Answers to Follow-up Questions
Posed to Dr. William T. Hogarth
By the U.S. Commission on Ocean Policy
Following the Southeast Regional Meeting
Charleston, SC
(Letter of March 7, 2002)

Question 1(a): What changes are underway at NMFS to streamline handling of national security concerns (military training, exercises, military hardware development/testing)?

Over the last few years, NOAA and the Navy have developed a productive working relationship. NOAA Assistant Administrator for Fisheries Bill Hogarth has been meeting with the Assistant Secretary of the Navy for Installations and Environment regarding opportunities to expand coordination efforts for complying with applicable resource laws and also to continue to increase cooperative research and outreach on complex scientific issues. NMFS and the Navy have begun a number of efforts to improve coordination through more effective communication.

- One way to give the Navy more flexibility and to allow NMFS adequate time to carry out our responsibilities is to take a more programmatic approach to Navy activities. Programmatic consultations provide a flexible way to address a number of related activities in advance.

- NMFS and the Navy have established an Environmental Coordinating Group to discuss issues of concern including their respective responsibilities and missions. Discussions have focused on the integration of agency processes under the ESA and the MMPA and the constraints of the military in achieving their mission responsibilities.

- The Navy established a Navy/NMFS liaison position in the Office of Protected Resources to help with intra- and inter-agency communication.

- We are developing noise standards for the impacts of various marine activities on marine mammals and we are producing a computer tool for calculating acoustic safety zones.

- We are working with the Navy to identify ways we can cooperatively fund research, such as joint sponsorship of a National Research Council panel on ambient noise; joint sponsorship of research on the effects of explosions on marine animals; and using passive acoustics to conduct marine mammal surveys.

- NMFS recognizes that the definition of harassment under the MMPA can be confusing at times to all regulated entities, not just DOD, and therefore difficult for the regulated community to understand and apply. That is why we have worked with DOD and the U.S. FWS to propose a revised definition as part of a MMPA

reauthorization package.

In addition to our work with the Navy, NMFS has been working on methods for streamlining our involvement in non-military security concerns. In the energy arena, NMFS recognizes the security ramifications of safely and reliably delivered and produced energy products. Specifically, NMFS is exploring various methods for streamlining the environmental review process for producing hydropower and transporting natural gas through pipelines while minimizing environmental degradation. In the transportation arena, NMFS is an active player in a multi-agency effort aimed at increasing the ability of ports to respond efficiently to growing demands for expanding and modernizing their facilities. One of the key components of this effort is to increase coordination among multiple agencies to streamline the environmental review process for these often highly complex port development projects.

Question 1(b): You mentioned the relationship between NMFS and the Secretary of Commerce regarding certain fishing decisions. Did you mean the Under Secretary of Commerce, or is there a direct decision-making line between NMFS and the Secretary of Commerce?

Authority for living marine resource matters has been delegated from the Secretary of Commerce to the NOAA Assistant Administrator for Fisheries for a number of years, with the NMFS leadership keeping NOAA informed on issues as they develop.

The new leadership at the Department of Commerce has been extraordinarily supportive of NOAA, and NOAA Fisheries in particular. The Secretary and his staff have demonstrated a real interest in programs at NOAA Fisheries, showed a keen understanding of the complexity of our issues, assisted us in budget and programmatic discussions at OMB, and encouraged NOAA Fisheries to vigorously pursue its mission. Since arriving at NOAA, Admiral Lautenbacher has demonstrated to me the same type of enthusiasm, commitment and support.

Question 2: Much has been said about inconsistencies of assessments across the regions. Can you provide the Commission with a comprehensive summary of stock assessments by region?

A comprehensive summary of stock of stock assessments by region, taken from the N*ational Marine Fisheries Service Stock Assessment Improvement Plan* (2001) is attached.

Assessments of living marine resources do differ across the regions and among species. In an ideal world, assessments would be conducted for every federally-managed species, based on at least one reliable index of abundance. Although budget resources currently constrain our ability to achieve this, NMFS is committed to working toward that goal. For example, the *National Marine Fisheries Service Stock Assessment Improvement Plan* (2001) provides a snapshot of the current state of stock assessments and a carefully devised plan for meeting staff levels required to raise those assessments up to each of three tiers of excellence. Likewise, *the National Marine Fisheries Service Data Acquisition Plan* (1998) describes vessel requirements for meeting the growing demand for high quality at-sea data.

In the meantime, because fiscal resources for fisheries management are not unlimited, a system of priorities must be set to ensure that the most important data needs are met. Ecological and human dimension factors are taken into consideration in development of a carefully reasoned strategy for obtaining data required for stock assessments.

Several factors are considered when determining which stocks to assess. High priority must be given to endangered or threatened species. For example, all marine mammals are protected, but special emphasis is given to the endangered species among them. Among fish species, the frequency of assessments is determined principally by the rate of change in the stocks (e.g., population size, recruitment), relative to how intensively species are harvested. Stocks that are overfished are given high priority because adequate stock assessments and monitoring programs are essential to track the success of rebuilding programs on these stocks. Another consideration when setting priorities is the value of the stock or species to the U.S. economy. The ecological importance of a species is also considered. Surveys may be conducted on a species of little economic value, but which is an important forage fish for, or predator on other fish stocks, or is a bycatch species.

Marine ecosystems and the human systems that benefit from them are dynamic. Changes in the marine environment can trigger a chain reaction of stock status, fishing effort, and regulatory changes. For this reason, stock assessment priorities also must be flexible to be responsive to the information needs of resource managers.

Question 3(a): Where are the science voids in fisheries management?

There are many gaps in our scientific knowledge. Many topics will never be completely understood, but we continually strive to improve our knowledge.

The spawning and early life history of most species are poorly known. Understanding the factors behind fisheries recruitment remains one of the greatest challenges. There remains much to learn about environmental and climatic influences on the biology, abundance, or distribution of species, or multispecies (predator-prey) interactions. Separating out the impact of human factors (fishing, habitat loss, pollution) from natural factors impacting population abundance is very difficult, as are measuring and evaluating how much habitat has been lost over time or the extent to which it has been degraded; how the quantity and quality of habitat functionally relates to fisheries productivity; the carrying capacity of marine ecosystems; how fisheries bycatch impacts recruitment and abundance; and, with any certainty, how long or if an overfished stock will rebuild.

Socio-economic knowledge is growing, but we need to continue to research the various social and economic factors in commercial and recreational fisheries, such as how to adequately estimate capacity in different fisheries sectors and the economic cost-benefit to the nation for various scenarios of resource exploitation, fishery participation, and intangible benefits.

The three most significant scientific needs to address our scientific knowledge are:

(1) NMFS resource surveys, which are designed to produce fishery-independent indices of abundance, and to collect related information on spatial and temporal distributions, associated species, habitat, and oceanographic variables. These data are inputs to stock assessment models of increasing complexity and sophistication. The highest order assessments are based on age or size-specific models, and incorporate temporal and/or spatial effects of the fishery and the marine environment. Applied fishery oceanography elucidates environmental variability from climate and large-scale physical phenomena to separate natural agents from human-induced effects in the fisheries.

(2) Fisheries observers, who provide fishery-dependent data collection on species composition and biology, kept and discarded catch, and fishing effort. NMFS has developed 41 fishery management plans and observers cover only 11 of the identified fisheries. NMFS also has responsibility for monitoring an additional 25 Category I and II state and federal fisheries under MMPA, but observer coverage is in only 7 of these fisheries. Although historically focused on biological sampling, observer programs can aid in the collection of socioeconomic data from the fishing fleet.

(3) A rigorous social science program which includes staff, data and research to produce socioeconomic analyses that satisfy the federal stewardship responsibilities under nearly all of our legal mandates. Such analyses will improve the scientific foundation for policy development and aid decision makers in weighing the ecological, social, and economic impacts of management options. Social and economic analyses can identify the alternative that minimizes losses to stakeholders while still achieving conservation goals.

Question 3(b): Where is the "best science available" not sufficient?

Because we are often faced with making difficult resource management decisions, which can have considerable socio-economic impacts, a solid scientific knowledge base is critical to our agency's mission. In relatively few cases have science issues been the cause of adverse court decisions. NOAA Fisheries maintains full service science centers with scientists who in many cases are world-renowned in their field. The problem is not the quality of science or where it is located, but the fact that it is under-funded given the growing demands for data and analysis.

Over time, enhanced scientific capabilities should lead to a reduction in the number of *status-unknown* species reported each year in the Report to Congress; increased ability to better monitor and forecast rebuilding rates for overfished or depleted stocks; and progress towards an effective ecosystem-based management framework.

Question 4: What are your suggestions to streamline the efforts of the fishery management councils?

Because fisheries and fish stocks change often, it can be a challenge to meet the timelines required by NEPA and still meet our fishery management goals. However, we are working with the councils to ensure consistent and timely use of NEPA to make

decisions that are robust and defensible. This will enable us in turn to more efficiently review and implement council actions.

With our council partners, we have undertaken a broad effort to streamline the process to review, approve and implement the fishery management plans developed by the regional fishery management councils. In general, our efforts will focus in two broad areas: eliminating duplicative reviews, and front-loading the inputs to decisions so that all considerations (*e.g.*, NEPA analysis, protected species issues, essential fish habitat) are included at the earliest stages of decision making.

Question 5: Where are investments most required in fisheries management, and how do you determine a state's share in the investment?

The greatest investments that are needed in fisheries management include improving the information base for decision making (including statistics, data collection and stock assessment), improving the analysis of the implications of choices for fisheries management (including National Environmental Policy Act concerns as well as socio-economic considerations), and increasing compliance (including upgrading law enforcement). The states are integral partners with the federal government in carrying out these activities, and their efforts contribute directly and indirectly to the federal government's ability to meet our objectives. Unfortunately, state marine fisheries programs around the country are underfunded. We find that it is often in our interest to invest in partnership programs with our state colleagues, because they are in a position to best help us achieve our objectives.

NOAA Fisheries maintains an ongoing relationship with the states through the three interstate marine fisheries commissions. Through these liaisons we conduct an ongoing review of interrelated state and federal programs and how best to allocate responsibilities given available state and federal resources. An exception is funding under the Interjurisdictional Fisheries Act, which is allocated to the states by statutory formula. Under the Atlantic Coastal Fisheries Cooperative Management Act, NOAA Fisheries reviews cooperative efforts to conserve and manage the valuable marine resources of the Atlantic coastal states and allocates funding based upon mutually agreed priorities. NOAA Fisheries' Regional Administrators maintain direct contacts with each of the states in their regions, and through participation on the regional fishery management councils, identify state and federal agency contributions to particular problems in the region.

Question 6. What are your recommendations on science funding?

Good science forms the foundation of NOAA Fisheries' stewardship mission. While demands for high-quality science are escalating, funding to bolster science programs has not kept pace. Several of the priority areas for additional science and science infrastructure funding are those that enable the shift from a single-species to an ecosystem approach to management.

Data Collection
To provide comprehensive, state-of the art analysis, improved data collection for both

fishery dependent and independent data is required. Vessels are needed for collecting the data on the physical environment and sampling the biological components of the ecosystem. Meeting this need requires building modern fisheries research vessels and funding for chartering commercial fishing and other vessels. Research and development of new technologies, improvements in and innovative uses of existing technologies, and development of new and advanced sampling systems and approaches will improve stock assessment products, including oceanographic observations and habitat characterization.
NOAA Fisheries is also committed to enhancing its program efforts through implementing the Stock Assessment Improvement Plan. Investment in a national fishing vessel registration and fisheries information system in cooperation with the Marine Fisheries Commissions, states, industry, and the Fishery Management Councils and expansion of the national observer program will increase the collection of high quality fisheries, environmental and socioeconomic data from commercial and recreational fishing vessels.

Fisheries Oceanography
Current fisheries oceanography research is generally focused on small- to meso-scale projects. It is becoming increasingly evident, however, that we must also be concerned with climate change and with decadal-scale changes (i.e., “regime shifts”) that impact production throughout diverse ecosystems.

Socioeconomics
A strong NOAA social sciences program will improve the scientific and economic foundation of the Agency’s policies and help decision makers weigh the ecological, social, and economic impacts of their decisions.

Essential Fish Habitat Studies
The Magnuson-Stevens Act requires NOAA Fisheries to identify essential fish habitat (EFH) in all fishery management plans (FMPs), minimize the adverse effects of fishing on EFH to the extent practicable, and consult with other agencies to develop EFH conservation measures for actions that funded, or undertaken by a Federal agency. NOAA Fisheries and the Councils have incorporated initial EFH information into existing FMPs, and NOAA Fisheries has begun conducting the required consultations.

LEGEND to attached Appendix 1 of the NMFS Stock Assessment Improvement Plan.

Data

Catch

0 = none
1 = landed catch
2 = catch size composition
3 = spatial patterns (logbooks)
4 = catch age composition
5 = total catch by sector (observers)

Abundance

0 = none
1 = fishery CPUE or imprecise survey with size composition
2 = precise, frequent survey with age composition
3 = survey with estimates of q
4 = habitat-specific survey

Life History

0 = none
1 = size
2 = basic demographic parameters
3 = seasonal or spatial information (mixing, migration)
4 = food habits data

Assessment Level

0 = none
1 = index only (commercial or research CPUE)
2 = simple life history equilibrium models
3 = aggregated production models
4 = size/age/stage-structured models
5 = add ecosystem (multispecies, environment), spatial & seasonal analyses

Frequency

0 = never
1 = infrequent
2 = frequent or recent (2-3 years)
3 = annual or more

Fishery Management Plan	Stock		Jurisdiction	Catch	Abundance	Life History	Assessment Level	Assessment Frequency
	Spanish Mackerel	Gulf Group	SAFMC / GMFMC	3	2	3	4	2
		Atlantic Group	SAFMC / GMFMC	3	1	3	4	2
	Cobia		SAFMC/ GMFMC	2	2	1	4	1
	Cero		SAFMC / GMFMC	1	0	1	1	1
	Dolphin		SAFMC / GMFMC	2	1	2	2	1
	Little Tunny		SAFMC / GMFMC	1	0	1	1	0
	Bluefish (Gulf of Mexico only)		GMFMC	1	0	1	1	0
Reef Fish Resources of the Gulf of Mexico	Red Snapper		GMFMC	5	3	3	4	3
	Nassau Grouper		GMFMC	1	1	1	1	1
	Jewfish		GMFMC	1	1	1	1	1
	Vermilion Snapper		GMFMC	3	1	2	4	2
	Gag Grouper		GMFMC	3	2	1	4	2
	Greater Amberjack		GMFMC	2	2	1	4	2
	Gray Triggerfish		GMFMC	1	0	1	0	0
	Lesser Amberjack		GMFMC	1	0	1	0	0
	Almaco Jack		GMFMC	1	0	1	0	0
	Banded Rudderfish		GMFMC	1	0	1	0	0
	Tomtate		GMFMC	1	0	1	0	0
	Pigfish		GMFMC	1	0	1	0	0
	Queen Snapper		GMFMC	1	0	1	0	0
	Mutton Snapper		GMFMC	1	0	1	0	0
	Schoolmaster		GMFMC	1	0	1	0	0
	Blackfin Snapper		GMFMC	1	0	1	0	0
	Cubera Snapper		GMFMC	1	0	1	0	0
	Gray (Mangrove) Snapper		GMFMC	1	0	1	0	0
	Dog Snapper		GMFMC	1	0	1	0	0
	Mahogany Snapper		GMFMC	1	0	1	0	0
	Lane Snapper		GMFMC	1	0	1	0	0
	Silk Snapper		GMFMC	1	0	1	0	0
	Yellowtail Snapper		GMFMC	1	0	1	0	0
	Wenchman		GMFMC	1	0	1	0	0
	Goldface Tilefish		GMFMC	1	0	1	0	0
	Blackline Tilefish		GMFMC	1	0	1	0	0
	Anchor Tilefish		GMFMC	1	0	1	0	0
	Blueline Tilefish		GMFMC	1	0	1	0	0

Fishery Management Plan	Stock	Jurisdiction	Catch	Abundance	Life History	Assessment Level	Assessment Frequency
	Tilefish	GMFMC	1	0	1	0	0
	Rock Hind	GMFMC	1	0	1	0	0
	Speckled Hind	GMFMC	1	0	1	0	0
	Yellowedge Grouper	GMFMC	1	0	1	0	0
	Red Hind	GMFMC	1	0	1	0	0
	Red Grouper	GMFMC	3	1	2	4	2
	Misty Grouper	GMFMC	1	0	1	0	0
	Warsaw Grouper	GMFMC	1	0	1	0	0
	Snowy Grouper	GMFMC	1	0	1	0	0
	Black Grouper	GMFMC	1	0	1	0	0
	Yellowmouth Grouper	GMFMC	1	0	1	0	0
	Scamp	GMFMC	1	0	1	0	0
	Yellowfin Grouper	GMFMC	1	0	1	0	0
	Grass Porgy	GMFMC	1	0	1	0	0
	Jolthead Porgy	GMFMC	1	0	1	0	0
	Hogfish	GMFMC	1	0	1	0	0
	Dwarf Sand Perch	GMFMC	1	0	1	0	0
	Sand Perch	GMFMC	1	0	1	0	0
Gulf of Mexico Red Drum	Red Drum	GMFMC	3	2	3	4	2
Caribbean Spiny Lobster[5]	Spiny Lobster	CFMC	2	1	2	1	2
Caribbean Reef Fish[6]	Nassau Grouper	CFMC	1	1	1	1	1
	Jewfish	CFMC	1	1	1	1	1
	Ocean Surgeonfish	CFMC	1	0	1	0	0
	Doctorfish	CFMC	1	0	1	0	0
	Blue Tang	CFMC	1	0	1	0	0
	Frogfish	CFMC	1	0	1	0	0
	Flamefish	CFMC	1	0	1	0	0
	Conchfish	CFMC	1	0	1	0	0
	Trumpetfish	CFMC	1	0	1	0	0
	Scrawled Filefish	CFMC	1	0	1	0	0
	Queen Triggerfish	CFMC	1	0	1	0	0
	Whitespotted Filefish	CFMC	1	0	1	0	0
	Ocean Triggerfish	CFMC	1	0	1	0	0
	Black Durgon	CFMC	1	0	1	0	0
	Sargassum Triggerfish	CFMC	1	0	1	0	0
	Redlip Blenny	CFMC	1	0	1	0	0
	Peacock Flounder	CFMC	1	0	1	0	0
	Yellow Jack	CFMC	1	0	1	0	0

Fishery Management Plan	Stock	Jurisdiction	Catch	Abundance	Life History	Assessment Level	Assessment Frequency
	Blue Runner	CFMC	1	0	1	0	0
	Horse-eye Jack	CFMC	1	0	1	0	0
	Black Jack	CFMC	1	0	1	0	0
	Bar Jack	CFMC	1	0	1	0	0
	Greater Amberjack	CFMC	1	0	1	0	0
	Almaco Jack	CFMC	1	0	1	0	0
	Longsnout Butterflyfish	CFMC	1	0	1	0	0
	Foureye Butterflyfish	CFMC	1	0	1	0	0
	Spotfin Butterflyfish	CFMC	1	0	1	0	0
	Banded Butterflyfish	CFMC	1	0	1	0	0
	Redspotted Hawkfish	CFMC	1	0	1	0	0
	Flying Gurnard	CFMC	1	0	1	0	0
	Atlantic Spadefish	CFMC	1	0	1	0	0
	Neon Goby	CFMC	1	0	1	0	0
	Rusty Goby	CFMC	1	0	1	0	0
	Royal Gramma	CFMC	1	0	1	0	0
	Porkfish	CFMC	1	0	1	0	0
	Margate	CFMC	1	0	1	0	0
	Tomtate	CFMC	1	0	1	0	0
	French Grunt	CFMC	1	0	1	0	0
	White Grunt	CFMC	1	0	1	0	0
	Bluestriped Grunt	CFMC	1	0	1	0	0
	Squirrelfish	CFMC	1	0	1	0	0
	Longspine Squirrelfish	CFMC	1	0	1	0	0
	Blackbar Soldierfish	CFMC	1	0	1	0	0
	Cardinal Soldierfish	CFMC	1	0	1	0	0
	Spanish Hogfish	CFMC	1	0	1	0	0
	Creole Wrasse	CFMC	1	0	1	0	0
	Yellowcheek Wrasse	CFMC	1	0	1	0	0
	Yellowhead Wrasse	CFMC	1	0	1	0	0
	Clown Wrasse	CFMC	1	0	1	0	0
	Puddingwife	CFMC	1	0	1	0	0
	Pearly Razorfish	CFMC	1	0	1	0	0
	Green Razorfish	CFMC	1	0	1	0	0
	Hogfish	CFMC	1	0	1	0	0
	Bluehead Wrasse	CFMC	1	0	1	0	0
	Black Snapper	CFMC	1	0	1	0	0
	Queen Snapper	CFMC	1	0	1	0	0
	Mutton Snapper	CFMC	1	0	1	0	0
	Schoolmaster	CFMC	1	0	1	0	0
	Blackfin Snapper	CFMC	1	0	1	0	0

Fishery Management Plan	Stock	Jurisdiction	Catch	Abundance	Life History	Assessment Level	Assessment Frequency
	Gray Snapper	CFMC	1	0	1	0	0
	Dog Snapper	CFMC	1	0	1	0	0
	Mahogany Snapper	CFMC	1	0	1	0	0
	Lane Snapper	CFMC	1	0	1	0	0
	Silk Snapper	CFMC	1	0	1	0	0
	Yellowtail Snapper	CFMC	1	0	1	0	0
	Wenchman	CFMC	1	0	1	0	0
	Vermilion Snapper	CFMC	1	0	1	0	0
	Blackline Tilefish	CFMC	1	0	1	0	0
	Sand Tilefish	CFMC	1	0	1	0	0
	Yellow Goatfish	CFMC	1	0	1	0	0
	Spotted Goatfish	CFMC	1	0	1	0	0
	Chain Moray	CFMC	1	0	1	0	0
	Green Moray	CFMC	1	0	1	0	0
	Goldentail Moray	CFMC	1	0	1	0	0
	Batfish	CFMC	1	0	1	0	0
	Goldspotted Eel	CFMC	1	0	1	0	0
	Yellowhead Jawfish	CFMC	1	0	1	0	0
	Dusky Jawfish	CFMC	1	0	1	0	0
	Spotted Trunkfish	CFMC	1	0	1	0	0
	Honeycomb Cowfish	CFMC	1	0	1	0	0
	Scrawled Cowfish	CFMC	1	0	1	0	0
	Trunkfish	CFMC	1	0	1	0	0
	Smooth Trunkfish	CFMC	1	0	1	0	0
	Cherubfish	CFMC	1	0	1	0	0
	Queen Angelfish	CFMC	1	0	1	0	0
	Rock Beauty	CFMC	1	0	1	0	0
	Gray Angelfish	CFMC	1	0	1	0	0
	French Angelfish	CFMC	1	0	1	0	0
	Sergeant Major	CFMC	1	0	1	0	0
	Blue Chromis	CFMC	1	0	1	0	0
	Sunshinefish	CFMC	1	0	1	0	0
	Yellowtail Damselfish	CFMC	1	0	1	0	0
	Dusky Damselfish	CFMC	1	0	1	0	0
	Beaugregory	CFMC	1	0	1	0	0
	Bicolor Damselfish	CFMC	1	0	1	0	0
	Threespot Damselfish	CFMC	1	0	1	0	0
	Bigeye	CFMC	1	0	1	0	0
	Glasseye Snapper	CFMC	1	0	1	0	0
	Midnight Parrotfish	CFMC	1	0	1	0	0
	Blue Parrotfish	CFMC	1	0	1	0	0

Fishery Management Plan	Stock	Jurisdiction	Catch	Abundance	Life History	Assessment Level	Assessment Frequency
	Speckled Rockfish	PFMC	0.5	0	1	0	0
	Splitnose Rockfish	PFMC	1	1	2	2	1
	Squarespot Rockfish	PFMC	0.5	0	1	0	0
	Starry Rockfish	PFMC	0.5	0	1	0	0
	Stripetail Rockfish	PFMC	0.5	0	1	0	0
	Tiger Rockfish	PFMC	0.5	0	1	0	0
	Vermilion Rockfish	PFMC	0.5	0	1	0	0
	Yelloweye Rockfish	PFMC	1	1	2	2	1
	Yellowmouth Rockfish	PFMC	1	1	2	2	1
	Leopard Shark	PFMC	1	0.5	1	0	0
	Soupfin Shark	PFMC	1	0.5	1	0	0
	Spiny Dogfish	PFMC	1	0.5	1	0	0
	Big Skate	PFMC	1	0.5	1	0	0
	California Skate	PFMC	1	0.5	1	0	0
	Longnose Skate	PFMC	1	0.5	1	0	0
	Ratfish	PFMC	0.5	0	1	0	0
	Finescale Codling	PFMC	0.5	0	1	0	0
	Pacific Rattail	PFMC	0.5	0	1	0	0
	Cabezon	PFMC	0.5	0	1	0	0
	Kelp Greenling	PFMC	0.5	0	1	0	0
	California Scorpionfish	PFMC	0.5	0	1	0	0
	Treefish	PFMC	0.5	0	1	0	0
Western Pacific Crustaceans	Spiny Lobster (2 species)	WPFMC	4	2	3	3	3
		WPFMC	4	2	3	3	3
	Slipper Lobster	WPFMC	4	2	3	3	3
	Kona Crab	WPFMC	1	1	0	0	0
Western Pacific Corals[11]	Pink Corals (3 species)	WPFMC	0	1	2	1	1
		WPFMC	0	1	2	1	1
		WPFMC	0	1	2	1	1
	Gold Corals (4 species)	WPFMC	0	1	2	1	1
		WPFMC	0	1	2	1	1
		WPFMC	0	1	2	1	1
		WPFMC	0	1	2	1	1
	Bamboo Corals (2 species)	WPFMC	0	1	2	1	1
		WPFMC	0	1	2	1	1
	Black Corals (3 species)	WPFMC	1	1	0	1	1
		WPFMC	1	1	0	1	1
		WPFMC	1	1	0	1	1
Bottomfish and Seamount Groundfish of the	Pelagic Armorhead	WPFMC	0	0	0	0	0
	Seabass (Main Hawaiian Islands)	WPFMC	1	1	2	1	3

Fishery Management Plan	Stock	Jurisdiction	Catch	Abundance	Life History	Assessment Level	Assessment Frequency
Western Pacific	Squirrelfish Snapper (Northwest and Main	WPFMC	1	1	2	1	3
	Longtail Snapper (Northwest and Main	WPFMC	1	1	2	1	3
	Silverjaw Jobfish	WPFMC	1	1	2	0	0
	Gray Jobfish	WPFMC	1	1	2	1	3
	Bluestripe Snapper	WPFMC	1	1	2	0	0
	Yellowtail Snapper	WPFMC	1	1	2	0	0
	Pink Snapper	WPFMC	1	1	2	0	0
	Yelloweye Snapper	WPFMC	1	1	2	0	0
	Snapper *Pristipomoides filamentosus*	WPFMC	1	1	2	1	3
	Snapper *Pristipomoides zonatus*	WPFMC	1	1	2	0	0
	Giant Trevally	WPFMC	1	1	2	0	0
	Black Jack	WPFMC	1	1	2	0	0
	Thick Lipped Trevally	WPFMC	1	1	2	0	0
	Amberjack	WPFMC	0	0	2	0	0
	Blacktip Grouper	WPFMC	1	1	2	0	0
	Seabass (Northwest Hawaiian Islands)	WPFMC	1	1	2	1	3
	Lunartail Grouper	WPFMC	1	1	2	0	0
	Ambon Emperor	WPFMC	1	1	2	0	0
	Redgill Emperor	WPFMC	1	1	2	0	0
	Alfonsin	WPFMC	0	0	0	0	0
	Ratfish	WPFMC	0	0	0	0	0
Western Pacific Pelagics	Yellowfin Tuna (Central Western Pacific)	WPFMC	2	3	3	5	3
	Albacore (South Pacific)	WPFMC	2	3	3	5	3
	Albacore (North Pacific)	WPFMC	2	3	3	4	2
	Yellowfin Tuna (Eastern Tropical Pacific)	WPFMC	4	3	3	4	3
	Skipjack Tuna (Central Western Pacific)	WPFMC	2	4	3	5	3
	Skipjack Tuna (Eastern Tropical Pacific)	WPFMC	4	3	3	4	3
	Striped Marlin	WPFMC	1	1	2	1	3
	Black Marlin	WPFMC	1	0	0	0	0
	Bigeye Tuna (Pacific)	WPFMC	4	3	3	4	3
	Other tuna relatives: Auxis spp.	WPFMC	1	0	2	0	0
	Other tuna relatives: Scomber spp.	WPFMC	1	0	2	0	0
	Other tuna relatives: Allothunnus spp.	WPFMC	1	0	2	0	0
	Swordfish (Pacific)	WPFMC	3	1	3	3	2
	Pomfret	WPFMC	1	0	0	0	0
	Sailfish (Pacific)	WPFMC	1	0	0	0	0
	Shortbill Spearfish (Pacific)	WPFMC	1	0	0	0	0
	Wahoo (Pacific)	WPFMC	1	1	2	1	3
	Mahimahi (Pacific)	WPFMC	1	1	2	1	3

Fishery Management Plan	Stock	Jurisdiction	Catch	Abundance	Life History	Assessment Level	Assessment Frequency
	Pelagic Sharks (Pacific)	WPFMC	1	1	0	0	0
	Blue Marlin (Pacific)	WPFMC	2	1	3	3	2
	Opah	WPFMC	1	1	0	1	2
	Oilfish	WPFMC	1	0	0	0	0
	Escolar	WPFMC	1	0	0	0	0
Gulf of Alaska Groundfish	Western / Central Walleye Pollock	NPFMC	4	3	2	5	3
	Eastern Walleye Pollock	NPFMC	4	3	2	2	3
	Pacific Cod	NPFMC	5	2	2	4	3
	Sablefish	NPFMC	4	2	3	4	3
	Shortspine Thornyhead	NPFMC	2	1	2	4	3
	Arrowtooth Flounder	NPFMC	4	1	2	4	3
	Western Pacific Ocean Perch	NPFMC	4	1	2	4	3
	Central Pacific Ocean Perch	NPFMC	4	1	2	4	3
	Eastern Pacific Ocean Perch	NPFMC	4	1	2	4	3
	Atka Mackerel	NPFMC	2	1	2	2	3
	Alaska Plaice	NPFMC	1	1	1	2	3
	Butter Sole	NPFMC	1	1	1	1	3
	Deepsea Sole	NPFMC	1	1	1	1	3
	Dover Sole	NPFMC	4	1	2	2	3
	English Sole	NPFMC	1	1	1	1	3
	Flathead Sole	NPFMC	4	1	2	2	3
	Greenland Turbot	NPFMC	1	1	1	1	3
	Rex Sole	NPFMC	4	1	1	2	3
	Northern Rock Sole	NPFMC	4	1	2	2	3
	Southern Rock Sole	NPFMC	4	1	2	2	3
	Sand Sole	NPFMC	1	1	1	1	3
	Starry Flounder	NPFMC	1	1	1	1	3
	Yellowfin Sole	NPFMC	1	1	1	1	3
	Dusky Rockfish	NPFMC	3	1	2	2	3
	Yelloweye Rockfish	NPFMC	4	1	3	2	3
	Aurora Rockfish	NPFMC	2	1	1	2	3
	Blackgill Rockfish	NPFMC	1	1	1	1	3
	Bocaccio	NPFMC	1	1	1	1	3
	Chilipepper	NPFMC	1	1	1	1	3
	Darkblotched Rockfish	NPFMC	2	1	2	2	3
	Greenstriped Rockfish	NPFMC	1	1	1	1	3
	Harlequin Rockfish	NPFMC	2	1	2	2	3
	Northern Rockfish	NPFMC	4	1	2	2	3
	Pygmy Rockfish	NPFMC	1	1	1	1	3
	Redbanded Rockfish	NPFMC	1	1	1	1	3
	Redstripe Rockfish	NPFMC	1	1	1	1	3

Fishery Management Plan	Stock	Jurisdiction	Catch	Abundance	Life History	Assessment Level	Assessment Frequency
	Rougheye Rockfish	NPFMC	2	1	2	2	3
	Sharpchin Rockfish	NPFMC	2	1	2	2	3
	Shortbelly Rockfish	NPFMC	1	1	1	1	3
	Shortraker Rockfish	NPFMC	4	1	2	2	3
	Silvergrey Rockfish	NPFMC	1	1	1	1	3
	Splitnose Rockfish	NPFMC	1	1	1	1	3
	Stripetail Rockfish	NPFMC	1	1	1	1	3
	Vermilion Rockfish	NPFMC	1	1	1	1	3
	Yellowmouth Rockfish	NPFMC	1	1	1	1	3
	C-O Sole	NPFMC	1	1	1	0	3
	Curlfin Sole	NPFMC	1	1	1	0	3
	Hybrid Sole	NPFMC	1	1	1	0	3
	Longhead Dab	NPFMC	1	1	1	0	3
	Pacific Sanddab	NPFMC	1	1	1	0	3
	Petrale Sole	NPFMC	1	1	1	0	3
	Roughscale Sole	NPFMC	1	1	1	0	3
	Slender Sole	NPFMC	1	1	1	0	3
	Bering Flounder	NPFMC	1	1	1	0	3
	Kamchatka Flounder	NPFMC	1	1	1	0	3
	Black Rockfish	NPFMC	1	1	1	0	3
	Blue Rockfish	NPFMC	1	1	1	0	3
	Widow Rockfish	NPFMC	1	1	1	0	3
	Yellowtail Rockfish	NPFMC	1	1	1	0	3
	Canary Rockfish	NPFMC	1	1	1	0	3
	China Rockfish	NPFMC	1	1	1	0	3
	Copper Rockfish	NPFMC	1	1	1	0	3
	Quillback Rockfish	NPFMC	1	1	1	0	3
	Rosethorn Rockfish	NPFMC	1	1	1	0	3
	Tiger Rockfish	NPFMC	1	1	1	0	3
	Broad Banded Thornyhead	NPFMC	1	1	1	0	3
	Longspine Thornyhead	NPFMC	1	1	1	0	3
	Blue Shark	NPFMC	0	0	0	0	0
	Brown Cat Shark	NPFMC	0	0	0	0	0
	Pacific Sleeper Shark	NPFMC	1	0	0	0	0
	Salmon Shark	NPFMC	1	0	1	0	0
	Sixgill Shark	NPFMC	0	0	0	0	0
	Spiny Dogfish Shark	NPFMC	1	0	0	0	0
	Alaska Skate	NPFMC	0	1	1	0	0
	Aleutian Skate	NPFMC	0	1	1	0	0
	Big Skate	NPFMC	0	1	1	0	0
	Flathead Skate	NPFMC	0	1	1	0	0

Fishery Management Plan	Stock		Jurisdiction	Catch	Abundance	Life History	Assessment Level	Assessment Frequency
	Longnose Skate		NPFMC	0	1	1	0	0
	Roughtail Skate		NPFMC	0	1	1	0	0
	Sandpaper Skate		NPFMC	0	1	1	0	0
	Starry Skate		NPFMC	0	1	1	0	0
	Armorhead Sculpin		NPFMC	0	1	0	0	0
	Bigmouth Sculpin		NPFMC	0	1	0	0	0
	Blackfin Sculpin		NPFMC	0	1	0	0	0
	Dusky Sculpin		NPFMC	0	1	0	0	0
	Great Sculpin		NPFMC	0	1	0	0	0
	Red Irish Lord		NPFMC	0	1	0	0	0
	Ribbed Sculpin		NPFMC	0	1	0	0	0
	Roughspine Sculpin		NPFMC	0	1	0	0	0
	Spinyhead Sculpin		NPFMC	0	1	0	0	0
	Tadpole Sculpin		NPFMC	0	1	0	0	0
	Thorny Sculpin		NPFMC	0	1	0	0	0
	Yellow Irish Lord		NPFMC	0	1	0	0	0
	Ocotpus *Octopus dofleini*		NPFMC	0	0	0	0	0
	Octopus *Opisthoteuthis california*		NPFMC	0	0	0	0	0
	Squid *Berryteuthis magister*		NPFMC	0	0	0	0	0
	Squid *Onychoteuthis borealijaponicus*		NPFMC	0	0	0	0	0
	Capelin		NPFMC	0	0	1	0	0
	Eulachon		NPFMC	0	0	1	0	0
	Rainbow Smelt		NPFMC	0	0	1	0	0
Alaska High Seas Salmon	Pink Salmon		NPFMC	5	2	3	4	3
	Sockeye Salmon		NPFMC	5	2	3	4	3
	Chum Salmon		NPFMC	5	2	3	4	3
	Coho Salmon		NPFMC	5	2	3	4	3
	Chinook Salmon		NPFMC	5	2	3	4	3
Bering Sea / Aleutian Islands Groundfish	Walleye Pollock	Eastern Bering Sea	NPFMC	5	3	2	5	3
		Aleutian Islands	NPFMC	5	1	2	4	3
		Bogoslof	NPFMC	5	3	3	4	3
	Pacific Cod		NPFMC	5	2	2	4	3
	Yellowfin Sole		NPFMC	5	2	3	4	3
	Greenland Turbot		NPFMC	5	1	2	4	3
	Arrowtooth Flounder		NPFMC	3	2	2	4	3
	Rock Sole		NPFMC	5	2	2	4	3
	Flathead Sole		NPFMC	3	2	2	4	3
	Sablefish	Eastern Bering Sea	NPFMC	4	2	3	4	3
		Aleutian Islands	NPFMC	4	2	3	4	3
	Pacific Ocean Perch	Eastern Bering Sea	NPFMC	5	1	2	4	3
		Aleutian Islands	NPFMC	5	2	2	4	3

Fishery Management Plan	Stock		Jurisdiction	Catch	Abundance	Life History	Assessment Level	Assessment Frequency
	Atka Mackerel		NPFMC	5	1	2	4	3
	Alaska Plaice		NPFMC	4	2	2	4	3
	Northern Rockfish	Eastern Bering Sea	NPFMC	2	2	2	0	2
		Aleutian Islands	NPFMC	2	1	2	0	2
	Sharpchin Rockfish	Eastern Bering Sea	NPFMC	2	2	2	0	2
		Aleutian Islands	NPFMC	2	1	2	0	2
	Shortraker Rockfish	Eastern Bering Sea	NPFMC	2	2	2	0	2
		Aleutian Islands	NPFMC	2	1	2	0	2
	Rougheye Rockfish	Eastern Bering Sea	NPFMC	2	2	2	0	2
		Aleutian Islands	NPFMC	2	1	2	0	2
	Squid Berryteuthis magister		NPFMC	0	0	0	1	3
	Squid Onychoteuthis borealijaponica		NPFMC	0	0	0	1	3
	Longspine Thornyhead		NPFMC	1	1	1	1	1
	Shortspine Thornyhead		NPFMC	1	1	1	2	2
	Bering Flounder		NPFMC	1	2	1	0	3
	Kamchatka Flounder		NPFMC	1	2	1	0	3
	Arctic Flounder		NPFMC	1	2	1	0	3
	Butter Sole		NPFMC	1	2	1	0	3
	C-O Sole		NPFMC	1	2	1	0	3
	California Tonguefish		NPFMC	1	2	1	0	3
	Curlfin Sole		NPFMC	1	2	1	0	3
	Deepsea Sole		NPFMC	1	2	1	0	3
	Dover Sole		NPFMC	1	2	1	0	3
	English Sole		NPFMC	1	2	1	0	3
	Hybrid Sole		NPFMC	1	2	1	0	3
	Longhead Dab		NPFMC	1	2	1	0	3
	Pacific Sanddab		NPFMC	1	2	1	0	3
	Petrale Sole		NPFMC	1	2	1	0	3
	Rex Sole		NPFMC	1	2	1	0	3
	Roughscale Sole		NPFMC	1	2	1	0	3
	Sand Sole		NPFMC	1	2	1	0	3
	Slender Sole		NPFMC	1	2	1	0	3
	Starry Flounder		NPFMC	1	2	1	0	3
	Aurora Rockfish		NPFMC	1	1	1	0	1
	Black Rockfish		NPFMC	1	1	1	0	1
	Blackgill Rockfish		NPFMC	1	1	1	0	1
	Blue Rockfish		NPFMC	1	1	1	0	1
	Bocaccio		NPFMC	1	1	1	0	1
	Brown Rockfish		NPFMC	1	1	1	0	1
	Canary Rockfish		NPFMC	1	1	1	0	1
	Chameleon Rockfish		NPFMC	1	1	1	0	1