary data, the most pressing bycatch concerns in the West Coast fisheries are likely ESA-listed salmon and overfished groundfish species. The Center has focused monitoring efforts on the fisheries that have the largest rate of bycatch for salmon and overfished groundfish species. While there have been documented takes of some marine mammals and seabirds, the take of marine mammals is less than the potential biological removal (PBR) level for the species taken (all nine fisheries are Category III) and no listed or endangered seabird or marine mammal species have been documented as being taken in any of the fisheries. However, self-reporting methods used for these species are likely to be biased, as fishers have incentives to under-report encounters with species that may limit fishing access or quotas. In addition, while it is mandatory for Category III vessels to report mortalities or injuries of marine mammals to the NMFS Office of Protected Resources via a mailed form, reporting of seabird takes is strictly voluntary. Therefore, baseline reporting methods should be maintained in order

to monitor any increase or decrease in the level of incidence. For fisheries with other reporting methods beyond self-reporting, the bycatch of marine mammals and seabirds may be conducted simultaneously with data for other more immediate bycatch concerns in these fisheries. As an example, observers collecting overfished groundfish species bycatch data from a commercial trawl fleet can also gather incidences of marine mammal and seabird takes.

2.1 Fishery Independent Surveys: Currently, the Science Center has four groundfish surveys: a continental shelf/slope bottom trawl survey, a pilot pot survey for sablefish, a pilot fixed gear survey for bocaccio and the joint US/Canada Pacific hake survey. The surveys use standardized gear to characterize the distribution, abundance and biology of species encountered by the fishery. The bottom trawl and hake surveys are coastwide and detailed data such as size and age composition and maturity levels are collected from targeted species to determine trends in the population. The pilot pot and fixed gear surveys are limited to geographic areas of concern for the species they are surveying (i.e. the pot survey for sablefish takes place off Oregon and the fixed gear survey for bocaccio takes place off Southern California.) While these surveys are deployed, data is collected simultaneously from as many species as possible, some which may be used for bycatch monitoring. Survey operations procedures including verifying net warp lengths before and after surveys, an operations manual with survey components outlined, etc. is in development for each of the Science Center's surveys. The associated annual costs for these fishery independent surveys are approximately $5,000K.

2.2 Fishery Dependent Sampling Methods: Fishery dependent sampling methods include commercial fishery landings/sales receipts ("fish tickets"), trawl logbooks, port sampling and recreational sampling. For the commercial fisheries, each state is responsible for carrying out fish ticket, logbook, catch reporting and port sampling responsibilities. Logbook and fish ticket data is combined with observer program data to assess total bycatch on a fleet-wide basis. Recreational fisheries are assessed via the Recreational Fisheries Information Network (RecFIN,) a comprehensive program coordinating federal and state activities for purposes of providing standardized catch and effort trend data on a broad geographic basis. A Vessel Monitoring System (VMS) is expected to be in use for the 2004 fishery. The position data collected via this system could be correlated with other data to assess how bycatch may be further reduced. The associated annual costs for these methods are difficult to assess and multiple agencies will be involved at different levels.

2.3 Observer and Monitoring Programs: Two distinct observer programs are coordinated at the Science Center: the At-sea Hake Observer Program and the West Coast Groundfish Observer Program. As discussed above, NMFS' immediate bycatch management concerns are the incidental take of salmon and overfished groundfish species. Sampling methodologies employed by the observer programs reflect these priorities. Although the incidental take of protected non-fish species (i.e., marine mammals, seabirds, and sea turtles) is rare in these fisheries, the observer programs make sampling for them a priority when they are encountered.

The Science Center focuses its monitoring efforts on the fisheries that have the largest incidental take of

salmon and groundfish species and plans to expand into other fisheries as resources permit. The specific sampling design employed by the programs differ based on goals to be achieved, but they are adequately standardized to combine catch and bycatch data from the two programs. Bycatch and catch data from these programs are also comparable to NMFS observer program data for other regions, which allows monitoring for the cumulative effect of fisheries on species that travel into other NMFS regional areas, i.e. sea turtles, marine mammals and seabirds.

The Science Center's two programs deploy observers on vessels in three of the nine West Coast fisheries (at-sea hake, groundfish bottom trawl, non-trawl gear groundfish). The fisheries they cover are distinct in fleet composition, gear used, target species and time fished. The data collected is used in combination with state-collected logbook and fish ticket information to estimate the bycatch in the these West Coast fisheries.

At-sea Hake Observer Program: This program deploys two observers on the each at-sea hake processor. Begun during the 1970's by the Alaska Fisheries Science Center (AFSC,) this program is one of nation's longest running observer programs. Observers collect information on total catch, species composition of the catch (including any protected resources and seabirds), age structure data from several species and the fishery's interactions with species of concern. Observer total catch estimates are accessed on a daily basis by the Northwest Region for in-season fishery management. This fishery is a major source of salmon bycatch on the coast. Under the Biological Opinion on the effects of the groundfish fisheries on endangered and threatened salmon stocks, the at-sea hake fishery is anticipated to take up to 11,000 chinook salmon per season as bycatch. With close to 100% of the hauls in the fishery sampled, the program closely monitors the number of chinook taken. The majority of the annual cost of the deploying the observers is paid for by industry. The cost of training, in-season support and debriefing observers is supported by NMFS. Currently the annual cost of the program is approximately $535K ($500K paid for by industry).

West Coast Groundfish Observer Program: The program began deploying observers on groundfish vessels in August 2001. The focus of this program is to collect total catch and discard data (including protected resources and seabirds) from commercial groundfish trawl and non-trawl gear (longline, pot, etc.) vessels. Observers in this program collect species composition of the discard and data on target fisheries interactions with species of concern. This program is collecting data on one of the largest unknowns on the coast – the amount of groundfish discard by the bottom trawl and non-trawl fleets. As these fleets land the majority of catch in mixed species fisheries, they are likely the main source of bycatch of overfished groundfish on the West Coast. The observer program's data is already being used in a bycatch model that guides West Coast groundfish fisheries management.

This observer program initially targeted the trawl and non-trawl limited entry fleets for observer coverage. Next, the program plans to expand its data collection efforts to assess catch and bycatch in those open access fisheries that target groundfish. The program currently collects data from the open access fleet operating off California, but may expand to also cover open access vessels operating off Oregon in 2004, pending revisions to state regulations. Few vessels land open access groundfish into Washington ports and this fleet and has been covered on a limited basis. Beyond these groundfish-targeting fisheries, there are several state-managed fisheries that incidentally take and land or discard groundfish. The observer program hopes to also deploy observers on these fleets to determine the extent of the bycatch in non-groundfish fisheries. The associated annual costs for these programs is approximately $3,730K.

The collection of bycatch data in the salmon fisheries is limited, and what little data is collected is regionally based and not consistent along the Pacific coast. Currently Washington State has an observer program that collects all bycatch data in the recreational salmon fisheries, the program has been running since 1999. Washington also had observers on some commercial salmon vessels in 2003. California also has been collecting some bycatch data in their recreational salmon fisheries in the last few years, however this was limited to only salmon bycatch. Washington and Oregon also have been monitoring the mark rates in mark selective fisheries, though there has not been consistent reporting of this information.

2.4 Other Monitoring Programs: Some of the remaining fisheries could be monitored for bycatch by methods more cost-effective and less labor-intensive than observer programs. The Regional office is currently scoping alternatives to monitor the shoreside whiting fishery. This fleet uses similar pelagic trawl nets to catch whiting delivered to shoreside plants. Unlike the at-sea processors, the catch and bycatch of these vessels is sampled by port samplers as they land their fish for processing. However, to confirm that all catch is landed, a monitoring program is preferable over a self-reporting system. Monitoring alternatives include developing an Electronic Monitoring System (EMS) that collects video images with associated time and positional data. The images can be analyzed to confirm that all catch is being landed and the estimates of bycatch from port sampler data is accurate. NMFS has tested some of these techniques on groundfish vessels.

3.0 Bycatch Research Needs

3.1 Groundfish: In 2000, the Center developed a groundfish research plan with input from scientists, constituents and other interested parties. The plan's research priorities have focused on collecting data from portions of the fisheries that were previously data-poor. The Science Center has greatly expanded its research capability in the last two years to address these data-collection priorities by: expanding the West Coast bottom trawl survey, creating a research group focused on science for ecosystem management, establishing a pot survey for sablefish and a fixed gear survey for bocaccio,

expanding the hake/whiting acoustical survey and establishing an observer program. These priorities are expansive and include investigations into the different components of the coastwide fisheries system. For the purpose of this bycatch plan, we will address fishery specific bycatch research needs.

At-sea Hake Observer Program Staff Funding. The At-sea Hake Observer Program addresses the bycatch monitoring concerns of the at-sea fishery. However, this program has been run without designated funding since its inception and the staffing costs are paid from base funds. In addition, the AFSC still aids the program in supplying observer's sampling gear, data transmission software capability and database support. Without their support and some designated funding, the Science Center will be hard-pressed to maintain the program. If AFSC is able to continue its aid, the Science Center would need $25K annually of staff funding and is seeking that funding. If AFSC were to withdraw its support from this program, the Science Center would need an additional $150 in annual funding for program support.

Monitoring Program for Shoreside Whiting. As mentioned above, alternative monitoring programs for the shoreside whiting fishery are being analyzed. The scoping analysis, including the associated implementation costs for alternatives is expected to be completed in the near future. The program design could include partial industry funding, but funding for associated NMFS staffing costs, data analysis and oversight will also be necessary. Cost unknown.

Groundfish Observer Program Coverage Expansion. The West Coast Groundfish Observer Program is funded for collecting data from both the limited entry bottom trawl and fixed gear fisheries year-round. These fleet components that account for the overall majority of the catch are being covered at approximately 10%. Coverage of a higher percentage of the fleet would require more resources. However, the observer program is also expanding its coverage to the open access fleet. Vessels in this fleet are more problematic for coverage due to their smaller size (including kayaks and skiffs) and high mobility (boats can be trailered from port to port). The program has established partial coverage of the California portion of the fleet, and expects to be partially covering the other large portion of the fleet in Oregon. Other state fishery vessels that take groundfish as bycatch are also a concern. The program is exploring expansion into some of these fisheries that are likely taking groundfish as bycatch. Additional data processing and analysis staff would be needed for these expansions. Cost is approximately $1,500K to significantly increase coverage percentage and/or $500K for each additional ancillary fleet.

Gear Modifications. In the summer of 2003, the Science Center was involved with an Exempted Fishing Permit that tests a modified bottom trawl net. The Oregon Department Fish and Wildlife tested the gear last summer and verified that it reduced the bycatch of roundfish when targeting flatfish stocks. The Science Center deployed observers on the vessels participating in the EFP to sample catch. The net (referred to as flatfish net, cut-back net, upside-down trawl, pineapple trawl) has gained popularity with members of the fleet as it reduces the bycatch crews have to sort through. Preliminary results of this EFP suggest that continued research into net modifications may yield highly cost-effective

techniques for bycatch reduction. Cost unknown.

Seabird Abundance Study. The impact of seabird bycatch in these fisheries is difficult to assess. The available observer data do not indicate a problem in gross seabird takes. However, a single take of an ESA-listed seabird species, such as the short-tailed albatross, would be of major concern. Expanding observer programs for rarely occurring bycatch 'events' could be cost-prohibitive. Studies to determine seabird abundance and distribution around fishing vessels is the first step to determining whether seabird/ fisheries interactions are an issue in NWR-managed fisheries. The information can be collected on vessels chartered for this purpose as well as aboard commercial vessels. A similar study conducted in the North Pacific by SeaGrant cost approximately $50K.

Integrated Data System. The current GIS of bottom habitat information is now complete. Additional layers including ecosystem, social and biological data will be added over the coming years as it they become available. This database will help assess where annual bycatch hot spots are located and the effects of shifting the fishery out of those areas. Data is currently being collected for these layers by scientists in the Science Center and will be augmented each year. Cost unknown.

Monitoring Program for Pacific Halibut. Bycatch in this fishery is likely to be similar to other non-trawl fisheries that the observer program currently covers. The commercial halibut fishery is a series of three to six short, 12 hour openers per year. The observer program does not cover the Pacific halibut fishery due to the vagueness of the authority of NMFS to require coverage on those vessels and the fishery's size. An option being discussed in the Council is combining the halibut fishery with the non-trawl gear groundfish fishery. This combination would give clear authority for observer coverage. If the halibut fishery remains autonomous from the non-trawl gear groundfish fishery, the observer program will need to expand its coverage into this fishery to collect bycatch data on at least a baseline level. Cost $0K to $4K.

Fishery Dependent Surveys. The RecFIN program is currently being modified to provide more timely and accurate information for management purposes, particularly for overfished groundfish species. Given current budgetary limitations, these modifications, along with existing on-going efforts to improve recreational data collection, should improve the ability to assess bycatch issues in the West Coast recreational fisheries. Cost unknown.

3.2 Salmon:

Hooking Mortality Rate Estimates for Both Recreational and Commercial Fisheries. The current structure of estimating mortality in the salmon fisheries is not as precise as it could be. There has been some recent research in this area, however there are only a few stocks on the Pacific coast that have reliable mortality estimates. This limits fishery manager's options in the management of the various salmon fisheries. Increasing the confidence of the mortality rate estimates would allow managers to have more flexibility in structuring fisheries to protect weak stocks. Cost $500,000 to $10,000,000, depending on the scope and spatial scale.

Coded Wire Tags (CWT) and Adipose Fin Clips - Hatchery Coho and Chinook Mass Marking. Currently the vast majority hatchery coho on the West Coast are adipose fin clipped. Limited numbers of hatchery chinook on the West Coast are mass marked with adipose fin clips: the majority of Puget Sound hatchery chinook and approximately a third of the hatchery stocks in the Columbia River Basin. Generally, 3-5% of marked hatchery coho and chinook releases have CWT. To increase the mark rate of hatchery fish would allow for increased use of selective fisheries for coho, and could establish selective fisheries for chinook; however, implementing such a program would coast several million dollars. To improve CWT recovery and fishery sampling, the states would need to increase sampling of inside sport fisheries (e.g. Puget Sound and California,) at an annual cost of about $1-2 million annually. In addition, about 25 hand wands per state (75 wands) would be needed to detect and recover CWTs after mass marking is completed, at a cost of about $10,000 for each wand. Mark selective fisheries cause substantial problems with continuing to use the CWT system to estimate fishery impacts on ESA listed stocks. Research is needed to find innovative ways of 'fixing' the problems. Possible solutions are DNA analysis, PITT tags, otolith marking, thermal marks, and greatly increased sampling efforts. Currently NMFS is in the early stages of convening a technical workshop to explore methods.

Estimation of Stock Composition of Salmon Bycatch in the Salmon Fisheries. Currently there are no estimates on the stock composition of salmon bycatch. A non-lethal means of sampling, such as microsatellite DNA analysis, needs to be developed. Also, further research into acquiring finer resolution of DNA analysis is needed (population level identification vs. regional identification). Cost unknown.

Escapement and Production Data Gaps (CA, OR, ID, PS, WA coastal stocks). Currently there are many salmon stocks that do not have any monitoring or sampling for escapement and production. Escapement and production data is baseline information that is critical for adequately managing salmon stocks, and in formulating estimates of salmon bycatch and its longterm effects. States need increased funding to support sampling of escapements and production of salmon from West Coast rivers and streams. Cost unknown.

Selective Gear Studies. Fishing spreads per boat, hooks, and other potential methods and gear modifications need to be investigated to reduce bycatch in the salmon fisheries. In addition, technologies such as live holding boxes with oxygenated water should be studied. This technology has been used in the commercial tangle-net fishery in the lower Columbia River in recent years, and shows some indication that mortality of released salmon is decreased. An investigation on whether this technology is feasible in the commercial and charter boat fleet should be completed. Cost unknown.

Observer Program for Commercial Vessels and Charter Boats. There is observation of fishing and bycatch in the recreational salmon fishery, however it is limited and does not cover the entire coast. There is currently no observation of bycatch in the commercial salmon fisheries. An observation program would give accurate data on bycatch, and would support the other research priorities listed

above. Possible methods are Vessel Monitoring Systems, video, and observers on the boats and dockside. Cost unknown.

3.3 Protected Non-Fish Species: Because interactions between marine mammals, seabirds, sea turtles and groundfish fisheries managed by the NWR are rare, there are no observer programs solely designated to monitor for their bycatch. However, the observer programs do collect protected species incidental catch baseline data and data on sightings of protected non-fish species and seabirds in addition to their other duties. Groundfish observers are instructed in the species identification of protected non-fish species and are provided with dichotomous keys to aid with the identification of drowned specimens. Incidental take data can be used to monitor the effects of groundfish fisheries on protected non-fish species. Additionally, interaction and sighting data aid scientists in determining the temporal/spatial nature of protected non-fish species and can be used to predict fishery interactions.

4.0 Bycatch Management Measures

4.1 Groundfish: The greatest challenge facing West Coast groundfish fisheries management is the need to constrain the direct and incidental catch of overfished groundfish species to levels that facilitate timely rebuilding, while providing fisheries access to more abundant groundfish stocks. Nine groundfish species have been declared overfished since the passage of the Sustainable Fisheries Act: bocaccio, canary rockfish, cowcod, darkblotched rockfish, lingcod, Pacific ocean perch (POP,) Pacific whiting, widow rockfish, and yelloweye rockfish. All of these species tend to be found mixed with a wide variety of other, more abundant species, and all of the overfished species except POP and darkblotched rockfish are continental shelf species. In spite of having been declared overfished, Pacific whiting is a relatively abundant stock and is the only overfished groundfish species for which there is a directed fishery. The other eight overfished groundfish species either may not be taken or retained at all, or may only be retained when taken incidentally in fisheries targeting associated healthier stocks. Incidental take of overfished species has been managed through a variety of efforts, from restrictions on the types of gears used to large-scale area closures known as Rockfish Conservation Areas.

Northwest Region is developing a programmatic environmental impact statement (EIS) to review bycatch management in the West Coast groundfish fisheries. This programmatic EIS is intended to provide the Council with a road map for its future groundfish management efforts, to ensure that groundfish management programs address and reduce bycatch of groundfish and non-groundfish species in the groundfish fisheries. Program alternatives for bycatch reduction in this EIS include:

- Implement effort reduction measures to reduce the number of vessels participating in the groundfish trawl fleet so that the number of participants is ultimately one-half of the number of current participants (220-250 vessels). The programmatic EIS assumes that reducing the trawl fleet by one-half will allow the Council to continue to use its current trip limit management program and to raise the trip limits within that program.

- Eliminate the current policy of maintaining a year-round fishery, introducing short fishing seasons that allow higher trip limits within each short season than are currently available in the six two-month cumulative periods.

- Establish sector-specific catch limits for overfished groundfish species, such that each fishery sector would be permitted to fish as long as that sector keeps its catch of overfished species below limits for those species. This program alternative would require intensive monitoring to ensure compliance.

- Establish vessel-specific catch limits for overfished and other groundfish species, such that each vessel would be permitted to fish as long as that vessel keeps its catch below limits for those species. This program alternative would also require intensive monitoring to ensure compliance.

- Establish long-term closed areas where overfished groundfish and other sensitive species are most likely to be encountered; establish individual vessel catch limits for various groundfish species, and prohibit discarding of designated species.

NMFS plans to submit the Draft EIS to the Environmental Protection Agency (EPA) for review in January 2004. The EPA will then publish a Notice of Availability (NOA) on the Draft EIS and request comments from the public on NMFS's behalf. The public comment period on the Draft EIS will be held from the January publication (NOA) through mid-April. Following receipt of comments from the public and the Council, NMFS plans to make the Final EIS available to the public in June 2004.

In addition to this program-level EIS, NMFS and the Council will be dealing with bycatch on a more direct basis in several arenas. Through the 2004 specifications and management measures process, NMFS will introduce a series of management measures for the groundfish fisheries that are specifically intended to minimize total catch of overfished species to levels that will facilitate rebuilding of those species. Management measures include continued implementation of the Rockfish Conservation Areas, season closures in both recreational and commercial fisheries, landings limits for more abundant species constrained based on co-occurrence rates with overfished species, and other measures. Monitoring in the groundfish fishery will also increase in 2004 with the implementation of a final rule for a vessel monitoring system (VMS) program.

Beyond immediate fishery management measures, the biggest roadblock to bycatch management in the West Coast groundfish fisheries is overcapacity. Most sectors of the fishery were overcapitalized before the agency implemented broad-scale closures and reductions to protect overfished species. With overfished species protection setting the framework for groundfish management, the notably lower harvest levels relative to the number of vessels in the fishery has resulted in even greater levels of overcapacity. At its September 2003 meeting, the Council decided to explore an individual fishing quota program for the limited entry groundfish trawl fishery and to review the need for a license

limitation program in the open access groundfish fisheries. If NMFS and the Council are able to get groundfish fishing capacity to levels more appropriate to available harvest, they will be better able craft bycatch management programs that both minimize bycatch and allow vessels to operate profitably.

The current biological opinion on ESA listed salmon for the West Coast groundfish fisheries was completed on December 15, 1999. When new information becomes available, NOAA Fisheries reviews that information in relation to the most recent biological opinion, and then makes an assessment whether reinitiation of consultation is needed. In January 2004, the Science Center plans to make observer data for the second year (September 2002-August 2003) of the West Coast observer program available to the public and for use in reviewing bycatch in groundfish fisheries. Following the release of this observer data, NWR will review salmon bycatch information from the 2002 and 2003 observer seasons and determine whether the 1999 biological opinion needs to be reinitiated.

4.2 Salmon: There are no new management measures that are available presently, however modification of the current regime of management options (see the Pacific Coast Salmon Plan; www.pcouncil.org/salmon/salfmp.html) could be structured differently to reduce bycatch. Examples are: innovative use of time/area closures; innovative use of gear restrictions, e.g. troll lines per boat and lures that target species salmon species; eliminate mooching (drifting with the ocean currents using baited lures) in California recreational fisheries because mooching has a high hooking mortality for salmon that are released; modify size limits, i.e. eliminating the minimum size limit in the recreational fishery would eliminate the release of undersized fish; increase enforcement presence and fines; and eliminate selective fisheries. The most effective long-term approach would be a uniform enforcement presence coastwide, with heavy fines for infractions of the salmon fishery regulations. Currently the states and USCG enforce the regulations in ocean salmon fisheries. Recent budget cuts for state fishery management agencies, and homeland security duties for the USCG have weakened the enforcement presence on the coast. To maximize the effect of these regulations, enforcement must be present and infractions prosecuted.

4.3 Protected Non-Fish Species: There are no management measures presently implemented to specifically reduce the bycatch of protected non-fish species because groundfish fisheries managed by the NWR are thought to have minimal interactions with protected non-fish species. For example, the NWR groundfish fisheries are in MMPA Category III, indicating a remote likelihood of, or no known serious injuries or mortalities, to marine mammals. Sea turtles are rare in areas where groundfish fisheries are prosecuted and the incidental take of a sea turtle has not been documented in any groundfish fishery managed by the NWR. While seabirds have been observed feeding offal and following fishing vessels, few incidental takes of seabirds in groundfish fisheries managed by the NWR have been documented. As more information about the spatial and temporal overlap of groundfish fisheries and protected non-fish species along the Pacific Coast is gathered, a more comprehensive understanding of protected species/fishery interactions is possible and management measures may be implemented to mitigate the effects of NWR groundfish fisheries if necessary.

NMFS is taking action, with the U.S. Fish and Wildlife Service (FWS) to improve the federal government's understanding of fisheries interactions with seabirds. The Migratory Bird Treaty Act (MBTA) implements various treaties and conventions between the U.S. and Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. Under the Act, taking, killing, or possessing migratory birds is unlawful. In addition to the MBTA, an Executive Order, Responsibilities of Federal Agencies to Protect Migratory Birds, (EO 13186) directs Federal agencies to negotiate Memoranda of Understanding with the U.S. Fish and Wildlife Service (FWS) that would obligate agencies to evaluate the impact on migratory birds as part of any NEPA process. In 2002 and 2003, the FWS and NMFS have been working together to draft a Memorandum of Understanding concerning seabirds. The following seabirds have been listed by the FWS as "birds of conservation concern:" Black-footed albatross (*Phoebastria nigripes*); Ashy storm-petrel (*Oceanodroma homochroa*); Gull-billed tern (*Sterna nilotica*); Elegant tern (*Sterna elegans*); Arctic Tern (*Sterna paradisaea*); Black skimmer (*Rynchops niger*); Xantus's murrelet (*Synthliboramphus hypoleucus*), and; Cassin's auklet (*Ptychoramphus aleuticus*).

Under the Magnuson-Stevens Act, NMFS must ensure fishery management actions comply with other laws designed to protect seabirds. NMFS is also required to consult with FWS if fishery management plan actions may affect seabird species listed as endangered or threatened. Taken together, these laws and directives underscore the need to consider impacts to seabirds in decision making and consider ways to reduce potential impacts of the proposed action. In February 2001, NMFS adopted a National Plan of Action (NPOA) to Reduce the Incidental Take of Seabirds in Longline Fisheries. This NPOA contains guidelines that are applicable to relevant groundfish fisheries and would require seabird incidental catch mitigation if a significant problem is found to exist. During the first two years of NPOA implementation, NMFS regions were tasked with assessing the incidental take of seabirds in longline fisheries. In the limited entry groundfish longline fleet off the coast of Washington, Oregon, and California during September 2001 - October 2002, there were no incidental seabird takes documented by West Coast Groundfish Observers. In 2004, NWR plans to draft a Biological Assessment of the effects of the West Coast groundfish and halibut fisheries on short-tail albatross to meet the agency's obligations under the ESA.

5.0 Education and Outreach Efforts

5.1 NMFS Communications with the Public: NMFS Northwest Region education and outreach program uses several approaches to inform the public and the media on a variety of fishery management concerns.

The NWR regularly employs many communications tactics and resources to reach out to the public and the media and to educate members of the public on fishery issues. These projects are intended to be useful to the general public, the fishing public (commercial and recreational, non-government organizations, other government agencies, academia, etc. The following activities

are intended to educate the public about what the agency is doing about those issues, and how people can assist with those efforts:

- Using Northwest Region Website to provide easy access to information by posting news, various materials, updates and appropriate links.
- Distribution of news releases on significant activities.
- Distribution of media advisories/radio public service announcements to remind people of issues/programs and to solicit input on them.
- Distribution of e-mail notices, requests for input, reminders and updates.
- Scheduling and executing media editorial boards to educate media leadership and provide agency points of view.
- Soliciting appropriate entities to include NWR information on their Websites and link to the NWR's section on them.
- Identifying, supporting and participating in appropriate subject-related panels, seminars and conferences.
- Participation in related industry exhibitions such as FishExpo, recreational fishing, boat shows.
- Participation in related public events and festivals such as environmental fairs, salmon homecomings, city celebrations.
- Holding meetings/workshops to provide information and solicit input; for the general public or with targeted invitations.

NMFS information specific to commercial and recreational fisheries management and regulations is distributed via a variety of mediums.

- Groundfish fisheries information is distributed in regular mailings to the groundfish fleet, via fax, via a website (http://www.nwr.noaa.gov/1sustfsh/gdfsh01.htm,) and via an internet news list (westcoastgroundfish@noaa.gov).
- Salmon fisheries information is distributed via mail in an annual regulations package, via several telephone hotlines, and via a website (http://www.nwr.noaa.gov/1sustfsh/salmon01.htm.)
- Halibut fisheries information is distributed via mail to the halibut fleet, via a telephone hotline, and via a website (http://www.nwr.noaa.gov/1sustfsh/halbut01.htm.)
- Seabird information, including albatross identification guides, information on ESA listed species and species of conservation concern, and seabird deterrent information, has been distributed via mail to halibut fishers. Albatross identification guides are distributed to the groundfish fleet via the West Coast Observer Program. NMFS NWR plans to develop a webpage to disseminate seabird information in 2004.

The Region also meets quarterly with California fisheries managers to discuss marine resource management issues that cross federal and state jurisdictions. Other salmon fishery related meetings include the North of Cape Falcon Forum, US v. Oregon fisheries, and US-Canada Pacific Salmon Treaty fisheries. In 2003, the Region began meeting with fisheries managers from the Washington

treaty tribes (Makah, Quileute, Hoh, Quinault) and from Washington State to also discuss cross-jurisdictional groundfish management issues.

The Science Center's website (http://www.nwfsc.noaa.gov/index.cfm) provides information on all of their research programs, including those focusing on groundfish and salmon harvest activities:

- Groundfish – Fisheries Resource Analysis and Monitoring Division: (http://www.nwfsc.noaa.gov/research/divisions/fram/index.cfm)
- Salmon – Resource Enhancement and Utilization Technologies Division: (http://www.nwfsc.noaa.gov/research/divisions/reut/index.cfm)

In addition to these research program websites, the Science Center sponsors an industry-formed website (http://www.fishresearchwest.org/) to communicate with the public about cooperative research issues. This website explains how the fishing and marine-interest public can get involved with the government in collaborative research projects, posts opportunities for involvement in collaborative research for fishing vessels and non-fishing partners, and solicits grants and contracts for fisheries research. The Center also participates in a discussion group that occurs quarterly in Oregon with state agencies, industry, university and federal scientists to discuss research priorities and issues, including bycatch issues.

Additional potential NWR communications resources to educate members of the public about bycatch, what the agency is doing to minimize bycatch and bycatch mortality, and how people can assist with those efforts:

- Design and produce color regional bycatch poster and brochure; estimated cost $6,000.
- Produce a video bycatch public service announcement; estimated cost $14,000.

Additional potential NWR communications tactics to reach out to members of the public about bycatch issues:

- Distribute bycatch posters and brochures to marinas, yacht and kayak clubs, sailing and rowing schools, aquaria, maritime centers, Washington State Ferries, state offices of environmental education; estimated cost $1,200.
- Provide brochures to appropriate trade shows, festivals, fairs, etc.; estimated cost $400.
- Reproduce video bycatch public service announcement and distribute to regional television stations; estimated cost $1,000.

5.2 Bycatch Reporting for the Public: Bycatch-related regulations are distributed as part of the general public information distribution processes described above for all fisheries regulations. Information from the West Coast Groundfish Observer Program is reported on an annual basis and is distributed on the Science Center's website as well as by paper copies on request. The Observer Program also reports on its activities to the Pacific Council at each of the Council's meetings. For the at-sea whiting fisheries, bycatch data is provided to fishery participants as inseason reports, so that they

know where their bycatch levels fall relative to allowable levels. The at-sea whiting fleet also maintains a within-fleet satellite information system that allows them to track areas where bycatch of non-whiting species is relatively higher in real time so that vessels may avoid those areas to reduce their bycatch of protected species (salmon, halibut, Dungeness crab) and overfished groundfish species.

In addition to these bycatch data reports, the Center has developed a bycatch model that estimates amounts of overfished groundfish species taken in groundfish and other fisheries targeting more abundant stocks. This model was developed in 2001 for use in 2002 fisheries management and has since been refined with information from the Observer Program. In January 2003, NMFS sponsored a meeting of the Pacific Council's Scientific and Statistical Committee to review the bycatch model and make model-improvement suggestions. The model is discussed and explained in public Council-related fora and in *Federal Register* notices implementing the groundfish fishery specifications and management measures.

5.3 Partnering with the Public on Bycatch-Related Research: NMFS has been working with the States and the public to develop and implement Exempted Fishing Permit (EFP) programs that develop alternative gear designs to reduce bycatch. EFPs provide a process for testing innovative fishing gears and strategies to substantiate methods for prosecuting sustainable and risk-averse fishing opportunities. In 2002 and 2003, the following bycatch-related EFPS were approved for West Coast research:

- August 2003: California flatfish EFP for small footrope trawl vessels using an experimental net design intended to reduce incidental catch of rockfish.
- April 2003: Oregon EFP for experimental trawl gear for flatfish fisheries, intended to test a net design that would reduce incidental catch of rockfish.
- January 2003: Washington EFPs for trawl pollock, trawl arrowtooth flounder, and longline spiny dogfish, intended to document bycatch rates of overfished species by vessels operating under observed, bycatch cap fishing constraints.
- September 2002: California flatfish EFP for small footrope trawl vessels using an experimental net design intended to reduce incidental catch of rockfish.
- July 2002: California EFP for vertical hook-and-line gear, intended to test incidental canary rockfish bycatch rates for fishing directed at nearshore and shelf rockfish complexes.
- May 2002: Washington EFPs for trawl arrowtooth flounder and trawl yellowtail rockfish, intended to document bycatch rates of overfished species by vessels operating under observed, bycatch cap fishing constraints.

NMFS also either participates in or approves scientific research fishing that involves West Coast marine resources. Scientific research permits (SRPs) are issued for NOAA/NMFS research and letters of acknowledgment (LOAs) are issued to other government agencies and/or universities conducting scientific research fishing. Under the Magnuson-Stevens Act, scientific research fishing does not include gear development research, however, many of the recently issued SRPs and LOAs address species co-occurrence ratios, survival rates of discarded fish, and other bycatch-related issues.

In 2002 and 2003, SRPs were issued for the following projects:

- Assessing the effects of environmental and capture processes on the behavior and mortality of important bycatch species,
- U.S./Canada echo integration trawl and oceanographic survey assessing the Pacific whiting population,
- Survey to assess the pre-recruit Pacific whiting population,
- Trawl survey to assess groundfish populations along the continental shelf and slope,
- Fixed gear survey to assess groundfish populations in the California Bight,
- Fixed gear survey to assess the Pacific Coast sablefish population, and
- Assessing species-specific groundfish habitat requirements.

In 2002 and 2003, LOAs were issued for the following projects:

- Development of a selective bottom trawl to reduce bycatch in the flatfish fishery,
- Development of a selective pot to reduce bycatch in the flatfish fishery,
- Assessing benthic condition of the continental shelf,
- Fixed gear survey to assess the Pacific halibut population off Washington and Oregon,
- Assessing rockfish populations in a rocky reef environment, and
- Assessing rockfish habitat utilization along the continental shelf off Oregon.
- Chinook Technical Committee LOA funded projects on encounter rates (Makah, and WDFW), and the coastwide DNA standardized baseline development project.
- Tangle net test research by WDFW in the Columbia River and Willapa Bay.

The primary foci of a cooperative research program with industry should be the development of bycatch reduction gear and investigation of methods to provide economic incentives to reduce bycatch. This would require a significant expansion of the Center's existing Cooperative Research Program. Cost is approximately $1,500K.

6.0 Literature Cited

Tyler, W.B., K.T. Briggs, D.B. Lewis, and R.G. Ford. 1993. Seabird distribution and abundance in relation to oceanographic processes in the California Current System. In The status, ecology, and conservation of marine birds of the North Pacific. K. Vemeer, K.T. Briggs, K.H. Morgan, and D. Siegel-Causey, Eds. Can. Wildl. Serv. Spec. Publ., Ottawa, pp. 48- 60.

Northwest Region Current Bycatch Priorities and Implementation Plan Summary

Monitoring

Priorities for FY04:

- Integrate 2002-2003 WCGOP data into groundfish bycatch model
- Convert at-sea whiting fishery observer program from voluntary participation to mandatory participation (proposed rule published on September 10, 2003, 68 FR 53334)

Priorities for FY05:

- Implement mandatory catch monitoring program for shore-based whiting fishery, possibly with camera or other technological observation systems
- Explore expanding the vessel monitoring system program to cover commercial open access and fleets that target groundfish

Research

Priorities for FY04:

- NMFS will convene a technical workshop to explore ways to solve problems with continuing to use the CWT system to estimate fishery impacts on ESA listed stocks while increasing the use of mark selective fisheries
- Expand observer program coverage to assess bycatch in open access fleet

Priorities for FY05:

The "Research Needs" section, above, is essentially a wish list. The changes that would help to decrease the bycatch of non-target salmon species and listed salmon ESUs would increase the precision of salmon bycatch estimates in the array of West Coast salmon fisheries. Portions of the projects listed under groundfish research needs will be part of the Science Center's ongoing research priorities. NMFS would have to increase funding to existing research and monitoring programs to meet bycatch research needs for salmon, groundfish, and halibut fisheries and on fisheries interactions with protected species.

Management

Priorities for FY04:

- Complete programmatic bycatch EIS for West Coast groundfish fisheries
- Revise non-trawl/fixed gear 2004 groundfish landings limits based on early-2004 analysis of 2002-2003 WCGOP data
- Determine whether Biological Opinion on effects of West Coast groundfish fishery on listed salmon species needs to be reinitiated
- Draft Biological Assessment on effects of West Coast groundfish and halibut fisheries on short-tailed albatross

Priorities for FY05:

- Explore capacity reduction programs in groundfish trawl and open access sectors

Education/Outreach

Priories for FY04:

- Develop seabirds and fisheries interaction website for NWR
- Continue to work with the Pacific Council on development of its communications plan

Priorities for FY05

Unknown