Biennial Report to Congress on the Recovery Program for Threatened and Endangered Species

October 1, 2002 – September 30, 2004

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National Marine Fisheries Service
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U.S. DEPARTMENT OF COMMERCE

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OVERVIEW

The primary purpose of the Endangered Species Act of 1973, as amended (ESA) is the conservation of endangered and threatened species and the ecosystems on which they depend. Conservation is defined as "…the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this Act are no longer necessary." As one means of achieving recovery, the ESA requires the development of recovery plans for listed endangered or threatened species (except those species for which it is determined that such a plan will not promote the conservation of the species). These plans organize and guide the recovery process. The ESA amendments of 1988 added a requirement that the Secretaries of Commerce and the Interior report to Congress every 2 years on the status of efforts to develop and implement recovery plans, and on the status of all species for which recovery plans have been developed (section 4(f)(3)). The Secretary of Commerce has delegated responsibility for endangered and threatened species recovery to the National Marine Fisheries Service (NMFS) of the National Oceanic and Atmospheric Administration (NOAA). This is the eighth Report to Congress on the status of the recovery program for these species.

This report summarizes efforts to recover all domestic species under NMFS' jurisdiction from October 1, 2002, through September 30, 2004. It includes accounts of each species, its status, current threats, conservation actions undertaken during this timeframe, and priority actions needed in the next biennium. During the 2 years covered in this report, NMFS had jurisdiction over 52 domestic species[*] of salmon, sturgeon, sawfish, sea grass, mollusks, sea turtles, and marine mammals, and eight foreign species, for a total of 60 species. The 52 species addressed in this report include the smalltooth sawfish (*Pristis pectinata*), which was added to the list of threatened and endangered species on April 1, 2003; and the Oregon Coast coho (*Oncorhynchus kisutch*), whose ESA protection was set aside by a court ruling in February 2004 and was proposed for relisting in June 2004.

Of our 52 domestic listed species, 16 currently have recovery plans. Six species' recovery plans are in the process of being updated: Hawaiian monk seal; eastern and western distinct population segments of Steller sea lions; the North Atlantic right whale; and loggerhead and Kemp's ridley turtles (see Table 1). In June and August of 2004, respectively, the draft Atlantic salmon and draft North Atlantic right whale recovery plans were completed and published for public comment; these will be finalized in 2005. Thirty-two recovery plans are currently being drafted, including those for 26 Evolutionarily Significant Units (ESUs) of Pacific salmon. In addition to the numerous Pacific salmon technical recovery teams and sub-basin recovery teams (see Pacific Salmon Overview), there are active recovery teams for the white abalone, smalltooth sawfish, Kemp's ridley and loggerhead turtles, Hawaiian monk seal, and Steller sea lion. Additionally, two active take reduction teams, formed in accordance with Marine Mammal Protection Act, assist in the recovery of listed species: the Atlantic Large Whale Take Reduction Team and Pacific Offshore Cetacean Take Reduction Team.

[*] Species is defined in the ESA as including any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate fish or wildlife that interbreeds when mature.

Recovery of threatened and endangered species is a tremendous, long-term challenge. One means NMFS is using to meet this challenge is through meaningful stakeholder involvement in recovery planning and implementation. All NMFS' active recovery teams either have stakeholder representation (Federal, state, and local government agencies; affected industries; conservation or other non-governmental organizations; or affected individuals) on their teams, or hold stakeholder fora to keep the public informed of their progress and to obtain feedback. In some cases (e.g., Pacific salmon recovery efforts in Washington State), recovery boards were appointed by the Governor and the plans written by local sub-basin recovery teams. NMFS helps support and is active on these teams, and is adopting their plans as draft recovery plans to be published for public comment. Experience has shown that true stakeholder involvement in the planning process results in "buy-in" to the recovery plan and greater recovery activity both during and after the planning process. Stakeholder involvement is emphasized in the new Interim Recovery Planning Guidance completed in October 2004, which is now being field-tested in regional and field offices (see http://www.nmfs.noaa.gov/pr/PR3/recover_planning.html).

In addition to recovery planning, recovery implementation was active for all NMFS listed species during the biennium covered in this report, although the absence of dedicated funding in 2004 affected our ability to address recovery needs for shortnose sturgeon, white abalone, and Johnson's seagrass. Among ongoing conservation and research activities, two efforts are especially worth noting: (1) the Atlantic/Gulf of Mexico Sea Turtle Strategy (Sea Turtle Strategy) and (2) efforts to recover North Atlantic right whales, one of our most severely endangered species.

The Sea Turtle Strategy is a gear-based approach to evaluating and reducing sea turtle bycatch in state and Federal waters of the Atlantic Ocean and Gulf of Mexico. To date, sea turtle bycatch has been addressed fishery by fishery, often on an emergency basis. Management efforts have primarily focused on fisheries that have been the subject of ESA section 7 consultations, and thus have largely neglected sea turtle bycatch in state and recreational fisheries. The Sea Turtle Strategy takes a comprehensive look at fisheries, which will result in bycatch reduction measures across jurisdictional boundaries and fisheries for gear types having the greatest impact on sea turtle populations. The Sea Turtle Strategy should result in greater conservation of turtles and other bycatch species, and allow greater predictability of required measures for fishers.

Efforts to recover North Atlantic right whales are proceeding on two paths. Steps to reduce serious injury and death due to entanglement in commercial fishing gear (primarily through fishing gear modifications and restrictions to reduce the likelihood of entanglement) are handled under the Atlantic Large Whale Take Reduction Plan. New regulations are currently being instituted through rulemaking, with possible additional regulations under consideration. Because right whale deaths also result from collisions with large ships, NMFS has developed a Right Whale Ship Strike Reduction Strategy. This strategy is being implemented through mariner education and outreach programs, ESA section 7 consultations, and consideration of modifications to ships' operations to reduce ship strikes. On June 1, 2004, NMFS published an Advance Notice of Proposed Rulemaking and, in July and August of 2004, held five public meetings in Boston, Massachusetts; Jersey City, New Jersey; Wilmington, North Carolina; Jacksonville, Florida; and Silver Spring, Maryland, to present the strategy and solicit information

on the development and implementation of the proposed new operational measures. A draft Right Whale Ship Strike Reduction Strategy is anticipated in 2005.

Between October 1, 2002, and September 30, 2004, of the 52 domestic endangered or threatened species listed under the ESA, 25 (48%) were stabilized or improving; 12 (23%) were known to be declining; and 15 (29%) were unknown or mixed in their status. The numbers are encouraging, especially given the large number of highly imperiled species listed in the past decade. A list of species for which NMFS is responsible is provided in the following section.

Recovery plans are available online at
http://www.nmfs.noaa.gov/pr/PR3/recovery.html

Recovery plans may also be requested by writing to the following address:
Endangered Species Division - Recovery Plans
Office of Protected Resources - F/PR3
National Marine Fisheries Service
1315 East-West Highway
Silver Spring, MD 20910-3226

This report is available online via the NMFS-Office of Protected Resources website at
http://www.nmfs.noaa.gov/pr/PR3/biennial.html

ESA-LISTED SPECIES UNDER NMFS' JURISDICTION

Table 1.
ESA-listed species under NMFS' jurisdiction including listing status, trends, priority numbers, and recovery plan status

Species/ESU/DPS[1]	Date Listed / Reclassified	ESA Status	Population/ESU Trend	Recovery Priority Number[2]	Status of Recovery Plan
SEA TURTLES					
Green sea turtle					
-Breeding colony populations in Florida, Pacific coast Mexico	7/28/1978	Endangered	Increasing (*FL*); Declining (*Mexico*)	5	Completed 01/1998
-Rangewide	7/28/1978	Threatened	Declining	5	Completed 01/1998 *(Pacific);* 10/1991 (*Atlantic*)
Hawksbill sea turtle	6/2/1970	Endangered	Declining	1	Completed 01/1998 *(Pacific);* 11/1993 (*Atlantic*)
Kemp's Ridley sea turtle	12/2/1970	Endangered	Increasing	5	Completed 08/1992 - Under Revision
Leatherback sea turtle	6/2/1970	Endangered	Declining (*Pacific*); Mixed (*Atlantic*)	1	Completed 01/1998 *(Pacific);* 05/1992 (*Atlantic*)
Loggerhead sea turtle	7/28/1978	Threatened	Declining (*Pacific*); Stable (*Atlantic*)	5	Completed 01/1998 *(Pacific);* 12/1991 (*Atlantic*) - Under Revision
Olive Ridley sea turtle					
-Breeding colony populations of Pacific coast Mexico	7/28/1978	Endangered	Increasing	5	Completed 01/1998
-Rangewide	7/28/1978	Threatened	Mixed	5	Completed 01/1998
PACIFIC SALMON					
Northwest Region					
-Lower Columbia River Chinook ESU	3/24/1999	Threatened	Stable	1	Under Development
-Puget Sound Chinook ESU	3/24/1999	Threatened	Stable	1	Under Development
-Snake River Fall-run Chinook ESU	4/22/1992	Threatened	Increasing	1	Draft Completed 03/1995 (not adopted); Under Development
-Snake River Spring/Summer-run Chinook ESU	4/22/1992	Threatened	Increasing	1	Draft Completed 03/1995 (not adopted); Under Development

-Upper Columbia River, Spring Run Chinook ESU	3/24/1999	Endangered	Increasing	1	Under Development
-Upper Willamette River Chinook ESU	3/24/1999	Threatened	Stable	1	Under Development
-Columbia River chum ESU	3/25/1999	Threatened	Increasing	1	Under Development
-Hood Canal Summer-run chum ESU	3/25/1999	Threatened	Increasing	1	Under Development
-Oregon Coast coho ESU	8/10/1998[3]; 6/14/2004	Proposed Threatened[3]	Increasing	1	Under Development
-Ozette Lake sockeye ESU	3/25/1999	Threatened	Unknown	1	Under Development
-Snake River sockeye ESU	11/20/1991	Endangered	Increasing	1	Draft Completed 03/1995 (not adopted); Under Development
-Lower Columbia River steelhead ESU	3/19/1998	Threatened	Increasing	1	Under Development
-Middle Columbia River steelhead ESU	3/25/1999	Threatened	Increasing	1	Under Development
-Snake River Basin steelhead ESU	8/18/1997	Threatened	Stable	1	Under Development
-Upper Columbia River steelhead ESU	8/18/1997	Endangered	Increasing	1	Under Development
-Upper Willamette River steelhead ESU	3/25/1999	Threatened	Increasing	1	Under Development
Northwest and Southwest Regions					
-Southern Oregon/Northern California Coast coho ESU	5/6/1997	Threatened	Mixed	1	Under Development
Southwest Region					
-Northern California steelhead ESU	6/7/2000	Threatened	Declining	7	Under Development
-California Central Valley steelhead ESU	3/19/1998	Threatened	Declining	3	Under Development
-Central California Coast steelhead ESU	8/18/1997	Threatened	Declining	3	Under Development
-South-Central California steelhead ESU	8/18/1997	Threatened	Unknown	3	Under Development
-Southern California steelhead ESU	8/18/1997; 05/01/2002[4]	Endangered	Unknown; likely declining	3	Under Development
-Central California Coast coho ESU	10/31/1996	Threatened	Declining	1	Under Development
-California Coast Chinook ESU	9/16/1999	Threatened	Declining	3	Under Development
-Sacramento River Winter-run Chinook ESU	8/4/1989; 11/5/1990; 1/4/1994[5]	Endangered	Increasing	1	Draft Completed 08/1997; Under Development
-Central Valley California Spring-run Chinook ESU	9/16/1999	Threatened	Increasing	3	Under Development

ATLANTIC SALMON					
Gulf of Maine DPS	11/17/2000	Endangered	Declining	1	Draft Completed 2004
NON-SALMONID FISH					
Gulf sturgeon	9/30/1991	Threatened	Stable	8	Completed 09/1995
Shortnose sturgeon	3/11/1967	Endangered	Mixed	5	Completed 12/1998
Smalltooth sawfish - *U.S. DPS*	4/1/2003	Endangered	Unknown[6]	7	Under Development
PLANTS					
Johnson's seagrass	9/14/1998	Threatened	Unknown[6]	7	Completed 09/2002
INVERTEBRATES					
White abalone	5/29/2001	Endangered	Declining	2	Under Development
SEALS AND SEA LIONS					
Caribbean monk seal	3/11/1967	Endangered	Presumed Extinct	12	None
Guadalupe fur seal	12/16/1985	Threatened	Increasing	10	None
Hawaiian monk seal	11/23/1976	Endangered	Declining	1	Completed 03/1983 - Under Revision
Steller sea lion - *eastern DPS*	4/10/1990; 11/26/1990; 5/5/97[7]	Threatened	Increasing	10	Completed 12/1992; Under Revision
Steller sea lion - *western DPS*	4/10/1990; 11/26/1990; 5/5/97[7]	Endangered	Declining	7	Completed 12/1992; Under Revision
WHALES					
Blue whale	6/2/1970	Endangered	Increasing	7	Completed 07/1998
Bowhead whale	6/2/1970	Endangered	Increasing	9	None
Fin whale	6/2/1970	Endangered	Unknown	7	Draft Completed 07/1998 - Under Revision
Humpback whale	6/2/1970	Endangered	Increasing	3	Completed 11/1991
Northern right whale[8]	6/2/1970	Endangered	Unknown	1	Completed 12/1991 (*Atlantic*), Draft Revision Completed 2004; Under Development (*Pacific*)
Sei whale	6/2/1970	Endangered	Unknown	3	Draft Completed 07/1998 - Under Revision
Sperm whale	6/2/1970	Endangered	Unknown	7	None

NOTES FOR TABLE 1:

[1] ESU = Evolutionarily Significant Unit; DPS = Distinct Population Segment

[2] Recovery Priority Numbers are designated according to guidelines published by NMFS on June 15, 1990 (55 FR 24296). Priorities are designated from 1 (high) to 12 (low) based on the following factors: degree of threat, recovery potential, and conflict with development projects or other economic activity. See Appendix B for further information on NMFS Recovery Priority Numbers, including criteria used to designate numbers.

[3] This ESU was listed as threatened on 8/10/1998; court decision set aside ESA protections on 2/24/2004. NMFS proposed relisting as threatened on 6/14/2004; the current status of this ESU is proposed threatened. The ESU is included in this table because during the timeframe covered by this report the ESU was listed as threatened under the ESA.

[4] This ESU was first listed on 8/18/1997; the southern range extension to the U.S.-Mexico border was added to the listing for this ESU via a final rule on 5/1/2002.

[5] This ESU was first emergency-listed as threatened on 8/4/1989, then officially listed as threatened on 11/5/1990, then reclassified as endangered on 1/4/1994.

[6] Population trends for these species/DPS are currently unknown due to the impact of Hurricane Charley (2004). Prior to this event, the smalltooth sawfish population was considered to be stable.

[7] This species was first listed as threatened via a 240-day emergency rule on 4/10/1990, then officially listed as threatened in a final rule on 11/26/1990. NMFS separated the species into western and eastern DPSs via a final rule on 5/5/1997, which maintained the eastern DPS as threatened and reclassified the western DPS as endangered.

[8] During the timeframe for this report (2002–2004), two separate endangered species of right whale in the Northern Hemisphere were listed: the North Atlantic right whale (*Eubalaena glacialis*) and the North Pacific right whale (*Eubalaena japonica*). In January 2005, NMFS published a final rule to remove this distinction, thereby reverting to the previously used taxonomy of one endangered species – the northern right whale (*Eubalaena glacialis*) – for both North Pacific and North Atlantic populations. This report, therefore, uses the taxonomy at time of publication (northern right whale), noting that the taxonomic split may be reinstated in the future pending an upcoming status review and following ESA listing procedures.

SEA TURTLE RECOVERY

NMFS and the U.S. Fish and Wildlife Service (FWS) share responsibility for the research, management, and recovery of sea turtle species found in waters and lands under U.S. jurisdiction. Although both agencies work together on several marine turtle recovery activities, NMFS is primarily responsible for recovery actions in the marine environment and the FWS for recovery actions in the terrestrial environment (i.e., nesting beaches). Six species of sea turtles are targeted by NMFS recovery activities: green, leatherback, loggerhead, hawksbill, olive ridley, and Kemp's ridley. Within these species, two regionally important populations are listed separately: (1) the green turtle breeding populations in Florida and on the Pacific Coast of Mexico (East Pacific green turtle) and (2) the olive ridley turtle breeding populations on the Pacific Coast of Mexico.

Green Sea Turtle (*Chelonia mydas*)

Date Listed: July 28, 1978

Legal Status:
Endangered (*breeding colony populations in Florida and Pacific coast of Mexico*)
Threatened (*rangewide except where listed as endangered*)

Recovery Plan Status:
Pacific: Two final recovery plans were approved on January 12, 1998: one for the East Pacific green turtle population and one for all other Pacific breeding populations.
Atlantic: A final recovery plan was approved on October 29, 1991.

Species Status:
An assessment of the annual number of nesting females from major nesting areas (and other beaches in the Pacific Ocean, Asian Seas, Indian Ocean, Mediterranean Sea, and Atlantic Ocean where quantitative data are available) indicates a decline by 48 to 67 percent over the past three generations[1]. In the United States, the nesting populations in Hawaii (Figure 1) and Florida[1] show a positive trend since establishment of index beaches in 1989. Age at sexual maturity is estimated to be between 20 and 50 years. Thus, caution is warranted when interpreting nesting trend data collected for less than 15 years.

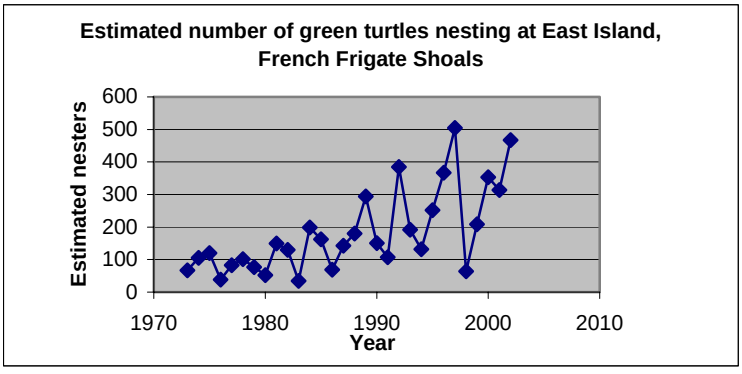


Figure 1. Estimated number of female green turtles nesting at East Island, French Frigate Shoals, Hawaiian Archipelago, 1973–2002

[1] Seminoff, J.A. 2002. Global status of the green turtle (*Chelonia mydas*): A summary of the 2001 stock assessment for the IUCN Red List Programme.

Threats and Impacts:
Threats and impacts found in the marine environment affecting both the threatened rangewide populations and the endangered breeding population of green turtles include the following:

- Harvest of immature turtles and adults – Direct harvest of East Pacific green turtles has been documented in Mexico and Peru. Some known direct harvest of immature turtles and adults is reported to occur in Australia (by Aboriginal and Torres Strait Islanders), Japan, Solomon Islands, and the Philippines. Direct harvest very likely occurs in many other areas within the range of the green turtle, especially in the western Pacific (e.g., Indonesia/Malaysia).
- Incidental capture in commercial and artisanal fisheries – Some fisheries known to interact with green turtles with varying degrees of impact include gillnet, longline, purse seine, pound net, pot gear, and trawl fisheries.
- Incidental capture in "ghost" fishing gear
- Parasites and diseases (e.g., tuberculosis, pneumonia, coccidiosis, and fibropapillomatosis)
- Pollution (e.g., ingestion of marine debris, chemical pollution in algae/seagrass feeding pastures, light pollution that disorients nesting females and emergent hatchlings, and oil pollution)
- Boating activities that may result in direct injury or death through collisions or propeller wounds, or that may contribute to habitat degradation through anchoring and propeller scarring
- Power plant entrainment and entrapment, primarily along the U.S. Atlantic coast
- Hopper dredging entrainment and entrapment and dredging impacts to turtle habitat
- Oil and gas exploration, development and transportation – Underwater explosions (e.g., gas and oil structure removal and use of explosives during exploration activities) can kill or injure turtles, and may destroy or damage habitat.
- Potential acoustical disturbance – Potential disturbance from sonar and seismic surveys is poorly understood and may impact turtles.
- Navy exercises – There is minimal information on various short-term and longer-term Navy exercises that may impact the migratory and foraging behavior of turtles and their habitats.

Conservation Actions:
Conservation actions conducted in 2002–2004 for recovery of the green turtle include the following:

Pacific/Indian Ocean:
- Identified stock structure and conducted population identification of fisheries bycatch using DNA analysis, flipper tagging, and satellite telemetry
- Identified habitat requirements using stable isotope analysis
- Conducted long-term monitoring and research of the causes of and threats posed by fibropapillomatosis
- Continued vital population assessment work under the Sea Turtle Stranding and Salvage Network (STSSN), including genetic sampling and analysis of age classes
- Supported marine debris cleanup efforts around the Hawaiian Islands

- Conducted long-term nesting beach monitoring in the northwest Hawaiian Islands
- Conducted long-term, spatially extensive, capture-mark-recapture programs at six sites throughout Hawaiian archipelago
- Performed a diet analysis of oceanic green turtles in the North Pacific
- Supported capacity building of the Department of Marine and Wildlife Resources and nesting beach and in-water monitoring in American Samoa
- Conducted in-water monitoring in Commonwealth of Northern Mariana Islands
- Supported capacity building of the Guam Department of Agriculture, Division of Aquatic and Wildlife Resources, and its efforts to survey beaches for nesting activity
- Supported capacity building of the Republic of Palau, Division of Marine Resources, and its project to establish a monitoring system and to conduct baseline studies of turtles and their habitats in Palau
- Supported a project in Papua New Guinea to mitigate tuna and prawn fisheries interactions with turtles and to build the capacity of the National Fisheries Authority
- Supported the Marshall Islands Sea Turtle-Fisheries Interaction Outreach Education project to build sea turtle conservation and management capacity of the Marshall Islands Marine Resources Authority
- Supported a capacity building project for the Federated States of Micronesia National Ocean Resources Management Authority and the tuna longline industry to provide training on handling fishery-sea turtle interactions and on providing a foundation for future management activities
- Monitored and tracked resident green turtles in south San Diego Bay, California, Galapagos Islands, Chile, Peru, and the Pacific Coast of Mexico
- Supported an observer program in Peru to document the threat of shark and mahi mahi longline fishery on green turtles
- Supported an observer program in the Chilean swordfish-directed longline fishery and provided circle hooks and technical support for experimental testing of modified gear
- Supported monitoring and protection efforts of nesting beaches in Mexico, Galapagos Islands, and Costa Rica
- Supported aerial surveys of foraging and nesting areas in Mexico
- Supported Ecuador population assessment
- Supported education and collaborative work with Mexico to reduce take
- Participated in the Indian Ocean Memorandum of Understanding (MOU) on the Conservation and Management of Marine Turtles of the Indian Ocean and Southeast Asia, and its associated Conservation and Management Plan (CMP), to provide a similar comprehensive framework for the conservation and protection of sea turtles and their habitats in the Indo-Pacific region

Atlantic Ocean:

- Identified stock structure and conducted population identification of fisheries bycatch using DNA analysis, flipper tagging, and satellite telemetry
- Identified habitat requirements using stable isotope analysis
- Conducted long-term monitoring and research of the causes of and threats posed by fibropapillomatosis
- Continued vital population assessment work under the Sea Turtle Stranding and Salvage Network (STSSN), including genetic sampling and analysis of age classes

- Developed a Sea Turtle Disentanglement Network in the Atlantic Northeast Region to address sea turtle entanglement in pot and other fishing gear
- Developed gear technologies to reduce sea turtle bycatch, including modifications to scallop dredges, pound net leaders, and whelk pots
- Developed and implemented turtle excluder devices (TEDs) large enough to release leatherback sea turtles, as well as large green and loggerhead sea turtles
- Prohibited the use of large mesh gillnets in Pamlico Sound, North Carolina, during the fall months when sea turtles are migrating through the sound
- Prohibited the use of large mesh gillnets in the Exclusive Economic Zone (EEZ) of the mid-Atlantic during times when sea turtles are most likely to interact with this gear
- Prohibited the use of all pound net leaders in a defined area of the Virginia waters of the Chesapeake Bay from May 6 through July 15 each year – Outside this area, the prohibition includes leaders with ≥12 inches of stretched mesh and leaders with stringers from May 6 to July 15 each year.
- Supported the Maryland Tagging/Health Assessment Study – Personnel from the Fish and Wildlife Health Program weighed, measured, biopsied, tagged, and released sea turtles incidentally captured in pound nets in Chesapeake Bay. Appropriation for cooperative conservation and recovery efforts with states was the source of funding for this project.
- Supported a health assessment study on sea turtles caught in New York pound nets – Appropriation for cooperative conservation and recovery efforts with states was the source of funding for this project.
- Participated in the Inter-American Convention for the Protection and Conservation of Sea Turtles
- Supported in-water population studies in the Atlantic and Caribbean to provide indices of turtle abundance

Priority Recovery Actions Needed:

Priority recovery actions needed for the green sea turtle include the following:

- Develop and implement solutions to reduce sea turtle interactions with fisheries.
- Support nations in establishing research and monitoring programs.
- Support education and outreach to reduce the direct take of eggs and turtles, and support the prohibition of direct take of juvenile and adult green turtles in their foraging habitats.
- Characterize the nesting abundance at the Revillagigedos rookery.
- Support the use of large circle hooks in global longline gear and continue to identify other gear modifications and fishing practices to reduce turtle bycatch.
- Support nations in monitoring and implementing management measures to reduce sea turtle interactions in pelagic and coastal fisheries.
- Implement regulations in the United States requiring the use of TEDs wherever the distribution of sea turtles overlaps with the use of trawling gear known to take turtles.

Recovery Priority Number:

5 (*Breeding Colony Populations in Florida and Pacific coast of Mexico*); 5 (*Rangewide*)

The recovery priority number for the green sea turtle is five. This represents a moderate magnitude of threat, a high recovery potential, and the presence of conflict with economic activities.

Hawksbill Sea Turtle (*Eretmochelys imbricata*)

Date Listed: June 2, 1970

Legal Status: Endangered

Recovery Plan Status:
Pacific: A final recovery plan was approved on January 12, 1998.
Atlantic: A final recovery plan was approved on December 15, 1993.

Species Status:
The hawksbill sea turtle is severely depleted throughout its range as a result of decades of intensive harvest. Today, most nesting populations continue to decline, a few appear stable (Buck Island Reef National Monument, St. Croix, USVI), and a few have begun to improve (Mona Island, Puerto Rico) or stabilize as a result of years of intensive conservation efforts. Major causes of the continued decline of the hawksbill turtle include commercial exploitation driven by the continuing demand for hawksbill shell (bekko), directed harvest of eggs, poaching of adult and immature turtles for meat, and destruction and degradation of coral reef habitats providing critically important foraging areas.

Threats and Impacts:
Threats and impacts found in the marine environment affecting hawksbill turtles include the following:

- Direct take of turtles
- Increased human presence
- Dredging – Dredging can result in habitat destruction by disrupting nesting or foraging grounds; hopper dredges can also injure or kill turtles caught in dragheads.
- Marine debris – Hawksbill turtles ingest a wide variety of marine debris, and effects include interference with metabolism as well as absorption of toxic by-products.
- Incidental capture in commercial and recreational fishing gear including driftnets, seines, trawls, longlines, and gillnets
- Boat collisions – In areas where recreational boating and ship traffic is intense, propeller and collision injuries may occur.
- Oil and gas production – Marine turtles are at risk when encountering an oil spill, as respiration, skin, blood chemistry and salt gland functions are affected.
- Underwater explosions (e.g., gas and oil structure removal and the use of explosives) – Such explosions can kill or injure turtles, and may destroy or damage habitat.
- Pesticides, heavy metals, and polychlorinated biphenyls (PCBs) – These materials and substances have been detected in turtles and eggs, but their effect is unknown.
- Destruction of habitat – Hawksbill sea turtles depend on coral reefs for shelter and food; therefore, destruction of reefs from a variety of causes may impact hawksbill sea turtles.
- Entrainment in coastal power plants drawing their cooling water from nearshore and estuarine waters – Because entrainment can cause mortality, some plants have put in place measures to reduce the risk to sea turtles.
- Entanglement in “ghost” fishing gear

Conservation Actions:
Conservation actions conducted in 2002–2004 for recovery of the hawksbill turtle include the following:

- Supported nesting beach monitoring in the main Hawaiian Islands
- Controlled non-native predators of eggs and hatchlings in the main Hawaiian Islands
- Supported satellite and radio telemetry studies of post-nesting females in the main Hawaiian Islands
- Supported capacity building of the Guam Department of Agriculture, Division of Aquatic and Wildlife Resources, and its program to survey beaches for nesting activity
- Convened the Second Western Pacific Sea Turtle Cooperative Research and Management Workshop with the Western Pacific Fisheries Management Council, May 17-18, 2004, to focus on the southwest Pacific hawksbill stock
- Supported capacity building of the Department of Marine and Wildlife Resources and nesting beach and in-water monitoring in American Samoa
- Conducted in-water monitoring in Commonwealth of Northern Mariana Islands
- Supported capacity building of the Republic of Palau, Division of Marine Resources, and its project to establish a monitoring system and conduct baseline studies of turtles and their habitats in Palau
- Supported a project in Papua New Guinea to mitigate tuna and prawn fisheries interactions with marine turtles and to build the capacity of the National Fisheries Authority
- Supported the Marshall Islands Sea Turtle-Fisheries Interaction Outreach Education project to build sea turtle conservation and management capacity of the Marshall Islands Marine Resources Authority

Priority Recovery Actions Needed:
Priority recovery actions needed for the hawksbill sea turtle include the following:

- Stop the direct harvest of hawksbill turtles and eggs through education and law enforcement actions.
- Reduce incidental mortalities of hawksbill turtles by commercial and artisanal fisheries.
- Determine population size, status, and trends through long-term regular nesting beach and in-water censuses.
- Identify stock home ranges using DNA analysis.
- Support conservation and biologically viable management of hawksbill populations in countries that share U.S. hawksbill stocks.
- Identify and protect primary nesting and foraging areas for the species.
- Eliminate adverse effects of development on hawksbill nesting and foraging habitats.
- Control non-native predators of eggs and hatchlings (e.g., mongoose, feral cats, and pigs) in the Hawaiian population.

Recovery Priority Number: 1
The recovery priority number for the hawksbill sea turtle is one. This represents a high magnitude of threat, a high recovery potential and the presence of conflict with economic activities.

Kemp's Ridley Sea Turtle (*Lepidochelys kempii*)

Date Listed: December 2, 1970

Legal Status: Endangered

Recovery Plan Status:
A final recovery plan for the Kemp's ridley turtle was approved on August 21, 1992. A revised plan is currently under development.

Species Status:
The only major nesting site for Kemp's ridley turtles is a single stretch of beach near Rancho Nuevo, Tamaulipas, Mexico. Although still much decreased in number from the mid-20th century, the number of nests at Rancho Nuevo and nearby beaches from 1985-1999 increased at a mean rate of 11.3 percent per year. Current totals exceed 3,000 nests per year. Kemp's ridley turtles mature at an earlier age than other species, thus "lag effects" are possible as a result of unknown impacts to the non-breeding life stages, and are likely seen in the increasing nesting trend beginning in 1985. There is cautious optimism that the Kemp's ridley population is increasing.

Threats and Impacts:
Threats and impacts found in the marine environment affecting Kemp's ridley turtles include the following:

- Dredging – Dredging can result in habitat destruction by disrupting nesting or foraging grounds; hopper dredges can also kill turtles caught in dragheads.
- Marine debris – Marine debris constitutes a threat to Kemp's ridley turtles of all ages through ingestion and entanglement.
- Interactions with commercial and recreational fishing gear, including bottom and mid-water trawl gear, purse seines, pound nets, pots, hook and line, and gillnets
- Boat propeller and collision injuries – Such injuries may occur in areas where recreational boating and ship traffic is intense; the magnitude of ship strikes is unknown.
- Oil production – Marine turtles are at risk when encountering an oil spill, as respiration, skin, blood chemistry and salt gland functions are affected.
- Underwater explosions (e.g., gas and oil structure removal and testing using explosives) – Such explosions can kill or injure turtles, and may destroy or damage habitat.
- Pesticides, heavy metals, and polychlorinated biphenyls (PCBs) – These materials and substances have been detected in turtles and eggs, but their effect is unknown.
- Marina and dock development – Marina and dock development can cause foraging habitat to be destroyed or damaged; it can also lead to increased boat traffic, thus increasing the risk of turtle/vessel collisions.
- Entrainment in coastal power plants drawing their cooling water from nearshore and estuarine waters – Because entrainment can cause mortality, some plants have put in place measures to reduce the risk to sea turtles.
- Entanglement in "ghost" fishing gear – Turtles get caught in discarded fishing gear; the number of Kemp's ridley turtles affected is unknown, but is potentially significant.

Conservation Actions:
Conservation actions conducted in 2002–2004 for recovery of the Kemp's ridley turtle include the following:

- Continued vital work through the Sea Turtle Stranding and Salvage Network (STSSN) including collecting age samples for analysis at the National Sea Turtle Aging Laboratory
- Developed a Sea Turtle Disentanglement Network in the Northeast Region
- Prohibited the use of all pound net leaders in a defined area of the Virginia waters of the Chesapeake Bay from May 6 through July 15 each year – Outside this area, the prohibition includes leaders with ≥ 12 inches of stretched mesh and leaders with stringers from May 6 to July 15 each year.
- Conducted gear research on the use of alternative pound net leaders
- Supported the Maryland Tagging/Health Assessment Study – Personnel from the Fish and Wildlife Health Program weighed, measured, biopsied, tagged, and released sea turtles incidentally captured in pound nets in Chesapeake Bay. Appropriation for cooperative conservation and recovery efforts with states was the source of funding for this project.
- Supported a health assessment study on sea turtles caught in New York pound nets, which was conducted during this period – Appropriation for cooperative conservation and recovery efforts with states was the source of funding for this project.
- Supported a study on factors contributing to marine turtle cold stunning events in Cape Cod Bay – Appropriation for cooperative conservation and recovery efforts with states was a partial source of funding for this project.
- Supported the New England Aquarium and Wellfleet Audubon for cold stun response
- Expanded stranding coverage on the eastern shore of Chesapeake Bay in Virginia
- Performed fresh-dead necropsies and sample analyses for turtles stranded in Virginia

Priority Recovery Actions Needed:
Priority recovery actions needed for the Kemp's ridley sea turtle include the following:

- Minimize mortality of Kemp's ridley turtles from commercial fisheries.
- Support Mexico in its conservation efforts on beaches and expansion of in-water management.
- Continue and improve stock assessments.
- Determine distributional and seasonal movements for all life stages in the marine environment.
- Identify important marine habitat.
- Improve and refine estimation techniques for the takes of sea turtles to ensure that criteria for recovery are being met.
- Reduce threats to the Kemp's ridley population and foraging habitat from marine pollution.

Recovery Priority Number: 5
The recovery priority number for the Kemp's ridley sea turtle is five. This represents a moderate magnitude of threat, a high recovery potential, and the presence of conflict with economic activities.

Leatherback Sea Turtle (*Dermochelys coriacea*)

Date Listed: June 2, 1970

Legal Status: Endangered

Recovery Plan Status:
Pacific: A final recovery plan was approved on January 12, 1998.
Atlantic: A final recovery plan was approved on April 6, 1992.

Species Status:
In the Pacific, the leatherback turtle is declining at all key nesting beaches except Jamursba-Medi Beach, Indonesia, where there is a long-term decline in the nesting population, but a short-term (since 1999) stability in population numbers. Leatherbacks were extirpated from Malaysia in recent years, and may potentially be extirpated from the entire Pacific if action is not taken. In the Atlantic, nesting trends for key beaches in South America are mixed, while other important nesting beaches (e.g., Florida and St. Croix) are showing an increase.

Threats and Impacts:
Threats and impacts found in the marine environment affecting leatherback turtles include the following:

- Incidental capture in commercial and artisanal fisheries – Some fisheries known to interact with leatherbacks with varying degrees of impact include: drift gillnet, longline, purse seine, pot/trap, pound net, and bottom and mid-water trawl fisheries.
- Pollution (ingestion of and entanglement in fixed lines, marine debris, oil pollution)
- Boating activities that may result in direct injury or death through collision impact or propeller wounds
- Pesticides, heavy metals, and polychlorinated biphenyls (PCBs) – These materials and substances have been detected in turtles and eggs, but their effects are unknown.
- Oil and gas exploration, development, and transportation – Underwater explosions (e.g., gas and oil structure removal and the use of explosives during exploration activities) can kill or injure turtles, and may destroy or damage habitat.
- Potential acoustical disturbance – Potential impacts from acoustical disturbance from sonar and seismic surveys are poorly understood.
- Navy exercises – There is minimal information on various short-term and longer-term Navy exercises that may impact the migratory and foraging behavior of turtles and their habitats.
- Entanglement in “ghost” fishing gear – Leatherbacks can become entangled in discarded fishing gear.

Conservation Actions:
Conservation actions conducted in 2002–2004 for recovery of the leatherback turtle include the following:

Pacific/Indian Ocean:

- Conducted monitoring (aerial surveys) for foraging leatherbacks off central and northern California and the Pacific Northwest
- Conducted capture/tagging/tracking of foraging leatherbacks off Monterey, California
- Supported monitoring and protection of leatherbacks nesting in Mexico and Costa Rica – Currently, all primary nesting beaches in Mexico are protected (although egg poaching still exists), and secondary nesting beaches are partially protected.
- Supported aerial surveys of leatherback nesting beaches in Mexico
- Supported monitoring and protection of leatherback nesting beaches in the western Pacific, including education of local villagers on the importance of conservation of leatherbacks – Locations included Papua New Guinea ("no harvest" moratorium set up on Kamiali Beach in 2003; monitoring index beaches and tagging females), Indonesia (ongoing monitoring and protection, tagging, and telemetry), Solomon Islands (new monitoring), and Vanuatu (monitoring and protection of known leatherback nesting beach; surveying for other possible leatherback nesting beaches).
- Supported work with Kei Islands villagers to reduce and/or eliminate direct harvest of adult leatherbacks in marine and coastal habitats (e.g., quantified socioeconomic parameters, established a harvest baseline, and addressed alternative means of livelihood)
- Conducted aerial surveys and ground monitoring of leatherback nesting beaches in Papua New Guinea
- Supported an observer program in Chilean swordfish-directed longline fishery and provided circle hooks and technical support for experimental testing modified gear
- Supported an observer program in Peru to document the threat of shark and mahi mahi longline fishery on leatherback turtles and to document the direct harvest of leatherbacks
- Reduced turtle interaction rates and mortality rates in U.S. Pacific swordfish-directed longline fleets by requiring large circle hooks combined with non-squid bait; requiring proper handling of hooked and entangled leatherbacks; and carrying and using disentangling and de-hooking equipment such as dip nets, line cutters, and de-hookers.
- Reduced turtle interaction rates in the U.S. California/Oregon drift gillnet fisheries for swordfish and thresher shark by implementing and enforcing a time/area closure in central and northern California in time/area of high leatherback concentrations
- Identified stock ranges and conducted population identification of fisheries bycatch using DNA analysis
- Ratified a Memorandum of Understanding (MOU) between the NMFS Southwest Fisheries Science Center and Instituto del Mar del Peru (IMARPE) in 2004 to lay the groundwork for future leatherback bycatch reduction programs
- Participated in Inter-American Convention for the Protection and Conservation of Sea Turtles, November 2004, which passed Resolution COP2CIT-001, "Conservation of Leatherback Turtles"
- Convened the Second Western Pacific Sea Turtle Cooperative Research and Management Workshop with the Western Pacific Fisheries Management Council, May 19–21, 2004, to focus on the west Pacific leatherback stock

- Supported a project in Papua New Guinea to mitigate tuna and prawn fisheries interactions with marine turtles and to build the capacity of the National Fisheries Authority
- Supported the Marshall Islands Sea Turtle-Fisheries Interaction Outreach Education project to build sea turtle conservation and management capacity of the Marshall Islands Marine Resources Authority
- Supported a resource economist to review current efforts to optimize sea turtle conservation and management efforts
- Investigated costs of establishing an endowment for the long-term protection of the Arnavon Islands in the Solomon Islands
- Supported a capacity building project for the Federated States of Micronesia National Ocean Resources Management Authority and the tuna longline industry to provide training on handling fishery-sea turtle interactions and on providing a foundation for future management activities
- Promoted "best practice technologies" in the major longline fleets of the Pacific
- Continued vital population assessment work under the Sea Turtle Stranding and Salvage Network (STSSN), including genetic sampling and analysis of age classes
- Worked cooperatively with Canada to identify and address threats to leatherback turtles in Canadian waters and contributed to the development of recovery plans for leatherback turtles in Canada
- Participated in the Indian Ocean Memorandum of Understanding (MOU) on the Conservation and Management of Marine Turtles of the Indian Ocean and Southeast Asia, and its associated Conservation and Management Plan (CMP), to provide a similar comprehensive framework for the conservation and protection of sea turtles and their habitats in the Indo-Pacific region

Atlantic Ocean:

- Developed and required the use of turtle excluder devices (TEDs) that can exclude leatherbacks in shrimp fisheries operating in the Atlantic and Gulf of Mexico
- Continued vital population assessment work under the Sea Turtle Stranding and Salvage Network (STSSN), including genetic sampling and analysis of age classes
- Developed a Sea Turtle Disentanglement Network in the Atlantic Northeast Region to address sea turtle entanglement in pot and other fishing gear
- Prohibited the use of large mesh gillnets in Pamlico Sound, North Carolina, during the fall months when sea turtles are migrating through the sound
- Prohibited the use of large mesh gillnets in the Exclusive Economic Zone (EEZ) in the mid-Atlantic during times when sea turtles are most likely to interact with the gear
- Prohibited the use of all pound net leaders in a defined area of the Virginia waters of the Chesapeake Bay from May 6 through July 15 each year – Outside this area, the prohibition of leaders with ≥ 12 inches of stretched mesh and leaders with stringers is in place from May 6 to July 15 each year.
- Supported the Maryland Tagging/Health Assessment Study – Personnel from the Fish and Wildlife Health Program weighed, measured, biopsied, tagged, and released sea turtles incidentally captured in pound nets in Chesapeake Bay. Appropriation for cooperative conservation and recovery efforts with states was the source of funding for this project.

- Supported satellite telemetry studies in Canadian waters to research the behavior and ecology of one of the largest seasonal foraging populations of leatherbacks in the Atlantic
- Worked cooperatively with Canada to identify and address threats to leatherback turtles in Canadian waters, and contributed to the development of recovery plans for leatherback turtles in Canada
- Participated in the Inter-American Convention for the Protection and Conservation of Sea Turtles
- Identified stock ranges and conducted population identification of fisheries bycatch using DNA analysis

Priority Recovery Actions Needed:
Priority recovery actions needed for the leatherback sea turtle include the following:

- Reduce incidental captures in fisheries.
- Promote the use of large circle hooks in global longline fisheries and continue to identify other gear modifications and fishing practices to reduce bycatch in longline fisheries.
- Identify all key nesting beaches in Papua New Guinea and Indonesia.
- Provide education/outreach to reduce harvest of eggs and turtles.
- Develop a strategy to document and address the critical problem of entanglement in fixed pot gear off New England, throughout the Gulf of Maine, and wherever else fixed pot gears are fished.
- Support nesting beach management/census programs to promote increased hatchling production.
- Support research to determine migration pathways and identify important foraging grounds in the Atlantic.
- Enhance population stock identification.
- Support nations in monitoring and implementing management measures to reduce sea turtle interactions in pelagic and coastal fisheries.
- Implement regulations in the United States requiring the use of TEDs wherever the distribution of sea turtles overlaps with the use of trawling gear known to take turtles.

Recovery Priority Number: 1
The recovery priority number for the leatherback sea turtle is one. This priority number represents the critical status of this species and is based on a high magnitude of threat, a high recovery potential, and the presence of conflict with economic activities.

Loggerhead Sea Turtle (*Caretta caretta*)

Date Listed: July 28, 1978

Legal Status: Threatened

Recovery Plan Status:
Pacific: A final recovery plan was approved on January 12, 1998.
Atlantic: A final recovery plan was approved on December 26, 1991. A revised plan is currently under development.

Species Status:
In the Pacific, loggerheads are declining at the major nesting areas in Japan and Australia (Table 2, Figure 2). In the U.S. Atlantic and Gulf of Mexico, the annual number of loggerhead nests between 1989 and 1998 ranged from 53,014 to 92,182, with a mean of 73,751. The U.S. population appears to be stable, at best, or declining. Approximately 1,000 nests were recorded for beaches in Quintana Roo, Mexico, in 1998 and nesting appears to be stable or increasing.

Table 2. Status and trends of Pacific loggerhead nesting subpopulations

Subpopulations	No. of Females Nesting Annually	Trends
Japan	<1,000	Mixed[1]
Australia (eastern, 70% of nesting)	<500	Declining
New Caledonia	tens or low hundreds	Unknown

[1]There has been an overall long-term decline of the Japanese population of loggerheads (50– 90 percent decline in the past 50 years), although Yakushima Island (where approximately 40 percent of females nest in Japan) has shown an increase only in recent years

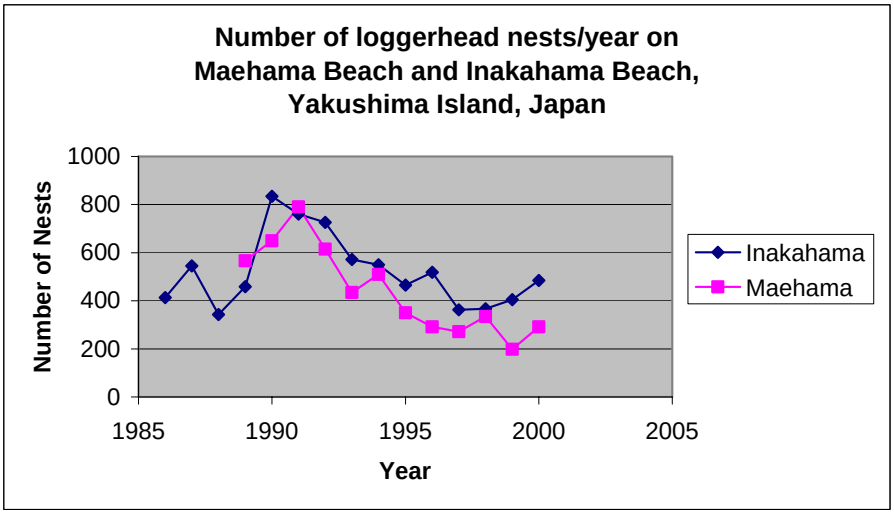


Figure 2. Abundance and trend of loggerhead sea turtle nests on Yakushima Island, Japan

Threats and Impacts:
Threats and impacts found in the marine environment affecting loggerhead turtles include the following:

- Incidental catch in commercial and artisanal fisheries – Some fisheries known to interact with loggerheads include gillnet, longline, purse-seine, pound net, dredge, fixed pot/trap, and bottom and mid-water trawl fisheries.

- Directed take of immature loggerhead sea turtles in Mexico
- Entanglement in marine debris
- Pollution (e.g., ingestion of marine debris, chemical pollution in algae/seagrass feeding pastures, light pollution that disorients nesting adults and emergent hatchlings, and oil pollution)
- Boating activities that may result in direct injury or death through collisions or may result in habitat degradation through anchoring and propeller scarring
- Power plant entrainment and entrapment, primarily along the U.S. Atlantic coast
- Hopper dredging entrainment and entrapment and habitat degradation
- Oil and gas exploration, development, and transportation – Underwater explosions (e.g., gas and oil structure removal and the use of explosives) can kill or injure turtles, and may destroy or damage habitat.
- Potential acoustical disturbance – Potential acoustical disturbance from sonar and seismic surveys is poorly understood.
- Navy exercises – There is minimal information on various short-term and longer-term Navy exercises that may impact the migratory and foraging behavior of turtles and their habitats.

Conservation Actions:
Conservation actions conducted in 2002–2004 for recovery of the loggerhead turtle include the following:

Pacific/Indian Ocean:
- Reduced interaction rates and mortality rates in U.S. Pacific swordfish-directed longline fleets by requiring large circle hooks combined with non-squid bait; proper handling of hooked and entangled loggerheads; and carrying and using disentangling and de-hooking equipment such as dip nets, line cutters, and de-hookers.
- Identified stock home ranges and conducted population identification of fisheries bycatch using DNA analysis
- Attached satellite transmitters and tracked loggerheads from nesting beaches in Japan, from post-release in U.S. longline gear, and from foraging grounds off Baja California (Mexico); researched migration routes and preferred oceanic habitat
- Ratified a Memorandum of Understanding (MOU) between the Southwest Fisheries Science Center and Instituto del Mar del Peru (IMARPE) in 2004 to lay the groundwork for future loggerhead bycatch reduction programs
- Supported monitoring and protection efforts of nesting beaches in Japan (Minabe-Senri and Hii-Horikiri beaches, and Maehama and Inakahama beaches on Yakushima Island).
- Supported education and collaborative work with Mexican halibut set gillnet fisheries in Baja California to reduce take of turtles
- Supported an observer program in the Chilean swordfish-directed longline fishery and provided circle hooks and technical support for experiments testing modified gear
- Supported an observer program in Peru to document the threat of shark and mahi mahi longline fishery on loggerheads turtles
- Supported a project in Papua New Guinea to mitigate tuna and prawn fisheries interactions with marine turtles and to build the capacity of the National Fisheries Authority

- Supported the Marshall Islands Sea Turtle-Fisheries Interaction Outreach Education project to build sea turtle conservation and management capacity of the Marshall Islands Marine Resources Authority
- Continued vital population assessment work under the Sea Turtle Stranding and Salvage Network (STSSN), including genetic sampling and analysis of age classes
- Participated in the Indian Ocean Memorandum of Understanding (MOU) on the Conservation and Management of Marine Turtles of the Indian Ocean and Southeast Asia, and its associated Conservation and Management Plan (CMP), to provide a similar comprehensive framework for the conservation and protection of sea turtles and their habitats in the Indo-Pacific region

Atlantic Ocean:

- Continued vital population assessment work under the Sea Turtle Stranding and Salvage Network (STSSN), including genetic sampling and analysis of age classes
- Developed a Sea Turtle Disentanglement Network in the Atlantic Northeast Region to address sea turtle entanglement in pot and other fishing gear
- Developed gear technologies to reduce sea turtle bycatch including modifications to scallop dredges, pound net leaders, and whelk pots
- Developed and implemented turtle excluder devices (TEDs) large enough to release leatherback sea turtles, as well as large green and loggerhead sea turtles
- Prohibited the use of large mesh gillnets in Pamlico Sound, North Carolina, during the fall months when sea turtles are migrating through the sound
- Prohibited the use of large mesh gillnets in the U.S. Exclusive Economic Zone (EEZ) in the mid-Atlantic during times when sea turtles are most likely to interact with the gear
- Prohibited the use of all pound net leaders in a defined area of the Virginia waters of the Chesapeake Bay from May 6 through July 15 each year – Outside this area, the prohibition of leaders with ≥ 12 inches of stretched mesh and leaders with stringers is from May 6 to July 15 each year.
- Supported the Maryland Tagging/Health Assessment Study – Personnel from the Fish and Wildlife Health Program weighed, measured, biopsied, tagged, and released sea turtles incidentally captured in pound nets in Chesapeake Bay. Appropriation for cooperative conservation and recovery efforts with states was the source of funding for this project.
- Supported a health assessment study on sea turtles caught in New York pound nets – Appropriation for cooperative conservation and recovery efforts with states was the source of funding for this project.
- Participated in the Inter-American Convention for the Protection and Conservation of Sea Turtles

Priority Recovery Actions Needed:

Priority recovery actions needed for the loggerhead sea turtle include the following:

- Reduce incidental capture of loggerheads in commercial and artisanal fisheries.
- Promote the use of large circle hooks in global longline fisheries and continue to identify other gear modifications and fishing practices to reduce bycatch in longline fisheries.
- Reduce bycatch of loggerheads in the Mexican halibut set gillnet fishery.

- Reduce threats to loggerhead population and foraging habitat from marine pollution.
- Improve and refine estimation techniques for takes of sea turtles to ensure recovery criteria are met.
- Promote best management practices for nesting beaches in Japan.
- Implement regulations in the United States requiring the use of TEDs wherever the distribution of loggerhead sea turtles overlaps with the use of trawling gear known to take turtles.
- Closely monitor and proactively address the development of fisheries targeting loggerhead prey species.

Recovery Priority Number: 5
The recovery priority number for the loggerhead sea turtle is five. This represents a moderate magnitude of threat, a high recovery potential and the presence of conflict with economic activities.

Olive Ridley Sea Turtle (*Lepidochelys olivacea*)

Date Listed: July 28, 1978

Legal Status:
Endangered (*breeding colony populations of Pacific coast of Mexico*)
Threatened (*rangewide except where listed as endangered*)

Recovery Plan Status:
A recovery plan for the U.S. Pacific populations of the olive ridley sea turtle was approved on January 12, 1998.

Species Status:
See Table 3 for status and trend data for subpopulations of the olive ridley sea turtle.

Table 3. Status and trends of olive ridley nesting subpopulations

Subpopulation	No. of Females Nesting Annually	Trend
Mexico – Playa Escobilla	525,000 (nests)	Increasing
Costa Rica – Playa Ostional	450,000 - 600,000	Unknown[1]
Costa Rica – Playa Nancite	25,000 – 50,000	Unknown
Guatemala	4,300,000 (eggs)	Declining
Nicaragua	Unknown	Unknown
India (Gahirmatha)	150,000 – 200,000	Mixed[2]
Indonesia	Scattered	Unknown
Malaysia	Scattered	Declining

[1] Although the data are too limited for a statistically valid determination of a trend, there does appear to be a 6-year decrease in the number of nesting females.
[2] Although there has been no drastic decline in the nesting population in the past 25 years, there are differences in trends between decades. Data from the 1990s show the population is declining or on the verge of a decline, and no *arribadas* (mass nestings of turtles) have been documented in recent years.

Threats and Impacts:
Threats and impacts found in the marine environment affecting olive ridley turtles include the following:

- Egg harvest
- Direct harvest of adults (including nesting females)
- Boat collisions
- Disease (fibropapilloma)
- Nesting activity of other olive ridley turtles – Nesting turtles destroy eggs by inadvertently digging up previously laid nests or causing them to be contaminated by bacteria and other pathogens from rotting nests nearby.
- Incidental take in commercial and artisanal fisheries – Some fisheries are known to interact with olive ridleys, including gillnets (Chilean artisanal driftnet fishery for swordfish, Taiwanese coastal set net and gillnet fishery), longline fisheries (U.S. longline fleet for swordfish/tuna, Costa Rican longline fleet for mahi mahi), purse seine fisheries (U.S. and non-U.S. tuna purse seine fleet in the eastern tropical Pacific Ocean), trawl

fisheries (Costa Rican Pacific shrimp trawl fishery, Indian coastal trawl fisheries), and Peruvian artisanal fisheries (gillnets and hook and line).

Conservation Actions:
Conservation actions conducted in 2002–2004 for recovery of the olive ridley turtle include the following:

- Identified home ranges and conducted population identification of fisheries bycatch using DNA analysis
- Surveyed population abundance and collected data on size, diet, and distribution of olive ridleys in the eastern tropical Pacific during NOAA research cruises
- Supported a project in Papua New Guinea to mitigate tuna and prawn fisheries interactions with marine turtles and to build the capacity of the National Fisheries Authority
- Supported the Marshall Islands Sea Turtle-Fisheries Interaction Outreach Education project to build sea turtle conservation and management capacity of the Marshall Islands Marine Resources Authority
- Supported a capacity building project for the Federated States of Micronesia National Ocean Resources Management Authority and the tuna longline industry to provide training on handling fishery-sea turtle interactions and on providing a foundation for future management activities

Priority Recovery Actions Needed:
Priority recovery actions needed for the olive ridley sea turtle include the following:

- Promote the use of large circle hooks in global longline fisheries and continue to identify other gear modifications and fishing practices to reduce bycatch in longline fisheries.
- Support nations in monitoring programs for pelagic and coastal fisheries.

Recovery Priority Number:
5 (*Breeding colony populations of Pacific coast of Mexico*); 5 (*Rangewide*)
The recovery priority number for the olive ridley sea turtle is five. This represents a moderate magnitude of threat, a high recovery potential, and the presence of conflict with economic activities.

PACIFIC SALMON RECOVERY

Overview for 2002–2004

Evolutionarily Significant Units Listed Under the ESA
Throughout most of 2002–2004, 26 species – or Evolutionarily Significant Units (ESUs)[1] – of Pacific salmon and steelhead were listed under the ESA. Of these 26 ESUs, 16 occur solely in the NMFS Northwest Region (NWR), 9 occur solely in the NMFS Southwest Region (SWR), and 1 ESU – the Southern Oregon/Northern California coast coho salmon ESU – overlaps both Regions[2]. The listing for Oregon coast coho salmon ESU was recently invalidated by a U.S. District Court, and was proposed for relisting in a June 2004 proposed rule (see "Listing Actions" below) (69 FR 33102; June 14, 2004). One new ESU – the Lower Columbia River coho ESU – was also proposed for listing in the rule, bringing to 27 the total number of ESUs included in the June 14, 2004, proposed rule.

Recovery Planning Efforts for Pacific Salmon and Steelhead
NMFS believes it is critically important to ground the recovery planning process for Pacific salmon in the many state, regional, tribal, local, and private conservation efforts already under way throughout the region. The agency has established a recovery planning process to maximize local involvement and capitalize on these ongoing efforts[3].

To develop recovery plans meeting ESA statutory requirements, as well as goals for local involvement, NMFS organized the 26 listed ESUs into nine recovery areas or "domains" (see Figure 3; for maps of individual ESU distribution see Appendix A, Figure A-1). Recovery domains in the NWR are the Puget Sound, Willamette/Lower Columbia, Interior Columbia, Oregon Coast, and Southern Oregon/Northern California Coast Domains; domains in the SWR are the Southern Oregon/Northern California Coast, North-Central California Coast, California Central Valley, and South-Central California Coast Domains. Recovery planning for the Southern Oregon/Northern California Coast domain is managed jointly by the NWR and SWR. For each recovery domain, one or more recovery plans are being developed to address the ESUs within that domain. Technical Recovery Teams (TRTs), composed of regional technical experts and NMFS scientists, have been appointed for each domain. In Phase I of Pacific salmon recovery planning, the TRTs conduct technical analyses, which include the following: (1) identifying the independent populations or recovery units within the ESU; (2) identifying population viability guidelines and ESU recovery goals; and (3) identifying research, evaluation, and monitoring needs. Some TRTs are also characterizing habitat and fish abundance relationships, identifying the factors for decline and limiting factors for each ESU, and

[1] The ESA defines the term species as "...including any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature" (16 US.C. 1531-1544). NMFS treats an ESU as constituting a distinct population segment, and hence a "species," under the ESA (56 FR 58612; November 20, 1991).
[2] See Figure A-1 in Appendix A for the geographic distribution of Pacific salmon ESUs on the West Coast.
[3] For more information on recovery activities being implemented by other Federal agencies, states, regional fora, local municipalities, and private organizations and individuals, please see the summary of "Efforts Being Made to Protect West Coast Salmon and *O. mykiss*" in the recent proposed listing determinations for West Coast salmon and steelhead (69 FR 33102; June 14, 2004).

identifying the early actions important for recovery. In Phase II, NMFS is working with ongoing state, tribal, regional, local, and private efforts in each domain to develop a recovery plan identifying the measures and actions necessary for achieving the recovery goals identified by the TRTs. The structure and level of stakeholder participation varies within and across recovery planning domains; however, NMFS ensures the timeframe, degree of certainty, and economic cost for achieving recovery goals are assessed for all recovery plans.

The TRTs in the NWR have made significant progress in Phase I of the recovery planning process by identifying independent populations within the subject ESUs, and developing population viability guidelines and ESU recovery goals. In the SWR, identification of independent populations is well under way and preliminary work on viability criteria for these populations has begun. Phase II of recovery planning has commenced in each of the NWR domains, and the SWR has been working closely with specific co-managers and stakeholders to guide ongoing recovery planning and implementation efforts – e.g., the CALFED Bay-Delta program in the Central Valley and the State of California's coho salmon recovery plan development process. Generally, regional groups are evaluating the available TRT technical products and focusing on identifying the measures and actions necessary for achieving the recovery goals identified by the TRTs. Important steps in this process include the following: (1) inventorying all ongoing state, tribal, local, and Federal conservation plans and planning efforts; (2) evaluating the existing conservation plans and efforts to assess how well they address identified factors for decline and limiting factors, and the extent to which they collectively achieve the identified recovery goals; (3) identifying and evaluating any additional or alternative measures necessary for achieving the identified recovery goals; (4) prioritizing the required recovery measures and identifying the entity(ies) responsible for implementing them; and (5) estimating the costs and time needed to carry out the identified recovery measures. Table 4 summarizes the recovery planning progress for Pacific salmon in each of the recovery planning domains.

As described earlier, NMFS found that all 26 previously listed ESUs still warranted the protections of the ESA and proposed extending ESA protections to one previously unlisted ESU.[4] Nonetheless, significant progress has been made in achieving the conservation and recovery of listed salmon and steelhead stocks in Oregon, Washington, and Idaho. The encouraging recent improvements in returns represent an opportunity for recovery actions to yield significant progress toward restoring salmon and steelhead stocks. As recovery plans are developed, the specific recovery goals for each ESU will be detailed.

Listing Actions

In June 2004, NMFS completed a review of the ESA listing status of 27 West Coast salmon and steelhead ESUs (69 FR 33102; June 14, 2004). This review was precipitated by a 2001 court ruling involving Oregon Coast coho salmon *(Alsea Valley Alliance* v. *Evans)*, which concluded NMFS had violated the provisions of the ESA by listing only part of an ESU (i.e., NMFS had included hatchery populations in the ESU but had not listed them). Although this ruling applied

[4] See Table A-1 in Appendix A, which describes the most recently compiled status information for 27 ESUs of Pacific salmon on the West Coast. This table includes qualitative trends in viability criteria for each ESU, based on the current status relative to ESU status at time of listing or first review.

directly only to Oregon Coast coho salmon, the same circumstances (i.e., hatchery populations or resident populations not listed but still considered part of listed ESUs) also applied to nearly all of NMFS' previous listing determinations. Informed by the court's ruling in *Alsea*, hatchery programs and resident populations considered part of an ESU were included in the 2004 proposed listing determinations. Approximately 140 hatchery programs are proposed for listing as part of the Northwest ESUs, and approximately 20 as part of the Southwest ESUs. Table 5 provides a complete list of current and proposed ESA listing status for these 27 ESUs.

Critical Habitat

Section 4(b)(2) of the ESA requires NMFS to designate critical habitat for threatened and endangered species. In 2002, NMFS' critical habitat designations for 19 Pacific salmon ESUs in 2000 (65 FR 7764; February 16, 2000) were challenged for inadequately considering the economic impacts of the critical habitat designations (National Association of Homebuilders v. Evans). In a separate case, the Court of Appeals for the 10th Circuit ruled the approach to economic analysis employed by the U.S. Fish and Wildlife Service (FWS) and NMFS in critical habitat designations was insufficient (New Mexico Cattlegrowers' Association v. U.S. Fish and Wildlife Service). On April 30, 2002, NMFS entered into a consent decree to vacate the critical habitat designations promulgated in 2000, and formally removed the critical habitat designations for 19 ESUs in September 2003, including 13 NWR ESUs and 6 SWR ESUs (68 FR 55900; September 29, 2003)[5]. Critical habitat designations remained in place for four Northwest ESUs not subject to the consent decree (Snake River sockeye, Southern Oregon/Northern California Coast coho, Snake River spring/summer Chinook, and Snake River fall Chinook) and for three Southwest ESUs (Sacramento River winter-run Chinook, Central California Coast coho, and Southern Oregon/Northern California Coast coho).

On December 10 and 14, 2004, NMFS published separate proposed rules to designate critical habitat for 13 ESUs in the NWR and 7 ESUs in the SWR[6]. The specific areas proposed for designation in the NWR include approximately 27,553 miles (44,342 km) of lake, riverine, and estuarine habitat in the three northwestern states, as well as approximately 2,121 miles (3,413 km) of marine nearshore habitat in Puget Sound, Washington. The specific areas proposed for designation in the SWR include approximately 11,668 miles (18,669 km) of riverine habitat and 947 square miles (2,444 sq km) of estuarine habitat in San Francisco Bay. The proposed rules for both NMFS Regions include an analysis of the economic and other impacts of the designations, and a range of areas being considered for exclusion in the final rule on critical habitat designations.

Overall Status

In recent years, the abundance of both hatchery-reared and naturally spawning populations of listed salmon and steelhead ESUs has generally increased. This increase in abundance is likely

[5] Critical habitat was vacated for the following thirteen NWR ESUs: Ozette Lake sockeye; Puget Sound, Lower Columbia River, Upper Willamette River, and Upper Columbia River Chinook; Oregon Coast coho; Hood Canal summer-run and Columbia River chum; Upper Columbia River, Snake River Basin, Lower Columbia River, Upper Willamette River, and Middle Columbia River steelhead. Critical habitat was vacated for the following six SWR ESUs: California Central Valley spring-run and California Coastal Chinook; Southern California, South-Central California, Central California Coast, and Central Valley California steelhead.

[6] See 69 FR 71880, December 10, 2004; and 69 FR 74572, December 14, 2004.

due to changes in ocean conditions; improvements to habitat from restoration efforts; and changes in harvest regimes, hydropower operations, and hatchery practices implemented since the listings occurred. Although improvements are seen in many salmon populations, others within the listed ESUs have exhibited mixed trends or have declined in abundance. For the most recent information on ESU trends for listed Pacific salmon, please see the forthcoming 2005 Pacific Coastal Salmon Recovery Fund Report to Congress (see the PCSRF website at: http://webapps.nwfsc.noaa.gov/servlet/page?_pageid=784&_dad=portal30&_schema=PORTAL30).

Population declines and extirpations of Pacific salmon and steelhead are the result of numerous factors affecting habitat (such as hydropower development, land development, resource extraction, and other land uses), as well as harvest practices, hatchery practices[7], natural variation in ocean-climate conditions, and other factors such as predation and the introduction of non-native species. These factors affect each listed salmon and steelhead ESU differently, and no single factor is solely responsible for population declines. Furthermore, it is difficult to quantify precisely the relative contribution of any one factor to the decline of a given ESU.

Activities Contributing to Recovery

The statutory and regulatory tools of the ESA are being used to alleviate many threats to listed salmon in the short-term. The contributions of such tools to salmon recovery are described below.

4(d) Rule Activities

ESA section 9(a) take prohibitions apply to all ESA-listed endangered species. For threatened species, ESA section 4(d) leaves it to NMFS' discretion whether and to what extent section 9(a) prohibitions will extend to a given species, and authorizes NMFS to issue regulations considered necessary for the conservation of the species. NMFS has promulgated 4(d) rules that exempt a range of activities from the take prohibitions of threatened salmon and steelhead ESUs[8]. In the NWR, over 500 programs or activities have been approved under the 4(d) rule. These include 472 research activities and 52 programs in areas such as hatchery and harvest management plans, resource management plans, road maintenance activities, habitat restoration activities, and tribal resource management plans. In the SWR during the biennium, 78 California Department of Fish and Game scientific research programs were authorized under the 4(d) rule. Such programs benefit salmon by addressing threats and by being conducted in a way that adequately protects listed ESUs. In turn, the non-Federal entities conducting the activities benefit from the certainty that they are in compliance with the ESA.

As part of the June 2004 updated listing determinations, NMFS also proposed amending existing protective regulations under section 4(d) for threatened ESUs. The proposed changes will ensure that fisheries and artificial propagation can be managed in a manner consistent with the

[7] Hatchery fish can benefit recovery by augmenting populations to support harvest and meet tribal treaty fishing rights, and can also provide the last level of protection against extinction. Potential negative aspects of hatchery-bred fish include competition for food and altered genetic diversity of natural populations.

[8] See 62 FR 38479, July 18, 1997; 65 FR 42422, July 10, 2000; 65 FR 42485, July 10, 2000; and 67 FR 1116, January 9, 2002.

conservation and recovery of threatened salmon and steelhead. Furthermore, the proposed changes will streamline existing regulations so that conservation opportunities associated with the 4(d) protective regulations are more clearly conveyed to affected parties.

Section 7 Activities

Under section 7 of the ESA, NMFS conducts hundreds of informal and formal consultations every year with Federal agencies that authorize, fund, or carry out actions that may affect Pacific salmon. In FY2003 and 2004, the NWR conducted over 3,200 section 7 consultations, and the SWR conducted 582. These consultations ensure Federal actions are conducted in ways that are not likely to jeopardize the continued existence of listed species or adversely modify or destroy critical habitat. The scope of section 7 consultations includes actions related to land management, transportation, restoration, fill and removal of materials in stream channels, and hydropower operation.

Section 10 Activities

Section 10 of the ESA provides authorization for incidental take that may occur as a part of otherwise lawful activities carried out by non-Federal entities (e.g., timber harvest, water supply management, and other resource extraction and land management activities) or as part of scientific research or enhancement activities. Such authorization allows those conducting such activities to proceed with the certainty of ESA compliance and ensures that any adverse impacts caused to listed species are being avoided, minimized, or mitigated. In FY2003 and 2004, the NWR approved, implemented, or collaborated on 39 Habitat Conservation Plans (HCPs) under ESA section 10 and issued a total of five permits. The SWR collaborated on 22 HCPs at various stages of development, review, or negotiation during the biennium and issued no permits during this time. Additionally, the NWR issued 115 new and modified permits for scientific research and enhancement activities under section 10; the SWR issued 18 such permits.

Pacific Coastal Salmon Recovery Fund

The Pacific Coastal Salmon Recovery Fund (PCSRF) was established by Congress in FY2000 to assist state, local, and tribal salmon recovery efforts. The goal of the PCSRF is to make significant contributions to the conservation and restoration of healthy and sustainable Pacific salmon runs and the habitats on which they depend. The PCSRF has funded many successful projects that are beginning to show direct benefits, such as salmon using newly accessible or improved habitat. A majority of the PCSRF funds have been spent on habitat restoration activities, as this is a significant need for salmon recovery. The PCSRF program has also filled a vital need by supporting recovery planning (approximately $1 million in the NWR) and building organizational infrastructure so the long-term goal of salmon recovery can be achieved. In FY2003 and 2004, Congress appropriated about $180 million of PCSRF funds for state and tribal salmon restoration and conservation efforts. The states provided a 25 percent match to these Federal funds. Since FY2000, over 4,000 projects have been funded for habitat protection and restoration; watershed and sub-basin planning and assessment; research, monitoring, and evaluation; and public outreach and education. For more information, please see the 2004 Report to Congress on the PCSRF and funded activities, which is available online at http://www.nwr.noaa.gov/pcsrf/.

Figure 3. Pacific salmon recovery domains

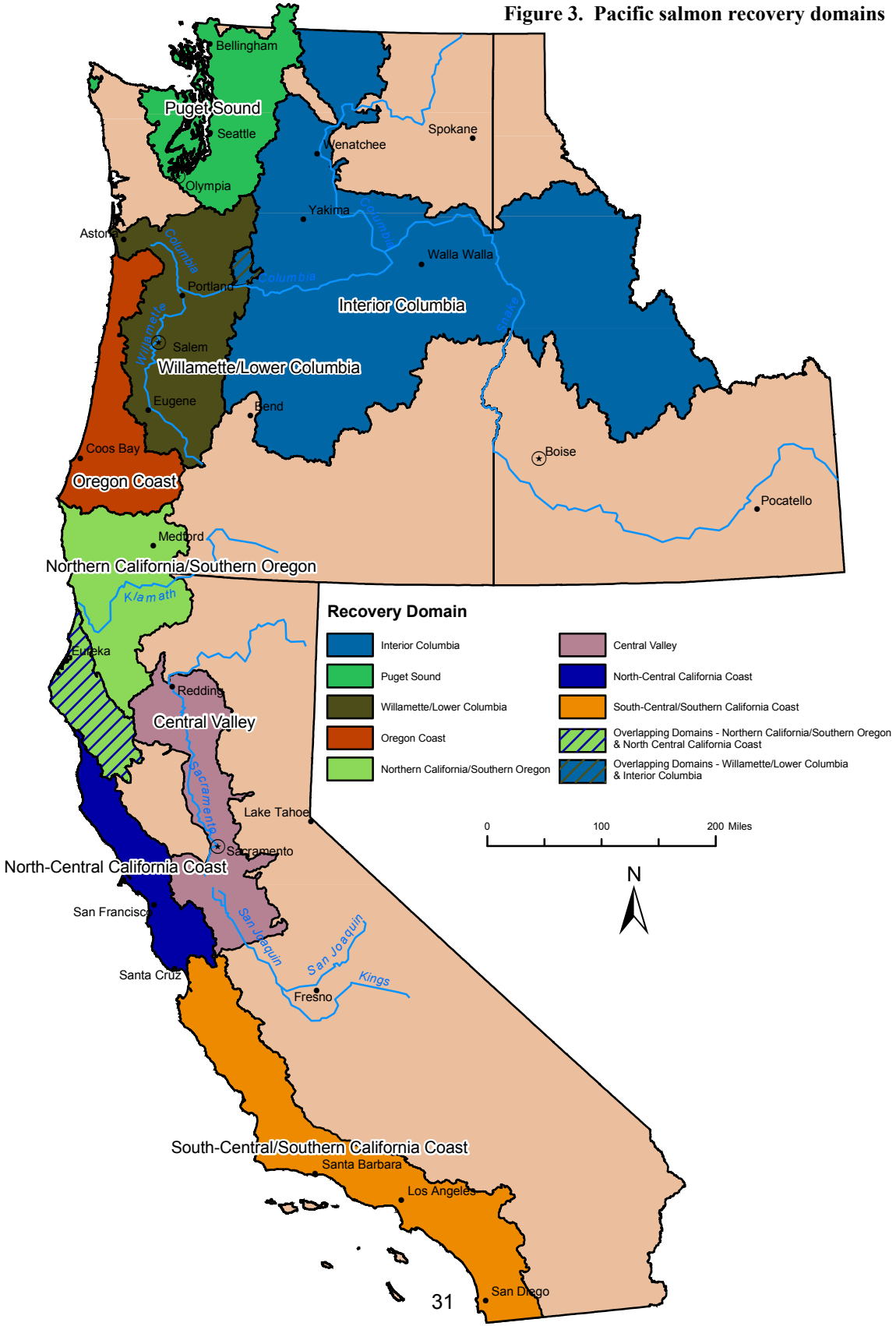


Table 4. Summary of NMFS' recovery planning progress by recovery planning domain for ESA-listed Pacific Salmon (*Oncorhynchus* spp.)

Recovery Planning Domain	ESU	Technical Recovery Teams (Phase I)		Phase II Recovery Planning Initiated
		Identification of Independent Populations Completed	Population Viability Guidelines and ESU Recovery Goals Completed	
Puget Sound	Puget Sound Chinook Hood Canal Summer chum Ozette Lake Sockeye	Yes	Yes	Yes
Willamette/Lower Columbia	Upper Willamette River Chinook Lower Columbia River Chinook Lower Columbia River steelhead Columbia River chum Upper Willamette River steelhead	Yes	Yes	Yes
Interior Columbia	Upper Columbia River spring Chinook Snake River spring/summer Chinook Snake River fall Chinook Upper Columbia River steelhead Middle Columbia River steelhead Snake River Basin steelhead Snake River sockeye	Yes	Yes	Yes
Oregon Coast	Oregon Coast coho	Yes	By June 2005	Yes
S. Oregon/N. California Coast	Southern Oregon/Northern California Coast coho	By Mid 2005	By Late 2005	Yes[1]
North-central California Coast	Central California coast coho Northern California steelhead California coast Chinook Central California coast steelhead	By Mid 2005	By Late 2005	Yes[2]
South-central California Coast	South-central California coast steelhead Southern California steelhead	By Mid to Late 2005	By Early 2006	Yes[3]
California Central Valley	Sacramento River winter-run Chinook	yes	By Late 2005	Yes[4]
	Central Valley spring-run Chinook	yes		
	Central Valley steelhead	By Mid 2005		

[1] Preliminary efforts for coho salmon are under way with the State of California.

[2] Efforts for Phase II are currently under way, including coordination with the State of California on its adopted Recovery Strategy for Coho Salmon.

[3] Only limited efforts for Phase II recovery planning are under way at this time.

[4] Preliminary efforts for Phase II recovery planning are under way at this time – primarily through coordination with the CALFED Bay-Delta Program in the Central Valley.

Table 5. Current and proposed ESA listing status of 27 Pacific salmon ESUs.

Recovery Planning Domain	ESU[1]	Current ESA Listing Status	Proposed ESA Listing Status [2]
Puget Sound	Puget Sound Chinook	*Threatened*	*Threatened*
	Hood Canal Summer chum	*Threatened*	*Threatened*
	Ozette Lake Sockeye	*Threatened*	*Threatened*
Willamette/Lower Columbia	Upper Willamette River Chinook	*Threatened*	*Threatened*
	Lower Columbia River Chinook	*Threatened*	*Threatened*
	Lower Columbia River steelhead	*Threatened*	*Threatened*
	Lower Columbia River coho	*Proposed*	*Threatened*
	Columbia River chum	*Threatened*	*Threatened*
	Upper Willamette River steelhead	*Threatened*	*Threatened*
Interior Columbia	Upper Columbia River spring Chinook	*Endangered*	*Endangered*
	Snake River spring/summer Chinook	*Threatened*	*Threatened*
	Snake River fall Chinook	*Threatened*	*Threatened*
	Upper Columbia River steelhead	*Endangered*	*Threatened*
	Middle Columbia River steelhead	*Threatened*	*Threatened*
	Snake River Basin steelhead	*Threatened*	*Threatened*
	Snake River sockeye	*Endangered*	*Endangered*
Oregon Coast	Oregon Coast coho[3]	*Threatened* [3]	*Threatened*
S. Oregon/N. California Coast	Southern Oregon/Northern California Coast coho	*Threatened*	*Threatened*
North-central California Coast	Central California coast coho	*Threatened*	*Endangered*
	Northern California steelhead	*Threatened*	*Threatened*
	California coast Chinook	*Threatened*	*Threatened*
	Central California coast steelhead	*Threatened*	*Threatened*
South-central California Coast	South-central California coast steelhead	*Threatened*	*Threatened*
	Southern California steelhead	*Endangered*	*Endangered*
California Central Valley	Sacramento River winter-run Chinook	*Endangered*	*Threatened*
	Central Valley spring-run Chinook	*Threatened*	*Threatened*
	Central Valley steelhead	*Threatened*	*Threatened*

[1] An Evolutionarily Significant Unit (ESU) is a distinctive group of Pacific salmon or steelhead, considered to be a "species" under the ESA.

[2] On June 14, 2004, NMFS proposed updated listing determinations for all 26 previously listed Pacific salmon ESUs, as well as one previously unlisted ESU (69 FR 33102).

[3] The 1998 threatened listing of the Oregon coast coho salmon was set aside by a District Court ruling in *Alsea Valley Alliance v. Evans* (161 F. Supp. 2d 1154, D. Oreg. 2001). Although the District Court's ruling was stayed pending resolution of an appeal by the U.S. 9th Circuit Court of Appeals, on February 24, 2004, the Appeals Court dismissed the appeal and dissolved its stay of the District Court's ruling, thus removing Oregon coast coho from ESA protections (*Alsea Valley v. Evans*, 9th Circuit appeal, No. 01-36071). See this section for further information.

Salmon Recovery in the Northwest

Lower Columbia River Chinook ESU (*Oncorhynchus tshawytscha*)

Date Listed: March 24, 1999

Legal Status: Threatened

Recovery Plan Status:
No recovery plan has been completed, but recovery planning is under way.

- Phase I – Technical Recovery Teams have identified independent populations and completed the population viability guidelines and ESU recovery goals.
- Phase II – Recovery planning has been initiated for this ESU.
- A plan for the Washington portion of this ESU was completed by Washington's Lower Columbia Fish Recovery Board in December 2004. This plan will be released by NMFS for public comment in 2005. Once these comments are incorporated, the plan will be used as an interim recovery plan pending completion of the Oregon portion.

Species Status:
The estimated historical abundance of the Lower Columbia River Chinook ESU is 108,000. The recent mean abundance of this ESU is 11,720. Since the time of listing or first review for this ESU, its productivity has remained unchanged, and its population abundance has remained unchanged.

Threats and Impacts:
Threats and impacts to the Lower Columbia River Chinook ESU include the following:

- Reduced access to spawning and rearing habitat because of tributary hydropower systems
- Hatchery impacts
- Loss of habitat diversity and channel stability in tributaries (from forest practices, agriculture, and development)
- Excessive sediment in spawning gravel (from forest practices and agriculture)
- Elevated water temperature in tributaries (from flow modification and riparian area degradation)
- Harvest impacts to fall Chinook salmon

Conservation Actions:
Major accomplishments for this ESU in 2002–2004 include the following:

- Accomplished hydropower operational changes and agreements for dam removal – NMFS began implementation of the Cowlitz River Settlement Agreement, under Federal Energy Regulatory Commission (FERC) relicensing, and completed the Lewis River Settlement Agreement. These agreements included reintroduction efforts into previously blocked habitat, improved flow releases, dam passage survival studies and plans for improvements, and habitat improvements. NMFS also began implementation of the Settlement Agreement for the Powerdale Hydroelectric Project, which will improve fish passage conditions in the Hood River and result in the removal of Powerdale Dam in 2010; and implementation of the Settlement Agreement for the Bull Run Hydroelectric

Project, which will result in the removal of Marmot Dam in 2007 and restoration of unimpeded passage in the Sandy River.

- Conducted local habitat restoration projects – Hundreds of projects have improved riparian areas, fish passage at barriers, and stream function. Some local governments have also upgraded their ordinances to offer greater habitat protection.
- Improved forest management practices on Federal lands and some state and private lands – The Northwest Forest Plan Aquatic Conservation Strategy continued in 2002–2004. The strategy is designed to conserve and restore salmon and steelhead habitat and to provide an anchor for Federal lands' contribution to salmon recovery. Implementation of the forest practices rules consistent with the Washington Forest and Fish Agreement, to which NMFS is a party, will improve aquatic habitat conditions for fish and wildlife on state and private forest lands in Washington State.
- Instituted hatchery operational reforms to ensure hatcheries benefit conservation efforts and reduce risks to the ESU
- Externally marked hatchery fish to provide for selective fisheries targeting hatchery spring Chinook and to allow for the identification of hatchery and wild fish at weirs and traps, on the spawning grounds, and during broodstock collection
- Improved management of in-river fisheries through the implementation of Fisheries Management and Evaluation Plans for all tributary fisheries – The marking of hatchery spring Chinook has permitted implementation of selective commercial and recreational fisheries for spring Chinook, reducing impacts to wild spring Chinook salmon from 65 percent to 22 percent.
- Completed a draft recovery plan for the Washington portion of this ESU – The Lower Columbia Fish Recovery Board completed this plan in December 2004.

Priority Recovery Actions Needed:

Priority recovery actions needed for this ESU include the following:

- Provide fish passage at tributary dams and small passage blockages, including road crossings and culverts that block or impede fish passage. Where fish passage efforts at tributary dams are under way, continue to improve juvenile and adult passage survival.
- Improve flow management below tributary dams by refining releases to enhance fish protection.
- Improve land use practices affecting water quality, channel stability, and floodplain function to prevent further degradation of these habitat attributes and to protect existing habitat, especially in lowland stream reaches. Conduct habitat restoration to restore degraded water quality, channel stability, and floodplain function and associated watershed processes.
- Further improve hatchery practices by marking hatchery fall Chinook, updating adult traps and weirs, using alternate release strategies, and developing localized broodstocks.
- Improve ocean fisheries management to address impacts to Lower Columbia River fall Chinook salmon (e.g., by developing additional reference populations by which to gauge harvest impacts and help guide harvest management decisions).

Recovery Priority Number: 1

With a high magnitude of threat, high recovery potential, and the presence of conflict, this ESU has been assigned a recovery priority number of one. The magnitude of threat to this ESU has been classified as high, because of strong risks to its abundance, productivity, spatial structure, and diversity (which largely have persisted since its status was first reviewed), and the fact that this ESU faces a strong extinction risk in the foreseeable future. This ESU does not meet the criteria for a moderate magnitude of threat (which stipulate that the species will not face extinction if recovery is temporarily held off, although there is a continuing population decline or threat to its habitat). Delaying recovery for this ESU would likely result in mounting extinction risks rather than maintaining the status quo level of risk. The recovery potential for this ESU has also been classified as high. Although numerous factors limit the recovery of this ESU, the source of these factors and their demographic impacts are relatively well understood and recovery planning is currently under way. Although it may be cost-prohibitive to completely address every limiting factor, it is likely that integrated reduction of most threats can achieve recovery of this ESU. Finally, as a complex variety of activities and management practices continue to impact the conservation and recovery of all Pacific salmon ESUs listed under the ESA, NMFS has determined "conflict" exists with regard to this ESU. Taken together, these three factors correspond to a recovery priority number of one.

Puget Sound Chinook ESU (*Oncorhynchus tshawytscha*)

Date Listed: March 24, 1999

Legal Status: Threatened

Recovery Plan Status:
No recovery plan has been completed, but recovery planning is under way.

- Phase I – Technical Recovery Teams have identified independent populations and completed the population viability guidelines and ESU recovery goals.
- Phase II – Recovery planning has been initiated for this ESU.
- A draft recovery plan for this ESU is expected by December 2005.

Species Status:
The estimated historical abundance of the Puget Sound Chinook ESU is 670,000. The recent mean abundance of this ESU is 21,189. Since the time of listing or first review for this ESU, its productivity has remained unchanged, and its population abundance has remained unchanged.

Threats and Impacts:
Threats and impacts to the Puget Sound Chinook ESU include the following:

- Freshwater habitat loss and degradation
- Nearshore and marine habitat loss and degradation
- Fish passage obstructions along the migration corridor
- Poor water quality
- Altered water temperature and flow regime
- Adverse hatchery impacts
- Mortality from harvest activities

Conservation Actions:
Major accomplishments in 2002–2004 for this ESU include the following:

- Improved harvest and hatchery management – The Puget Sound Harvest Plan includes harvest objectives consistent with optimizing habitat potential and integrating hatchery objectives. Harvest objectives were revised to be consistent with what is known of the productivity in the various watersheds and the contribution of hatchery spawners. The harvest plan also includes implementation, monitoring, and evaluation procedures designed to ensure fisheries are consistent with fishery objectives for conservation and resource use. Co-managers have also implemented time, area, and gear restrictions to maximize harvest opportunity on hatchery and healthy listed Chinook populations and to minimize impacts on weaker populations. These actions include complete closure of some terminal fisheries, non-retention of Chinook, and selective fishing techniques.
- Implemented hatchery management modifications – The implementation of hatchery reform recommendations developed independently by the Hatchery Scientific Review Group has led to operational changes that are expected to benefit natural Chinook populations. Specific threat reduction measures for hatcheries to benefit natural populations are provided in the co-managers' Puget Sound hatchery resource management plans and Hatchery and Genetic Management Plans approved by NMFS.

- Conducted local habitat restoration projects – The Shared Strategy for Puget Sound (a coalition of governments, tribes, and stakeholders) is leading significant long-term conservation of Chinook salmon and habitat. The 14 local watershed groups within the Shared Strategy completed draft watershed recovery plans in June 2004. The plans identify habitat actions necessary to achieve population viability goals within the watersheds. Local recovery plans describe actions that can be implemented both within 10 years and over a longer period of time. Projects also included the Snohomish estuary protection and restoration project. The City of Everett, the Tulalip Tribe, the port, and a coalition of interested groups continued working to protect and restore 1,500 acres of estuary.
- Removed a pipeline barrier to passage for several anadromous fish populations – The pipeline was removed by the Tacoma Public Utilities District.
- Improved forest management practices on Federal lands – The Northwest Forest Plan Aquatic Conservation Strategy is designed to conserve and restore salmon and steelhead habitat, and provides an anchor for Federal lands' contribution to salmon recovery.
- Conducted an ongoing ESA section 7 consultation on the Elwha Dam removal – The removal of this dam will greatly aid salmon recovery in this system. The project will restore freshwater habitat access, improve habitat conditions within the watershed, and improve estuary habitat at the mouth of the Elwha River.

Priority Recovery Actions Needed:
Priority recovery actions needed for this ESU include the following:

- Restore degraded floodplain and channel structure.
- Restore and protect estuarine habitat.
- Improve and restore degraded riparian forests and increase large woody debris recruitment.
- Restore natural sediment routing processes.
- Improve water quality.
- Curtail nearshore habitat loss and restore nearshore habitat quality.
- Restore natural hydrologic processes and improve flow management.
- Continue to improve hatchery and harvest management.

Recovery Priority Number: 1
With a high magnitude of threat, high recovery potential, and the presence of conflict, this ESU has been assigned a recovery priority number of one. The magnitude of threat to this ESU has been classified as high, because of strong risks to its abundance, productivity, spatial structure, and diversity (which largely have persisted since its status was first reviewed), and the fact that this ESU faces a strong extinction risk in the foreseeable future. This ESU does not meet the criteria for a moderate magnitude of threat (which stipulate that the species will not face extinction if recovery is temporarily held off, although there is a continuing population decline or threat to its habitat). Delaying recovery for this ESU would likely result in mounting extinction risks rather than maintaining the status quo level of risk. The recovery potential for this ESU has also been classified as high. Although numerous factors limit the recovery of this ESU, the source of these factors and their demographic impacts are relatively well understood and recovery planning is currently under way. Although it may be cost-prohibitive to completely address every limiting factor, it is likely that integrated reduction of most threats can achieve

recovery of this ESU. Finally, as a complex variety of activities and management practices continue to impact the conservation and recovery of all Pacific salmon ESUs listed under the ESA, NMFS has determined "conflict" exists with regard to this ESU. Taken together, these three factors correspond to a recovery priority number of one.

Snake River Fall-run Chinook ESU (*Oncorhynchus tshawytscha*)

Date Listed: April 22, 1992

Legal Status: Threatened

Recovery Plan Status:
A draft recovery plan for this ESU was developed in March of 1995, but was not adopted. No recovery plan has been completed for this ESU, but recovery planning is under way.

- Phase I – Technical Recovery Teams have identified independent populations and completed the population viability guidelines and ESU recovery goals.
- Phase II – Recovery planning has been initiated for this ESU.
- A draft recovery plan for this ESU is expected by December 2005.

Species Status:
The estimated historical abundance of the Snake River fall-run Chinook ESU is 72,000. The recent mean abundance of this ESU is 871. Since the time of listing or first review for this ESU, its productivity has improved, and its population abundance has improved.

Threats and Impacts:
Threats and impacts to the Snake River fall-run Chinook ESU include the following:

- Obstructions to fish passage along the migration corridor and poor survival in the mainstem
- Habitat loss and degradation
- Altered water temperatures and low river flows
- High mortality from harvest activities
- Predation

Conservation Actions:
Major accomplishments in 2002–2004 for this ESU include the following:

- Accomplished structural and operational modification to hydropower system
- Improved Federal land management practices – Land management plans of the U.S. Forest Service and Bureau of Land Management are being designed to protect and restore habitat.
- Improved water quality permitting procedures by working with the Environmental Protection Agency (EPA) to develop procedures that enhance salmon considerations
- Conducted local habitat restoration and restoration of stream flows – This work includes efforts by the Northwest Power Planning Council Fish and Wildlife Program, Pacific Coastal Salmon Recovery Fund (PCSRF), Natural Resources Conservation Service (NRCS), and the NOAA Restoration Center.
- Worked to improve water quantity via the Snake River basin adjudication settlement of water claims between the Nez Perce Tribe and the State of Idaho, including a program to improve instream flows in the Lemhi River – This was approved by Congress in late 2004, and expected by Idaho and the Nez Perce Tribe in 2005.
- Equipped hundreds of irrigation diversions with fish screens
- Reduced overall harvest rates

- Conducted conservation efforts at hatcheries – Started in the 1970s, the Lyons Ferry egg bank is an ongoing program that helps preserve diversity within the ESU, especially when the population declined to less than 100 fish in 1990. Broodstock has been building over time, and 2004 was the first year all facilities reached a capacity of 5 million smolts.

Priority Recovery Actions Needed:
Priority recovery actions needed for this ESU include the following:

- Improve survival in the migration corridor. Restoring the migration corridor, including the estuary, to a more normative ecological function would increase salmon survival above the current 9.85–23.6 percent survival rate for juvenile in-river migrants, potentially to as high as 50.8 percent survival.
- Continue the structural and operational modifications to hydropower dams to improve salmon survival in the migration corridor.
- Protect high-quality habitats.
- Conduct habitat restoration, as 80 percent of historical habitat for this ESU has been lost.
- Increase instream flows.
- Further reduce mortality from harvest activities, which is currently 35-40 percent of the run.
- Control predation.

Recovery Priority Number: 1
With a high magnitude of threat, high recovery potential, and the presence of conflict, this ESU has been assigned a recovery priority number of one. The magnitude of threat to this ESU has been classified as high, because of strong risks to its abundance, productivity, spatial structure, and diversity (which largely have persisted since its status was first reviewed), and the fact that this ESU faces a strong extinction risk in the foreseeable future. This ESU does not meet the criteria for a moderate magnitude of threat (which stipulate that the species will not face extinction if recovery is temporarily held off, although there is a continuing population decline or threat to its habitat). Delaying recovery for this ESU would likely result in mounting extinction risks rather than maintaining the status quo level of risk. The recovery potential for this ESU has also been classified as high. Although numerous factors limit the recovery of this ESU, the source of these factors and their demographic impacts are relatively well understood and recovery planning is currently under way. Although it may be cost-prohibitive to completely address every limiting factor, it is likely that integrated reduction of most threats can achieve recovery of this ESU. Finally, as a complex variety of activities and management practices continue to impact the conservation and recovery of all Pacific salmon ESUs listed under the ESA, NMFS has determined “conflict” exists with regard to this ESU. Taken together, these three factors correspond to a recovery priority number of one.

Snake River Spring/Summer-run Chinook ESU (*Oncorhynchus tshawytscha*)

Date Listed: April 22, 1992

Legal Status: Threatened

Recovery Plan Status:
A draft recovery plan for this ESU was developed in March 1995, but was not adopted. No recovery plan has been completed for this ESU, but recovery planning is under way.

- Phase I – Technical Recovery Teams have identified independent populations and completed the population viability guidelines and ESU recovery goals.
- Phase II – Recovery planning has been initiated for this ESU.
- A draft recovery plan for this ESU is expected by December 2005.

Species Status:
The estimated historical abundance of the Snake River spring/summer-run Chinook ESU is over 1.5 million. The recent mean abundance of this ESU is 9,700. Since the time of listing or first review for this ESU, its productivity has improved, and its population abundance has improved.

Threats and Impacts:
Threats and impacts to the Snake River spring/summer-run Chinook ESU include the following:

- Obstructions to fish passage along the migration corridor and poor survival in the mainstem
- Habitat loss and degradation
- Altered water temperatures and low river flows
- High mortality from harvest activities
- Predation

Conservation Actions:
Major accomplishments in 2002–2004 for this ESU include the following:

- Accomplished structural and operational modification to hydropower system
- Improved Federal land management practices – Land management plans of the U.S. Forest Service and Bureau of Land Management are being designed to protect and restore habitat.
- Improved water quality permitting procedures by working with the Environmental Protection Agency (EPA) to develop procedures that enhance salmon considerations
- Conducted local habitat restoration and restoration of stream flows – This work includes efforts by the Northwest Power Planning Council Fish and Wildlife Program, Pacific Coastal Salmon Recovery Fund (PCSRF), Natural Resources Conservation Service (NRCS), and the NOAA Restoration Center.
- Worked to improve water quantity via the Snake River basin adjudication settlement of water claims between the Nez Perce Tribe and the State of Idaho, including a program to improve instream flows in the Lemhi River – This was approved by Congress in late 2004, and expected by Idaho and the Nez Perce Tribe in 2005.
- Equipped hundreds of irrigation diversions with fish screens

- Reduced overall harvest rates
- Conducted conservation efforts at hatcheries

Priority Recovery Actions Needed:
Priority recovery actions needed for this ESU include:

- Improve survival in the migration corridor. Restoring the migration corridor, including the estuary, to a more normative ecological function would increase survival above the current 52.5 percent of juvenile migrants (including those transported around barriers), potentially to as high as 78.6 percent survival.
- Continue the structural and operational modifications to hydropower dams to improve salmon survival in the migration corridor.
- Protect high-quality habitats.
- Conduct habitat restoration.
- Increase instream flows.
- Further reduce mortality from harvest activities.
- Control predation.

Recovery Priority Number: 1
With a high magnitude of threat, high recovery potential, and the presence of conflict, this ESU has been assigned a recovery priority number of one. The magnitude of threat to this ESU has been classified as high, because of strong risks to its abundance, productivity, spatial structure, and diversity (which largely have persisted since its status was first reviewed), and the fact that this ESU faces a strong extinction risk in the foreseeable future. This ESU does not meet the criteria for a moderate magnitude of threat (which stipulate that the species will not face extinction if recovery is temporarily held off, although there is a continuing population decline or threat to its habitat). Delaying recovery for this ESU would likely result in mounting extinction risks rather than maintaining the status quo level of risk. The recovery potential for this ESU has also been classified as high. Although numerous factors limit the recovery of this ESU, the source of these factors and their demographic impacts are relatively well understood and recovery planning is currently under way. Although it may be cost-prohibitive to completely address every limiting factor, it is likely the integrated reduction of most threats can achieve recovery of this ESU. Finally, as a complex variety of activities and management practices continue to impact the conservation and recovery of all Pacific salmon ESUs listed under the ESA, NMFS has determined "conflict" exists with regard to this ESU. Taken together, these three factors correspond to a recovery priority number of one.

Upper Columbia River Spring-run Chinook ESU (*Oncorhynchus tshawytscha*)

Date Listed: March 24, 1999

Legal Status: Endangered

Recovery Plan Status:
No recovery plan has been completed, but recovery planning is under way.

- Phase I – Technical Recovery Teams have identified independent populations and completed the population viability guidelines and ESU recovery goals.
- Phase II – Recovery planning has been initiated for this ESU.
- A draft recovery plan for this ESU is expected by December 2005.

Species Status:
The estimated historical abundance of the Upper Columbia River spring-run Chinook ESU is 6,450. The recent mean abundance of this ESU is 620. Since the time of listing or first review for this ESU, its productivity has improved, and its population abundance has improved.

Threats and Impacts:
Threats and impacts to the Upper Columbia River spring-run Chinook ESU include the following:

- Obstructions to fish passage along the migration corridor
- Habitat loss and degradation
- Altered water temperatures and low river flows

Conservation Actions:
Major accomplishments in 2002–2004 for this ESU include the following:

- Accomplished hydropower operational changes
- Conducted and facilitated local habitat restoration and protection projects – Conservation easements and land purchases of riparian areas along rivers and streams have been used to protect critical spawning and rearing areas; the Natural Resources Conservation Service (NRCS) conservation reserve and enhancement program protects riparian areas on farms and ranches.
- Equipped 16 to 18 irrigation diversion withdrawals with screens, leading to greater productivity and abundance
- Conducted complex negotiations each season through *U.S. v. Oregon* to direct Columbia River harvest rates and fishery structure for the protection of listed Chinook salmon
- Implemented continued improvements in juvenile and adult passage, significant improvements in hatchery programs to benefit salmon conservation, and substantial habitat actions in the tributaries of the Columbia River under the Mid Columbia Habitat Conservation Plan (HCP)

Priority Recovery Actions Needed:
Priority recovery actions needed for this ESU include the following:

- Protect high-quality habitat.

- Improve fish passage at barriers along the migration corridor.
- Improve flow management.
- Restore habitat and increase habitat complexity.

Recovery Priority Number: 1

With a high magnitude of threat, high recovery potential, and the presence of conflict, this ESU has been assigned a recovery priority number of one. The magnitude of threat to this ESU has been classified as high, because of strong risks to its abundance, productivity, spatial structure, and diversity (which largely have persisted since its status was first reviewed), and the fact that this ESU faces a strong extinction risk in the foreseeable future. This ESU does not meet the criteria for a moderate magnitude of threat (which stipulate that the species will not face extinction if recovery is temporarily held off, although there is a continuing population decline or threat to its habitat). Delaying recovery for this ESU would likely result in mounting extinction risks rather than maintaining the status quo level of risk. The recovery potential for this ESU has also been classified as high. Although numerous factors limit the recovery of this ESU, the source of these factors and their demographic impacts are relatively well understood and recovery planning is currently under way. Although it may be cost-prohibitive to completely address every limiting factor, it is likely that integrated reduction of most threats can achieve recovery of this ESU. Finally, as a complex variety of activities and management practices continue to impact the conservation and recovery of all Pacific salmon ESUs listed under the ESA, NMFS has determined "conflict" exists with regard to this ESU. Taken together, these three factors correspond to a recovery priority number of one.

Upper Willamette River Chinook ESU (*Oncorhynchus tshawytscha*)

Date Listed: March 24, 1999

Legal Status: Threatened

Recovery Plan Status:
No recovery plan has been completed, but recovery planning is under way.

- Phase I – Technical Recovery Teams have identified independent populations and completed the population viability guidelines and ESU recovery goals.
- Phase II – Recovery planning has been initiated for this ESU.
- A draft recovery plan for this ESU is expected by December 2005.

Species Status:
The estimated historical abundance of the Upper Willamette River Chinook ESU is 300,000. The recent mean abundance of this ESU is 1,787. Since the time of listing or first review for this ESU, its productivity has remained unchanged, and its population abundance has remained unchanged.

Threats and Impacts:
Threats and impacts to the Upper Willamette River Chinook ESU include the following:

- Reduced access to spawning and rearing because of hydropower systems
- Altered water quality and temperature cause by tributary hydropower and development
- Lost and degraded floodplain connectivity and lowland stream habitat (from hydropower/flood control, development, loss of large wood, and streambank hardening)
- Altered streamflow (from tributary hydropower/flood control and water withdrawals)
- Hatchery impacts

Conservation Actions:
Major accomplishments in 2002–2004 for this ESU include the following:

- Improved harvest management – Selective fisheries have been designed to reduce impacts to wild fish by more than 75 percent, while retaining recreational and commercial fisheries.
- Instituted hatchery reforms – Recent changes have helped develop locally adapted broodstocks and have reintroduced fish into habitats above impassable dams to explore the potential for reestablishing self-sustaining populations in those areas.
- Facilitated improved dam management – The U.S. Army Corps of Engineers has modified releases from its 13 multipurpose dams and reservoirs to benefit salmon; Federal Energy Regulatory Commission (FERC) relicensing settlements have improved salmon passage and survival at other hydropower projects.
- Conducted local habitat restoration projects – Hundreds of projects during 2002–2004 have improved riparian areas, fish passage at barriers, and stream function. Some local governments have also upgraded their ordinances to offer greater habitat protection.
- Improved forest management practices on Federal lands – The Northwest Forest Plan Aquatic Conservation Strategy is designed to conserve and restore salmon and steelhead habitat, and provides an anchor for Federal lands' contribution to salmon recovery.

Priority Recovery Actions Needed:
Priority recovery actions needed for this ESU include the following:

- Provide fish passage at Federal dams, private dams, and small passage blockages. Dams operated by the U.S. Army Corps of Engineers block access to most historical spawning habitat for this ESU, forcing fish to spawn in lower-quality, accessible habitat. A number of private dams, road crossings, and culverts also block or impede fish passage.
- Improve water quality by retrofitting large Federal dams to provide more normative temperature regimes downstream. Reduce point and non-point sources of thermal and toxic pollution and continue to clean up contaminated stream reaches.
- Conduct habitat restoration, particularly in lowland floodplain stream reaches where channel complexity and floodplain connectivity are severely degraded. Lack of quality rearing habitat in these reaches, which are predominantly surrounded by private land, is a major limiting factor for this ESU. Stream restoration in forested reaches and the lower mainstem Willamette River and its tributaries would also be beneficial.
- Improve flow management at Federal and private dams to ensure safe migration, rearing, spawning, and incubation conditions for Chinook salmon. Establish minimum instream flows in tributaries with excessive water withdrawals that limit water availability and therefore affect salmon migration and reproduction.
- Continue improving management of hatchery fish, especially by improving hatchery collection facilities that currently injure, delay, and kill listed fish. Consider using hatchery fish to reestablish naturally self-sustaining Chinook populations above Federal dams.

Recovery Priority Number: 1
With a high magnitude of threat, high recovery potential, and the presence of conflict, this ESU has been assigned a recovery priority number of one. The magnitude of threat to this ESU has been classified as high, because of strong risks to its abundance, productivity, spatial structure, and diversity (which largely have persisted since its status was first reviewed), and the fact that this ESU faces a strong extinction risk in the foreseeable future. This ESU does not meet the criteria for a moderate magnitude of threat (which stipulate that the species will not face extinction if recovery is temporarily held off, although there is a continuing population decline or threat to its habitat). Delaying recovery for this ESU would likely result in mounting extinction risks rather than maintaining the status quo level of risk. The recovery potential for this ESU has also been classified as high. Although numerous factors limit the recovery of this ESU, the source of these factors and their demographic impacts are relatively well understood and recovery planning is currently under way. Although it may be cost-prohibitive to completely address every limiting factor, it is likely that integrated reduction of most threats can achieve recovery of this ESU. Finally, as a complex variety of activities and management practices continue to impact the conservation and recovery of all Pacific salmon ESUs listed under the ESA, NMFS has determined "conflict" exists with regard to this ESU. Taken together, these three factors correspond to a recovery priority number of one.

Columbia River Chum ESU (*Oncorhynchus keta*)

Date Listed: March 25, 1999

Legal Status: Threatened

Recovery Plan Status:
No recovery plan has been completed, but recovery planning is under way.

- Phase I – Technical Recovery Teams have identified independent populations and completed the population viability guidelines and ESU recovery goals.
- Phase II – Recovery planning has been initiated for this ESU.
- Washington's Lower Columbia Fish Recovery Board completed a plan for the Washington portion of this ESU in December 2004. This plan will be released by NMFS for public comment in 2005. Once these comments are incorporated, the plan will be used as an interim recovery plan pending completion of the Oregon portion.

Species Status:
The estimated historical abundance of the Columbia River chum ESU is 500,000. The recent mean abundance of this ESU is 755. Since the time of listing or first review for this ESU, its productivity has improved, and its population abundance has improved.

Threats and Impacts:
Threats and impacts to the Columbia River chum ESU include the following:

- Altered channel form and stability in tributaries (from forest practices, agriculture, and development)
- Excessive sediment in tributary spawning gravels (from forest practices, agriculture, and development)
- Altered stream flow in tributaries and the mainstem (from hydropower and water supply operations)
- Loss of some habitat types in tributaries
- Harassment of spawners in tributaries and the mainstem Columbia River (by humans and livestock)

Conservation Actions:
Major accomplishments for this ESU in 2002–2004 include the following:

- Maintained hydropower operational changes established in 2000 – Federal hydrosystem flow operations continued to be managed to optimize mainstem Columbia River chum habitat through the fall and winter spawning and incubation periods, while conserving water to support spring and summer juvenile migrants from other ESUs.
- Conducted habitat restoration projects – Federal, state, and local governments and private entities carried out several habitat restoration projects to increase natural production and add to the ESU's spatial structure, helping to protect against catastrophic loss.
- Improved forest management practices on Federal lands and some state and private lands – The Northwest Forest Plan Aquatic Conservation Strategy was continued, and is designed to conserve and restore salmon and steelhead habitat and provide an anchor for Federal lands' contribution to salmon recovery. Implementation of forest practices

consistent with the Washington Forest and Fish Agreement, to which NMFS is a party, will improve aquatic habitat conditions for fish and wildlife on state and private lands in Washington State.

- Developed "adult capture/juvenile release" hatchery programs – Adults taken from the wild are spawned in a hatchery and the resulting juveniles are released to rear in natural habitat. These programs are designed to reseed historical habitat while minimizing the risk of reduced reproductive success due to captivity.
- Completed a draft recovery plan for the Washington portion of this ESU – This plan was completed by the Lower Columbia Fish Recovery Board in December 2004; NMFS will make it available for comment in 2005.

Priority Recovery Actions Needed:
Priority recovery actions needed for this ESU include:

- Monitor and evaluate the effects of a mainstem hydrosystem flow management strategy (reverse-load factoring) at spawning areas below Bonneville Dam. The strategy could cause delay and prespawning mortality.
- Restore and protect natural channel processes at additional tributary sites. On-site work will include reconnecting lower tributary mainstems with side channels and flood plains.
- Restore historical populations in Columbia River tributaries where there is currently no known spawning activity.
- Conduct restoration projects to increase shallow water rearing habitat in the lower Columbia River, and monitor and evaluate to determine how much additional restoration is needed.
- Develop land and water use practices that avoid continued degradation and loss of chum spawning and rearing habitat.

Recovery Priority Number: 1
With a high magnitude of threat, high recovery potential, and the presence of conflict, this ESU has been assigned a recovery priority number of one. The magnitude of threat to this ESU has been classified as high, because of strong risks to its abundance, productivity, spatial structure, and diversity (which largely have persisted since its status was first reviewed), and the fact that this ESU faces a strong extinction risk in the foreseeable future. This ESU does not meet the criteria for a moderate magnitude of threat (which stipulate that the species will not face extinction if recovery is temporarily held off, although there is a continuing population decline or threat to its habitat). Delaying recovery for this ESU would likely result in mounting extinction risks rather than maintaining the status quo level of risk. The recovery potential for this ESU has also been classified as high. Although numerous factors limit the recovery of this ESU, the source of these factors and their demographic impacts are relatively well understood and recovery planning is currently under way. Although it may be cost-prohibitive to completely address every limiting factor, it is likely that integrated reduction of most threats can achieve recovery of this ESU. Finally, as a complex variety of activities and management practices continue to impact the conservation and recovery of all Pacific salmon ESUs listed under the ESA, NMFS has determined "conflict" exists with regard to this ESU. Taken together, these three factors correspond to a recovery priority number of one.

Hood Canal Summer-run Chum ESU (*Oncorhynchus keta*)

Date Listed: March 25, 1999

Legal Status: Threatened

Recovery Plan Status:
No recovery plan has been completed, but recovery planning is under way.
- Phase I – Technical Recovery Teams have identified independent populations and completed the population viability guidelines and ESU recovery goals.
- Phase II – Recovery planning has been initiated for this ESU.
- A draft recovery plan for this ESU is expected by December 2005.

Species Status:
The estimated historical abundance of the Hood Canal summer-run chum ESU is 40,000. The recent mean abundance of this ESU is 6,500. Since the time of listing or first review for this ESU, its productivity has improved, and its population abundance has improved.

Threats and Impacts:
Threats and impacts to the Hood Canal summer-run chum ESU include the following:
- Habitat loss and degradation
- Poor water quality

Conservation Actions:
Major accomplishments in 2002–2004 for this ESU include the following:
- Reduced impacts from harvest activities
- Conducted collaborative habitat restoration efforts with the Washington Department of Fish and Wildlife and the Point No Point Treaty Council; projects in the Jimmycomelately Creek in partnership with the Jamestown S'Klallam tribes; and other projects in the Snow/Salmon, Chimacum, Tahuya, and Dewatto watersheds
- Conducted conservation efforts at hatcheries, including 115 proposed individual Hatchery and Genetic Management Plans (HGMPs) to help hatchery programs conserve this ESU.
- Implemented the Puget Sound Harvest Management Plan – The plan establishes an annual fishing regime designed to minimize incidental take of summer chum salmon, while providing an opportunity for fisheries conducted for other species. The regime includes complete closure of some terminal fisheries, non-retention of summer chum, and gear restrictions.
- Implemented the upgraded Forest Practice Rules to reduce impacts on salmon habitat from forestry activities
- Issued a 4(d) limit for the Washington State Department of Transportation Routine Road Maintenance activities – The limit is implemented by local governments.
- Completed several sections of a draft salmon recovery plan – The Hood Canal Coordinating Council completed these sections of the plan.

Priority Recovery Actions Needed:
Conservation and recovery actions needed for this ESU include the following:

- Restore degraded floodplain and channel structure.
- Restore and protect estuarine habitat.
- Restore degraded riparian forest and enhance large woody debris recruitment.
- Restore natural sediment routing processes.
- Restore natural hydrologic processes and improve flow management.
- Continue to improve hatchery and harvest management.

Recovery Priority Number: 1
With a high magnitude of threat, high recovery potential, and the presence of conflict, this ESU has been assigned a recovery priority number of one. The magnitude of threat to this ESU has been classified as high, because of strong risks to its abundance, productivity, spatial structure, and diversity (which largely have persisted since its status was first reviewed), and the fact that this ESU faces a strong extinction risk in the foreseeable future. This ESU does not meet the criteria for a moderate magnitude of threat (which stipulate that the species will not face extinction if recovery is temporarily held off, although there is a continuing population decline or threat to its habitat). Delaying recovery for this ESU would likely result in mounting extinction risks rather than maintaining the status quo level of risk. The recovery potential for this ESU has also been classified as high. Although numerous factors limit the recovery of this ESU, the source of these factors and their demographic impacts are relatively well understood and recovery planning is currently under way. Although it may be cost-prohibitive to completely address every limiting factor, it is likely that integrated reduction of most threats can achieve recovery of this ESU. Finally, as a complex variety of activities and management practices continue to impact the conservation and recovery of all Pacific salmon ESUs listed under the ESA, NMFS has determined "conflict" exists with regard to this ESU. Taken together, these three factors correspond to a recovery priority number of one.

Oregon Coast Coho ESU (*Oncorhynchus kisutch*)

Date Listed: August 10, 1998; June 14, 2004 (proposed)

Legal Status: Proposed Threatened
The Oregon Coast coho ESU was listed as threatened on August 10, 1998. On February 24, 2004, a court order set aside ESA protection for this ESU. This ESU is currently proposed for relisting as a threatened species, as published in a proposed rule on June 14, 2004.

Recovery Plan Status:
No recovery plan has been completed, but recovery planning is under way.

- Phase I – Technical Recovery Teams have identified independent populations. The population viability guidelines and ESU recovery goals for this ESU will be completed in June 2005.
- Phase II – Recovery planning has been initiated for this ESU.
- A draft recovery plan for this ESU is expected by December 2005.

Species Status:
The estimated historical abundance of the Oregon Coast coho ESU is 1.5 million. The recent mean abundance of this ESU is 86,474. Since the time of first review for this ESU, its productivity has improved, and its population abundance has improved.

Threats and Impacts:
Threats and impacts to the Oregon coast coho ESU include the following:

- Habitat degradation and loss
- Reduced habitat complexity
- Limited habitat capacity for juvenile rearing

Conservation Actions:
Major accomplishments in 2002–2004 for this ESU include the following:

- Conducted habitat restoration efforts – The State of Oregon, Tribal governments, cities and counties, local watershed councils, private landowners, and projects funded through the NOAA Restoration Center opened 237 stream miles of habitat (by removing or upgrading 227 blockages through fish passage projects), installed fish screens, restored wetlands, fenced and planted riparian areas, and added large wood to streams to improve spawning and rearing habitat.
- Improved forest management practices on Federal lands – The Northwest Forest Plan Aquatic Conservation Strategy is designed to conserve and restore salmon and steelhead habitat, and provides an anchor for coho salmon recovery. ESA section 7 consultations with the U.S. Forest Service and Bureau of Land Management improved land management actions to protect and restore habitat.
- Achieved substantial reductions in mortality from harvest activities – The State of Oregon continued to implement ocean and freshwater fisheries in accordance with Amendment 13 of the Pacific Fisheries Management Council's Pacific Salmon Plan.
- Implemented hatchery reforms – Oregon significantly decreased the number of hatchery coho smolts released in coastal rivers. Hatchery and Genetic Management Plans are

being developed and will reduce impacts to (and may help with conservation of) coho salmon.
- Coordinated with the State of Oregon on the adoption of its Native Fish Conservation policy – This is a science-based process for managing fisheries, hatcheries and habitat.
- Improved road maintenance on state and private forest lands

Priority Recovery Actions Needed:
Priority recovery actions needed for this ESU include the following:
- Continue to evaluate implementation of Amendment 13 of the Pacific Salmon Plan addressing fishery harvest impacts.
- Finalize and implement Hatchery and Genetic Management Plans for the remaining hatcheries in the ESU.
- Continue to identify and remove fish passage barriers in high-priority coho spawning and rearing habitat.
- Protect habitat through implementation of the Northwest Forest Plan's Aquatic Conservation Strategy and continued ESA consultations with Federal agencies.
- Protect and restore habitat by fencing and planting riparian areas, placing large wood in streams to trap sediment and increase habitat complexity, and protecting and restoring off-channel winter rearing habitat in floodplains and tributaries. Also, protect beaver populations to increase coho habitat created by beaver activity in coastal areas.
- Continue to protect and restore habitat through actions by local watershed councils and landowners.

Recovery Priority Number: 1
With a high magnitude of threat, high recovery potential, and the presence of conflict, this ESU has been assigned a recovery priority number of one. The magnitude of threat to this ESU has been classified as high, because of strong risks to its abundance, productivity, spatial structure, and diversity (which largely have persisted since its status was first reviewed), and the fact that this ESU faces a strong extinction risk in the foreseeable future. This ESU does not meet the criteria for a moderate magnitude of threat (which stipulate that the species will not face extinction if recovery is temporarily held off, although there is a continuing population decline or threat to its habitat). Delaying recovery for this ESU would likely result in mounting extinction risks rather than maintaining the status quo level of risk. The recovery potential for this ESU has also been classified as high. Although numerous factors limit the recovery of this ESU, the source of these factors and their demographic impacts are relatively well understood and recovery planning is currently under way. Although it may be cost-prohibitive to completely address every limiting factor, it is likely that integrated reduction of most threats can achieve recovery of this ESU. Finally, as a complex variety of activities and management practices continue to impact the conservation and recovery of all Pacific salmon ESUs listed under the ESA, NMFS has determined "conflict" exists with regard to this ESU. Taken together, these three factors correspond to a recovery priority number of one.

Ozette Lake Sockeye ESU (*Oncorhynchus nerka*)

Date Listed: March 25, 1999

Legal Status: Threatened

Recovery Plan Status:
No recovery plan has been completed, but recovery planning is under way.

- Phase I – Technical Recovery Teams have identified independent populations and completed the population viability guidelines and ESU recovery goals.
- Phase II – Recovery planning has been initiated for this ESU.
- A draft recovery plan for this ESU is expected by December 2005.

Species Status:
The estimated historical abundance of the Ozette Lake sockeye ESU is 18,000. The recent mean abundance of this ESU is 1,108. Since the time of listing or first review for this ESU, the productivity and population abundance trends remain uncertain.

Threats and Impacts:
Threats and impacts to the Ozette Lake sockeye ESU include the following:

- Loss of spawning habitat
- Degradation of lake habitat
- Altered flow regime in streams
- Predation by marine mammals

Conservation Actions:
Major accomplishments in 2002–2004 for this ESU include the following:

- Conducted conservation efforts at hatcheries
- Accomplished a reduction of impacts from harvest activities
- Approved the Washington State Department of Transportation's Routine Road Maintenance 4(d) limit and its implementation by Clallam County
- Implemented the upgraded Forestry Practice Rules, to which forestry activities are now subject
- Contributed to a state-tribal joint research management plan – The Lake Ozette Sockeye Salmon Resource Management Plan (RMP) guides the State of Washington and the Makah Tribe activities to increase the number of naturally producing fish.
- Implemented significant harvest management restrictions designed to protect Lake Ozette sockeye – No fisheries directed at Ozette Lake sockeye are planned until the population is recovered.
- Conducted meetings of the Lake Ozette Steering Committee to develop technical information to support proposed recovery actions

Priority Recovery Actions Needed:
Conservation and recovery actions needed for this ESU include the following:

- Restore sediment routing processes.
- Restore large woody debris recruitment and riparian habitat.

- Restore degraded tributary and river habitat structure.
- Control pinniped and mammal predation.
- Restore natural river and lake hydrologic processes.
- Improve forest management practices.

Recovery Priority Number: 1

With a high magnitude of threat, high recovery potential, and the presence of conflict, this ESU has been assigned a recovery priority number of one. The magnitude of threat to this ESU has been classified as high, because of strong risks to its abundance, productivity, spatial structure, and diversity (which largely have persisted since its status was first reviewed), and the fact that this ESU faces a strong extinction risk in the foreseeable future. This ESU does not meet the criteria for a moderate magnitude of threat (which stipulate that the species will not face extinction if recovery is temporarily held off, although there is a continuing population decline or threat to its habitat). Delaying recovery for this ESU would likely result in mounting extinction risks rather than maintaining the status quo level of risk. The recovery potential for this ESU has also been classified as high. Although numerous factors limit the recovery of this ESU, the source of these factors and their demographic impacts are relatively well understood and recovery planning is currently under way. Although it may be cost-prohibitive to completely address every limiting factor, it is likely that integrated reduction of most threats can achieve recovery of this ESU. Finally, as a complex variety of activities and management practices continue to impact the conservation and recovery of all Pacific salmon ESUs listed under the ESA, NMFS has determined "conflict" exists with regard to this ESU. Taken together, these three factors correspond to a recovery priority number of one.

Snake River Sockeye ESU (*Oncorhynchus nerka*)

Date Listed: November 20, 1991

Legal Status: Endangered

Recovery Plan Status:
A draft plan was developed in March 1995, but was not adopted. No recovery plan has been completed, but recovery planning is under way.

- Phase I – Technical Recovery Teams have identified independent populations and completed the population viability guidelines and ESU recovery goals.
- Phase II – Recovery planning has been initiated for this ESU.
- A draft recovery plan for this ESU is expected by December 2005.

Species Status:
The estimated historical abundance of this ESU is 4,400. The recent mean abundance of the Snake River sockeye ESU is 4. Since the time of listing or first review for this ESU, its productivity has improved, and its population abundance has improved.

Threats and Impacts:
Threats and impacts to the Snake River sockeye ESU include the following:

- Obstructions to fish passage along the migration corridor
- Poor survival in the mainstem
- Habitat loss and degradation
- Altered water temperatures and low river flow
- High mortality from harvest activities – There may be some harvest in the Zone 6 gillnet fishery.
- Predation

Conservation Actions:
Major accomplishments in 2002–2004 for this ESU include the following:

- Accomplished structural and operational modification to hydropower system
- Improved Federal land management practices – Land management plans of the U.S. Forest Service and Bureau of Land Management are being designed to protect and restore habitat.
- Improved water quality permitting procedures by working with EPA to develop procedures that enhance salmon considerations
- Conducted local habitat restoration and restoration of stream flows – This work includes efforts by the Northwest Power Planning Council Fish and Wildlife Program, Pacific Coastal Salmon Recovery Fund (PCSRF), Natural Resources Conservation Service (NRCS), and the NOAA Restoration Center.
- Equipped hundreds of irrigation diversions with fish screens
- Worked to improve water quantity via the Snake River basin adjudication settlement of water claims between the Nez Perce Tribe and the State of Idaho, including a program to improve instream flows in the Lemhi River – This was approved by Congress in late 2004, and expected by Idaho and the Nez Perce Tribe in 2005.

- Reduced overall harvest rates
- Conducted conservation efforts at hatcheries – The captive broodstock program produces 200,000 embryos annually.

Priority Recovery Actions Needed:
Priority recovery actions needed for this ESU include the following:

- Improve survival in the migration corridor by increasing or maintaining necessary water flows for smolts, and by transporting adults to natal lakes. Maintaining discharges of 80 to 100 percent of mean May Salmon River flows for smolts is likely to result in an approximate 20 percent increase in downstream sockeye salmon detections. The current trend of poor adult survival from Lower Granite Dam (LGD) upstream to Sawtooth Basin spawning areas poses a severe threat to sockeye salmon survival. Adult trapping at LGD and subsequent transport to natal lakes would provide a marked increase in survival and potentially boost natural production.
- Continue the structural and operational modifications to hydropower dams to improve salmon survival in the migration corridor.
- Protect high-quality habitats.
- Conduct habitat restoration.
- Increase instream flows.
- Further reduce mortality from harvest activities; actual harvest rates over the past 5 years have ranged between 5 and 15 percent of the run each year.
- Control predation.

Recovery Priority Number: 1
With a high magnitude of threat, high recovery potential, and the presence of conflict, this ESU has been assigned a recovery priority number of one. The magnitude of threat to this ESU has been classified as high, because of strong risks to its abundance, productivity, spatial structure, and diversity (which largely have persisted since its status was first reviewed), and the fact that this ESU faces a strong extinction risk in the foreseeable future. This ESU does not meet the criteria for a moderate magnitude of threat (which stipulate that the species will not face extinction if recovery is temporarily held off, although there is a continuing population decline or threat to its habitat). Delaying recovery for this ESU would likely result in mounting extinction risks rather than maintaining the status quo level of risk. The recovery potential for this ESU has also been classified as high. Although numerous factors limit the recovery of this ESU, the source of these factors and their demographic impacts are relatively well understood and recovery planning is currently under way. Although it may be cost-prohibitive to completely address every limiting factor, it is likely that integrated reduction of most threats can achieve recovery of this ESU. Finally, as a complex variety of activities and management practices continue to impact the conservation and recovery of all Pacific salmon ESUs listed under the ESA, NMFS has determined "conflict" exists with regard to this ESU. Taken together, these three factors correspond to a recovery priority number of one.

Lower Columbia River Steelhead ESU (*Oncorhynchus mykiss*)

Date Listed: March 19, 1998

Legal Status: Threatened

Recovery Plan Status:
No recovery plan has been completed, but recovery planning is under way.

- Phase I – Technical Recovery Teams have identified independent populations and completed the population viability guidelines and ESU recovery goals.
- Phase II – Recovery planning has been initiated for this ESU.
- Washington's Lower Columbia Fish Recovery Board completed a plan for the Washington portion of this ESU in December 2004. The plan will be released by NMFS for public comment in 2005. Once these comments are incorporated, it will be used as an interim recovery plan pending completion of the Oregon portion.

Species Status:
The estimated historical abundance of the Lower Columbia River steelhead ESU is 25,500. The recent mean abundance of this ESU is 4,050. Since the time of listing or first review for this ESU, its productivity has improved, and its population abundance has improved.

Threats and Impacts:
Threats and impacts to the Lower Columbia River steelhead ESU include the following:

- Degraded floodplain and stream channel structure and function (from forest practices, agriculture, and development)
- Reduced access to spawning and rearing habitat (from tributary hydropower systems)
- Altered streamflow (from tributary hydropower systems)
- Excessive sediment and elevated water temperature in tributaries (from forest practices, agriculture, and development)
- Hatchery impacts (from programs releasing non-ESU steelhead)

Conservation Actions:
Major accomplishments for this ESU in 2002–2004 include the following:

- Accomplished hydropower operational changes – NMFS began implementation of the Cowlitz River Settlement Agreement (under Federal Energy Regulatory Commission relicensing) and completed the Lewis River Settlement Agreement. These agreements included reintroduction efforts to previously blocked habitat, improved flow releases, dam passage survival studies and plans for improvements, and habitat improvements. NMFS also began implementation of the Settlement Agreement for the Powerdale Hydroelectric Project, which will improve fish passage conditions in the Hood River and result in the removal of Powerdale Dam in 2010, and implementation of the Settlement Agreement for the Bull Run Hydroelectric Project, which will result in the removal of Marmot Dam in 2007 and restoration of unimpeded passage in the Sandy River.
- Conducted local habitat restoration projects
- Improved forest management practices on Federal lands and on some state and private lands – The Northwest Forest Plan Aquatic Conservation Strategy continued during

2002–2004 , and is designed to conserve and restore salmon and steelhead habitat and provide an anchor for Federal lands' contribution to salmon recovery. Implementation of forest practices rules consistent with the Washington Forest and Fish Agreement, to which NMFS is a party, will improve aquatic habitat conditions for fish and wildlife on state and private forest lands in Washington.

- Instituted hatchery reforms to reduce the effects of hatcheries on naturally produced populations
- Improved management of in-river fisheries through the implementation of Fisheries Management and Evaluation Plans designed to minimize impacts from fisheries on wild steelhead – Recent improvements include reductions in impacts to juvenile steelhead from resident trout fisheries; harvest impacts on wild steelhead have been reduced from a historical high of 75 percent to an overall impact of 8.5 percent of the population.
- Completed a draft recovery plan for the Washington portion of this ESU – The plan was completed by the Lower Columbia River Recovery Board in December 2004.

Priority Recovery Actions Needed:

Priority recovery actions needed for this ESU include the following:

- Provide fish passage at tributary dams and small passage blockages including road crossings and culverts blocking or impeding fish passage. Where fish passage efforts at tributary dams are under way, continue to improve juvenile and adult passage survival.
- Improve flow management below tributary dams. Refine releases to enhance fish protection, which is an especially problematic issue during extreme low water years.
- Improve land use practices affecting water quality, channel stability, and floodplain function to prevent further degradation of these habitat attributes and to protect existing habitat, especially in lowland stream reaches. Conduct habitat restoration to restore degraded water quality, channel stability, and floodplain function and associated watershed processes.
- Further improve hatchery practices, including continued reform and management of hatchery programs releasing non-ESU steelhead to support selective fisheries, and the continued reintroduction of steelhead into historical habitat using appropriate hatchery stocks.
- Improve ocean fisheries management.

Recovery Priority Number: 1

With a high magnitude of threat, high recovery potential, and the presence of conflict, this ESU has been assigned a recovery priority number of one. The magnitude of threat to this ESU has been classified as high, because of strong risks to its abundance, productivity, spatial structure, and diversity (which largely have persisted since its status was first reviewed), and the fact that this ESU faces a strong extinction risk in the foreseeable future. This ESU does not meet the criteria for a moderate magnitude of threat (which stipulate that the species will not face extinction if recovery is temporarily held off, although there is a continuing population decline or threat to its habitat). Delaying recovery for this ESU would likely result in mounting extinction risks rather than maintaining the status quo level of risk. The recovery potential for this ESU has also been classified as high. Although numerous factors limit the recovery of this ESU, the source of these factors and their demographic impacts are relatively well understood and recovery planning is currently under way. Although it may be cost-prohibitive to completely

address every limiting factor, it is likely that integrated reduction of most threats can achieve recovery of this ESU. Finally, as a complex variety of activities and management practices continue to impact the conservation and recovery of all Pacific salmon ESUs listed under the ESA, NMFS has determined "conflict" exists with regard to this ESU. Taken together, these three factors correspond to a recovery priority number of one.

Middle Columbia River Steelhead ESU (*Oncorhynchus mykiss*)

Date Listed: March 25, 1999

Legal Status: Threatened

Recovery Plan Status:
No recovery plan has been completed, but recovery planning is under way.

- Phase I – Technical Recovery Teams have identified independent populations and completed the population viability guidelines and ESU recovery goals.
- Phase II – Recovery planning has been initiated for five populations of this ESU located in Washington, but not for the remaining populations of the ESU located in Oregon and Washington.
- A draft recovery plan for this ESU is expected by December 2005 in two Washington river basins – the Yakima and Walla Walla River basins. A detailed outline of a recovery plan will be developed for the remaining 12 steelhead populations located in Washington and Oregon.

Species Status:
The estimated historical abundance of the Middle Columbia River steelhead ESU is 300,000. The recent mean abundance of this ESU is 9,013. Since the time of listing or first review for this ESU, its productivity has improved, and its population abundance has improved.

Threats and Impacts:
Threats and impacts to the Middle Columbia River Steelhead ESU include the following:

- Obstructions to fish passage along the migration corridor
- Habitat loss and degradation
- Altered water temperatures and low river flows

Conservation Actions:
Major accomplishments in 2002–2004 for this ESU include the following:

- Accomplished hydropower operational changes
- Conducted local habitat restoration projects, including reconnecting streams and side channels (e.g., Wilson Creek, Yakima River and Castile Falls, and Klickitat River) – Conservation easements and land purchases of riparian areas along rivers and streams were used to protect critical spawning and rearing areas. The Natural Resources Conservation Service (NRCS) conservation reserve and enhancement program protects riparian areas on farms and ranches (e.g., the Walla Walla River Basin).
- Conducted complex negotiations each season through *U.S. v. Oregon* to direct Columbia River harvest rates and fishery structure for the protection of listed steelhead
- Equipped six to eight irrigation diversion withdrawals with screens, leading to greater productivity and abundance
- Conducted water conservation projects in over-appropriated streams (where available water is insufficient to meet existing water rights) to transfer water rights to a state trust water program

Priority Recovery Actions Needed:
Priority recovery actions needed for this ESU include the following:

- Protect high-quality habitat.
- Improve fish passage at barriers along the migration corridor.
- Improve management of river flows to benefit salmon.
- Restore habitat and increase habitat complexity.

Recovery Priority Number: 1
With a high magnitude of threat, high recovery potential, and the presence of conflict, this ESU has been assigned a recovery priority number of one. The magnitude of threat to this ESU has been classified as high, because of strong risks to its abundance, productivity, spatial structure, and diversity (which largely have persisted since its status was first reviewed), and the fact that this ESU faces a strong extinction risk in the foreseeable future. This ESU does not meet the criteria for a moderate magnitude of threat (which stipulate that the species will not face extinction if recovery is temporarily held off, although there is a continuing population decline or threat to its habitat). Delaying recovery for this ESU would likely result in mounting extinction risks rather than maintaining the status quo level of risk. The recovery potential for this ESU has also been classified as high. Although numerous factors limit the recovery of this ESU, the source of these factors and their demographic impacts are relatively well understood and recovery planning is currently under way. Although it may be cost-prohibitive to completely address every limiting factor, it is likely that integrated reduction of most threats can achieve recovery of this ESU. Finally, as a complex variety of activities and management practices continue to impact the conservation and recovery of all Pacific salmon ESUs listed under the ESA, NMFS has determined "conflict" exists with regard to this ESU. Taken together, these three factors correspond to a recovery priority number of one.

Snake River Basin Steelhead ESU (*Oncorhynchus mykiss*)

Date Listed: August 18, 1997

Legal Status: Threatened

Recovery Plan Status:
No recovery plan has been completed, but recovery planning is under way.

- Phase I – Technical Recovery Teams have identified independent populations and completed the population viability guidelines and ESU recovery goals.
- Phase II – Recovery planning has been initiated for this ESU.
- A draft recovery plan for this ESU is expected by December 2005.

Species Status:
The estimated historical abundance of the Snake River Basin steelhead ESU is over 82,000. The recent mean abundance of this ESU is 14,768. Since the time of listing or first review for this ESU, its productivity has remained unchanged, and its population abundance has remained unchanged.

Threats and Impacts:
Threats and impacts to the Snake River Basin steelhead ESU include the following:

- Obstructions to fish passage along the migration corridor and poor survival in the mainstem
- Habitat loss and degradation
- Altered water temperatures and low river flows
- High mortality from harvest activities, particularly for B run
- Predation

Conservation Actions:
Major accomplishments in 2002–2004 for this ESU include the following:

- Accomplished structural and operational modification to hydropower system
- Improved Federal land management practices – Land management plans of the U.S. Forest Service and Bureau of Land Management are being designed to protect and restore habitat.
- Improved water quality permitting procedures by working with the Environmental Protection Agency (EPA) to develop procedures that enhance salmon considerations
- Conducted local habitat restoration and restoration of stream flows – This includes efforts by the Northwest Power Planning Council Fish and Wildlife Program, Pacific Coastal Salmon Recovery Fund (PCSRF), Natural Resources Conservation Service (NRCS), and the NOAA Restoration Center, who have funded numerous projects to improve habitat conditions.
- Equipped hundreds of irrigation diversions with fish screens
- Reduced overall harvest rates
- Conducted conservation efforts at hatcheries
- Worked to improve water quantity via the Snake River basin adjudication settlement of water claims between the Nez Perce Tribe and the State of Idaho, including a program to

improve instream flows in the Lemhi River – This was approved by Congress in late 2004, and expected by Idaho and the Nez Perce Tribe in 2005.

Priority Recovery Actions Needed:
Priority recovery actions needed for this ESU include the following:

- Improve survival in the migration corridor. Restoring the migration corridor, including the estuary, to a more normative ecological function would increase survival above the current 42.8 to 53.6 percent survival rate (including those transported around barriers), potentially to as high as 82.1 percent survival.
- Continue the structural and operational modifications to hydropower dams to improve survival in the migration corridor.
- Protect high-quality habitats.
- Conduct habitat restoration.
- Increase instream flows. Increasing instream flows in a large portion of the ESU would improve egg-to-smolt survival and aid migration.
- Further reduce mortality from harvest activities, which is 7 to 8 percent of adults for A-run and 10 to 17 percent of adults for B-run.
- Control predation. Reducing predation below the current 13 percent of the smolts that have already survived hundreds of miles of migration and eight hydropower systems would improve the chances of obtaining increases in adult returns for all populations.

Recovery Priority Number: 1
With a high magnitude of threat, high recovery potential, and the presence of conflict, this ESU has been assigned a recovery priority number of one. The magnitude of threat to this ESU has been classified as high, because of strong risks to its abundance, productivity, spatial structure, and diversity (which largely have persisted since its status was first reviewed), and the fact that this ESU faces a strong extinction risk in the foreseeable future. This ESU does not meet the criteria for a moderate magnitude of threat (which stipulate that the species will not face extinction if recovery is temporarily held off, although there is a continuing population decline or threat to its habitat). Delaying recovery for this ESU would likely result in mounting extinction risks rather than maintaining the status quo level of risk. The recovery potential for this ESU has also been classified as high. Although numerous factors limit the recovery of this ESU, the source of these factors and their demographic impacts are relatively well understood and recovery planning is currently under way. Although it may be cost-prohibitive to completely address every limiting factor, it is likely that integrated reduction of most threats can achieve recovery of this ESU. Finally, as a complex variety of activities and management practices continue to impact the conservation and recovery of all Pacific salmon ESUs listed under the ESA, NMFS has determined "conflict" exists with regard to this ESU. Taken together, these three factors correspond to a recovery priority number of one.

Upper Columbia River Steelhead ESU (*Oncorhynchus mykiss*)

Date Listed: August 18, 1997

Legal Status: Endangered

Recovery Plan Status:
No recovery plan has been completed, but recovery planning is under way.

- Phase I – Technical Recovery Teams have identified independent populations and completed the population viability guidelines and ESU recovery goals.
- Phase II – Recovery planning has been initiated for this ESU.
- A draft recovery plan for this ESU is expected by December 2005.

Species Status:
The estimated historical abundance of the Upper Columbia River steelhead ESU is 4,100. The recent mean abundance of this ESU is 1,252. Since the time of listing or first review for this ESU, its productivity has improved, and its population abundance has improved.

Threats and Impacts:
Threats and impacts to the Upper Columbia River steelhead ESU include the following:

- Obstructions to fish passage along the migration corridor
- Habitat loss and degradation
- Altered water temperatures and low river flows

Conservation Actions:
Major accomplishments in 2002–2004 for this ESU include the following:

- Accomplished hydropower operational changes
- Worked to improve stream flows through water conservation, leases, and purchases in over-appropriated streams (where available water is insufficient to meet existing water rights)
- Conducted complex negotiations each season through *U.S. v. Oregon* to direct Columbia River harvest rates and fishery structure for the protection of listed steelhead
- Equipped 16 to 18 irrigation diversion withdrawals with screens, leading to greater productivity and abundance
- Implemented continued improvements in juvenile and adult passage, significant improvements to hatchery programs to benefit listed salmon, and substantial habitat actions in the tributaries of the Columbia River under the Mid Columbia Habitat Conservation Plan (HCP)
- Conducted and facilitated local habitat restoration projects – Conservation easements and land purchases of riparian areas along rivers and streams were used to protect critical spawning and rearing areas. The NRCS conservation reserve and enhancement program protects riparian areas on farms and ranches.

Priority Recovery Actions Needed:
Priority recovery actions needed for this ESU include the following:

- Protect high-quality habitat.

- Improve fish passage at barriers along the migration corridor.
- Improve management of river flows to benefit salmon.
- Restore habitat and increase habitat complexity.

Recovery Priority Number: 1

With a high magnitude of threat, high recovery potential, and the presence of conflict, this ESU has been assigned a recovery priority number of one. The magnitude of threat to this ESU has been classified as high, because of strong risks to its abundance, productivity, spatial structure, and diversity (which largely have persisted since its status was first reviewed), and the fact that this ESU faces a strong extinction risk in the foreseeable future. This ESU does not meet the criteria for a moderate magnitude of threat (which stipulate that the species will not face extinction if recovery is temporarily held off, although there is a continuing population decline or threat to its habitat). Delaying recovery for this ESU would likely result in mounting extinction risks rather than maintaining the status quo level of risk. The recovery potential for this ESU has also been classified as high. Although numerous factors limit the recovery of this ESU, the source of these factors and their demographic impacts are relatively well understood and recovery planning is currently under way. Although it may be cost-prohibitive to completely address every limiting factor, it is likely that integrated reduction of most threats can achieve recovery of this ESU. Finally, as a complex variety of activities and management practices continue to impact the conservation and recovery of all Pacific salmon ESUs listed under the ESA, NMFS has determined "conflict" exists with regard to this ESU. Taken together, these three factors correspond to a recovery priority number of one.

Upper Willamette River Steelhead ESU (*Oncorhynchus mykiss*)

Date Listed: March 25, 1999

Legal Status: Threatened

Recovery Plan Status:
No recovery plan has been completed, but recovery planning is under way.

- Phase I – Technical Recovery Teams have identified independent populations and completed the population viability guidelines and ESU recovery goals.
- Phase II – Recovery planning has been initiated for this ESU.
- A draft recovery plan for this ESU is expected by December 2005.

Species Status:
The estimated historical abundance of the Upper Willamette River steelhead ESU is 15,000. The recent mean abundance of this ESU is 4,422. Since the time of listing or first review for this ESU, its productivity has improved, and its population abundance has improved.

Threats and Impacts:
Threats and impacts to the Upper Willamette River steelhead ESU include the following:

- Reduced access to spawning and rearing habitats (from tributary hydropower and culverts)
- Degraded water quality and altered temperature (from tributary hydropower and development)
- Lost and degraded floodplain connectivity and lowland stream habitat (from hydropower/flood control, development, loss of large wood and riparian cover, and streambank hardening)
- Altered streamflow (from tributary hydropower/flood control and water withdrawals)

Conservation Actions:
Major accomplishments in 2002–2004 for this ESU include the following:

- Improved harvest management – Catch-and-release fisheries have substantially reduced the impacts to steelhead.
- Instituted hatchery reforms to reduce the effects of non-native summer steelhead hatchery fish on native, naturally produced winter steelhead populations
- Conducted local habitat restoration projects – Hundreds of projects during 2002–2004 have improved riparian areas, fish passage at barriers, and stream function. Some local governments have also upgraded their ordinances to offer greater habitat protection.
- Facilitated improved dam management – The U.S. Army Corps of Engineers has modified releases from its 13 multipurpose dams and reservoirs to benefit steelhead; Federal Energy Regulatory Commission (FERC) relicensing settlements have improved steelhead passage and survival at other hydropower facilities.
- Improved forest management practices on Federal lands – The Northwest Forest Plan Aquatic Conservation Strategy continued during the biennium and is designed to conserve and restore salmon and steelhead habitat and provide an anchor for Federal lands' contribution to salmon recovery.

Priority Recovery Actions Needed:
Priority recovery actions needed for this ESU include the following:

- Provide fish passage at Federal dams, private dams, and small blockages such as culverts. Dams operated by the U.S. Army Corps of Engineers block access to most historical spawning habitat for this ESU, forcing fish to spawn in accessible but lower-quality habitat below the dams. A number of private dams, road crossings, and culverts also block or impede fish passage.
- Improve flow management at Federal and private dams to ensure safe migration, rearing, spawning, and incubation conditions for steelhead, including allowing for habitat-forming processes downstream of the dams. Establish minimum instream flows in tributaries where excessive water withdrawals limit water availability.
- Conduct habitat restoration, particularly in lowland floodplain stream reaches where channel complexity and floodplain connectivity are severely degraded. Lack of quality rearing habitat in these reaches, which are predominantly surrounded by private land, is a major limiting factor for this ESU. Stream restoration in forested reaches and the lower mainstem Willamette River and its tributaries would also be beneficial
- Reduce point and non-point sources of thermal and toxic pollution and continue to clean up contaminated stream reaches. Improve water quality by retrofitting large Federal dams to provide more normative temperature regimes downstream.
- Continue improving management of non-native summer steelhead hatchery fish, especially by improving hatchery collection facilities that currently injure, delay, and kill ESA-listed fish.

Recovery Priority Number: 1
With a high magnitude of threat, high recovery potential, and the presence of conflict, this ESU has been assigned a recovery priority number of one. The magnitude of threat to this ESU has been classified as high, because of strong risks to its abundance, productivity, spatial structure, and diversity (which largely have persisted since its status was first reviewed), and the fact that this ESU faces a strong extinction risk in the foreseeable future. This ESU does not meet the criteria for a moderate magnitude of threat (which stipulate that the species will not face extinction if recovery is temporarily held off, although there is a continuing population decline or threat to its habitat). Delaying recovery for this ESU would likely result in mounting extinction risks rather than maintaining the status quo level of risk. The recovery potential for this ESU has also been classified as high. Although numerous factors limit the recovery of this ESU, the source of these factors and their demographic impacts are relatively well understood and recovery planning is currently under way. Although it may be cost-prohibitive to completely address every limiting factor, it is likely that integrated reduction of most threats can achieve recovery of this ESU. Finally, as a complex variety of activities and management practices continue to impact the conservation and recovery of all Pacific salmon ESUs listed under the ESA, NMFS has determined "conflict" exists with regard to this ESU. Taken together, these three factors correspond to a recovery priority number of one.

Salmon Recovery Overlapping the Northwest and Southwest

Southern Oregon/Northern California Coast Coho ESU (*Oncorhynchus kisutch)*

Date Listed: May 6, 1997

Legal Status: Threatened

Recovery Plan Status:
No recovery plan has been completed, but recovery planning is under way. In 2002, NMFS began Phase I recovery planning for the Southern Oregon/Northern California Coast and the Oregon Coast coho ESUs (ONCC) through a Technical Recovery Team (TRT). The ONCC TRT was divided into two working groups, one addressing the Southern Oregon/Northern California Coast coho ESU and the other addressing the Oregon Coast coho ESU.

The ONCC TRT has preliminarily identified 62 historical populations of Southern Oregon/Northern California Coast coho salmon, of which 27 are considered functionally independent and potentially independent, with all other coho populations dependent on others within the ESU. A draft report of these findings will be released for co-manager review and comments in 2005, with final units and viability analysis for each of the units within the ESU scheduled for release in late 2005. Phase II recovery planning has been initiated for this ESU. A draft recovery plan for this ESU is expected by December 2005.

Species Status:
The Southern Oregon/Northern California Coast coho ESU (SONC) includes all naturally spawned populations of coho salmon in coastal streams between Cape Blanco, Oregon, and Punta Gorda, California. Three artificial propagation programs are considered to be part of the ESU: the Cole Rivers Hatchery (Oregon Department of Fish and Wildlife (ODFW) stock # 52), Trinity River Hatchery, and Iron Gate Hatchery coho hatchery programs. NMFS has determined that these artificially propagated stocks are no more than moderately diverged from the local natural populations.

The estimated historical abundance of the Southern Oregon/Northern California coho ESU is 150,000. The recent mean abundance of this ESU is 5,170, which is the highest such abundance since 1980. However, this estimated abundance is derived from the only reliable time series of adult abundance for the naturally spawning component of the SONC Coast coho ESU – the Rogue River population in southern Oregon. The California portion of the ESU is characterized by a paucity of data, with only a few available spawner indices and presence-absence surveys. Less reliable indices of spawner abundance in several California populations exist, and suggest flat or declining trends. Relatively low levels of observed presence in historically occupied coho streams (32–56 percent from 1986 to 2000) indicate continued low abundance in the California portion of this ESU. Indications of stronger 2001 salmon returns in several California populations (presumably due to favorable freshwater and ocean conditions) are encouraging but must be evaluated in the context of more than a decade of generally poor performance. Only

three rivers have hatchery populations and natural populations are depressed throughout the range of the ESU. Although extant populations reside in all major river basins within the ESU, there is concern about the loss of local populations in the Trinity, Klamath, and Rogue River systems. The high hatchery production in these systems may mask trends in ESU population structure and pose risks to ESU diversity. The recent termination of several out-of-ESU hatcheries in California is expected to result in decreased risks to ESU diversity. NOAA's Biological Review Team (BRT) found moderately high risks for abundance and productivity VSP categories, with comparatively lower risk for spatial structure and diversity.

The overall ESU trend since the time of listing or first review shows that productivity has remained unchanged, and population abundance has remained unchanged.

Threats and Impacts:
The Southern Oregon/Northern California Coast coho salmon ESU declined in abundance over the past several decades as a result of loss of, and damage or change to the natural environment. Water diversions for agriculture, flood control, domestic, and hydropower purposes have greatly reduced or eliminated historically accessible habitat and degraded the remaining habitat. Forestry, agriculture, mining, and urbanization have degraded, simplified, and fragmented habitat. The destruction or modification of estuarine areas has resulted in the loss of important rearing and migration habitats. Oregon wetlands are estimated to have diminished by one-third, and California wetlands by over 80 percent. Habitat fragmentation and loss of habitat complexity have also contributed to the decline of this ESU. Sedimentation from historic and current extensive and intensive land use activities is recognized as a primary cause of habitat degradation throughout the range of this ESU. Most of the primary producing rivers in the range of the ESU were designated as impaired (primarily due to sediment and water temperature) under the Clean Water Act (CWA) by the U.S. Environmental Protection Agency (EPA) in the 1990s.

The following limiting factors are prevalent throughout the range of this ESU and affect most populations. These limiting factors include:

- Low overwinter and summer survival of juveniles
- Limited smolt production
- Low productivity[1]
- Reduced spawning success
- Limited spatial distribution

Conservation Actions:
Numerous conservation actions were conducted from 2002–2004 for Southern Oregon/Northern California ESU recovery and are detailed below.

Agricultural Land Management Practices

- Collaborated proactively with counties on General Plan Updates, Grading Ordinances, and Riparian Ordinances
- Completed ESA section 7 Biological Opinions for all Land and Resource Management Plans (LRMPs) and associated activities (under the LRMPs) for all listed species found within each of the individual National Forest or Bureau of Land Management (BLM)

[1] Defined as: (recruits • spawners^{-1})

Resource Area – National Forest lands make up the majority of the headwater tributaries for the ESU, and account for approximately 60 percent of the total habitat for the Southern Oregon/Northern California Coast coho salmon ESU.

- Contributed to the State of California Coho Recovery Plan – The State of California listed two California coho populations (from San Francisco Bay to the Oregon border) under the California Endangered Species Act (CESA) in 2003. NMFS was an active member on the State of California's two recovery teams that identified and addressed recovery needs of the species and habitat statewide. Over 700 conservation and regulatory recommendations in the plan cover a wide variety of land use activities throughout the range of California coho salmon, and over 200 more are related to agricultural practices within the Scott and Shasta rivers, which are tributaries to the Klamath River.

ESA Section 7 Consultations

- Conducted over 200 ESA section 7 consultations over the past 2 years with Federal action agencies that fund or carry out projects such as irrigation and water diversion, timber sales, watershed restoration, fish passage at barriers, gravel mining, grazing, and transportation projects throughout southern Oregon and northern California
- Worked closely in 2004 with the Yurok Tribe in its development of a Tribal 4(d) rule covering their Tribal Resource Management Plan (TRMP) for Chinook and coho salmon – NMFS is preparing a Biological Opinion and NEPA determination of the effects of the Yurok Tribe TRMP on threatened Southern Oregon/Northern California Coast coho salmon.

Gravel Mining

- Applied the NMFS Southwest Region (SWR) Gravel Mining Guidelines entitled "Sediment Removal from Freshwater Salmonid Habitat: Guidelines to NMFS Staff for the Evaluation of Sediment Removal Actions from California Streams"
- Continued collaboration with Humboldt, Del Norte, and Mendocino counties on the Humboldt, Del Norte and Mendocino Gravel Plans – Long-term sustained gravel mining plans have been, or are being, developed by these three northern California counties, which contain a substantial portion of the southern Oregon and northern California Coast ESU.

Municipal and Agricultural Water Diversions

- Developed "Guidelines for Maintaining Instream Flows to Protect Fisheries below Water Diversions," which are used by NMFS and the California State Water Resources Control Board for flow standards when issuing water rights permits – The Governor of California recently signed into law an amendment to the California Water Code to adopt NMFS' Instream Flow Guidelines.
- Applied the Water Drafting Specifications, Guidelines for Salmonid Passage at Stream Crossings, Fish Screening Criteria for Anadromous Salmonids, and the Addendum to Fish Screening Criteria for Pumped Water Intakes
- Continued working with the Bureau of Reclamation on the Klamath Project 10-Year Biological Opinion to ensure its Klamath Project operations and programs are consistent with the reasonable and prudent alternative, including development of a distribution

schedule for the water bank, assistance in developing study plans and methodologies, and development of the structure for the Conservation Implementation Program to be achieved by 2012

Summer Dams

- Developed a database of summer dams and commenced proactive efforts to engage with landowners to minimize the effects of such dams
- Implemented staff guidelines entitled "The Effects of Summer Dams on Salmon and Steelhead in California Coastal Watersheds & Recommendations for Mitigating Their Impacts"

Timberland Management and Forest Conversions

- Engaged in on-site reviews of timber operations, and implemented the "Salmonid Guidelines for Forest Practices" when evaluating non-Federal timber harvest operations
- Implemented the Stewardship Non-Industrial Timber Management Plan program in negotiation with the State Board of Forestry to encourage and minimize regulatory burdens on small forest landowners operating under a stewardship philosophy (over 1 million acres) – Private lands (non-industrial) make up a substantial portion of the range of this ESU.
- Worked on the Pacific Lumber Company Habitat Conservation Plan (PALCO HCP) – The HCP covers approximately 210,000 acres of industrial timberlands in Northern California and includes activities related to timber management, forest road development and maintenance, and commercial rock quarrying.
- Held technical and policy discussions (in conjunction with the U.S. Fish and Wildlife Service) with the Green Diamond Resource Company regarding the development of a Habitat Conservation Plan for much of its industrial timber operations in northern California – The Green Diamond Resource Company prepared a draft Aquatic Habitat Conservation Plan/Candidate Conservation Agreement in support of its applications. Currently, NMFS is conducting an ESA section 7 consultation for all ESA-listed Pacific salmon in northern California. The Initial Plan Area includes 416,531 acres in Humboldt and Del Norte counties, of which 170,241 acres (40.9 percent) are in the lower Klamath River basin.

Urbanization/Channelization

- Conducted ESA section 7 consultations to minimize the effects of flood control projects, levee setbacks, and floodplain management on the ESU
- Collaborated with Humboldt Bay Municipal Water District (HBMWD) on the development of a habitat conservation plan (HCP) to significantly reduce direct mortality of salmon at the water diversion, better coordinate withdrawals to improve instream flows on the Mad River, and improve operations – The HCP will be finalized once the "no surprises" rules are completed[2].

[2] "No surprises" rules are assurances provided by the government to non-Federal landowners through ESA section 10(a)(1)(B). Private landowners are assured that if "unforeseen circumstances" arise, NMFS and/or FWS will not require the commitment of additional land, water, or financial compensation or additional restrictions on the use of land, water, or other natural resources beyond the level otherwise agreed to in the HCP without the consent of the

Restoration

- Continued to provide annual grants to the State of California to assist recovery efforts in coastal watersheds as part of the Pacific Coastal Salmon Recovery Fund program – NMFS assisted the California Department of Fish and Game (CDFG) in the development of ranking criteria to evaluate grant proposals and ensure that (1) Federal grant money is used for the purposes set forth by Congress and (2) there is a representative on the technical ranking committee for projects developed and submitted to this program for potential funding. These projects include a wide range of activities such as easements; road inventories and restoration; improvement of fish passage at barriers; public outreach; sediment source inventories and stabilization; fencing of riparian areas along streams; and species and habitat monitoring. Many of these projects have been implemented but will require some time before the benefits to the species are realized.
- Participated as a member of the Trinity River Restoration Program Task Force – NMFS provided technical input during the preparation of the Trinity River flow study and habitat restoration plan, which includes flow allocations and direct in-channel actions, as well as continued watershed restoration activities, replacement of bridges and structures in the flood plain, monitoring, and adaptive management.
- Continued efforts as a member of the 16-member Klamath Conservation Program Task Force, which provides technical and scientific input to restoration programs and projects throughout the Klamath River Basin
- Consulted under ESA section 7 with the San Francisco District of the U.S. Army Corps of Engineers (ACOE) regarding ACOE's issuance of a Regional General Permit (RGP) to the California Department of Fish and Game (CDFG) – The RGP is for restoration activities pursuant to CDFG's "California Salmonid Stream Habitat Restoration Manual" and the resulting effects on ESA-listed salmon north of San Francisco to the Oregon border. This RGP authorizes CDFG (and the agents contracted, funded, and/or supervised by CDFG) to carry out fisheries habitat restoration program projects compliant with the manual. To date, more than 1,000 projects have been implemented, with hundreds of miles of Pacific salmon habitat being restored and available for use by juvenile and adult Pacific salmon.
- Continued working closely with Resource Conservation Districts (RCDs) and Natural Resource Conservation Services (NRCSs) to help identify potential impacts to ESA species, to help develop measures to address the impacts, and to help obtain regulatory relief under the ESA
- Continued working with the California Resource Agency and numerous state, local, and regional agencies; non-profit and stakeholder groups; and consultants as part of the State of California's Fish Passage Forum – The Forum addresses man-made barriers to adult and juvenile salmon passage throughout California's coastal rivers and streams. The Forum identified administrative, financial and technical impediments to addressing these issues, including information gaps, lack of watershed-level assessments and planning, and poorly coordinated project review and permitting processes. Group participants worked together to develop short- and long-term solutions to these impediments. The Forum continues to work to identify barriers; evaluate and prioritize restoration

permittee. The government will honor these assurances as long as a permittee is implementing the terms and conditions of the HCP, permit, and other associated documents in good faith.

opportunities; provide consistent barrier inventory data; and conduct training, public outreach, and education related to fish passage barriers.

- Continued prohibition on recreational fishing for coho salmon throughout the central California coast – The conservation objective set by the Pacific Fishery Management Council for the past five seasons has been an overall ocean exploitation below 13 percent for CCC coho salmon.
- Streamlined programs through programmatic strategies and developed best management practices for Federal, state, county, or city governments and private landowners for the benefit of salmon habitat – Some programmatic strategies and actions have been completed and others are currently under way. These include the following:
    - State of California Road Maintenance Manual
    - Bank Stabilization Guidelines
    - Gravel Mining Guidelines (completed in 2004)
    - Ground Water Management Guidelines
    - Water Development and Rights Policies
    - Minimum Flow Policies for dry seasons to ensure appropriate water temperatures and conditions (under way)
    - Desalination Management Policy and Timber Harvest Guidelines (completed in January 2005)
- Worked with five northern California counties (Siskiyou, Trinity, Del Norte, Humboldt, and Mendocino) to develop a Memorandum of Understanding regarding the Five Counties Road Program – NMFS worked to develop a standardized county routine road maintenance manual to help protect ESA-listed species and their habitat. To date, the counties have identified over 400 juvenile and adult Pacific salmon barriers associated with county roads, identified over 1 million cubic yards of potentially deliverable sediment directly into ESA-listed salmonid habitats, and prioritized all restoration actions based on species priorities among all five counties. Over 30 high-priority projects have been completed, opening up over 100 miles of habitat that had been blocked for more than 50 years. Projects have also prevented thousands of cubic yards of sediment from directly entering salmon and steelhead streams. This plan was recently submitted by the counties to the NMFS Southwest Region for coverage under the ESA 4(d) rule process. NMFS is currently developing the Environmental Assessment under the National Environmental Policy Act (NEPA) for this plan.
- Commenced collaboration with CDFG in the development of Hatchery and Genetics Management Plans (HGMPs) and Fisheries Management Evaluation Plans (FMEPs) for all hatcheries and fisheries programs located throughout northern California – It is anticipated that upon completion of these plans, programs will qualify for the ESA 4(d) rule exemption from ESA take violations.
- Adopted the standards established in the Oregon Coho Plan for the Rogue River coho salmon HGMP, whose goal is to limit hatchery spawners to less than 10 percent of the spawning population – Due to the reduction in numbers of hatchery-produced coho salmon, coho strays and their impacts to wild coho populations are no longer considered a limiting factor in the Rogue River.

Priority Recovery Actions Needed:
Several priority recovery actions are needed for the Southern Oregon/Northern California coho salmon ESU, including the following:

- Research and monitor distribution, status, and trends of salmon.
- Complete and fund a population-monitoring plan.
- Promote operations of current recovery hatcheries and develop HGMPs to minimize negative influences of hatcheries.
- Improve freshwater habitat quantity and quality.
- Protect and restore habitat complexity and connectivity from the upper watershed to the ocean.
- Conduct focused freshwater habitat restoration in anadromous salmonid streams (e.g., erosion control, bank stabilization, riparian protection and restoration, and reintroduction of large woody debris).
- Balance water supply and allocation with fisheries needs through a water rights program, designate fully appropriated watersheds, develop passive diversion devices or offstream storage, eliminate illegal water diversions, and improve criteria for water drafting and dam operations.
- Improve agricultural and forestry practices, in particular, riparian protections, road construction, and road maintenance.
- Improve county and city planning, regulations (e.g., riparian and grading ordinances), and county road maintenance programs.
- Remove/upgrade high-priority man-made fish passage barriers (e.g., watercourse crossings and non-hydropower dams).
- Implement screening of all water diversion structures.
- Replace existing, outdated septic systems and improve wastewater management.
- Identify and treat point and non-point source pollution of streams from wastewater, agricultural practices, and urban environments.
- Modify channel and flood control maintenance and eliminate artificial breeching of sandbars for improvements in channel and estuarine habitats.

Recovery Priority Number: **1**
In the NMFS Southwest Region, ranking for the Southern Oregon/Northern California Coast coho ESU was based on a high magnitude of threat, a high potential for recovery, and anticipated conflict with current and future land disturbance and water-associated development within the range of the ESU. The Biological Review Team (BRT) conducting an updated status review in 2004 reiterated the same conclusions reached by a previous status review in 1995, stating that the SONC Coast coho ESU is "likely to become endangered within the foreseeable future." This determination was made based on substantially low abundance from historical levels, as coho salmon populations occupy roughly 50 percent of their historic range. Long-term abundance trends are clearly down but stable on the Oregon side of the ESU, and there is concern for many lost coho populations within the larger river basins – namely the Rogue, Klamath, and Trinity rivers. Strong risks to the abundance, productivity, spatial structure, and diversity of this ESU have largely persisted since its status was first reviewed, and the magnitude of threat for this ESU is high. The recovery potential for this ESU has also been classified as high. Although numerous factors limit the recovery of this ESU, the source of these factors and their

demographic impacts are known and recovery planning is currently under way. Although it may be cost-prohibitive to completely address every limiting factor, it is likely that integrated reduction of most threats can achieve recovery of this ESU. Finally, as a complex variety of activities and management practices continue to impact the conservation and recovery of all Pacific salmon ESUs listed under the ESA, NMFS has determined "conflict" exists with regard to this ESU. Taken together, these three factors correspond to a recovery priority number of one.

Salmon Recovery in the Southwest

Northern California Steelhead ESU (*Oncorhynchus mykiss*)

Date Listed: June 7, 2000

Legal Status: Threatened

Recovery Plan Status:
No recovery plan has been completed for this ESU, but recovery planning is under way.

Species Status:
The Northern California Steelhead ESU (NC) includes all naturally spawned populations of steelhead and their progeny in California streams from Redwood Creek south to the Gualala River (inclusive). Resident populations of *O. mykiss* that co-occur with anadromous populations below impassible barriers are included in the ESU. Two artificial propagation programs are also considered part of the ESU: the Yager Creek Hatchery and the North Fork Gualala River Hatchery.

Little historical abundance information exists for the naturally spawning portion of the NC Steelhead ESU. Although data were relatively limited, analysis by the Biological Review Team (BRT) in the 2004 status review suggested the following conclusions: (1) population abundances were low relative to historical estimates, (2) recent trends were downward, and (3) summer-run steelhead abundance was "very low." The BRT was also concerned about the negative influences of hatchery stocks, especially in the Mad River. The BRT also noted two major sources of uncertainty in the status review – lack of data on run sizes throughout the ESU and uncertainty about the genetic heritage of winter-run steelhead in the Mad River. Population trends for this ESU show a continuing decline in abundance.

Threats and Impacts:
The following limiting factors are prevalent throughout the ESU and affect most populations within the ESU: low over-winter and summer survival of juveniles; limited smolt production; low productivity[1]; reduced spawning success; and limited spatial distribution throughout the ESU.

The threats affecting these limiting factors are pervasive throughout the ESU and vary among populations within the ESU. Most of the threats are associated with habitat and water quantity and quality issues, which include the following:

- Lack of side-channel, alcove, tributary, pool, and floodplain habitats for over-winter and summer survival of juveniles
- Reduced riparian areas, including function and diversity of habitat types along all water courses

[1] Defined as: (recruits • spawners^{-1})

- Decreased stream channel sinuosity[2] and habitat complexity due to excessive removal of habitat forming structures (e.g., large woody debris and boulders) and stream channel straitening for flood control purposes
- Excessive sedimentation in stream channels from a variety of past and current land use activities that have filled in pools, covered spawning gravels and benthic invertebrates, and reduced flood flow capacity
- Fragmentation of historic and current habitats due to human-caused barriers (e.g., dams, culverts, and bridges)
- Negative impacts on steelhead and their habitat from water impoundments, hydroelectric facilities, push-up dams for small riparian diversions, surface and subsurface water withdrawals, and water conveyance and flood control systems – Many of the water facilities do not have fish passage facilities, and the few facilities with some adult passage capabilities have met with limited success. These blockages fragment historic and current steelhead habitat directly or indirectly due to their operations.
- Inadequate screening of numerous water diversions to protect adult and juvenile salmon from being entrained into the diversions
- Significant point and non-point source pollution, which can contribute pollutants such as heat and toxic substances into streams and rivers

Conservation Actions:
The Preliminary Recovery Strategy for this ESU is to ensure NMFS is fulfilling its obligation under the ESA to conserve and recover NC steelhead. NMFS focuses primarily on linking and coordinating ESA programs to recovery planning and developing stronger, more collaborative partnerships with other entities whose decisions affect salmon recovery options. Under this guidance, numerous conservation actions were conducted from 2002–2004 for NC steelhead ESU recovery and are detailed below.

Agricultural Land Management Practices

- Implemented the Fish Friendly Farming program, a multi-agency, third-party certification and technical assistance program for wine grape growers practicing best management practices (BMPs) for salmon – Over 10,000 acres of private property have been inspected and certified through this program.
- Collaborated proactively with counties on General Plan Updates, Grading Ordinances, and Riparian Ordinances
- Contributed to the State of California Coho Recovery Plan – The State of California listed two California coho populations (from San Francisco Bay to the Oregon border) under the California Endangered Species Act (CESA) in 2003. NMFS was an active member on the State of California's two recovery teams that identified and addressed recovery needs of the species and habitat statewide. Each of the recovery teams developed conservation measures and identified necessary state regulatory changes for integration into a single statewide coho recovery plan, which the California Department of Fish and Game (CDFG) published in 2004. Over 700 conservation and regulatory

[2] Stream channel sinuosity as defined by the U.S. Geological Survey (USGS) is the ratio of the channel length between two points on a channel to the straight-line distance between the same two points – a measure of meandering.

recommendations in the plan cover a wide variety of land use activities throughout the range of the NC steelhead ESU.

ESA Section 7 Consultations

- Conducted over 500 ESA section 7 consultations during the past 6 years with Federal action agencies throughout southern Oregon and northern California that fund or carry out projects such as irrigation and water diversion, timber sales, watershed restoration, fish passage at barriers, gravel mining, grazing, and transportation projects

Gravel Mining

- Applied the NMFS Southwest Region (SWR) Gravel Mining Guidelines, entitled "Sediment Removal from Freshwater Salmonid Habitat: Guidelines to NMFS Staff for the Evaluation of Sediment Removal Actions from California Streams"
- Used these guidelines to conduct effects analyses of proposed actions that would remove sediment from streams, either for commercial sediment production or flood control channel excavation – This information helps staff identify adverse effects of sediment removal actions and provide reasonable and prudent alternative measures, as necessary.
- Continued collaboration with Humboldt, Del Norte, and Mendocino counties and the U.S. Army Corps of Engineers (ACOE) on the Humboldt, Del Norte, and Mendocino Gravel Plans – Long-term sustained gravel mining plans have been, or are being, developed by these three northern California counties, which contain a substantial portion of the southern Oregon and northern California Coast ESUs. NMFS will work with the counties and the ACOE to ensure any Letters of Permission (LOPs) issued for gravel mining are protective of all ESA-listed Pacific salmon.

Municipal and Agricultural Water Diversions

- Developed "Guidelines for Maintaining Instream Flows to Protect Fisheries below Water Diversions," which are used by NMFS and the California State Water Resources Control Board for flow standards when issuing water rights permits – The Governor of California recently signed into law an amendment to the California Water Code to adopt NMFS' Instream Flow Guidelines.
- Applied the Water Drafting Specifications, Guidelines for Salmonid Passage at Stream Crossings, Fish Screening Criteria for Anadromous Salmonids, and the Addendum to Fish Screening Criteria for Pumped Water Intakes

Summer Dams

- Developed a database of summer dams and commenced proactive efforts to engage with landowners to minimize the effects of such dams
- Implemented staff guidelines, entitled "The Effects of Summer Dams on Salmon and Steelhead in California Coastal Watersheds & Recommendations for Mitigating Their Impacts"

Timberland Management and Forest Conversions

- Continued to engage with the Board of Forestry in public meetings, and presented information to the Board on specific areas in the Forestry Rules needing improvements based on Science Panel findings and field experience
- Engaged in on-site reviews of timber operations, and used the "Salmonid Guidelines for Forest Practices" when evaluating non-Federal timber harvest operations
- Implemented the Stewardship Non-Industrial Timber Management Plan program in negotiation with the State Board of Forestry to encourage and minimize regulatory burdens on small forest landowners operating under a stewardship philosophy (over 1 million acres)
- Conducted Habitat Conservation Plan (HCP) negotiations with the Mendocino Redwood Company – A Planning Agreement is in place that includes riparian protections from timber harvest and other operating restrictions beneficial to salmon until the HCP is completed.

Urbanization/Channelization

- Conducted ESA section 7 consultations to minimize the effects of flood control projects, levee setbacks, and floodplain management on the ESU

Restoration

- Continued to provide annual grants to the State of California to assist recovery efforts in coastal watersheds as part of the Pacific Coastal Salmon Recovery Fund – Assisted the California Department of Fish and Game (CDFG) in the development of ranking criteria to evaluate grant proposals and ensure that (1) Federal grant money is used for the purposes set forth by Congress and (2) there is a representative on the technical ranking committee for projects developed and submitted to this program for potential funding. These projects include a wide range of activities such as easements; road inventories and restoration; improvement of fish passage at barriers; public outreach; sediment source inventories and stabilization; fencing of riparian areas along streams; and species and habitat monitoring. Many of these projects have been implemented but will require some time before the benefits to the species are realized.
- Consulted under ESA section 7 with the San Francisco District of ACOE regarding ACOE's issuance of a Regional General Permit (RGP) to CDFG – The RGP is for restoration activities pursuant to CDFG's "California Salmonid Stream Habitat Restoration Manual" and the resulting effects on ESA-listed salmon north of San Francisco to the Oregon border. This RGP authorizes CDFG (and the agents contracted, funded, and/or supervised by CDFG) to carry out fisheries habitat restoration program projects compliant with the manual. To date, more than 1,000 projects have been implemented, with hundreds of miles of Pacific salmon habitat being restored and available for use by juvenile and adult Pacific salmon.
- Continued to collaborate with the California Conservation Corps, the CDFG, and other state and Federal agencies conducting anadromous salmonid and aquatic stream habitat restoration projects – These projects include fish passage barrier modifications, instream habitat projects, riparian tree planting, and up-slope sediment reduction projects.
- Continued working with the California Resource Agency and numerous state, local, and regional agencies; non-profit and stakeholder groups; and consultants as part of the State

of California's Fish Passage Forum – The Forum addresses man-made barriers to adult and juvenile salmonid passage throughout California's coastal rivers and streams. The Forum identified administrative, financial, and technical impediments to addressing these issues, including information gaps, lack of watershed-level assessments and planning, and poorly coordinated project review and permitting processes. Group participants worked together to develop short- and long-term solutions to these impediments. The Forum continues to work to identify barriers; evaluate and prioritize restoration opportunities; provide consistent barrier inventory data; and conduct training, public outreach, and education related to fish passage barriers.

Hatchery and Genetics

- Commenced collaboration with CDFG in the development of Hatchery and Genetics Management Plans (HGMPs) and Fisheries Management Evaluation Plans for all hatcheries and fisheries programs located throughout northern California – It is anticipated that upon completion of these plans, these programs would qualify for the ESA section 4(d) rules exempting them from take violations. NMFS has been working with several hatchery programs and CDFG to reduce the mortality of wild, native ESA-listed salmon that were in excess of the facilities' spawning needs.
- Implemented hatchery programs to control disease and minimize its effect on wild fish
- Conducted pikeminnow eradication efforts

Federal Efforts

- Streamlined programs through programmatic strategies and developed best management practices for Federal, state, county, or city governments and private landowners for the benefit of steelhead habitat – Some programmatic strategies and actions have been completed and others are currently under way. These include the following:
    - State of California Road Maintenance Manual
    - Bank Stabilization Guidelines
    - Gravel Mining Guidelines (completed in 2004)
    - Ground Water Management Guidelines
    - Water Development and Rights Policies
    - Minimum Flow Policies for dry seasons to ensure appropriate water temperatures and conditions (under way)
    - Desalination Management Policy and Timber Harvest Guidelines (completed in January 2005)
- Evaluated impacts to the NC steelhead ESU through numerous ESA section 7 consultations, which have improved or minimized adverse impacts
- Drafted an ESA section 6 agreement to support state recovery actions
- Provided annual grants to the State of California through the Pacific Coastal Salmon Recovery Fund program to assist recovery efforts in coastal watersheds

Priority Recovery Actions Needed:

Several priority recovery actions are needed for the Northern California steelhead ESU, including the following:

- Research and monitor distribution, status, and trends of steelhead.

- Promote operations of current recovery hatcheries and develop HGMPs to minimize negative influences of hatcheries.
- Improve freshwater habitat quantity and quality.
- Protect and restore habitat complexity and connectivity from the upper watershed to the ocean.
- Conduct focused freshwater habitat restoration in anadromous salmonid streams (e.g., erosion control, bank stabilization, riparian protection and restoration, and reintroduction of large woody debris).
- Balance water supply and allocation with fisheries needs through a water rights program, designate fully appropriated watersheds, develop passive diversion devices or offstream storage, eliminate illegal water diversions, and improve criteria for water drafting and dam operations.
- Improve agricultural and forestry practices, in particular, riparian protections, road construction, and road maintenance.
- Improve county and city planning, regulations (e.g., riparian and grading ordinances), and county road maintenance programs.
- Finalize the ESA section 6 agreement to support state recovery actions.
- Remove/upgrade high-priority man-made fish passage barriers (e.g., watercourse crossings and non-hydropower dams).
- Implement screening of all water diversion structures.
- Replace existing, outdated septic systems and improve wastewater management.
- Identify and treat point and non-point source pollution of streams from wastewater, agricultural practices, and urban environments.
- Modify channel and flood control maintenance and eliminate artificial breeching of sandbars for improvements in channel and estuarine habitats.

Recovery Priority Number: 7

Ranking for the Northern California steelhead (NC steelhead) ESU was based on a moderate degree of threat, a low-moderate recovery potential, and anticipated conflict with development projects or other economic activity. Although the Biological Review Team (BRT) in 2004 found a high risk for the abundance Viable Salmon Population (VSP) category and moderately high risk for the productivity category, spatial structure and diversity were comparatively of lesser concern. Lack of data for this ESU provides some uncertainty and, thus, this priority number will be evaluated in the future as the recovery plan is drafted. It is believed a moderate potential for recovery is possible for NC steelhead due to lack of data and the moderate likelihood that freshwater impacts can be substantially controlled or reduced through habitat protection, implementation of best management practices, and focused restoration. Imminent land use changes and encroaching urbanization into rural areas are anticipated to conflict with the conservation needs of NC steelhead.

California Central Valley Steelhead ESU (*Oncorhynchus mykiss*)

Date Listed: March 19, 1998

Legal Status: Threatened

Recovery Plan Status:
No recovery plan has been completed for this ESU, but recovery planning is under way.

Species Status:
The Central Valley steelhead ESU (CV) is thought to have occurred historically from the McCloud River and other northern tributaries to Tulare Lake and the Kings River in the southern San Joaquin Valley. It is estimated that more than 95 percent of historical spawning habitat is now inaccessible to this ESU, and little information is available regarding the viability of the naturally spawning component of the CV ESU. Anadromous steelhead spawning above Red Bluff Diversion Dam (RBDD) have a small population size and exhibit strongly negative trends in abundance and population growth rate. No escapement estimates have been made for the area above RBDD since the mid-1990s. A crude extrapolation from the incidental catch of out-migrating juvenile steelhead (captured in a midwater-trawl sampling program for juvenile Chinook salmon below the confluence of the Sacramento and San Joaquin rivers) estimated that, on average during 1998–2000, approximately 181,000 juvenile steelhead were naturally produced each year in the Central Valley by approximately 3,600 spawning female steelhead. Prior to 1850, there were 1 to 2 million spawners, and in the 1960s about 40,000 spawners. The Biological Review Team (BRT) reported that recent spawner surveys of small Sacramento River tributaries (Mill, Deer, Antelope, Clear, and Beegum creeks) and incidental captures of juvenile steelhead via monitoring on the Calaveras, Cosumnes, Stanislaus, Tuolumne, and Merced rivers confirmed that steelhead are abundant throughout accessible streams and rivers.

Although steelhead appear to remain widely distributed in Sacramento River tributaries, the vast majority of historic spawning areas are currently located upstream of impassable dams. Coastal steelhead are widely distributed in the Central Valley basin, with approximately half of the available habitat upstream of impassable dams. At higher elevations, habitat appears to support high densities of steelhead. It is not evident how CV steelhead and resident populations interacted before these dams were built. Steelhead produced from hatcheries have been widely stocked throughout the CV, Sierra Nevada, and southern Cascades. Stocking may have deleterious effects on native wild populations. There are reports of native wild populations in some areas having received stocked fish. Identification of any particular resident populations that may be part of the CV ESU has not been possible due to the lack of sufficient status and trend data**.**

Two artificial propagation programs are considered to be part of the CV steelhead ESU; both are located in the Sacramento River Basin, consisting of large-scale mitigation facilities intended to support recreational fisheries for steelhead, and not to supplement naturally spawning populations. All production is marked and the hatchery fish are integrated with the natural-origin fish.

Informed by the BRT's findings, and NMFS' assessment of the effects of artificial propagation programs on the viability of the ESU, the Artificial Propagation Evaluation Workshop concluded that the California CV steelhead ESU altogether is "in danger of extinction."

Threats and Impacts:
The CV steelhead ESU's primary limiting factor is the inaccessibility of more than 95 percent of its historic spawning and rearing habitat due to impassable dams. Where steelhead are still extant, natural populations are subject to habitat degradation and various impacts from water development activities and land use activities. This ESU requires cool water found at higher elevations, now largely above impassable dams. The lack of adequate status and trend monitoring and research limits our understanding of ESU viability and our ability to determine how steelhead populations may have interacted before the dams were built. The geographically wide stocking of hatchery fish may have deleterious effects on native wild trout populations, but this cannot be assessed. It is likely many of the threats affecting Chinook salmon are also negatively impacting steelhead, such as inadequately screened water diversions, excessively high water temperatures, and predation by non-native species.

Conservation Actions:
During 2002–2004 , progress was made toward addressing some of the limiting factors and threats to this ESU, largely through ESA section 7 consultations and other ESA-related conservation efforts in the Central Valley. The Central Valley Project section 7 consultation with the Bureau of Reclamation likely contributed to habitat improvements benefiting the CV steelhead ESU, such as flow and temperature improvements.

In addition, two large, comprehensive conservation programs in the Central Valley provide a wide range of ecosystem and species-specific protective efforts benefiting steelhead – the CALFED Bay-Delta Program and the Central Valley Project Improvement Act (CVPIA). CALFED works with local communities to improve water quality and reliability for California's water supplies, and to restore the San Francisco Bay-Delta ecosystem. Although not fully implemented, CALFED's Ecosystem Restoration Program has funded projects involving habitat restoration; floodplain restoration and/or protection; instream habitat restoration; riparian habitat restoration/protection; fish screening and passage projects, research on and eradication of non-native species, as well as on contaminants; research and monitoring of fishery resources; and watershed stewardship and outreach. The Environmental Water Account is used to offset losses of juvenile fish at the Delta pumps, and to provide higher instream flows in the Yuba, Stanislaus, American, and Merced rivers to benefit salmonids.

The CVPIA balances the priorities of fish and wildlife protection, restoration, and mitigation with irrigation, domestic water use, fish and wildlife enhancement, and power augmentation. The CVPIA has conducted studies/investigations and implemented hundreds of actions, including modifications of Central Valley Project operations, management and acquisition of water for fish and wildlife needs, flow management for fish migration and passage, increased water flows, replenishment of spawning gravels, restoration of riparian habitats, screening of water diversions, and habitat restoration.

The Delta Pumping Plant Fish Protection Agreement and the Tracy Fish Collection Mitigation Agreement mitigate for State Water Project and pumping plant impacts by screening water diversions, enhancing law enforcement efforts to reduce illegal fish harvest, installing seasonal barriers to guide fish away from undesirable spawning habitat or migration corridors, restoring salmon habitat, and removing four dams to improve fish passage on Butte Creek for Chinook and steelhead. Approximately one-third of the approved funding for salmonid projects specifically targets spring-run Chinook salmon and steelhead in the upper Sacramento River tributaries.

Ongoing measures to protect steelhead in the State of California include 100 percent marking of all hatchery steelhead, zero bag limits for unmarked steelhead, gear restrictions, closures, and size limits designed to protect smolts. The State also works closely with NMFS to review and improve inland fishing regulations.

Priority Recovery Actions Needed:
The inability to adequately conduct viability assessments for the CV steelhead ESU is largely due to the lack of comprehensive abundance and trend data for steelhead in the Central Valley. Recently, the CALFED program agreed, in concept, to the funding and development of a CV steelhead monitoring program. Development and implementation of a monitoring and assessment program for CV steelhead is critical for assessing population viability and responses to extensive habitat restoration efforts funded by CALFED and CVPIA.

CALFED's Battle Creek Restoration Project is a priority action that has already restored stream reaches in the 42 miles of Upper Battle Creek suitable for steelhead. The upper reach will be fully restored under an agreement between Pacific Gas and Electric (which operates nine hydroelectric dams in this reach) and several resource agencies. The intent is to remove five of the dams and dedicate the water rights to the environment. The remaining dams would have increased instream flows, thereby increasing habitat by 500 to 800 percent. The remaining dam structures would be modified with optimally designed fish ladders and screens, and meander belt and riparian forest would be restored. Continued funding and implementation of CALFED's Ecosystem Restoration Program and the CVPIA remain an overall priority for continuation of habitat restoration efforts, screening of diversions, flow and temperature monitoring, status and trends research monitoring, modification of structures to improve fish passage, and overall water quality improvements.

Recovery Priority Number: 3
The Recovery Priority Number for the CV steelhead ESU was derived from a moderate magnitude of threat, because more than 95 percent of historic spawning habitat is inaccessible (due to impassable dams) and because CV steelhead require cooler water at higher elevations (again, found largely above impassable dams). The recovery potential was determined to be low to moderate due to a lack of suitable habitat (requiring cold water and high elevation) below impassable barriers, inadequate status and trends data to assess ESU viability, and the widespread stocking of hatchery fish (which could negatively impact wild steelhead populations). Conflict was determined to exist because of anticipated future development and habitat degradation issues, as well as increasing demands for Central Valley water supplies.

Central California Coast Steelhead ESU (*Oncorhynchus mykiss*)

Date Listed: August 18, 1997

Legal Status: Threatened

Recovery Plan Status:
No recovery plan has been completed for this ESU, but recovery planning is under way.

NMFS Southwest Region (SWR) will initiate the preparation of the recovery plan for the Central California Coast (CCC) steelhead ESU at the same time the Technical Recovery Team (TRT) distributes the draft Population Structure report for ESUs of Chinook salmon, coho salmon, and steelhead in the North Central California Coast Recovery Domain. NMFS will work closely with the California Department of Fish and Game (CDFG) to ensure appropriate integration and collaboration between the state Coho Recovery Planning process and the Federal recovery planning process. Primary authorship of the recovery plan will be the responsibility of NMFS staff, with outreach by NMFS to state, Federal, and private partners central to the recovery effort.

Species Status:
The CCC steelhead ESU includes all naturally spawned populations of steelhead and their progeny in California streams from the Russian River to Aptos Creek, and the drainages of San Francisco and San Pablo Bays eastward to the Napa River (inclusive), excluding the Sacramento-San Joaquin River Basin. Resident populations of *O. mykiss* that co-occur with anadromous populations below impassable barriers (natural and manmade) are included in the CCC steelhead ESU.

No time series data exist of population abundance for the naturally spawning component of the CCC steelhead ESU. The naturally spawning population in the largest river system for this ESU, the Russian River, is believed to have declined seven-fold since the mid-1960s. Juvenile density data is available for five "representative" populations, and each population exhibits a decline over the past 8 years of available data. The population trend for the CCC steelhead ESU is a continuing decline in abundance.

Threats and Impacts:
The following limiting factors are prevalent throughout the ESU and affect most populations within the ESU: low over-winter and summer survival of juveniles; limited smolt production; low productivity[1]; reduced spawning success; and limited spatial distribution throughout the ESU. The threats affecting these limiting factors are pervasive throughout the ESU and vary among populations within the ESU. Most of the threats are associated with habitat and water quantity and quality issues, which include:

- Lack of side-channel, alcove, tributary, pool, and floodplain habitats for over-winter and summer survival of juveniles

[1] Defined as: (recruits • spawners^{-1})

- Reduced riparian areas, including function and diversity of habitat types along all water courses
- Decreased stream channel sinuosity[2] and habitat complexity due to excessive removal of habitat forming structures (e.g., large woody debris and boulders) and stream channel straitening for flood control purposes
- Excessive sedimentation in stream channels from a variety of past and current land use activities that have filled in pools, covered spawning gravels and benthic invertebrates, and reduced flood flow capacity
- Fragmentation of historic and current habitats due to human-caused barriers (e.g., dams, culverts, and bridges)
- Negative impacts on steelhead and habitat from water impoundments, hydroelectric facilities, push-up dams for small riparian diversions, surface and subsurface water withdrawals, and water conveyance and flood control systems – Many of the water facilities do not have fish passage facilities, and the few facilities with some adult passage capabilities have met with limited success. These blockages fragment historic and current steelhead habitat directly or indirectly due to their operations.
- Inadequate screening of numerous water diversions to protect adult and juvenile salmon from being entrained into the diversions
- Significant point and non-point source pollution, which can contribute pollutants such as heat and toxic substances into streams and rivers

Conservation Actions:
The Preliminary Recovery Strategy for the CCC steelhead ESU is to ensure NMFS is fulfilling its obligation under the ESA to conserve and recover Central California Coast (CCC) steelhead. NMFS focuses primarily on linking and coordinating ESA programs to recovery planning and developing stronger, more collaborative partnerships with other entities whose decisions affect salmon recovery options. Under this guidance, NMFS conducted numerous conservation actions from 2002–2004 for CCC steelhead ESU recovery and these actions are detailed below.

Agricultural Land Management Practices
- Implemented the Fish Friendly Farming program, a multi-agency, third-party certification and technical assistance program for wine grape growers practicing best management practices (BMPs) for salmon – Over 10,000 acres of private property have been inspected and certified through this program.
- Collaborated proactively with counties on General Plan Updates, Grading Ordinances, and Riparian Ordinances
- Continued working closely with Resource Conservation Districts (RCDs) and the Natural Resources Conservation Service (NRCS) to help identify potential impacts on ESA-listed species, to help develop measures to address these impacts, and to help obtain regulatory relief under the ESA

[2] Stream channel sinuosity as defined by the U.S. Geological Survey (USGS) is the ratio of the channel length between two points on a channel to the straight-line distance between the same two points – a measure of meandering.

Gravel Mining

- Applied the NMFS Southwest Region (SWR) Gravel Mining Guidelines, entitled "Sediment Removal from Freshwater Salmonid Habitat: Guidelines to NMFS Staff for the Evaluation of Sediment Removal Actions from California Streams"
- Used guidelines to conduct effects analyses of proposed actions that would remove sediment from streams, either for commercial sediment production or flood control channel excavation

Municipal and Agricultural Water Diversions

- Developed "Guidelines for Maintaining Instream Flows to Protect Fisheries below Water Diversions," which are used by NMFS and the California State Water Resources Control Board for flow standards when issuing water rights permits – The Governor of California recently signed into law an amendment to the California Water Code to adopt NMFS' Instream Flow Guidelines.
- Applied the Water Drafting Specifications, Guidelines for Salmonid Passage at Stream Crossings, Fish Screening Criteria for Anadromous Salmonids, and the Addendum to Fish Screening Criteria for Pumped Water Intakes
- Developed a fisheries enhancement plan for the Santa Clara Valley Water District's operation of six reservoirs in northern Santa Clara County, California
- Developed a fish barrier removal program and habitat enhancement plan with the Alameda County Water District and San Francisco Public Utilities
- Worked with the City of Vallejo and Bureau of Reclamation to establish instream flows for steelhead in Suisun Creek, Solano County, California

Summer Dams

- Developed a database of summer dams and commenced proactive efforts to engage with landowners to minimize the effects of such dams
- Implemented staff guidelines, entitled "The Effects of Summer Dams on Salmon and Steelhead in California Coastal Watersheds & Recommendations for Mitigating Their Impacts"

Timberland Management and Forest Conversions

- Continued to engage with the Board of Forestry in public meetings, and presented information to the Board on specific areas in the Forestry Rules needing improvements based on Science Panel findings and field experience
- Engaged in on-site reviews of timber operations, and implemented the "Salmonid Guidelines for Forest Practices" when evaluating non-Federal timber harvest operations
- Implemented the Stewardship Non-Industrial Timber Management Plan program in negotiation with the State Board of Forestry to encourage and minimize regulatory burdens on small forest landowners operating under a stewardship philosophy (over 1 million acres)
- Conducted Habitat Conservation Plan (HCP) negotiations with the Mendocino Redwood Company – A Planning Agreement is in place that includes riparian protections from timber harvest and other operating restrictions beneficial to salmon until the HCP is completed.

Urbanization/Channelization

- Conducted ESA section 7 consultations to minimize the effects of flood control projects, levee setbacks, and floodplain management on the ESU
- Conducted Apanolia Creek Fish Barrier Removal and Habitat Restoration by removing three fish barriers, allowing steelhead access to the upper watershed
- Conducted San Pedro Creek floodplain restoration
- Worked with Caltrans and the Federal Highway Administration (FHWA) to develop guidelines and minimization measures for pile driving impacts on salmonids
- Worked with Stanford University to remedy fish passage impediments in San Francisquito Watershed, San Mateo County, California

Other Actions

- Worked with the San Francisco Bay maritime industry to refine environmental work windows for protection of listed salmonids

Federal Efforts

- Streamlined programs through programmatic strategies and developed best management practices for Federal, state, county, or city governments and private landowners for the benefit of steelhead habitat – Some programmatic strategies and actions have been completed and others are currently under way. These include the following:
    - State of California Road Maintenance Manual
    - Bank Stabilization Guidelines
    - Gravel Mining Guidelines (completed in 2004)
    - Ground Water Management Guidelines
    - Water Development and Rights Policies
    - Minimum Flow Policies for dry seasons to ensure appropriate water temperatures and conditions (under way)
    - Desalination Management Policy and Timber Harvest Guidelines (completed in January 2005)
- Evaluated impacts to the CCC steelhead ESU through numerous ESA section 7 consultations, which have improved or minimized adverse impacts
- Drafted an ESA section 6 agreement to support state recovery actions
- Provided annual grants to the State of California through the Pacific Coastal Salmon Recovery Fund program to assist recovery efforts in coastal watersheds

Restoration

- Continued to provide annual grants to the State of California to assist recovery efforts in coastal watersheds as part of the Pacific Coastal Salmon Recovery Fund program – NMFS assisted the California Department of Fish and Game (CDFG) in the development of ranking criteria to evaluate grant proposals and ensure that (1) Federal grant money is used for the purposes set forth by Congress and (2) there is a representative on the technical ranking committee for projects developed and submitted to this program for potential funding. These projects include a wide range of activities such as easements; road inventories and restoration; improvement of fish passage at barriers; public outreach; sediment source inventories and stabilization; fencing of riparian areas along

streams; and species and habitat monitoring. Many of these projects have been implemented but will require some time before the benefits to the species are realized.
- Continued to collaborate with the California Conservation Corps, the CDFG, and other state and Federal agencies conducting anadromous salmonid and aquatic stream habitat restoration projects – These projects include fish passage barrier modifications, instream habitat projects, riparian tree planting, and up-slope sediment reduction projects.
- Continued working with the California Resource Agency and numerous state, local and regional agencies; non-profit and stakeholder groups; and consultants as part of the State of California's Fish Passage Forum – The Forum addresses man-made barriers to adult and juvenile salmonid passage throughout California's coastal rivers and streams. The Forum identified administrative, financial, and technical impediments to addressing these issues, including information gaps, lack of watershed-level assessments and planning, and poorly coordinated project review and permitting processes. Group participants worked together to develop short- and long-term solutions to these impediments. The Forum continues to work to identify barriers; evaluate and prioritize restoration opportunities; provide consistent barrier inventory data; and conduct training, public outreach, and education related to fish passage barriers.

Priority Recovery Actions Needed:
Several priority recovery actions are needed for the Central California Coast steelhead ESU, including the following:

- Research and monitor distribution, status, and trends of steelhead.
- Promote operations of current recovery hatcheries and develop Hatchery and Genetics Management Plan (HGMPs) to minimize negative influences of hatcheries.
- Improve freshwater habitat quantity and quality.
- Protect and restore habitat complexity and connectivity from the upper watershed to the ocean.
- Conduct focused freshwater habitat restoration in anadromous salmonid streams (e.g., erosion control, bank stabilization, riparian protection and restoration, and reintroduction of large woody debris).
- Balance water supply and allocation with fisheries needs through a water rights program, designate fully appropriated watersheds, develop passive diversion devices or offstream storage, eliminate illegal water diversions, and improve criteria for water drafting and dam operations.
- Improve agricultural and forestry practices, in particular, riparian protections, road construction, and road maintenance.
- Improve county/city planning, regulations (e.g., riparian and grading ordinances) and county road maintenance programs.
- Finalize the ESA section 6 agreement to support state recovery actions
- Remove/upgrade high-priority man-made fish passage barriers (e.g., watercourse crossings and non-hydropower dams).
- Screen all water diversion structures.
- Replace existing outdated septic systems and improve wastewater management.
- Identify and treat point and non-point source pollution of streams from wastewater, agricultural practices, and urban environments.

- Modify channel and flood control maintenance and eliminate artificial breeching of sandbars for improvements in channel and estuarine habitats.

Recovery Priority Number: 3
Ranking for the CCC steelhead ESU was based on a high degree of threat, a low-moderate recovery potential, and an anticipated conflict with development projects or other economic activity. This determination was made based on the following factors: (1) the largest run for the ESU (the Russian River) has been reduced in size and this decline continues, (2) populations in the southern part of the range have declined substantially, (3) habitats are degraded, and (4) there have been recent droughts and a change in ocean productivity. A low-moderate recovery potential exists due to the large extent of urbanization within the range. Imminent land use changes and encroaching urbanization into rural areas are anticipated to conflict with the conservation needs of the CCC steelhead.

South-Central California Steelhead ESU *(Oncorhynchus mykiss)*

Date Listed: August 18, 1997

Legal Status: Threatened

Recovery Plan Status:
No recovery plan has been completed for this ESU, but recovery planning is under way. A Technical Recovery Team (TRT) has been convened and is in the Phase I recovery planning process. The TRT will establish the historic geographic distribution of the species within the South-Central California Steelhead Evolutionary Significant Unit (ESU), identify historic independent and dependent populations, and establish recovery goals and scenarios. Phase II recovery planning will involve the establishment of an appropriate policy and planning structure to develop a recovery plan, implementation strategy, and cost assessment.

Species Status:
The steelhead population within the South-Central California Steelhead ESU (SCC) has declined dramatically from estimated annual runs totaling 25,000 adults to less than 500 returning adult fish. Of the 36 watersheds historically supporting steelhead runs, approximately 90 percent continue to support runs, although run sizes have been sharply reduced in most watersheds. Current population trends within individual watersheds continuing to support runs are generally unknown, but may vary widely.

Threats and Impacts:
The SCC steelhead ESU is near the southern limit of the steelhead's range. Extensive loss of populations in most of the major watersheds is the result of agricultural development, urbanization, dewatering, and modification of rivers and creeks. A significant portion of the spawning and rearing habitat has been rendered inaccessible to steelhead because dams and other instream structures block or impede migration.

The principal threats to the SCC steelhead ESU are associated with the four major river systems, the Pajaro, Salinas, Nacimiento/Arroyo Seco, and Carmel rivers. Each of these watersheds is heavily impacted by water facilities (both surface and subsurface) and development on the floodplain and associated riparian corridor (for agricultural, residential, and industrial uses including sand and gravel extraction). Water developments have physically blocked or impeded migration of adult steelhead to headwater spawning and rearing tributaries, and have restricted the emigration of juveniles to the ocean. Development of the floodplains has altered the natural fluvial processes that facilitate migration and that, in some cases, sustain over-summering habitat for juvenile steelhead. Associated flood control structures and activities have further disrupted the natural fluvial processes necessary to maintain these habitats. Harvesting of timber and development of residential structures (and associated roads) on steep-sided erosive slopes has resulted in accelerated erosion and sedimentation of river and stream channels. In addition, the continued spread and propagation of invasive plants and aquatic species has further degraded habitats for steelhead, particularly juveniles. The loss and degradation of the remaining estuarine habitat as a result of both point and non-point source pollution and artificial breaching of sand-bars has reduced the suitability of these habitats for rearing and acclimation. Finally, the

introduction of exotic fish, and the stocking of non-native steelhead fish stocks (in lieu of land and water conservation measures) to support recreational fishing have also contributed to the decline of native steelhead and related resident trout populations in many coastal rivers and streams.

Conservation Actions:
Fish passage facilities have been constructed on the Carmel River at the Los Padres Dam with funding from the Carmel River Steelheaders and the CalAm Water Agency. A number of impediments to fish passage caused by road crossings and other instream structures have been eliminated or substantially improved as a result of retro-fitting (or in some cases eliminating) such structures. Funding for these projects was provided through the Pacific Coastal Salmon Recovery Fund. Planning for the potential removal of San Clemente Dam in the Carmel River has advanced substantially; funding for this project was provided by the CalAm Water Agency and the California Department of Water Resources.

Sport fishing regulations for native steelhead have been changed to regulate recreational angling in virtually all coastal rivers and streams accessible to SCC steelhead ESU adults migrating from the ocean. This recreational fishery is limited to several days a week during the migratory season and is catch-and-release only. In addition, the California Department of Fish and Game has curtailed its stocking of hatchery-reared trout, limiting stockings to reservoirs, or stream reaches above impassable barriers.

Finally, NMFS has conducted both formal and informal ESA section 7 consultations with Federal agencies that fund, carry out, or regulate projects such as flood protection, road construction, water diversion, and gravel mining throughout the range of the SCC steelhead ESU.

Priority Recovery Actions Needed:
Recovery planning will require further investigation of life history traits of this species, including use of estuarine habitat, juvenile growth and smolting patterns, distribution of residualized populations above artificial impassable barriers, and the relationship between putative resident and migratory forms of steelhead.

Re-establishing access to upper watersheds in both small coastal streams and several of the larger river systems is one of the highest priorities for the SCC steelhead ESU. Other major recovery actions include the completion of planning for the removal of San Clemente Dam on the Carmel River. The re-establishment of adequate flow regimes for the Salinas and Nacimiento rivers are also high priorities. Further investigation of potential recovery actions south of San Simeon is necessary to develop an ESU-wide recovery plan for the SCC steelhead ESU.

Recovery Priority Number: 3
Ranking for the SCC steelhead ESU was based on a moderate magnitude of threat, a high potential for recovery, and anticipated conflict with current and future development/disturbance within the range of the ESU. The Biological Review Team (BRT) that conducted an updated status review in 2004 concluded that the SCC steelhead ESU was “not in danger of extinction but likely to become so in the foreseeable future.” This determination was based in part on the

negative effects of poor land use practices, trout stocking, and generally downward trends in adult populations. It is believed there is a moderate magnitude of threat, with a high potential for recovery and continued conflict with land disturbance and water-associated impacts.

Southern California Steelhead ESU *(Oncorhynchus mykiss)*

Date Listed: August 18, 1997; Southern Range Extension May 1, 2002

Legal Status: Endangered

Recovery Plan Status:
No recovery plan has been completed for this ESU, but recovery planning is under way. A Technical Recovery Team (TRT) has been convened and is in the Phase I recovery planning process. The TRT will establish the historic geographic distribution of the species within the ESU, identify historic independent and dependent populations, and establish recovery goals and a range of recovery scenarios. Phase II recovery planning will involve the establishment of an appropriate policy and planning structure to develop a recovery plan, implementation strategy, and cost assessment.

Species Status:
The steelhead populations within the Southern California steelhead ESU have declined dramatically, from estimated annual runs totaling 55,000 adults to less than 500 returning adult fish. Populations are believed to have been extirpated from over half the 46 watersheds historically supporting steelhead runs. In the southern range extension (from Malibu to the U.S.–Mexico border), adult steelhead have been documented in only three watersheds since the original listing of the Southern California steelhead ESU. Current population trends within individual watersheds continuing to support runs are unknown, but may vary widely between watersheds and likely are declining in a majority of the watersheds within the Southern California steelhead ESU.

Threats and Impacts:
The Southern California steelhead ESU is at the extreme southern limit of the steelhead range. Extensive loss of populations, especially south of Malibu Creek, have resulted from urbanization, dewatering, and channelization of rivers and creeks. Southern California has also lost approximately 90 percent of its historical estuarine habitat. The majority of the spawning and rearing habitat has been rendered inaccessible to steelhead as a result of dams, debris basins, road crossings, and other instream structures blocking or impeding migration. The introduction of exotic fish and the stocking of non-native steelhead fish stocks in many coastal rivers and streams (in lieu of land and water conservation measures) to support recreational fishing have also contributed to the decline of native steelhead and related resident trout populations.

Conservation Actions:
Fish passage facilities have been constructed on the Ventura River at the Robles Diversion Dam, on Santa Paula Creek at the Harvey Dam and Santa Paula Creek Flood Control Channel, and on Sycamore Creek at the Sycamore Debris Basin. Funding for these projects was provided by the California Coastal Conservancy, the California Wildlife Conservation Board, and the Pacific Coastal Salmon Recovery Fund. A number of impediments to fish passage caused by road crossings and other instream structures have been eliminated or substantially improved as a result of retro-fitting (or in some cases eliminating) such structures. Funding for these projects was provided by through the Pacific Coastal Salmon Recovery Fund. Planning for the removal

of Matilija Dam in the Ventura River watershed (the largest dam removal project in the United States to date) has advanced substantially, and planning has commenced on the removal of Rindge Dam on Malibu Creek. Funding for these two major dam removal projects was provided by the U.S. Bureau of Reclamation, the U.S. Army Corps of Engineers, the U.S. Department of Justice, the California Coastal Conservancy, and local dam owners.

Sport-fishing regulations for native steelhead were changed to eliminate recreational angling in virtually all coastal rivers and streams accessible to adult steelhead migrating from the ocean. In addition, the California Department of Fish and Game (CDFG) curtailed its stocking of hatchery-reared trout, limiting stockings to reservoirs or stream reaches above impassable barriers. In at least one case, the CDFG has begun stocking sterile (triploid) fish to prevent the inter-breeding of hatchery-reared fish with native steelhead.

NMFS has formulated recommendations regarding fish passage and migration flows at Pyramid and Santa Felicia Dams on Piru Creek (a tributary to the Santa Clara River) as part of Federal Energy Regulatory Commission re-licensing actions. In addition, NMFS has participated in the Public Trust/Water Right hearings held by the California State Water Resources Control Board on the re-licensing of the Cachuma Dam project on the Santa Ynez River.

Finally, NMFS has conducted both formal and informal ESA section 7 consultations with Federal agencies that fund, carry out, or regulate projects such as flood protection, road construction, water diversion, and gravel mining throughout the range of the Southern California steelhead ESU.

Priority Recovery Actions Needed:
Recovery planning will require investigation of life history traits for this species, including use of estuarine habitat, juvenile growth and smolting patterns, distribution of residualized populations above artificial impassable barriers, and the relationship between putative resident and migratory forms of steelhead.

Re-establishing access to upper watersheds in both small coastal streams and several of the larger river systems is one of the highest priorities for the Southern California steelhead ESU. Other major recovery actions include completion of planning for the removal of Matilija Dam on the Ventura River and Rindge Dam on Malibu Creek. The re-establishment of adequate flow regimes for the Santa Maria, Santa Ynez, Ventura, and Santa Clara rivers is also a high priority. Further investigation of potential recovery actions south of Malibu Creek (within the southern range extension) includes watershed barrier inventories, habitat suitability assessments, and research into metapopulation dynamics between the larger river systems and short-run coastal streams. Such studies are necessary to develop an ESU-wide recovery plan for the Southern California steelhead ESU.

Recovery Priority Number: 3
Ranking for the Southern California steelhead ESU was based on a high magnitude of threat, a moderate potential for recovery, and anticipated conflict with current and future development/disturbance within the range of the ESU. The Biological Review Team (BRT) that conducted an updated status review in 2004 reiterated the conclusions reached during the

previous status review, that the Southern California steelhead ESU "was in danger of extinction." This determination was based in part on the extirpation of populations through much of their historical range, the blockage of freshwater habitats, and the continued stocking of hatchery-reared rainbow trout. It is believed there is a high magnitude of threat, with a moderate potential for recovery and continued conflict with land disturbance and water-associated development.

Central California Coast Coho Salmon ESU (*Oncorhynchus kisutch*)

Date Listed: October 31, 1996

Legal Status: Threatened

Recovery Plan Status:
No recovery plan has been completed for this ESU, but recovery planning is under way.

NMFS Southwest Region (SWR) will initiate the preparation of the recovery plan for Central California Coast coho (CCC) ESU at the same time the Technical Recovery Team (TRT) distributes the draft Population Structure report for the ESUs of Chinook salmon, coho salmon, and steelhead in the North-Central California Coast Recovery Domain. NMFS will work closely with the California Department of Fish and Game (CDFG) to ensure appropriate integration and collaboration between the state Coho Recovery Planning process and the Federal recovery planning process. Primary authorship of the recovery plan will be the responsibility of NMFS staff, with outreach by NMFS to state, Federal, and private partners during the recovery effort.

Species Status:
The Central California Coast coho salmon ESU (CCC coho) includes all naturally spawned populations from Punta Gorda in northern California to the South (including the San Lorenzo River in central California), as well as populations in tributaries to San Francisco Bay (excluding the Sacramento-San Joaquin River system). Four artificial propagation programs are considered part of this ESU[1]. The artificially propagated stocks were found to be no more than moderately divergent genetically from the natural populations.

Information on the abundance and productivity trends for the naturally spawning component of the CCC coho ESU is extremely limited. No long-term time series of spawner abundance exist for individual river systems. Data are particularly lacking for many river basins in the southern two-thirds of the ESU, where naturally spawning populations are considered to be at the greatest risk. Analyses of juvenile coho presence-absence information, juvenile density surveys, and irregular adult counts for the South Fork Noyo River indicate low abundance and long-term downward trends. The extirpation or near extirpation of natural coho salmon populations in several major river basins and across most of the southern historical range of the ESU represents a significant risk to ESU spatial structure and diversity. Trend data for this ESU show a continuing decline in abundance.

Threats and Impacts:
The extirpation or near extirpation of natural coho populations in several major river basins and across most of the southern historical range of the ESU represents a significant risk to CCC coho ESU spatial structure and diversity. Critically low abundance of all life stages makes this species vulnerable and genetically susceptible to all threats. Freshwater habitat loss and degradation

[1] The artificial propagation programs are: the Don Clausen/Warm Springs Fish Hatchery Captive Broodstock Program, Scott Creek/King Fisher Flats Conservation Program, Scott Creek Captive Broodstock Program, and the Noyo River Fish Station Egg-take Program coho hatchery program.

have been identified as leading factors in the decline of CCC coho salmon. Freshwater habitat loss and degradation have resulted from land use activities such as the following:

- Agricultural operations
- Artificial barriers
    - Canal and pipeline crossings
    - Conditions severing surface/subsurface hydrologic connection of stream channel and wetlands
    - Dams
    - Erosion-control structures
    - Flood-control structures
    - Pits from gravel mining
    - Road crossings (e.g., bridges, culverts, and low-water fords)
- Forestry operations
- Gravel extraction
- Illegal harvest
- Streambed alteration
- Substandard fish screens on diversions
- Suction dredging
- Unscreened water diversions
- Urbanization
- Water demand exceeding availability
- Water pollution

Additional threats include the following:

- Potential genetic modification in hatchery stocks resulting from domestication selection or low effective population size
- Incidental mortality from catch-and-release hooking
- Climatic variation leading to drought, flooding, and variable ocean conditions
- Predation

Conservation Actions:
The Preliminary Recovery Strategy for this ESU is to ensure NMFS is fulfilling its obligation under the ESA to conserve and recover CCC coho salmon. NMFS focuses primarily on linking and coordinating ESA programs to recovery planning and developing stronger, more collaborative partnerships with other entities whose decisions affect salmon recovery options. Under this guidance, numerous conservation actions were conducted from 2002–2004 for CCC coho ESU recovery and are detailed below.

Agricultural Land Management Practices

- Implemented the Fish Friendly Farming program, a multi-agency, third-party certification and technical assistance program for wine grape growers practicing best management practices (BMPs) for salmon – Over 10,000 acres of private property have been inspected and certified through this program.
- Collaborated proactively with counties on General Plan Updates, Grading Ordinances, and Riparian Ordinances; and continued working closely with Resource Conservation Districts (RCDs) and the Natural Resources Conservation Service (NRCS)

Gravel Mining

- Applied the NMFS Southwest Region (SWR) Gravel Mining Guidelines, entitled "Sediment Removal from Freshwater Salmonid Habitat: Guidelines to NMFS Staff for the Evaluation of Sediment Removal Actions from California Streams"
- Used these guidelines to conduct effects analyses of proposed actions that would remove sediment from streams, either for commercial sediment production or flood control channel excavation – This information helps staff identify adverse effects of sediment removal actions and provide reasonable and prudent alternative measures, as necessary.

Municipal and Agricultural Water Diversions

- Developed "Guidelines for Maintaining Instream Flows to Protect Fisheries below Water Diversions," which are used by NMFS and the California State Water Resources Control Board for flow standards when issuing water rights permits – The Governor of California recently signed into law an amendment to the California Water Code to adopt NMFS' Instream Flow Guidelines.
- Applied the Water Drafting Specifications, Guidelines for Salmonid Passage at Stream Crossings, Fish Screening Criteria for Anadromous Salmonids, and the Addendum to Fish Screening Criteria for Pumped Water Intakes

Summer Dams

- Developed a database of summer dams and commenced proactive efforts to engage with landowners to minimize the effects of such dams
- Implemented staff guidelines, entitled "The Effects of Summer Dams on Salmon and Steelhead in California Coastal Watersheds & Recommendations for Mitigating Their Impacts"

Timberland Management and Forest Conversions

- Continued to engage with the Board of Forestry in public meetings, and presented information to the Board on specific areas in the Forestry Rules needing improvements based on Science Panel findings and field experience
- Engaged in on-site reviews of timber operations, and used the "Salmonid Guidelines for Forest Practices" when evaluating non-Federal timber harvest operations
- Implemented the Stewardship Non-Industrial Timber Management Plan program in negotiation with the State Board of Forestry to encourage and minimize regulatory burdens on small forest landowners operating under a stewardship philosophy (over 1 million acres)
- Conducted Habitat Conservation Plan (HCP) negotiations with the Mendocino Redwood Company – A Planning Agreement is in place that includes riparian protections from timber harvest and other operating restrictions beneficial to salmon until the HCP is completed.

Urbanization/Channelization

- Conducted ESA section 7 consultations to minimize the effects of flood control projects, levee setbacks, and floodplain management on the ESU

Ocean and Freshwater Fishing

- Continued prohibitions on retention of coho salmon by commercial troll fishers and recreational ocean fisheries
- Continued prohibition on recreational fishing for coho salmon throughout the central California coast

Federal Efforts

- Streamlined programs through programmatic strategies and developed best management practices for Federal, state, county, or city governments and private landowners for the benefit of salmon habitat – Some programmatic strategies and actions have been completed and others are currently under way. These include the following:
    - State of California Road Maintenance Manual
    - Bank Stabilization Guidelines
    - Gravel Mining Guidelines (completed in 2004)
    - Ground Water Management Guidelines
    - Water Development and Rights Policies
    - Minimum Flow Policies for dry seasons to ensure appropriate water temperatures and conditions (under way)
- Completed the "Desalination Management Policy and Timber Harvest Guidelines" – NMFS evaluated impacts to CCC coho on a wide variety of section 7 consultations, which has improved or minimized adverse impacts to coho salmon and their habitat.
- Drafted an ESA section 6 agreement to support state recovery actions
- Provided annual grants to the State of California through the Pacific Coastal Salmon Recovery Fund program to assist recovery efforts in coastal watersheds

Restoration

- Continued to provide annual grants to the State of California to assist recovery efforts in coastal watersheds as part of the Pacific Coastal Salmon Recovery Fund program – Assisted the California Department of Fish and Game (CDFG) in the development of ranking criteria to evaluate grant proposals and ensure that (1) Federal grant money is used for the purposes set forth by Congress and (2) there is a representative on the technical ranking committee for projects developed and submitted to this program for potential funding. These projects include a wide range of activities such as easements; road inventories and restoration; improvement of fish passage at barriers; public outreach; sediment source inventories and stabilization; fencing of riparian areas along streams; and species and habitat monitoring. Many of these projects have been implemented but will require some time before the benefits to the species are realized.
- Continued to collaborate with the California Conservation Corps, the CDFG, and other state and Federal agencies conducting anadromous salmonid and aquatic stream habitat restoration projects – These projects include fish passage barrier modifications, instream habitat projects, riparian tree planting, and up-slope sediment reduction projects.
- Continued working with the California Resource Agency and numerous state, local and regional agencies; non-profit and stakeholder groups; and consultants as part of the State of California's Fish Passage Forum – The Forum addresses man-made barriers to adult and juvenile salmonid passage throughout California's coastal rivers and streams. The Forum identified administrative, financial, and technical impediments to addressing these

issues, including information gaps, lack of watershed-level assessments and planning, and poorly coordinated project review and permitting processes. Group participants worked together to develop short- and long-term solutions to these impediments. The Forum continues to work to identify barriers; evaluate and prioritize restoration opportunities; provide consistent barrier inventory data; and conduct training, public outreach, and education related to fish passage barriers.

Genetic and Hatchery Programs

2001 Warm Springs Hatchery Captive Broodstock Program:

- Conducted a collaborative effort with the U.S. Army Corps of Engineers (ACOE), CDFG, commercial fishing interests, local universities, conservation groups, and watershed groups to capture, breed, and release Russian River coho salmon
- Successfully raised and bred two year classes of coho salmon
- Used spawning matrix to spawn fish to preserve genetic integrity and improve survival as part of a Genetic Analysis and Management Plan designed by the NMFS Southwest Science Center
- Released the first juveniles into the Russian River, Sonoma County, in October 2004 with additional releases planned for subsequent years
- Successfully released adults into Walker Creek, Marin County, in 2003 and 2004
- Conducted extensive habitat restoration and monitoring work at release sites – Three-year habitat monitoring was funded by the Pacific Coastal Salmon Recovery Fund (PCSRF) to monitor flow temperatures, derive a biological index of productivity, and conduct outmigrant trapping using upstream migrant traps.

2002 Captive Broodstock Program at Monterey Bay Salmon and Trout Project:

- Continued collaboration with project, which is partially funded by PCSRF money
- Used spawning matrix to spawn fish to preserve genetic integrity and improve survival as part of a Genetic Analysis and Management Plan designed by the NMFS Southwest Science Center
- Conducted monitoring, which includes upstream trapping, snorkeling and evaluation of hatchery and wild fish interactions

Priority Recovery Actions Needed:

Several priority recovery actions are needed for the Central California Coast coho salmon ESU, including the following:

- Research and monitor distribution, status, and trends of coho.
- Promote operations of current recovery hatcheries and develop Hatchery and Genetics Management Plans (HGMPs) to minimize negative influences of hatcheries.
- Improve freshwater habitat quantity and quality.
- Protect and restore habitat complexity and connectivity from the upper watershed to the ocean.
- Conduct focused freshwater habitat restoration in anadromous salmonid streams (e.g., erosion control, bank stabilization, riparian protection and restoration, and reintroduction of large woody debris).
- Balance water supply and allocation with fisheries needs through a water rights program, designate fully appropriated watersheds, develop passive diversion devices or offstream

storage, eliminate illegal water diversions, and improve criteria for water drafting and dam operations.
- Improve agricultural and forestry practices, in particular, riparian protections, road construction, and road maintenance.
- Improve county and city planning, regulations (e.g., riparian and grading ordinances), and county road maintenance programs.
- Finalize the ESA section 6 agreement to support state recovery actions.
- Remove/upgrade high-priority man-made fish passage barriers (e.g., watercourse crossings and non-hydropower dams).
- Implement screening of all water diversion structures.
- Replace existing, outdated septic systems and improve wastewater management.
- Identify and treat point and non-point source pollution of streams from wastewater, agricultural practices, and urban environments.
- Modify channel and flood control maintenance and eliminate artificial breeching of sandbars for improvements in channel and estuarine habitats.

Recovery Priority Number: 1

Ranking for CCC coho salmon was based on a high degree of threat, a high recovery potential and an anticipated conflict with economic activity. The Biological Review Team agreed in 2004 that natural populations of coho salmon in the CCC ESU are in danger of extinction. This determination was based on the following factors: (1) substantially low abundance of coho salmon from historical levels (e.g., more than 50 percent of coho streams no longer have spawning runs), (2) long-term trends clearly downward, (3) degraded habitats, (4) threats to genetic integrity due to hatchery plantings, and (5) recent droughts and change in ocean productivity. It is believed a high potential for recovery is possible for CCC coho salmon because of the likelihood that freshwater impacts can be substantially controlled or reduced through habitat protection, implementation of best management practices, and focused restoration. Over 80 percent of the range of CCC coho lies under private ownership. Forestry is the predominant land use; however, high levels of forest conversion to agriculture and urbanization are currently under way. Imminent land use changes are anticipated to conflict with the conservation needs of CCC coho salmon.

California Coast Chinook ESU (*Oncorhynchus tshawytscha*)

Date Listed: September 16, 1999

Legal Status: Threatened

Recovery Plan Status:
No recovery plan has been completed for this ESU, but recovery planning is under way.

Species Status:
The California Coast (CC) Chinook salmon ESU includes all naturally spawned populations of Chinook salmon from rivers and streams south of the Klamath River to the Russian River, California. Seven artificial propagation programs are considered to be part of the ESU: the Humboldt Fish Action Council (Freshwater Creek), Yager Creek, Redwood Creek, Hollow Tree, Van Arsdale Fish Station, Mattole Salmon Group, and Mad River Hatchery fall-run Chinook hatchery programs.

CC Chinook salmon continue to exhibit depressed population sizes relative to historical abundances; this is particularly true for spring-run Chinook salmon, which may no longer exist anywhere within the range. The Biological Review Team (BRT) in 2004 cautioned that evaluation of the significance of recent potential increases in Chinook salmon abundance in the Russian River must weigh the substantial uncertainty regarding the genetic relatedness of these fish to others in the northern portion of the ESU. Population trends for this ESU show a continuing decline in abundance.

Threats and Impacts:
The following limiting factors are prevalent throughout this ESU and affect most CC Chinook populations within the ESU. These factors include: low overwinter and summer survival of juveniles, limited smolt production, low productivity[1], reduced spawning success, and limited spatial distribution throughout the ESU.

The threats affecting these factors are pervasive throughout the ESU and vary among populations. Most of the threats are associated with habitat and water quantity and quality issues, which include the following:

- Lack of side-channel, alcove, tributary, pool, and floodplain habitats for over-winter and summer survival of juveniles
- Reduced riparian areas, including function and diversity of habitat types along all water courses
- Decreased stream channel sinuosity[2] and habitat complexity due to excessive removal of habitat forming structures (e.g., large woody debris and boulders) and stream channel straitening for flood control purposes

[1] Defined as: (recruits • spawners^{-1})
[2] Stream channel sinuosity is defined by the U.S. Geological Survey (USGS) as the ratio of the channel length between two points on a channel to the straight-line distance between the same two points – a measure of meandering.

- Excessive sedimentation in stream channels from a variety of past and current land use activities that have filled in pools, covered spawning gravels and benthic invertebrates, and reduced flood flow capacity
- Fragmentation of historic and current habitats due to human-caused barriers (e.g., dams, culverts, and bridges)
- Negative impacts on steelhead and their habitat from water impoundments, hydroelectric facilities, push-up dams for small riparian diversions, surface and subsurface water withdrawals, and water conveyance and flood control systems – Many of the water facilities do not have fish passage facilities, and the few facilities with some adult passage capabilities have met with limited success. These blockages fragment historic and current steelhead habitat directly or indirectly due to their operations.
- Inadequate screening of numerous water diversions to protect adult and juvenile salmon from being entrained into the diversions
- Significant point and non-point source pollution, which can contribute pollutants such as heat and toxic substances into streams and rivers

Conservation Actions:
The Preliminary Recovery Strategy for this ESU is to ensure NMFS is fulfilling its obligation under the ESA to conserve and recover CC Chinook. NMFS focuses primarily on linking and coordinating ESA programs to recovery planning and developing stronger, more collaborative partnerships with other entities whose decisions affect salmon recovery options. Under this guidance, numerous conservation actions were conducted from 2002–2004 for the CC Chinook ESU recovery and are detailed below.

Agricultural Land Management Practices

- Implemented the Fish Friendly Farming program, a multi-agency, third-party certification and technical assistance program for wine grape growers practicing best management practices (BMPs) for salmon – Over 10,000 acres of private property have been inspected and certified through this program.
- Collaborated proactively with counties on General Plan Updates, Grading Ordinances, and Riparian Ordinances
- Consulted on the Northwest Forest Plan, a coordinated ecosystem management strategy for Federal lands administered by the U.S. Fish and Wildlife Service (FWS) and Bureau of Land Management (BLM) – ESA section 7 Biological Opinions are in place for all Land and Resource Management Plans (LRMPs) and associated activities (under the LRMPs) for all listed species found within each of individual National Forest or BLM Resource Area. NMFS participated in the development and review of the Watershed Analysis conducted across the public lands to ensure restoration actions are consistent with recovery actions for ESA-listed Pacific salmon. Improved habitat conditions will result in increased survival of the freshwater life stages of these fish. Implementation of actions consistent with the objectives and components (including watershed analysis, watershed restoration, reserve and refugia land allocations, and the associated standards and guidelines) will provide high levels of aquatic ecosystem understanding, protection, and restoration for aquatic habitat-dependent species.
- Continued working closely with Resource Conservation Districts (RCDs) and Natural Resources Conservation Service (NRCS) to help identify potential impacts to ESA

species, to help develop measures to address the impacts, and to help obtain regulatory relief under the ESA

- Contributed to the State of California Coho Recovery Plan – The State of California listed two California coho populations (from San Francisco Bay to the Oregon border) under the California Endangered Species Act (CESA) in 2003. NMFS was an active member on the State of California's two recovery teams that identified and addressed recovery needs of the species and habitat statewide. Each of the recovery teams developed conservation measures and identified necessary state regulatory changes for integration into a single statewide coho recovery plan, which the California Department of Fish and Game (CDFG) published in 2004. There are over 700 conservation and regulatory recommendations in the plan covering a wide variety of land use activities throughout the range of the CC Chinook ESU.

ESA Section 7 Consultations

- Conducted over 500 ESA section 7 consultations during the past 6 years with Federal action agencies throughout southern Oregon and northern California that fund or carry out projects such as irrigation and water diversion, timber sales, watershed restoration, fish passage at barriers, gravel mining, grazing, and transportation projects

Gravel Mining

- Applied the NMFS Southwest Region (SWR) Gravel Mining Guidelines, entitled "Sediment Removal from Freshwater Salmonid Habitat: Guidelines to NMFS Staff for the Evaluation of Sediment Removal Actions from California Streams"
- Used these guidelines to conduct effects analyses of proposed actions that would remove sediment from streams, either for commercial sediment production or flood control channel excavation – This information helps staff identify adverse effects of sediment removal actions and provide reasonable and prudent alternative measures, as necessary.
- Continued collaboration with Humboldt, Del Norte, and Mendocino counties on the Humboldt, Del Norte, and Mendocino Gravel Plans – Long-term sustained gravel mining plans have been, or are being, developed by these three northern California counties, which contain a substantial portion of the southern Oregon and northern California Coast ESUs. NMFS is working with the counties and the U.S. Army Corps of Engineers (ACOE) to ensure any Letters of Permission (LOPs) issued for gravel mining are protective of all ESA-listed Pacific salmon.

Municipal and Agricultural Water Diversions

- Developed "Guidelines for Maintaining Instream Flows to Protect Fisheries below Water Diversions," which are used by NMFS and the California State Water Resources Control Board for flow standards when issuing water rights permits – The Governor of California recently signed into law an amendment to the California Water Code to adopt NMFS' Instream Flow Guidelines.
- Applied the Water Drafting Specifications, Guidelines for Salmonid Passage at Stream Crossings, Fish Screening Criteria for Anadromous Salmonids, and the Addendum to Fish Screening Criteria for Pumped Water Intakes
- Conducted the Potter Valley ESA section 7 consultation on the revised flow regime for Eel River, with anticipated improvement of instream conditions for salmon

Summer Dams

- Developed a database of summer dams and commenced proactive efforts to engage with landowners to minimize the effects of such dams
- Implemented staff guidelines, entitled "The Effects of Summer Dams on Salmon and Steelhead in California Coastal Watersheds & Recommendations for Mitigating Their Impacts"
- Worked with CDFG and Humboldt State University on the Freshwater Creek Fish Passage Project to develop and construct a fish ladder that passes adult and juvenile salmon up and over a 20-foot seasonal dam on Freshwater Creek – The seasonal dam operates in spring and summer, and was a complete barrier to ESA-listed anadromous salmon for more than 50 years. With the construction of this bypass, these salmon can now access over 20 miles of rearing habitat year-round. The project represents the first fish ladder in California to effectively pass juvenile fish up and down the barrier.
- Recommended to the ACOE the denial of two permits for the annual installation of push-up gravel summer dams on Redwood Creek, Humboldt County, due to the following factors: impeded juvenile fish passage at barriers, direct mortality of juveniles, and increased sediment – The ACOE denied issuance of the permits for the first time in decades, and NMFS subsequently observed greater numbers of ESA-listed Pacific salmon in Redwood Creek.

Timberland Management and Forest Conversions

- Continued to engage with the Board of Forestry in public meetings, and presented information to the Board on specific areas in the Forestry Rules needing improvements based on Science Panel findings and field experience
- Engaged in on-site reviews of timber operations, and used the "Salmonid Guidelines for Forest Practices" when evaluating non-Federal timber harvest operations
- Implemented the Stewardship Non-Industrial Timber Management Plan program in negotiation with the State Board of Forestry to encourage and minimize regulatory burdens on small forest landowners operating under a stewardship philosophy (over 1 million acres)
- Conducted Habitat Conservation Plan (HCP) negotiations with the Mendocino Redwood Company – A Planning Agreement is in place that includes riparian protections from timber harvest and other operating restrictions beneficial to salmon until the HCP is completed.
- Worked on the Pacific Lumber Company Habitat Conservation Plan (PALCO HCP), which covers approximately 210, 000 acres of industrial timberlands in Northern California and includes activities related to timber management, forest road development and maintenance, and commercial rock quarrying
- Held technical and policy discussions (in conjunction with the U.S. Fish and Wildlife Service) with the Green Diamond Resource Company regarding the development of a Habitat Conservation Plan for much of its industrial timber operations in northern California – The Green Diamond Resource Company prepared a draft Aquatic Habitat Conservation Plan/Candidate Conservation Agreement in support of its applications. NMFS is conducting an ESA section 7 consultation for all ESA-listed Pacific salmon in northern California. The Initial Plan Area includes 416,531 acres in Humboldt and Del

Norte counties, of which 170,241 acres (40.9 percent) are in the lower Klamath River basin.

Urbanization/Channelization

- Conducted ESA section 7 consultations to minimize the effects of flood control projects, levee setbacks, and floodplain management on the ESU
- Collaborated with Humboldt Bay Municipal Water District (HBMWD) on the development of a habitat conservation plan (HCP) to significantly reduce direct mortality of salmon at the water diversion, better coordinate withdrawals to improve instream flows on the Mad River, and improve operations – Fundamental elements of the HCP include: installation of new fish screens, and maintenance and increase of river flows above historic levels. The HCP will be finalized once the "no surprises" rules are completed[3].

Restoration

- Continued to provide annual grants to the State of California to assist recovery efforts in coastal watersheds as part of the Pacific Coastal Salmon Recovery Fund program – Assisted the California Department of Fish and Game (CDFG) in the development of ranking criteria to evaluate grant proposals and ensure that (1) Federal grant money is used for the purposes set forth by Congress and (2) there is a representative on the technical ranking committee for projects developed and submitted to this program for potential funding. These projects include a wide range of activities such as easements; road inventories and restoration; improvement of fish passage at barriers; public outreach; sediment source inventories and stabilization; fencing of riparian areas along streams; and species and habitat monitoring. Many of these projects have been implemented but will require some time before the benefits to the species are realized.
- Consulted under ESA section 7 with the San Francisco District of ACOE regarding the ACOE's issuance of a Regional General Permit (RGP) to CDFG – The RGP is for restoration activities pursuant to CDFG's "California Salmonid Stream Habitat Restoration Manual" and the resulting effects on ESA-listed salmon north of San Francisco to the Oregon border. This RGP authorizes CDFG (and the agents contracted, funded, and/or supervised by CDFG) to carry out fisheries habitat restoration program projects compliant with the manual. To date, more than 1,000 projects have been implemented, with hundreds of miles of Pacific salmon habitat being restored and available for use by juvenile and adult Pacific salmonids.
- Worked with the Redwood Creek and State Parks services, which developed several plans to help protect and enhance anadromous salmon habitat – These plans identify actions the National Parks and State Parks will undertake to restore aquatic and terrestrial ecological functions within park boundaries, based on exhaustive inventorying over the past 20 years.

[3] "No surprises" rules are assurances provided by the government to non-Federal landowners through ESA section 10(a)(1)(B). Private landowners are assured that if "unforeseen circumstances" arise, NMFS and/or FWS will not require the commitment of additional land, water, or financial compensation or additional restrictions on the use of land, water, or other natural resources beyond the level otherwise agreed to in the HCP without the consent of the permittee. The government will honor these assurances as long as a permittee is implementing the terms and conditions of the HCP, permit, and other associated documents in good faith.

- Continued to collaborate with the California Conservation Corps, the CDFG, and other state and Federal agencies conducting anadromous salmonid and aquatic stream habitat restoration projects – These projects include fish passage barrier modifications, instream habitat projects, riparian tree planting, and up-slope sediment reduction projects.
- Continued working with the California Resource Agency and numerous state, local, and regional agencies; non-profit and stakeholder groups; and consultants as part of the State of California's Fish Passage Forum – The Forum addresses man-made barriers to adult and juvenile salmonid passage throughout California's coastal rivers and streams. The Forum identified administrative, financial, and technical impediments to addressing these issues, including information gaps, lack of watershed-level assessments and planning, and poorly coordinated project review and permitting processes. Group participants worked together to develop short- and long-term solutions to these impediments. The Forum continues to work to identify barriers; evaluate and prioritize restoration opportunities; provide consistent barrier inventory data; and conduct training, public outreach, and education related to fish passage barriers.

Hatchery and Genetics

- Commenced collaboration with CDFG in the development of Hatchery and Genetics Management Plans (HGMPs) and Fisheries Management Evaluation Plans for all hatcheries and fisheries programs located throughout northern California – It is anticipated that upon completion of these plans, these programs would qualify for the ESA section 4(d) rules exempting them from take violations. NMFS has been working with several hatchery programs and CDFG to reduce the mortality of wild, native ESA-listed salmon that were in excess of the facilities' spawning needs.
- Implemented hatchery programs to control disease and minimize its effect on wild fish
- Conducted pikeminnow eradication efforts

Federal Efforts

- Streamlined programs through programmatic strategies and developed best management practices for Federal, state, county, or city governments and private landowners for the benefit of salmon habitat – Some programmatic strategies and actions have been completed and others are currently under way. These include the following:
    - State of California Road Maintenance Manual
    - Bank Stabilization Guidelines
    - Gravel Mining Guidelines (completed in 2004)
    - Ground Water Management Guidelines
    - Water Development and Rights Policies
    - Minimum Flow Policies for dry seasons to ensure appropriate water temperatures and conditions (under way)
    - Desalination Management Policy and Timber Harvest Guidelines (completed in January 2005)
- Evaluated impacts to the CC Chinook ESU through numerous ESA section 7 consultations, which have improved or minimized adverse impacts
- Drafted an ESA section 6 agreement to support state recovery actions
- Provided annual grants to the State of California through the Pacific Coastal Salmon Recovery Fund program to assist recovery efforts in coastal watersheds

Priority Recovery Actions Needed:
Several priority recovery actions are needed for the California Coast Chinook Salmon ESU, including the following:

- Research and monitor distribution, status, and trends of Chinook.
- Promote operations of current recovery hatcheries and develop HGMPs to minimize negative influences of hatcheries.
- Improve freshwater habitat quantity and quality.
- Protect and restore habitat complexity and connectivity from the upper watershed to the ocean.
- Conduct focused freshwater habitat restoration in salmon streams (e.g., erosion control, bank stabilization, riparian protection and restoration, and reintroduction of large woody debris).
- Balance water supply and allocation with fisheries needs through a water rights program, designate fully appropriated watersheds, develop passive diversion devices or offstream storage, eliminate illegal water diversions, and improve criteria for water drafting and dam operations.
- Improve agricultural and forestry practices, in particular, riparian protections, road construction, and road maintenance.
- Improve county and city planning, regulations (e.g., riparian and grading ordinances), and county road maintenance programs.
- Finalize the ESA section 6 agreement to support state recovery actions.
- Remove/upgrade high-priority man-made fish passage barriers (e.g., watercourse crossings and non-hydropower dams).
- Implement screening of all water diversion structures.
- Replace existing, outdated septic systems and improve wastewater management.
- Identify and treat point and non-point source pollution of streams from wastewater, agricultural practices, and urban environments.
- Modify channel and flood control maintenance and eliminate artificial breeching of sandbars for improvements in channel and estuarine habitats.

Recovery Priority Number: 3
Ranking for the California Coast (CC) Chinook ESU was based on a high degree of threat, a low-moderate recovery potential, and anticipated conflict with development projects or other economic activity. The high degree of threat is based on (1) evidence that suggests populations have been extirpated in the southern part of the ESU or are extremely low in abundance, and (2) loss of the spring-run Chinook life history in the Eel River Basin and elsewhere in the ESU. A low-moderate potential for recovery is possible for CC Chinook based on the extremely limited availability of data and the moderate likelihood that freshwater impacts can be substantially controlled or reduced through habitat protection, implementation of best management practices, and focused restoration. And conflict is anticipated due to imminent land use changes and encroaching urbanization into rural areas.

Sacramento River Winter-run Chinook Salmon ESU *(Oncorhynchus tshawytscha)*

Date Listed: November 5, 1990; reclassified January 4, 1994

Legal Status: Endangered (reclassified from original listing as threatened)

Recovery Plan Status:
A draft recovery plan for the Sacramento winter-run Chinook salmon ESU was issued in August 1997. The final recovery plan for this ESU is under development.

Species Status:
The Sacramento River winter-run Chinook salmon ESU is represented by a single extant population. Construction of the Shasta and Keswick Dams completely displaced this ESU from its historical spawning habitat. Cold-water releases from the reservoir behind Shasta Dam artificially maintain the remaining spawning habitat. The productivity and abundance of the naturally spawning component of this ESU have exhibited marked improvement in recent years, compared to years of relatively low abundance in the 1980s and early 1990s. The Biological Review Team (BRT) noted that the recent mean abundance[1] is only 3 percent of the peak mean (post-1967), and the BRT is particularly concerned about risks to the diversity and spatial structure of the ESU. Construction of Shasta Dam merged at least four independent populations into a single population, resulting in a substantial loss of genetic diversity, life-history variability, and local adaptation. Critically low salmon abundance (particularly in the early 1990s) imposed "bottlenecks" for the single remaining population, which further reduced genetic diversity. ESU viability is assessed on the basis of four Viable Salmon Population (VSP) criteria: abundance, productivity, spatial structure, and diversity**.** For this ESU, the BRT found extremely high risk for each of the four VSP categories. The majority opinion of the BRT was that the naturally spawned component of the Sacramento River winter-run ESU is "likely to become endangered within the foreseeable future."

Two artificial propagation programs are also part of the Sacramento River winter-run Chinook ESU. Artificial propagation of and a captive broodstock program for winter-run Chinook are carried out in the Livingston-Stone National Fish Hatchery (NFH) on the mainstem Sacramento River above Keswick Dam. A captive broodstock program is also maintained at the University of California's Bodega Marine Laboratory. These programs (operated for conservation purposes since the early 1990s) were identified as high-priority recovery actions in the 1997 Draft Recovery Plan for this ESU. Because of increased escapement over the past several years, consideration is being given to terminating the captive broodstock program. An assessment of the effects of these artificial propagation programs on the viability of the ESU in total concluded that the programs decrease risk to some degree by contributing to increased ESU abundance and diversity, but have a neutral or uncertain effect on productivity and spatial structure. A second naturally spawning population is considered critical to the long-term viability of this ESU, and plans are under way (but not yet implemented) to eventually establish a second population in the upper Battle Creek watershed, using the artificial propagation program as a source for fish. The

[1] Measured as five-year geometric mean.

artificial propagation program has contributed to maintaining diversity of the ESU through careful use of spawning protocols to maximize genetic diversity of propagated fish and minimize impacts on the naturally spawning population. In addition, the artificial propagation and captive broodstock programs preserve the genome of this ESU.

Threats and Impacts:
As winter-run Chinook salmon historically were dependent on access to spring-fed tributaries to the upper Sacramento River that remained cool during summer and early fall, the most obvious impact to this ESU was the construction of Shasta Dam; the dam blocked access to the ESU's entire historic spawning habitat. With cold-water releases from Shasta creating conditions suitable for winter-run Chinook salmon 100 feet below the dam, this species was able to survive habitat alteration, but experienced significant impacts. Presumably, there were several independent populations of winter-run Chinook salmon in the Pitt, McCloud, and Little Sacramento rivers, and in various tributaries to these rivers, such as Hat Creek and the Fall River. These populations merged to form the current single population. Any populations that may have existed in Battle Creek and the Calaveras River have since been extirpated. This ESU continues to be threatened by having only one extant population, low population size (compared to historic levels), vulnerability to drought, inadequately screened or unscreened water diversions, predation at artificial strictures and by non-native species, pollution (e.g., Iron Mountain Mine), adverse flow conditions, high summer water temperatures, unsustainable harvest rates, and passage problems at various structures.

Conservation Actions:
Numerous conservation actions were conducted from 2002–2004 for the Sacramento River winter-run Chinook ESU.

The Central Valley Project section 7 consultation with the Bureau of Reclamation likely contributed to habitat improvements benefiting the Sacramento River winter-run Chinook salmon ESU. Implementation of the 1992 reasonable and prudent alternative has provided substantial benefits to this ESU by improving habitat and fish passage conditions in the Sacramento River and Delta. Such improvement likely has contributed to increases in abundance and productivity over the past decade through actions such as maintenance of minimum water flows during fall and winter months, establishment of temperature criteria to support spawning and rearing upstream of Red Bluff Diversion Dam (coupled with water releases from Shasta Dam), reoperation of the Red Bluff Diversion Dam gates for improved adult and juvenile fish passage, and constraints on Delta water exports to reduce impacts on juvenile outmigrants.

In addition, two large, ongoing comprehensive conservation programs in the Central Valley provide a wide range of ecosystem and species-specific protective efforts benefiting Chinook salmon – CALFED and the Central Valley Project Improvement Act (CVPIA). CALFED is a cooperative effort of more than 20 state and Federal agencies working with local communities to improve water quality and reliability for California's water supplies, and has made efforts to restore the San Francisco Bay-Delta. Though not fully implemented, CALFED's Ecosystem Restoration Program has funded projects involving habitat restoration, floodplain restoration and protection, instream and riparian habitat restoration and protection, fish screening and passage,

research on non-native species and contaminants, research and monitoring of fishery resources, and watershed stewardship and outreach. CALFED established the Environmental Water Account to offset losses of juvenile fish at the Delta pumps and to provide higher instream flows in the Yuba, Stanislaus, American, and Merced rivers to benefit salmon.

The CVPIA balances the priorities of fish and wildlife protection, restoration, and mitigation with irrigation, domestic water use, fish and wildlife enhancement, and power augmentation. The Bureau of Reclamation and the U.S. Fish and Wildlife Service have conducted studies and implemented hundreds of actions, including modifications of Central Valley Project operations, management and acquisition of water for fish and wildlife needs, flow management for fish migration and passage, increased water flows, replenishment of spawning gravels, restoration of riparian habitats, and screening of water diversions. Actions in the Sacramento River tributaries have focused on riparian and shaded riverine aquatic habitat restoration, improved access to available upstream habitat, improved instream flows, and reduced loss of juveniles at diversions. Habitat restoration includes water acquisition for instream flows; channel restoration and enhancement; removal of dams and blockages to migration; gravel replenishment; and construction or modifications of devices to improve instream habitat, and to improve access or reduce fish mortalities during migrations (such as fish ladders and screening diversions).

Harvest protective measures benefiting winter-run Chinook salmon include seasonal constraints on sport and commercial fisheries south of Point Arena. In addition, the State has listed winter-run Chinook under the California Endangered Species Act (CESA), and has thus established specific in-river fishing regulations and no-retention prohibitions designed to protect this fish stock (e.g., management measures for time and area closures, gear restrictions, and zero bag limits in the Sacramento River).

Priority Recovery Actions Needed:
The primary priority remaining for the winter-run Chinook salmon ESU is the establishment of an additional population or populations within the ESU. With only one population, the effects of other remaining threats (e.g., population size, unscreened water diversions**,** adverse water flow and temperature conditions**,** passage problems at various structures, and risk from drought conditions) are exacerbated. Reduction of all threats contributes to fulfillment of the VSP criteria for a viable ESU. CALFED's Battle Creek Restoration Project is another priority action to address limiting factors. This project has already restored stream reaches in the 42 miles of Upper Battle Creek suitable for winter-run Chinook salmon. The upper reach is to be fully restored under an agreement between Pacific Gas and Electric (which operates nine hydroelectric dams in this reach) and resource agencies. The intent is to remove five of the dams and dedicate water rights to the environment. The remaining dams would have increased instream flows, resulting in a habitat increase of 500 to 800 percent. In addition, remaining dam structures would be modified with optimally designed fish ladders and screens, and the meander belt and riparian forest would be restored. Continued funding and implementation of CALFED's Ecosystem Restoration Program and the CVPIA remain a priority overall to continue habitat restoration efforts, screening of diversions, flow and temperature monitoring, status and trends research monitoring, modification of structures to improve fish passage, and overall water quality improvements.

Recovery Priority Number: 1

The recovery priority number for the Sacramento River winter-run Chinook salmon ESU was based on a high magnitude of threat due to a single extant population vulnerable to loss of genetic diversity, low abundance, unscreened diversions, high water temperatures, and effects of drought. The recovery potential is low to moderate due to the lack of additional populations, lack of available/suitable habitat (cold water), unscreened diversions/passage problems, and inadequate instream flow. Conflict was determined to be present due to anticipated future development, habitat degradation issues, and increasing demands for Central Valley water supplies.

Central Valley Spring-run Chinook Salmon ESU (*Oncorhynchus tshawytscha*)

Date Listed: September 16, 1999

Legal Status: Threatened

Recovery Plan Status:
No recovery plan has been completed for this ESU, but recovery planning is under way.

Species Status:
The Central Valley (CV) spring-run Chinook salmon ESU has been reduced from an estimated 17 historical populations to only three extant natural populations with consistent spawning runs (on Mill, Deer, and Butte creeks, which are tributaries to the Sacramento River). These remaining natural populations reached low abundance levels during the late 1980s (at 67 to 243 spawners compared to a historic peak of about 700,000 spawners), and are within close geographic proximity, making them vulnerable to disease and catastrophic events. CV spring-run Chinook require cool water while they mature in freshwater over the summer. Summer water temperatures in the CV are suitable for Chinook salmon only above the 150 to 500 meter elevation; most such habitat in the CV is now upstream of impassable dams. The upper Sacramento River supports a small spring-run population, but its status is poorly documented and the degree of hybridization with fall-run Chinook salmon is unknown. Of numerous Sierra Nevada stream populations only two remain – the Feather River and the Yuba River populations. The Feather River population is dependent on Feather River Hatchery (FRH) production (which is not considered part of the ESU) and may have hybridized with fall-run Chinook. Production is offsite, which contributes to straying. The status of the Yuba River population is largely unknown, other than appearing to be small. An overall loss of diversity has resulted from the extirpation of spring-run populations in most of the CV, including all the San Joaquin tributaries. The Biological Review Team (BRT) views the FRH as a major threat to the genetic integrity of the remaining wild spring-run comprising this ESU.

The recent 5-year mean abundance for the three naturally spawning populations remains relatively small (500 to over 4,500 spawners); however, short- and long-term productivity trends are positive and population sizes have shown continued increases over the abundance levels of the 1980s. The BRT has noted moderately high risk for the VSP abundance, spatial structure, and diversity criteria, but a lower risk for productivity (reflecting recent positive trends). Informed by this risk assessment, the strong majority opinion of the BRT is that the CV spring-run Chinook salmon ESU is "likely to become endangered within the foreseeable future." No artificially propagated populations of spring-run Chinook in this ESU mitigate the BRT assessment.

Threats and Impacts:
The CV spring-run Chinook salmon ESU is currently faced with three primary limiting factors and threats: (1) loss of most historic spawning habitat, (2) degradation of the remaining habitat, and (3) genetic threats from the FRH spring-run Chinook salmon program. Spring-run Chinook require cool freshwater in summer, most of which is upstream of impassable dams. The ESU is

limited to only three natural populations of spring-run (on Mill, Deer, and Butte creeks) that have consistent spawning runs, one small and largely unknown population on the Yuba River, and a Feather River population dependent on FRH production. This ESU continues to be threatened by habitat loss, degradation and modification, small hydropower dams and water diversions that reduce or eliminate instream flows during migration, unscreened or inadequately screened water diversions, excessively high water temperatures, and predation by non-native species.

Conservation Actions:
During 2002–2004 , progress was made in addressing some of the limiting factors and threats to this ESU, largely through ESA section 7 consultations and other ESA-related conservation efforts in the Central Valley. The Central Valley Project section 7 consultation with the Bureau of Reclamation has likely contributed to habitat improvements benefiting the CV spring-run Chinook salmon ESU, such as flow and temperature improvements.

In addition, two large, comprehensive conservation programs in the Central Valley provide a wide range of ecosystem and species-specific protective efforts benefiting spring-run Chinook salmon – CALFED and the Central Valley Project Improvement Act (CVPIA). CALFED is a cooperative effort of more than 20 state and Federal agencies working with local communities to improve water quality and reliability for California's water supplies, while making efforts to restore the San Francisco Bay-Delta. Though not fully implemented, CALFED's Ecosystem Restoration Program has funded projects involving habitat restoration, floodplain restoration and protection, instream and riparian habitat restoration and protection, fish screening and passage projects, research on non-native species and contaminants, research and monitoring of fishery resources, and watershed stewardship and outreach. CALFED established the Environmental Water Account to offset losses of juvenile fish at the Delta pumps, and to provide higher instream flows in the Yuba, Stanislaus, American, and Merced rivers to benefit salmon.

The CVPIA balances the priorities of fish and wildlife protection, restoration, and mitigation with those of irrigation, domestic water use, fish and wildlife enhancement, and power augmentation. The Bureau of Reclamation and the U.S. Fish and Wildlife Service have conducted studies and implemented hundreds of actions, including modifications of Central Valley Project operations, management and acquisition of water for fish and wildlife needs, flow management for fish migration and passage, increased water flows, replenishment of spawning gravels, restoration of riparian habitats, and screening of water diversions. Actions in the Sacramento River tributaries have focused on riparian and shaded riverine aquatic habitat restoration, improved access to available upstream habitat, improved instream flows, and reduced loss of juveniles at diversions, particularly for spring-run Chinook salmon and steelhead. Habitat restoration includes water acquisition for instream flows, channel restoration and enhancement, removal of dams and blockages to migration, gravel replenishment, and construction or modifications of devices to improve instream habitat and to improve access or reduce fish mortalities during migrations (such as fish ladders and screening diversions).

The Delta Pumping Plant Fish Protection Agreement and the Tracy Fish Collection Mitigation Agreement mitigate for State Water Project and pumping plant impacts through screening of unscreened water diversions, enhanced law enforcement efforts to reduce illegal fish harvest, installation of seasonal barriers to guide fish away from undesirable spawning habitat or

migration corridors, salmon habitat restoration, and removal of four dams to improve fish passage on Butte Creek for Chinook and steelhead. Approximately one-third of the approved funding for salmon projects specifically targets spring-run Chinook salmon and steelhead in the upper Sacramento River tributaries.

Harvest protective measures benefiting spring-run Chinook salmon include seasonal constraints on sport and commercial fisheries south of Point Arena. In addition, the State has listed spring-run Chinook under the California Endangered Species Act (CESA), and has thus established specific in-river fishing regulations and no-retention prohibitions designed to protect this fish stock (e.g., fishing method restrictions, gear restrictions, bait limitations, seasonal closures, and zero bag limits), particularly in primary tributaries such as Deer, Big Chico, Mill, and Butte creeks, which support spring-run Chinook salmon. The California Department of Fish and Game has implemented enhanced enforcement efforts in spring-run tributaries and adult holding areas, which have significantly reduced illegal harvest.

Priority Recovery Actions Needed:
Recovery of the CV spring-run Chinook salmon ESU continues to be limited by the close geographic proximity of the only three remaining wild spring-run Chinook salmon populations with consistent spawning runs, which makes them vulnerable to disease and catastrophic events, loss of spawning habitat, widespread degradation and modification of remaining habitat (especially spawning and rearing habitat), and genetic threats from the FRH. The many small hydropower dams and water diversions on the natal tributaries reduce or eliminate instream flows during spring-run migration periods, leading to predation by non-native species and excessively high water temperatures, and loss of fish attributed to unscreened or inadequately screened water diversions in migratory corridors. Reduction of all these threats contributes to fulfillment of the Viable Salmon Population (VSP) criteria for a viable ESU.

CALFED's Battle Creek Restoration Project is a priority action. This project has already restored stream reaches in the 42 miles of Upper Battle Creek suitable for spring-run Chinook salmon. This upper reach is to be fully restored under an agreement between Pacific Gas and Electric (which operates nine hydroelectric dams in this reach) and resource agencies. The intent is to remove five of the dams and dedicate those water rights to the environment. The remaining dams would have minimum instream flows increased, resulting in a habitat increase of 500 to 800 percent. Remaining dam structures would be modified with optimally designed fish ladders and screens, and the meander belt and riparian forest would be restored. Continued funding and implementation of CALFED's Ecosystem Restoration Program and the CVPIA remain a priority overall to continue habitat restoration efforts, screening of diversions, flow and temperature monitoring, status and trends research monitoring, modification of structures to improve fish passage, and overall water quality improvements.

The FRH continues to influence spring-run Chinook salmon populations in the Feather and Yuba rivers, due to straying and hybridization with (unmarked) fall-run fish. This remains a major threat to the genetic integrity of the remaining wild spring-run Chinook populations, and thus addressing this threat remains a priority.

Recovery Priority Number: 3

The recovery priority number for the CV spring-run Chinook ESU was based on a moderate magnitude of threat, due to only three remaining extant natural populations with consistent spawning that are in close geographic proximity; the lack of cool water habitat below impassable dams; and the threat to genetic integrity from the FRH. The recovery potential is low to moderate due to lack of suitable habitat (cold water, high elevation) below impassable barriers, and the low number (three) of extant natural populations. Conflict was determined to exist due to anticipated future development, habitat degradation issues, and increasing demands for CV water supplies.

ATLANTIC SALMON RECOVERY

Atlantic Salmon (*Salmo salar*) – Gulf of Maine DPS

Date Listed: November 17, 2000 (listed jointly by NMFS and U.S. Fish and Wildlife Service)

Legal Status: Endangered

Recovery Plan Status:
The Draft Recovery Plan for the Gulf of Maine DPS was prepared jointly by NMFS, the Maine Atlantic Salmon Commission (ASC), and the U.S. Fish and Wildlife Service (FWS). The draft plan was published in June 2004, with the public comment period closing in August 2004.

The recovery plan builds on and expands recovery actions identified in the State of Maine's Atlantic Salmon Conservation Plan for Seven Maine Rivers (MASCP). NMFS and FWS (together, the Services) intend to maintain and expand ongoing collaborative recovery efforts in cooperation with the State of Maine.

The Services are in the process of addressing public comments on the draft recovery plan as part of efforts to finalize the recovery plan. NMFS has been designated as the lead agency responsible for finalizing the recovery plan, and the Services anticipate publishing the final recovery plan in 2005.

Species Status:
The Gulf of Maine DPS of Atlantic salmon has declined to critically low levels. Adult returns, juvenile abundance estimates, and survival have continued to decline since the DPS was listed. In 2003, total adult returns to the eight rivers still supporting wild Atlantic salmon populations within the DPS were estimated to range from 61 to 86 individuals.

Threats and Impacts:
An evaluation of the geographic extent and life stage affected by threats (and of the severity of these effects) identified the following threats to and impacts on recovery of the Gulf of Maine DPS of Atlantic salmon:

- Aquaculture practices, which pose ecological and genetic risks
- Acidified water and associated aluminum toxicity, which decrease juvenile survival
- Poaching of adults in DPS rivers
- Incidental capture of adults and parr by recreational fishermen
- Predation
- Excessive or unregulated water withdrawal
- Low marine survival
- Physical alteration of freshwater habitat

Conservation Actions:
During 2002–2004, the NMFS Northeast Regional Office (NERO) and Northeast Fisheries Science Center (NEFSC) – in cooperation with the Maine ASC, FWS, and other partners – pursued a range of management and research activities intended to mitigate and reduce the severest threats to Atlantic salmon.

Prior and existing categories of recovery actions for Atlantic salmon include research activities to improve our understanding of salmon abundance and health, identification and mitigation of threats to the species, collaboration with partners and affected parties to facilitate implementation of protective measures, and efforts to engage local stakeholders in stewardship activities. Recovery actions and activities implemented during 2002–2004 include the following:

- Prepared a draft recovery plan
- Participated in international management of Atlantic salmon through the North Atlantic Salmon Conservation Organization (NASCO)
- Continued monitoring and assessment of the status of wild salmon populations
- Initiated an experimental study to determine the potential for mitigating impacts on the DPS from low pH due to acid rain
- Conducted an experimental study to determine the potential for predator deterrence to increase survival rates of juvenile and adult Atlantic salmon
- Provided substantial support to the Maine ASC for assessment and management activities
- Worked with stakeholders on a variety of habitat restoration and protection projects
- Worked with the aquaculture industry to implement measures protective of the DPS
- Convened a biological review team to review the relationship of other Maine river systems and salmon populations to the Gulf of Maine DPS

Priority Recovery Actions Needed:
Priority recovery actions needed in the next several years for the Gulf of Maine Atlantic salmon DPS fall into several broad categories:

1. Implement recovery actions to address the severest threats.
2. Conduct research necessary to address critical information needs.
3. Work with partners and affected parties to facilitate the implementation of protective measures.
4. Engage local stakeholders to promote stewardship of Atlantic salmon and their habitat.

Specific high-priority recovery actions needed for the conservation and recovery of this DPS include:

- Publish the final Recovery Plan for the Gulf of Maine DPS of Atlantic Salmon.
- Appoint and convene an Atlantic Salmon Recovery Team to coordinate implementation of the recovery plan.
- Participate in international salmon management through NASCO to ensure adequate protection of U.S. stocks.
- Conduct research on stream acidification mitigation (Dennys River), cormorant predation (Narraguagus River), and habitat enhancement (Sheepscot River). Expand the research to other rivers in the DPS as necessary.

- Continue assessments of smolt production and migration, and expand the temporal and spatial extent of coverage for post-smolt surface trawling assessment programs.
- Continue to participate and contribute to international cooperative research and assessment efforts to improve the understanding of salmon at sea, including West Greenland and St. Pierre et Miquelon.
- Conduct a flow monitoring program, review water withdrawal permits and potential groundwater withdrawals for impact on stream flow and cold water discharges, and investigate the potential for stream flow augmentation to help meet Atlantic salmon flow needs and increase juvenile production and survival.
- Implement an integrated long-term water chemistry monitoring program on all DPS rivers.
- Prepare and implement non-point source pollution reduction plans for DPS rivers.
- Evaluate the link between pesticides and endocrine disruption.
- Conduct high-priority restoration projects.
- Review essential fish habitat (EFH) designations for Atlantic salmon.
- Evaluate the impacts of proposed activities on Atlantic salmon, including state and local land use regulations and best management practices (BMPs).
- Maintain commercial and recreational fishery restrictions on directed harvest.
- Monitor indirect harvest of fish, and take appropriate measures.
- Work with the State of Maine to minimize potential impacts of existing stocking programs on Atlantic salmon populations and minimize any potential adverse effects.
- Update existing fish health guidelines and protocols to control the introduction of new pathogens, and conduct research on disease detection and prevention.
- Develop and implement appropriate management measures to mitigate the impact of documented seal predation on wild salmon populations.
- Develop and implement a comprehensive Education and Outreach Plan for the Gulf of Maine DPS of Atlantic salmon.
- Continue stocking cultured fish to supplement wild salmon populations and conduct a peer-review of the current stocking program.
- Update brood stock management plans, including brood fish collection, genetic management, and program evaluation.
- Evaluate the need to reestablish populations of Atlantic salmon in rivers within the DPS where currently extirpated.
- Experimentally evaluate the role of alternate stocking strategies to supplement wild salmon populations.

Recovery Priority Number: 1

Immediately following the listing of the Gulf of Maine DPS of Atlantic salmon, NMFS (with FWS assistance) prepared a Recovery Outline for the DPS. In accordance with FWS Recovery Priority Guidelines, the Services assigned a priority number of 3C to this DPS in the Outline. The ranking is based on certain factors, including: high degree of threat, high potential for recovery, and the presence of conflict. On the NMFS scale, this corresponds to a priority number of "1."

NON-SALMONID FISH RECOVERY

Gulf Sturgeon (*Acipenser oxyrinchus desotoi*)

Date Listed: September 30, 1991 (listed jointly by NMFS and U.S. Fish and Wildlife Service)

Legal Status: Threatened

Recovery Plan Status:
The final recovery plan for the Gulf sturgeon was published in September 1995.

Species Status:
The Gulf sturgeon is an anadromous fish whose present range extends from Lake Pontchartrain and the Pearl River system in Louisiana and Mississippi east to the Suwannee River in Florida. Gulf sturgeon adults spawn in freshwater, then migrate to feed and grow in estuarine/marine habitats.

While the overall status of Gulf sturgeon is considered stable, the exact status remains unclear. No estimates of the historical population size of Gulf sturgeon or its subpopulations are available, although some commercial landing statistics are available from 1887 to 1985. Estimated population sizes for known Gulf sturgeon spawning rivers are shown in Table 6. Population data are limited, and no data are available for some subpopulations. As resources permit, NMFS is continuing to fund research to study and monitor Gulf sturgeon.

Table 6. Estimated spawning population sizes for known Gulf sturgeon spawning rivers

Known Spawning Rivers	Estimated Population Size
Pearl River	292[1]
Pascagoula River	No data available
Escambia/Conech Rivers	No data available
Yellow River	319–1,550[2]
Choctawhatchee River	No data available
Apalachicola River	62–218[3]
Suwannee River	7,650[4]

[1]Based on fish older than age 3. Morrow, J.V., J.P. Kirk, K.J. Killgore, H. Rogillio, and C. Knight. 1998. Status and recovery potential of Gulf sturgeon in the Pearl River system, Louisiana-Mississippi. North American Journal of Fisheries Management 18:798-808.
[2]Includes only fish>100 cm TL. Berg, J.J. 2004. Population assessment of the Gulf of Mexico sturgeon in the Yellow River, Florida. MS Thesis, University of Florida, Gainesville, USA. 77 pp.
[3]Includes only fishes below the Jim Woodruff Lock and Dam. Zehfuss, K.P., J.E. Hightower, and K.H. Plllock. 1999. Abundance of Gulf sturgeon in the Apalachicola River, Florida. Transactions of the American Fisheries Society 128:130-143.
[4]Based on fish about 2 (>60 cm TL) or more years old. Sulak, K.J. and J.P. Clugston. 1999. Recent advances in life history of Gulf of Mexico sturgeon, *Acipenser oxyrinchus desotoi*, in the Suwannee River, Florida, USA: a synopsis. Proceedings of the 3rd International Symposium on Sturgeon, Piacenza, Italy, July 8-11, 1997, Blackwell Wissenschafts-verlag, Berlin (FRG) 15(4-5):116-128. Journal of Applied Ichthyology/Zeitschrift fur angewandte Ichtyologie. Hamburg, Berlin.

Threats and Impacts:
Population-limiting factors for the Gulf sturgeon are thought to include barriers to historical spawning habitat (e.g., dams), habitat loss and degradation, and poor water quality (including contaminants, which may also limit recovery of the species). Recreational and subsistence fisheries for this species contributed to population declines in the past, but this threat was eliminated in 1984 when the State of Florida enacted protective measures and in 1991 when the species was listed under the ESA. Currently, Gulf sturgeon are likely taken in limited numbers as bycatch in shrimp trawl fisheries.

Conservation Actions:
During 2002–2004, major conservation actions were conducted for Gulf sturgeon. On March 19, 2003, NMFS and the U.S. Fish and Wildlife Service (FWS) designated critical habitat for the Gulf sturgeon. Using section 7 of the ESA**,** NMFS continued to consult with Federal agencies on actions (e.g., dredging) that may affect Gulf sturgeon or its designated critical habitat. Through these consultations, NMFS has worked effectively with Federal agencies to ensure they carry out their actions in a manner that will not jeopardize the continued existence of the species or destroy or adversely modify critical habitat.

NMFS continues to fund a number of research projects with in-house dollars to improve our understanding of Gulf sturgeon's movements and use of habitat[5]. NMFS continues to relocate tagged fishes during the winter months along the coastal Gulf shores and recently initiated a study to examine habitat use as Gulf sturgeon enter the estuarine environment following months of fasting.

Priority Recovery Actions Needed:
Priority recovery actions needed for the Gulf sturgeon include the following:

- Conduct an updated status review for Gulf sturgeon.
- Update, identify, initiate, and expand partnerships with state and Federal agencies to identify and implement conservation activities and actions to reduce the cumulative effects to both the Gulf sturgeon and, in particular, its designated critical habitat (ESA sections 6 and 7).
- Improve ESA section 7 consultations by improving early technical assistance for upcoming projects and dedicating personnel to conduct informal and formal Gulf sturgeon consultations.
- Nurture the established partnership between NMFS and FWS to continue joint research activities and management, and to expand coordination and consistency of consultations conducted by the two agencies.
- Identify and initiate ESA section 6 agreements with Gulf Coast states, and subsequently coordinate Gulf sturgeon recovery plan implementation proposals for funding.
- Update the 1995 Gulf sturgeon recovery plan. The plan – a product of NOAA, FWS, and the Gulf States Marine Fishery Commission – synthesizes information collected on individual genetically distinct subpopulations to assess status of the species. The 1995 recovery plan outlined the most important actions required for recovery of the species,

[5] ESA section 6 funds are not currently available for Gulf sturgeon research, as no Gulf Coast state has a section 6 agreement with NMFS that includes Gulf sturgeon.

including (1) a better understanding of the ecosystem and essential habitats of the species; (2) an assessment of riverine population sizes; and (3) a refinement of life history investigations in each river system to locate important spawning, foraging, and developmental habitats. Other recovery actions listed in the 1995 document included (1) conduct life history studies on the biological and ecological requirements of little-known or inadequately sampled life stages; (2) survey, monitor, and model riverine populations; and (3) continue the culture of Gulf sturgeon**.**

Recovery Priority Number: 8

This ranking corresponds to a moderate degree of threat, low to moderate potential for recovery, and the absence of conflict with economic activities. In accordance with FWS Recovery Priority Guidelines, the FWS has assigned the Gulf sturgeon a priority number of "12." The difference in numerical value reflects the consideration of taxonomic classification, which is used by FWS but not by NMFS in designating recovery priority numbers.

Shortnose Sturgeon (*Acipenser brevirostrum*)

Date Listed: March 11, 1967[1]

Legal Status: Endangered

Recovery Plan Status:
The final recovery plan for shortnose sturgeon was published in December 1998.

Species Status:
The life history of shortnose sturgeon includes strong fidelity to the natal river, a high degree of reproductive isolation, and a significant degree of genetic distinctiveness among populations, which are distributed along the eastern seaboard of North America from the St. John River in New Brunswick, Canada, south to the Saint Johns River in Florida. Trends of abundance for these populations vary. No estimate of the historical population size of shortnose sturgeon is available, although historical accounts indicate sturgeon were abundant in many river systems.

In the recovery plan, NMFS recognized 19 discrete populations of shortnose sturgeon. The status of many shortnose sturgeon populations remains undetermined, or estimates are out of date. NMFS is able to conduct statistically sound, quantitative population estimates for at most 2 of the 19 populations every 2 to 3 years. As resources permit, NMFS is continuing to fund research to study and monitor these populations.

In general, northern populations are healthier than those in the South. The Hudson River population has shown the most dramatic improvement and may be hailed as a clear metric of ESA success. The Hudson population, estimated at 30,000 in 1980, now exceeds 61,000 fish, with approximately 20,333 fish spawning annually. The Delaware population is also showing signs of improvement, with estimated population numbers of approximately 8,445. The Kennebec Complex has also shown signs of recovery: in 1998–2000, population size was estimated at 9,488, an increase from 7,222 for the period between 1977 and 1981. Recent information indicates that some populations previously thought to be extirpated (locally extinct) are still extant. For example, prior to 1996, NMFS and other scientists thought shortnose sturgeon were extirpated from the Chesapeake Bay and its tributaries. Between 1996 and 2004, 53 shortnose sturgeon were documented in the Bay, including six in the Potomac River.

In the South, many populations are at very low numbers or lack reliable population estimates. River-specific studies have recently been conducted to assess occurrence of adults and juveniles, but few recent, quantitative population estimates are available. The Cape Fear, North Carolina, population was estimated to be fewer than 50 individuals in 1995. The status of shortnose sturgeon in South Carolina rivers has been estimated only for the Savannah River (3,000 fish in 1999) and the Cooper River (100 to 300 spawners), although the species is known to inhabit 16 rivers in the state. Work in Georgia indicates that the Ogeechee River population was about 266 in 1993, and preliminary results from the Altamaha River indicate that the population may be

[1] Shortnose sturgeon was first listed March 11, 1967, under the Endangered Species Preservation Act; the species remained on the endangered species list when the ESA was enacted in 1973.

greater than 2,000. In addition, after 2 years of targeted surveying in the Saint Johns River, Florida, a single shortnose sturgeon was collected – a first in the river since the early 1980s.

Threats and Impacts:
Many threats to the species are rangewide; others are specific to the Southeast. Rangewide, dam construction and pollution associated with industrial growth in the late 1800s and early 1900s has resulted in substantial loss of suitable habitat. In addition, habitat alterations from discharges, dredging or disposal of material into rivers, or related development activities involving estuaries/riverine mudflats and marshes, remain constant threats. Threats have been reduced in some rivers to allow shortnose sturgeon populations to grow or stabilize. In other rivers, particularly in the Southeast, sturgeon populations remain low or the status is unknown.

Recent studies indicate that shortnose sturgeon, particularly in young life stages, are sensitive to low dissolved oxygen levels at high water temperatures. During summer, such hypoxic and anoxic areas are common, especially in southern rivers and in portions of the Chesapeake Bay. These environmental conditions pose a significant threat to shortnose sturgeon recovery.

Bycatch, particularly in shad gillnet fisheries, adversely impacts the recovery of some shortnose sturgeon populations. The extent of shortnose sturgeon bycatch is not currently known.

Conservation Actions:
Pursuant to ESA section 7, NMFS continues to consult with Federal agencies on actions that may affect shortnose sturgeon. Through these consultations, NMFS has worked effectively with Federal agencies to ensure they carry out their actions in a manner that will not jeopardize the continued existence of shortnose sturgeon. For example, NMFS recently completed a consultation with the Environmental Protection Agency (EPA) on water quality guidelines for states within the Chesapeake Bay watershed. This consultation resulted in dissolved oxygen standards that, if met, ensure the protection of shortnose sturgeon life stages in many areas of the Bay and its tributaries. NMFS continues to cooperate with the Federal Energy Regulatory Commission (FERC) on relicensing hydropower facilities to ensure safe passage (both upstream and downstream) of shortnose sturgeon and to ensure that adequate water flows are prescribed.

In 1998, the Edwards Dam – the first significant impediment to shortnose sturgeon migration in the Kennebec River – was removed. In the past 2 years, shortnose sturgeon have been documented above the former dam site, which indicates that access to historic areas has been restored. Currently, NMFS is collaborating with other Federal, state, and local environmental organizations to remove several dams on the Penobscot River to restore access to historic habitats of many anadromous species, including shortnose sturgeon.

NMFS is working with the State of Maryland to develop a conservation plan to minimize and mitigate effects of Chesapeake Bay commercial fishing on shortnose sturgeon. This plan may serve as a model for other states to work with NMFS to develop similar plans.

NMFS continues to provide funding for a number of research projects to increase existing knowledge of the status of several shortnose sturgeon populations; however, these projects are limited by in-house funding. Research was conducted on the Delaware River to identify

technologies that could be used to remotely detect individual sturgeon or sturgeon aggregations, or monitor the movements of sturgeon on a fine spatial scale. Three types of sonar systems were evaluated in the field to determine the efficacy in detecting and identifying shortnose sturgeon. Based on the positive preliminary results of this study, additional studies will be conducted to refine the technology. Researchers also used sonic telemetry to study the abundance and distribution of shortnose sturgeon in the lower, tidal Delaware River and Bay. NMFS also provided the initial funding to conduct a preliminary investigation of shortnose sturgeon use of the Potomac, Altamaha, and Santee-Cooper rivers.

Priority Recovery Actions Needed:
Priority recovery actions needed for the shortnose sturgeon include the following:

- Conduct an updated status review for shortnose sturgeon.
- Continue to gather information pertaining to individual populations – particularly those in the Chesapeake Bay and in the Penobscot, Cape Fear, Ogeechee, and Altamaha rivers.
- Conduct studies to assess the sensitivity of shortnose sturgeon life stages to various contaminants and water quality issues (primarily low dissolved oxygen coupled with high temperature).
- Work with Federal, state, and private partners to ensure adequate water flows and quality, and improve access to important habitats.
- Explore habitat restoration options (e.g., creation of spawning habitat, restoration of access to historical habitat, restoration of foraging habitat).
- Determine the extent and impact of bycatch on shortnose sturgeon populations and implement methods to reduce this bycatch.
- Convene a meeting of the shortnose sturgeon recovery team to review the implementation schedule and evaluate the progress toward completing each of the recovery/research tasks. The recovery plan recognizes that rangewide and river-specific differences in recovery and research priorities exist. Therefore, two regional implementation teams are needed to address shortnose sturgeon recovery and research priorities on a regional basis. A regional meeting for each implementation team is necessary to determine priorities for each individual population.

Recovery Priority Number: 5
The recovery priority number for shortnose sturgeon is five. This determination is based on the following rationale: the magnitude of threat for shortnose sturgeon is moderate, particularly given the extremely low numbers of shortnose sturgeon in the southern portion of the species' range; the recovery potential for this species is high, as many of the needed management actions are identified in the recovery plan; and this species is in conflict with construction or other development projects (e.g., bridge construction/demolition, dredging, blasting, and power plant operations) in most, if not all, of the species' range. Taken together, these rankings correspond to a recovery priority number of five.

Smalltooth Sawfish (*Pristis pectinata*) – U.S. DPS

Date Listed: April 1, 2003

Legal Status: Endangered

Recovery Plan Status:
The Smalltooth Sawfish Recovery Team was convened in November 2003. The team has developed a recovery outline for the species and is currently developing a draft recovery plan.

Species Status:
The recovery outline for the smalltooth sawfish states that the population status of the species appears to be stable but is only a small fraction of its historic size, and that its range is greatly constricted. However, because Florida experienced four major hurricanes in 2004 and one of these (Hurricane Charley) impacted habitats supporting smalltooth sawfish, the status of the smalltooth sawfish DPS is now considered unknown. Congress has provided funding to study the effects on the smalltooth sawfish from recent hurricane activity.

Threats and Impacts:
The overriding threats to the species include bycatch in commercial and recreational fisheries, and loss and degradation of habitat. Smalltooth sawfish are caught incidentally in various types of fishing gear, including gillnets, otter trawls, trammel nets, seines, and hand lines. The urbanization of the southeastern coastal states continues to modify and remove coastal habitats used by the smalltooth sawfish.

Conservation Actions:
Appropriation for cooperative conservation and recovery efforts with states was the source of funding for the State of Florida's 2003 project, "Monitoring Smalltooth Sawfish in Charlotte Harbor." Florida undertook this as a part of its smalltooth sawfish conservation program pursuant to its ESA section 6 cooperative agreement with NMFS. Funds have also been provided for 2003 and 2004 to Mote Marine Laboratory to study the abundance and movements of the species in south Florida.

Priority Recovery Actions Needed:
To ensure the smalltooth sawfish population does not decline further, studies are needed to better determine the habitat requirements of the species. Actions must be taken to reduce the threat of habitat alteration and loss. Impacts from commercial and recreational fishing need to be further studied, minimized, and mitigated. The public (fishermen, in particular) should be educated about the status of smalltooth sawfish, how to avoid incidentally catching sawfish, and how to release incidentally captured sawfish in a manner safe for both the fish and the fishermen. NFMS must develop and implement the Smalltooth Sawfish Recovery Plan. The Smalltooth Sawfish Recovery Team is currently developing a draft recovery plan that will provide more detail and prioritize actions needed to recover the species.

Recovery Priority Number: **7**
The smalltooth sawfish has a recovery priority number of seven, based on a moderate magnitude of threat, a low-moderate recovery potential, and the potential for economic conflicts.

PLANT RECOVERY

Johnson's Seagrass (*Halophila johnsonii*)

Date Listed: September 14, 1998

Legal Status: Threatened

Recovery Plan Status:
The Johnson's Seagrass Recovery Plan was finalized in September 2002.

Species Status:
Johnson's seagrass is only found along approximately 200 km of coastline in southeastern Florida. Results from surveys indicate the species is very rare – on the order of 3 to 10 percent presence. In 2004, Florida experienced four major hurricanes, two of which impacted habitats supporting Johnson's seagrass. Based on this recent event, the status of Johnson's seagrass is now considered unknown. Congress has provided funding to study the storms' effects on Johnson's seagrass.

Threats and Impacts:
Johnson's seagrass is threatened by several human and natural perturbations, including dredge and fill activities, construction of overwater structures, prop scarring, altered water quality, siltation, and storms. None of the threats identified at listing have been curtailed or eliminated. Cumulative impacts are a concern for the species.

Conservation Actions:
Conservation actions completed during 2002–2004 support the recovery actions identified in the Johnson's Seagrass Recovery Plan. Funding has supported research efforts designed to determine whether the distribution and size of seagrass beds are expanding or declining, and to identify factors influencing expansion and decline. Conservation actions have also identified areas with persistent populations.

Priority Recovery Actions Needed:
Priority recovery actions needed for Johnson's seagrass include determining the method of recruitment of seagrass patches, determining the maximum dispersal distances of vegetative fragments, and establishing permanent monitoring sites within the species' range.

Species Recovery Priority: 7
Johnson's seagrass is assigned a recovery priority of 7, based on a moderate magnitude of threat, a low-moderate recovery potential, and the potential for economic conflicts.

INVERTEBRATE RECOVERY

White Abalone (*Haliotis sorenseni*)

Date Listed: May 29, 2001

Legal Status: Endangered

Recovery Plan Status:
A recovery plan is currently being developed for white abalone. It is estimated that a draft plan will be completed in 2005.

Species Status:
During a short time span of just eight years (between 1969 to 1977), over 262 metric tons of white abalone were fished from California waters. This intense fishing pressure (see Figure 4) led to alarming declines of this species, and both abundance and density of white abalone in California have experienced a greater than 99 percent decline compared to pre-exploitation estimates. Even with closure of the fishery in 1996, densities of white abalone were reduced to such low levels it is believed recurrent recruitment failure has occurred ever since. Without protection and intervention, it is projected that white abalone will go extinct in California by 2010. This prediction is based on the following information as of 2000: (1) the observed reduction of the total population size to less than 0.1 percent of the pre-exploited population size; (2) the observed reduction in population density by at least three orders of magnitude, such that density is too low to allow the fertilization success necessary for natural recovery of the population; and (3) the last known recruitment success year for white abalone and the estimated maximum age of white abalone (35–40 years), suggest that, in the absence of new recruitment, surviving white abalone are likely to die of natural causes by 2010.

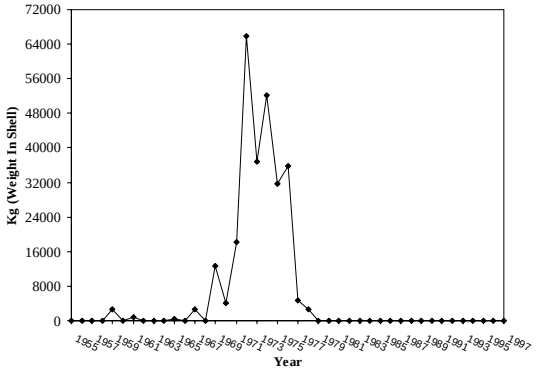


Figure 4. California commercial catch (weight in shell) of white abalone reported in California Department of Fish and Game bulletins for the period 1955-1997

In 2002, the white abalone population size was reported as 2,540 individuals, which is higher than the estimate of 1,600 individuals reported during the 2000 status review. In 2002 and 2003, remotely operated vehicle (ROV) and multi-beam sonar surveys on two banks off the southern California coast revealed that the white abalone population on the banks may be larger than

estimated for the entire range of the species. Observed densities and revised estimates of available white abalone habitat for the two banks were used to estimate the total population sizes for both banks. The estimated total abundance may be as high as 40,000 individuals on both banks, but confidence limits around these estimates are high and researchers are still working to refine the methods used to derive these estimates.

Threats and Impacts:
Key threats to white abalone include the following:

- Critically low levels of abundance (< 0.1 percent of the estimated pre-exploitation population size) with increased distance between individuals and repeated recruitment failure (Allee effects) during the 1990s, resulting in a decreasing population trend – There is no evidence this trend has reversed in recent years.
- Inadequate implementation of conservation and research efforts
- Disease
- Habitat modification through environmental/climate change
- Habitat modification through human activities
- Inadequate enforcement
- Illegal harvesting

These threats, which were key factors in the listing determination for white abalone, continue to imperil the species and will be considered during the recovery planning process.

Conservation Actions:
Conservation actions in 2002–2004 for recovery of the white abalone included the following:

- In 2002 and 2003, NMFS conducted white abalone surveys via a ROV and multi-beam sonar on two banks off the southern California coast, revealing that the white abalone population on the banks may be larger than estimated for the entire range of the species.
- In October 2002, NMFS completed a recovery outline to guide white abalone recovery efforts until a recovery plan is completed. In 2003, a multi-stakeholder White Abalone Recovery Team was formed and is currently developing a recovery plan.
- The California Department of Fish and Game issued its Draft Abalone Recovery and Management Plan (ARMP) in 2002. The ARMP outlines specific recovery actions for seven species of abalone in California, six of which (including white abalone) have not been fished commercially or recreationally since 1997. Many of the actions (e.g., surveys, captive propagation, outplanting, and disease research) involve cooperation with NMFS.
- In a June 2003 meeting between NMFS and the Instituto Nacional de la Pesca (INP), the INP stated that Mexico currently does not issue permits for harvesting white abalone. In addition, the INP presented preliminary results from a status review of white abalone. Based on responses to questionnaires sent out to the local abalone management zones (cooperatives), the INP identified areas along the shore and at offshore islands and banks that did or do contain white abalone. The INP, in cooperation with the cooperatives and possibly NMFS, would like to ground-truth these qualitative data by surveying specific locations with ROVs and multi-beam sonar (see priority actions below). However, at the time of the meeting, it was unknown whether funding to complete the final phases of the status review would be made available.

Priority Recovery Actions Needed:
The priority recovery actions needed for white abalone include the following:

- Identify and monitor white abalone populations and their habitat in the wild in cooperation with the State of California, other Federal agencies, and the Mexican government. The goals of this action include: (1) improving estimates of abundance, density, and available habitat; (2) determining genetic structure of extant populations; (3) estimating growth, survival, and mortality rates of individuals through tagging studies; and (4) determining minimum viable population size.
- Protect white abalone populations in the wild through enforcement of state and Federal regulations.
- Initiate a captive propagation program for white abalone to carry out laboratory-based studies critical to the successful artificial enhancement of wild populations (e.g., disease research, effects of temperature and diet on growth and survival, and fecundity estimates)
- Conduct public outreach and education.
- Secure financial support for white abalone recovery.

Recovery Priority Number: 3
The white abalone status review stated that extinction of this species would occur by 2010 without human intervention. Thus, the magnitude of threat to the species is high. The threats to white abalone are poorly understood, and management actions are costly and experimental with an uncertain probability of success. Thus, the recovery potential of this species is low to moderate. The recovery of white abalone is in conflict with oil pipeline and pier repair/removal projects, subtidal military operations, and aquaculture ventures. Considering these three criteria, the recovery priority number for white abalone is three.

MARINE MAMMAL RECOVERY

Seals and Sea Lions

Caribbean Monk Seal (*Monachus tropicalis*)

Date Listed: March 11, 1967

Legal Status: Endangered

Recovery Plan Status:
No recovery plan exists for the Caribbean monk seal.

Species Status:
This species is presumed extinct. Historically, the Caribbean monk seal ranged throughout the Caribbean region, but population numbers were greatly reduced by sealers in the 1800s. This species has been known to occur in Florida, Puerto Rico, and the U.S. Virgin Islands; however, no known populations currently exist in the wild. There have been no confirmed sightings since 1952, despite extensive surveys.

Threats and Impacts:
A significant factor in the reduction of Caribbean monk seal numbers was overharvesting by sealers in the 1800s. It is possible that disturbance of breeding areas by humans may have also played a role. Pups' tame behavior may have increased vulnerability to harvesting.

Conservation Actions:
No conservation actions were conducted during 2002–2004.

Priority Recovery Actions Needed:
Because this species is presumed extirpated or extinct, no priority recovery actions are needed at this time.

Recovery Priority Number: 12
Because this species is likely extirpated throughout its range, the recovery priority number for the Caribbean monk seal is 12. This represents a low magnitude of threat as a rare population, a low recovery potential, and the absence of conflict with economic activity.

Guadalupe Fur Seal (*Arctocephalus townsendi*)

Date Listed: December 16, 1985

Legal Status: Threatened

Recovery Plan Status:
No recovery plan has been completed for the Guadalupe fur seal.

Species Status:
Commercial sealing during the 19th century reduced the once-abundant Guadalupe fur seal to near extinction in 1894. The size of the population prior to the commercial harvests of the 19th century is not known, but estimates range from 20,000 to 100,000 animals. Prior to the harvest, this species ranged from Monterey Bay, California, to the Revillagigedo Islands, Mexico. The capture of two adult males at Guadalupe Island in 1928 established the species' return; however, they were not seen again until 1954. Guadalupe fur seals pup and breed mainly at Isla Guadalupe, Mexico. In 1997, a second rookery was discovered at Isla Benito del Este, Baja California, and a pup was born at San Miguel Island, California. The population is considered to be a single stock because all individuals are recent descendants from one breeding colony at Isla Guadalupe, Mexico.

Counts of Guadalupe fur seals have been made sporadically since 1954. A few of these counts were made during the breeding season, but the majority were made at other times of the year. Documented seal counts in the literature generally provide only the total of all Guadalupe fur seals counted (i.e., the counts are not separated by age/sex class). The counts made during the breeding season, when the maximum number of animals is present at the rookery, were used to examine population growth. The natural logarithm of the counts was regressed against year to calculate the growth rate of the population. These data indicate that the population of Guadalupe fur seals is increasing exponentially at an average annual growth rate of 13.7 percent. The population was estimated to be about 7,408 animals in 1993.

Threats and Impacts:
Drift and set gillnet fisheries may cause incidental mortality of Guadalupe fur seals in Mexico and the United States. In the United States, there have been no reports of incidental mortalities or injuries of Guadalupe fur seals in commercial fisheries. No information is available for human-caused mortalities or injuries in Mexico; however, similar drift gillnet fisheries for swordfish and sharks exist along the entire Pacific coast of Baja California, Mexico, and may take animals from the same population.

NMFS has documented strandings of Guadalupe fur seals in California. Although most of these animals died of natural causes, some mortalities likely can be attributed to interactions with commercial fisheries and marine debris. NMFS documented an increasing number of stranded Guadalupe fur seals on California's Channel Islands and along the central California coast.

Guadalupe fur seals have undergone an extreme genetic bottleneck. This reduction in genetic diversity may influence further population expansion.

Conservation Actions:
Guadalupe fur seals are listed as a threatened species by the State of California. In addition, they are listed as vulnerable on the World Conservation Union (IUCN) Red List and as an Appendix I species under CITES. The Guadalupe fur seal is protected by the government of Mexico, and the Isla de Guadalupe is now a pinniped sanctuary. As most of the range of this species lies in Mexico, NMFS took no conservation actions during the 2002–2004 timeframe.

Priority Recovery Actions Needed:
As most of the range of this species lies in Mexico, no priority recovery actions are needed at this time for the Guadalupe fur seal.

Recovery Priority Number: 10
The recovery priority number for the Guadalupe fur seal is designated as 10, due to low magnitude of threat, a high recovery potential, and the absence of significant conflict with economic projects.

Hawaiian Monk Seal (*Monachus schauinslandi*)[1]

Date Listed: November 23, 1976

Legal Status: Endangered

Recovery Plan Status:
A recovery plan for the Hawaiian monk seal was completed in March 1983. A revision of the recovery plan is currently under development, with a draft expected in 2005.

Species Status:
The current population of Hawaiian monk seals is approximately 1,300 individuals, which is assumed to be well below its optimum sustainable population (OSP). The species remains far from achieving recovery, but conservation efforts have contributed to a marked decrease in rate of population decline from –4.7 to –0.7 percent per year over the last two decades. The majority of the population occurs in the Northwestern Hawaiian Islands (NWHI) with various main breeding subpopulations (Table 7). The various subpopulations continue to exhibit differing trends, and most likely reflect varying factors influencing population growth at each site. The species is also found in lower numbers in the Main Hawaiian Islands (MHI) where population numbers and range both appear to be expanding. Births have been documented on most of the major islands and annual births in the MHI are believed to have increased since the mid-1990s.

Table 7. Estimated 2002 abundance of Hawaiian monk seal populations

Site	Estimation Method	N	Standard Deviation	Nmin	Population Status
French Frigate Shoals	Direct enumeration	311	NA	311	Declining
Laysan	Direct enumeration	273	NA	273	Stable
Lisianski	Direct enumeration	168	NA	168	Declining
Pearl and Hermes	Direct enumeration	228	NA	228	Declining
Midway Island	Direct enumeration	62	NA	62	Declining
Kure Atoll	Direct enumeration	114	NA	114	Declining
Necker	Corrected beach counts	48.3	19.6	35	Stable
Nihoa	Corrected beach counts	47.2	21.2	33	Stable
Main Hawaiian Islands	Aerial survey	52	NA	52	Increasing
TOTAL		1,304		1,276	

Source: Hawaiian Monk Seal Recovery Team; NMFS PIFSC
*Nmin = minimum population estimate for the total population, accounting for statistical uncertainty in the abundance estimates

Threats and Impacts:
Habitat Concerns – Monk seals are vulnerable to human activities, especially in areas used for pupping and resting. Loss of terrestrial habitat following winter storms in the late 1990s reduced available habitat for monk seals at French Frigate Shoals (FFS) and led to high levels of shark predation. Continued loss of habitat at FFS and other sites in the NWHI could exacerbate this threat. The establishment of the NWHI Coral Reef Ecosystem Reserve, while providing the best protection to date for the monk seals' NWHI marine habitat, has also enabled more research-

[1] Information in this section was obtained from the DRAFT Monk Seal Recovery Plan (in prep.)

related travel into the NWHI, with associated potential for seal disturbance and introduction of alien species.

Food Limitation – Food availability appears to be a likely limiting factor for population growth in the NWHI. Low reproductive rates, delayed maturity, reduced juvenile survival, and poor body condition have been identified in various subpopulations and are consistent with periodic or chronic food limitation. In the MHI, by contrast, seals appear to be in good condition, suggesting that monk seals in the MHI do not experience food limitation as in the NWHI.

Human Interactions – Monk seals are characteristically intolerant of humans, as disturbance at haulout sites is known to cause abandonment of such sites. This can negatively impact survival and reproduction in monk seals. Most human disturbance has been removed from the NWHI, but policies leading to this reduction in disturbance need to be diligently preserved. Interactions of monk seals with humans in the MHI are frequent, although most disturbance from humans is not intentional or malicious. Vessel strikes are suspected in deaths of and injuries to monk seals. This interaction is more likely to occur in the MHI, as greater numbers of seals inhabit this area over time.

Climate and Oceanographic Conditions – Changes in climate and oceanographic conditions may affect monk seals by changing the availability of their prey, and may result in changes in the number or distribution of monk seal predators. To the extent that global climate change may result in sea-level rise or alterations in currents, this may reduce available terrestrial habitat for monk seals, especially in the low-lying NWHI.

Diseases – Several mortality events (in 1978, 2000, and 2001) have raised concern about the potential role of disease in seal survival. There is evidence of monk seal exposure to various pathogens, including multiple viruses and bacteria, as well as to parasites, which could be significant stressors. Increased monk seal abundance in the MHI increases this potential threat due to direct or indirect exposure to other wild or domestic animals.

Male Aggression – During the 1980s and early 1990s, the primary cause of adult female mortality affecting the recovery potential of the monk seal population was injury and often death of female monk seals caused by multiple male aggression ("mobbing") attacks. Individual males have also injured and killed weaned pups and juveniles of both sexes.

Shark Predation – In recent years, there has been a significant increase in shark predation on pre-weaned monk seal pups born at French Frigate Shoals. This threat is significant and appears to be limited to FFS, but is likely a limiting factor for older seals at all sites.

Fisheries Interactions – Direct interactions with fisheries have been documented for Hawaiian monk seals, including interactions with actively fishing gear, consumption of fishing discards, and entanglement in derelict fishery debris. Interactions have been documented with the bridle of a lobster trap and in nearshore gillnets, the shore-based *ulua* recreational fishery, and the bottomfish and longline fisheries. While direct interactions of monk seals with existing fisheries are rare, impacts to monk seals may also be generated from indirect threats by fisheries in the region. Removal of some species in the coral reef food web may result in undesirable changes in

the environment or in abundance of other species. Increasing numbers of monk seals in the MHI will likely result in an increase in interactions with recreational shore-based fisheries.

Marine Debris – Marine debris and derelict fishing gear have been well documented as entangling monk seals, and monk seals have one of the highest documented entanglement rates of any pinniped species. At Tern Island, French Frigate Shoals, entrapment in a sheet metal seawall built in 1942 presents a serious hazard to monk seals and has resulted in 37 entrapments and two monk seal deaths, one occurring in 2003.

Vessel Groundings – Monk seals may be injured or killed by vessel groundings that release hazardous materials (including oil or fuel), rotting bait, lost gear that could entangle seals, and human disturbance after the grounding incident. Vessel groundings that damage coral reef communities may lead to outbreaks of ciguatera, which may then accumulate in monk seal prey.

Conservation Actions:
Although numerous conservation efforts over the past several decades have not halted the decline in monk seal population numbers, these efforts have slowed the decline, which in turn has provided more time to recover the species. The following conservation actions were undertaken for Hawaiian monk seal recovery in 2002–2004:

- Shark predation and tagging studies at FFS began in 1999. During the 2000–2003 field seasons, 10 sharks were removed at Trig Island in the FFS, and the number of pups believed to have been killed by sharks at that site dropped from 25 in 1999 to 6 in 2000, 9 in 2001, and 3 in 2002.
- The Marine Mammal Commission sponsored a workshop on Hawaiian monk seal management on the beaches of the MHI in October 2002.
- Annual field camp management of monk seals in the NWHI has been conducted since 1982. Field camp personnel locate, disentangle, and release seals trapped in marine debris.
- NMFS continues to collect, inventory, and transport potentially entangling debris to Honolulu for disposal at the end of each field season.
- NMFS completed a partial seawall reconstruction at French Frigate Shoal in 2004.

Priority Recovery Actions Needed:
While many recovery actions are necessary for the recovery of this species, four priority actions are required in order to halt the decline of Hawaiian monk seal populations and to move the species toward recovery. The four priority recovery actions are as follows:

- Improve the survivorship of females, particularly juveniles, in subpopulations of the NWHI. This requires the following actions:
    - Maintaining and enhancing existing protection and conservation of habitat and prey base;
    - Developing a better understanding of the factors resulting in poor juvenile survival (e.g., prey abundance role of internal parasites, caloric depletion while learning to forage, and the impact of disease and toxins);
    - Intervening where appropriate to ensure higher survival of juvenile and adult females; and

    - Continuing actions to protect females (adult and juvenile) from male aggression and to mitigate shark predation on pups whenever possible.
- Maintain the extensive field presence during the breeding season in the NWHI. Field presence is critical not just to the monitoring and research efforts, but also to the active management and conservation of Hawaiian monk seal subpopulations in these areas.
- Ensure the continued natural growth of the Hawaiian monk seal population in the MHI. This effort must include better coordination of activities between and among all parties interested in and affected by the increased population of monk seals in the MHI.
- Reduce the probability of the inadvertent introduction of infectious diseases into the Hawaiian monk seal population.

Recovery Priority Number: 1

The recovery priority number for the Hawaiian monk seal is one. The magnitude of threat to this species is high. The recovery potential is high, and conflict is present.

Steller Sea Lion (*Eumetopias jubatus*) – Eastern and Western DPSs

Date Listed:
April 10, 1990 (listed as one threatened species)
May 5, 1997 (split into Eastern/Western DPSs and reclassified)

Legal Status:
Endangered (*Western DPS)*
Threatened (*Eastern DPS*)

Recovery Plan Status:
A recovery plan addressing the recovery of the Steller sea lion as a single species was completed in December 1992. In 1997, the species was split into two listings under the ESA – an endangered western DPS and a threatened eastern DPS. Development of a new, revised recovery plan for the Steller sea lion is currently under development, and a draft is expected in 2005.

Species Status:
The Steller sea lion is divided at Cape Suckling, Alaska (144^{o}W longitude) into two distinct population segments (DPSs) – a western and an eastern.

The threatened eastern DPS is stable or increasing slightly, with a minimum population estimate of 31,028 individuals.

The long-term average population trend for the endangered western DPS of Steller sea lions from 1990-2002 is a decline of 4.3 percent per year. The minimum population estimate for this DPS is 34,779 individuals. Although non-pup Steller sea lions at trend sites for the western DPS increased 5.5 percent from 2000–2002, this was the first region-wide increase for the western DPS since standardized surveys began in the 1970s. The 2002 count was 5.4 percent below the 1998 count and 36.7 percent below the 1990 count. The count for trend sites in the Gulf of Alaska increased 13.7 percent from 2000–2002, whereas sites in the Aleutian Islands showed equivocal change (down 0.8 percent).

Threats and Impacts:
Commercial fishing was identified as a threat to both DPSs of Steller sea lions. This threat still exists, but is being mitigated by the implementation of closure areas around major rookeries and haulouts, particularly in the range of the endangered western DPS. Another threat to the western DPS is the lack of understanding of the role played by other human activities and ecosystem processes in Steller sea lion decline. In the eastern DPS, strandings of Steller sea lions with gunshot wounds occur, along with strandings of sea lions entangled in non-fishery-related gear.

Conservation Actions:
NMFS uses Steller sea lion protection measures to guard against the possibility that groundfish fisheries off Alaska would jeopardize the continued existence of the western DPS of Steller sea lions or adversely modify their critical habitat. The management measures disperse fishing over time and area to protect against potential competition for important Steller sea lion prey species

near rookeries and important haulouts. These Steller sea lion protection measures include the following:

- Rookeries are protected by fishery closures and no-transit zones.
- No pollock fishing is allowed within 10–20 nautical miles of 75 haulouts.
- Fishing is controlled in part of the sea lion critical habitat.
- Critical habitat in the Aleutian Islands is closed to pollock fishing.

The Steller Sea Lion Recovery Team also worked with species experts, Federal and state agencies, industry, and environmental interests to develop a new recovery plan. The team held 10 meetings from January 2002 to November 2004 to prepare the new draft recovery plan for this species.

NMFS and external partners are engaged in numerous research activities to monitor population dynamics and understand the role of human activities and natural variables in the observed decline of the western DPS.

Priority Recovery Actions Needed:
Priorities for the recovery of the Steller sea lion continue to be: (1) conducting an annual, rangewide population census to monitor population trends; (2) assessing survival and reproductive rates through long-term marking programs of the western and eastern DPSs for development of population growth models; and (3) assessing the spatial and temporal distribution and availability of prey throughout the range. Additional priority recovery actions for the Steller sea lion will be determined by the forthcoming recovery plan.

Recovery Priority Number: 7 (*western DPS*); 10 (*eastern DPS*)
The recovery priority number for the western DPS of Steller sea lion is seven, due to a moderate magnitude of threat, a moderate recovery potential, and the presence of conflict activity.

The recovery priority number for the eastern DPS of Steller sea lion is ten, due to a low magnitude of threat, high recovery potential, and no significant conflict with economic activity presenting a risk to recovery.

Whales

Blue Whale (*Balaenoptera musculus*)

Date Listed: June 2, 1970

Legal Status: Endangered

Recovery Plan Status:
A recovery plan for the blue whale was completed in July 1998.

Species Status:
Blue whales are a found in all oceans worldwide and are separated into populations from the North Atlantic, North Pacific, and Southern Hemisphere. Worldwide, blue whales were significantly depleted due to commercial whaling activities. In the Southern Hemisphere, pre-exploitation population estimates range from 150,000 to 210,000 whales[1]; recent abundance estimates place the population size from 400 to 1,400 whales.[2] In the Southern Indian Ocean, the pre-exploitation population size was 10,000 whales; the abundance estimate from the 1970s is 5,000 whales.[1] There are no historical or current abundance estimates for blue whales in the Northern Indian Ocean. In the North Pacific, pre-exploitation population size is speculated to be approximately 4,900 blue whales[1]; current population estimates for the entire North Pacific place the population size at a minimum of 3,300 blue whales[3]. In the North Atlantic, estimates for the entire basin are considered unreliable, but range from 1,100 to 1,500 blue whales for pre-exploitation population size,[1] and from 100 to 555 whales for current population size.

Three stocks of blue whales are recognized in the U.S. Exclusive Economic Zone (EEZ): the western North Atlantic stock, the Hawaiian stock, and the eastern North Pacific stock.

The distribution of the blue whale in the western North Atlantic generally extends from the Arctic to at least mid-latitude waters. The blue whale is considered an occasional visitor in the U.S. Atlantic EEZ, which may represent the current southern limit of its feeding range. The current range of the blue whale in the North Atlantic remains unknown. Although no reliable estimates of pre-whaling population size are available for the western North Atlantic stock of blue whales, this stock appears to have been depleted by whaling to such an extent that the species remains rare in some formerly important habitats. The current minimum population estimate for the western North Atlantic stock is 308 whales. There are insufficient data to determine a population trend for this stock.

Blue whales range throughout the North Pacific Ocean. Population structure in the North Pacific remains uncertain, but two stocks are recognized within the U.S. EEZ: the Hawaiian and the eastern North Pacific (formerly California/Mexico) stocks. Pre-whaling estimates of blue whales

[1] Gambell, R. 1976. World whale stocks. Mammal Rev. 6(1):41-53.
[2] International Whaling Commission statistics – www.iwcoffice.org
[3] Includes: Wade, P.R. and T. Gerrodette. 1993. Estimates of cetacean abundance and distribution in the Eastern Tropical Pacific. Rep. Int. Whal. Comm. 43:477–493.

in the eastern North Pacific range from fewer than 2,000 to 6,000 whales. However, these figures are not actual abundance estimates but rather indices of abundance based on sightings from whaling boats. As such, these estimates are not comparable to current population estimates. With the exception of the blue whale population that summers off California, there are no reliable estimates of blue whale abundance in the North Pacific Ocean. In Hawaii, blue whales are considered to be extremely rare. No data are available to provide a minimum population estimate or to determine a population trend for the Hawaiian stock. The eastern North Pacific stock feeds in California waters in summer and fall and migrates south to waters from Mexico to Costa Rica in winter. The current minimum population estimate for this stock is 1,138 whales, and the stock appears to be increasing in abundance.

Threats and Impacts:

- There is the potential for blue whales to be killed or seriously injured by ship strikes. In the North Atlantic in March 1998, a dead blue whale was brought into Rhode Island waters on the bow of a tanker. The cause of death was determined to be a ship strike, although the location of the ship strike is unknown. Ship strikes are also implicated in the deaths of four blue whales off California since 1980. The average blue whale mortality from ship strikes off California from 1991–1995 was 0.2 per year. Further mortalities of this nature probably have occurred without being reported. Several of the whales photo-identified off California had large gashes on the dorsal body surface, thought to be caused by collisions with vessels.
- There is a potential for bycatch of blue whales in drift gillnet fisheries for swordfish and sharks off California and Mexico. Observer coverage in such fisheries was relatively low in the past but increased to 10 to 18 percent during 1991–1995. In the observed fisheries, no blue whale mortalities were documented; however, entanglement rates may be underestimated, as blue whales may break through or carry away fishing gear, perhaps suffering unrecorded subsequent mortalities.
- Increasing levels of anthropogenic noise in the oceans may be a concern for blue whales.

Conservation Actions:

Conservation actions for the blue whale during 2002–2004 include the following:

- Monitoring the status of the California/Oregon/Washington stock of blue whales via shipboard surveys, conducted every 3 years with Marine Mammal Protection Act (MMPA) funding
- Placing observers onboard vessels in the California/Oregon swordfish/thresher shark drift gillnet fishery to monitor for the take of protected species, including marine mammals (MMPA funding)
- Implementing marine mammal take reduction measures identified in the Pacific Offshore Cetacean Take Reduction Plan (including the use of acoustic pingers) to reduce the bycatch of marine mammals (MMPA funding)

Priority Recovery Actions Needed: Continue current recovery actions.

Recovery Priority Number: 7

This priority number ranking reflects a moderate magnitude of threat, low to moderate recovery potential, and the presence of conflict.

Bowhead Whale (*Balaena mysticetus*)

Date listed: June 2, 1970

Legal status: Endangered

Recovery Plan status:
No recovery plan has been completed for the bowhead whale.

Species status:
Bowhead whales are distributed in seasonally ice-covered waters of the Arctic and near Arctic, with five stocks currently recognized by the International Whaling Commission. Four small stocks occur in the Sea of Okhotsk, Davis Strait, Hudson Bay, and the offshore waters of Spitsbergen; these small bowhead stocks are comprised of only a few tens to a few hundreds of individuals. The only stock found within U.S. waters is the western Arctic stock, which comprises the largest population of this species. The western Arctic stock migrates annually from wintering areas in the northern Bering Sea, through the Chukchi Sea in the spring, to the Beaufort Sea where it spends much of the summer before returning to the Bering Sea in the fall.

The most current abundance estimate for western Arctic bowhead whales (from ice-based counts in the spring of 2001) is 10,470 whales, and data indicate the population is increasing at 3.4 percent per year for the period 1978–2001. Pre-exploitation population levels are estimated at 10,400–23,000 whales. A status review for this species will be conducted in 2005, with a possibility of changing the ESA listing status of the bowhead whales.

Threats and Impacts:
Threats and impacts to the bowhead whale population include oil and gas exploration and development, and leasing within waters of the State of Alaska and on the Outer Continental Shelf (OCS). Most of the year, bowhead whales are closely associated with sea ice. During the summer, this population occurs in relatively ice-free waters in the southern Beaufort Sea – an area often exposed to industrial activity related to petroleum exploration and extraction. Increasing oil and gas development in the Arctic will lead to an increased risk of various forms of pollution to bowhead whale habitat, including oil spills, toxic and nontoxic waste, and noise due to higher levels of traffic as well as exploration and drilling operations. The area of disturbance is localized, however. Since the western Arctic bowhead whale population is approaching its pre-exploitation population size and has been increasing at a roughly constant rate for over 20 years, the impacts of oil and gas industry on individual survival and reproduction are likely to be minor.

Another element of concern is the potential for climate change, which will probably affect high northern latitudes more than other locations. Evidence gathered over the past 10 to 15 years indicates a shift in regional weather patterns in the Arctic region. Ice-associated animals, such as the bowhead whale, may be sensitive to changes in Arctic weather, sea-surface temperatures, or ice extent, and the concomitant effect on prey availability. There are insufficient data to make reliable predictions of the effects of any Arctic climate change on bowhead whales.

A minor additional concern for bowhead whales is the possibility of fishing gear interactions and entanglements. The latest stock assessment report for bowhead whales (2003) documents 10 cases of rope or net entanglement since 1978. Two of these reported cases involved bowhead whale entanglement in crab pot gear, one in 1993 and one in 1999; the average rate of entanglement in crab pot gear for 1997–2001 is 0.2.

Conservation Actions:
Conservation actions for the bowhead whale during 2002–2004 include the following:

- Time and area restrictions for indirect take of whales due to commercial activities
- Mitigation of oil and gas activities through section 7 consultations under the ESA
- Mitigation of oil and gas activities under section 101(a)(5) of the Marine Mammal Protection Act (MMPA)
- International Whaling Commission (IWC) actions
- Section 119 co-management agreements under the MMPA

In addition, several papers on bowhead whale stock structure were presented at the 2004 International Whaling Commission Scientific Committee (IWC SC) Meeting, from which a team of United States researchers developed a provisional plan for studying the stock structure of bowhead whales. This provisional plan underwent review at a workshop hosted by the NMFS Alaska Fisheries Science Center, and a summary report will be submitted to the Bowhead-Right-Gray Subcommittee at the 2005 IWC SC Meeting.

Priority Recovery Actions Needed:
Continue current conservation actions.

Recovery Priority Number: 9
This priority number reflects a low magnitude of threat (due to increasing population numbers), high recovery potential, and presence of conflict.

Fin Whale (*Balaenoptera physalus*)

Date Listed: June 2, 1970

Legal Status: Endangered

Recovery Plan Status:
No recovery plan currently exists for the fin whale. A draft joint recovery plan was generated in 1998 for the fin and sei whales; the plan is currently being updated.

Species Status:
Fin whales occur in oceans of both Northern and Southern Hemispheres between 20–75° N and S latitudes. Worldwide, fin whales were severely depleted by commercial whaling activities. The pre-exploitation abundance of fin whales in the Southern Hemisphere is estimated at 400,000 whales.[1] The most current population estimate (1979) for fin whales in the southern oceans is 85,200 whales.[1] In the North Pacific, the total pre-exploitation population size of fin whales is estimated at 42,000–45,000 whales.[2] The most recent abundance estimate (1991) for fin whales in the entire North Pacific basin is between 14,620 and 18,630 whales. In the North Atlantic, the pre-exploitation population size for fin whales is estimated at 30,000–50,000 whales[3]; current estimates of fin whale abundance for the entire North Atlantic range from 27,700 to 82,000 whales.[4]

The Marine Mammal Protection Act (MMPA) stock assessment reports for the fin whale recognize one stock of fin whales in the U.S. North Atlantic Ocean (western North Atlantic stock) and three stocks of fin whales in the U.S. North Pacific: the California/Oregon/ Washington stock, the Hawaii stock, and the Alaska/Northeast Pacific stock.

Western North Atlantic stock
An estimate of 2,814 fin whales for the western North Atlantic stock was derived from a 1999 line transect sighting survey conducted by a ship and airplane covering waters from Georges Bank to the mouth of the Gulf of St. Lawrence. This abundance estimate is considered the best available for the western North Atlantic fin whale stock because it is relatively recent. However, this estimate must be considered extremely conservative in view of the known range of the fin whale in the entire western North Atlantic, and the uncertainties regarding population structure and exchange between surveyed and unsurveyed areas. The status of this stock relative to its optimum sustainable population (OSP) size in the U.S. Atlantic Exclusive Economic Zone (EEZ) is unknown, and there are insufficient data to determine a population trend for western North Atlantic fin whales at this time.

[1] International Whaling Commission. 1979. Report of the subcommittee on protected species. Annex G, Appendix I. Rep. Int. Whal. Comm. 29: 84-86.
[2] Ohsumi, S., and S. Wada. 1974. Status of whale stocks in the North Pacific, 1972. Rep. Int. Whal. Comm. 24:114–126.
[3] Sergeant, D. E. 1977. Stocks of fin whales *Balaenoptera physalus* L. in the North Atlantic Ocean. Rep. Int. Whal. Comm. 27:460– 473.
[4] International Whaling Commission statistics – www.iwcoffice.org

North Pacific stocks
The initial pre-whaling population of fin whales in the entire North Pacific, as mentioned above, is estimated to be 42,000 to 45,000 whales. The minimum population estimate for the California/Oregon/Washington stock of fin whales from 1996 and 2001 summer/fall ship surveys is approximately 2,541 whales. However, reliable estimates of the current minimum population size and population trend for this stock are not available. Reliable estimates of minimum population size and population trend for the Hawaii and Alaska/Northeast Pacific stocks are currently not available.

Threats and Impacts:
Western North Atlantic stock
Fin whales from the western North Atlantic stock are injured and killed at least occasionally by inshore fishing gear (e.g., gillnets and lobster lines) off eastern Canada and the United States, and are occasionally injured or killed by ship strikes off the U.S. East Coast. NMFS' records on this stock from 1997 through 2001 yield an average of 2.0 human-caused mortalities per year – 0.6 per year resulting from fishery interactions or entanglements (0.2 in U.S. waters, 0.2 in Canadian waters, 0.2 in Bermudan waters), and 1.4 due to collisions with vessels (all in U.S. waters). Fin whales are also among the main attractions of whale watching enterprises in eastern Canada and the northeastern United States and, as a result, these whales are regularly subjected to close and persistent following by vessels.

North Pacific stocks
Threats and impacts to the Hawaiian and Alaska/Northeast Pacific stocks of fin whales are currently unknown.

Threats and impacts to the California/Oregon/Washington stock include interaction with commercial fisheries. NMFS has observed the incidental take of fin whales in the California/Oregon swordfish/thresher shark drift gillnet fishery (estimated incidental take of one fin whale per year from the California/Oregon/Washington stock). NMFS expects fin whales are also taken in drift gillnet fisheries off Baja California, but detailed information regarding takes in these fisheries is not available.

There is the potential for large whales, such as fin whales, to be killed or seriously injured by ship strikes. Ship strikes have been implicated in the deaths of four blue whales off California since 1980, and in the deaths of one fin whale in 1997 and one in 2001. Additional mortality from ship strikes probably goes unreported because the whales do not strand or, if they do strand, they do not always have obvious signs of trauma. The average observed annual mortality due to ship strikes is 0.4 fin whales per year for the period 1997–2001.

Fin whales are much less subject to whale watching in the eastern North Pacific than in the western North Atlantic. Thus, disturbance of fin whales in the Pacific is more likely to come from the abundant industrial, military, and fishing vessel traffic off the Mexican, U.S., and Canadian coasts than from the deliberate approaches of whale watching vessels.

Conservation Actions:

Western North Atlantic stock

For conservation measures concerning fishing gear interactions, see the section in this report on the Northern Right Whale. North Atlantic right, humpback, and fin whales are all managed under the Atlantic Large Whale Take Reduction Plan (ALWTRP) implemented through the Marine Mammal Protection Act.

North Pacific stocks

There are no conservation actions for the Hawaii and Alaska/Northeast Pacific stocks of fin whales.

Conservation actions for the California/Oregon/Washington stock of fin whales include the following:

- Monitoring the status of the California/Oregon/Washington stock of fin whales via ship-board surveys, which are conducted every 3 years with Marine Mammal Protection Act (MMPA) funding
- Placing observers onboard vessels in the California/Oregon swordfish/thresher shark drift gillnet fishery to monitor for the take of protected species, including marine mammals (MMPA funding)
- Implementing marine mammal take reduction measures identified in the Pacific Offshore Cetacean Take Reduction Plan (including the use of acoustic pingers) to reduce the bycatch of marine mammals (MMPA funding)

Priority Recovery Actions Needed:

Continue current conservation actions. Further priority recovery actions will be specified in the recovery plan.

Recovery Priority Number: 7

This priority number reflects a moderate degree of threat, low to moderate recovery potential, and the presence of conflict.

Humpback Whale (*Megaptera novaeangliae*)

Date Listed: June 2, 1970

Legal Status: Endangered

Recovery Plan Status:
In November 1991, NMFS published a final recovery plan for the humpback whale.

Species Status:
Humpback whales live in all major ocean basins from equatorial to sub-polar latitudes. In the entire Southern Hemisphere, humpback whale abundance prior to commercial exploitation is estimated at 100,000 whales.[1] Recent abundance estimates for the humpback whale south of 60°S in summer (i.e., incomplete) range from 5,900 to 16,800 whales.[2] No current or historical abundance estimates are available for humpbacks in the Indian Ocean. In the entire North Pacific Ocean prior to 1905, it is estimated that there were 15,000 humpback whales basin-wide.[3] In 1966, after heavy commercial exploitation, humpback abundance was estimated at 1,000 to 1,200 whales,[3] although it is unclear if estimates were for the entire North Pacific or just the eastern North Pacific. There are no reliable estimates for current humpback whale abundance in the entire North Pacific. In the North Atlantic, no estimate is available for pre-exploitation abundance basin-wide; a 1999 estimate places the humpback whale population at 10,600 individuals for the entire basin.[4]

Four stocks of humpback whales are recognized in the U.S. Exclusive Economic Zone (EEZ): the Gulf of Maine stock in the Atlantic Ocean, and the western North Pacific, central North Pacific, and eastern North Pacific stocks in the Pacific Ocean.

Western North Atlantic – Gulf of Maine stock
The humpback whale population in the North Atlantic Ocean can be divided into six relatively discrete stocks, defined by their fidelity to spring/summer/fall feeding grounds. In the western North Atlantic, humpback whales feed over a range encompassing the eastern coast of the United States (including the Gulf of Maine), the Gulf of St. Lawrence, Newfoundland/Labrador, and western Greenland. The two other North Atlantic feeding grounds occur off Iceland and northern Norway. In winter, whales from all feeding areas (including the Gulf of Maine) mate and calve primarily in the West Indies, where spatial and genetic mixing among subpopulations occurs. It is apparent not all whales migrate to the West Indies every winter, and significant numbers of animals are found in mid- and high-latitude regions at this time.

[1] Gambell, R. 1976. World whale stocks. Mammal Rev. 6(1):41-53
[2] International Whaling Commission statistics – www.iwcoffice.org
[3] Rice, D.W. 1978. The humpback whale in the North Pacific: distribution, exploitation, and numbers. In K. S. Norris and R. R. Reeves (Editors), Report on a Workshop on Problems Related to Humpback Whales (*Megaptera novaeangliae)* in Hawaii, p. 29–44. Contr. Rep. to U.S. Mar. Mammal Comm., NTIS PB-280-794.
[4] Smith, T.D., J. Allen, P.J. Clapham, P.S. Hammond, S. Katona, F. Larsen, J. Lien, D. Matilla, P.J. Palsbøll, J. Sigurjónsson, P.T. Stevick, and N. Øien. 1999. An oceanbasin-wide mark-recapture study of the North Atlantic humpback whale (*Megaptera novaeangliae*). Mar. Mamm. Sci. 15:1–32.

Estimating abundance for the Gulf of Maine stock has proved problematic. Several approaches have been investigated, including mark-recapture estimates, minimum population size, and line-transect estimates. The best estimate of abundance for Gulf of Maine humpback whales provides a minimum population estimate of 647 humpback whales. Current data suggest the Gulf of Maine humpback whale stock is steadily increasing in size.

Western North Pacific stock

The humpback whale population in the North Pacific Ocean can be divided into three relatively separate stocks: the western North Pacific, the central North Pacific, and the eastern North Pacific stocks. The western North Pacific stock of humpback whales is generally defined as those whales migrating between winter/spring calving and mating areas near Japan to summer/fall feeding areas in Alaskan waters, likely west of the Kodiak Archipelago (in the Bering Sea and Aleutian Islands).

The western North Pacific stock of humpback whales is estimated at 394 animals, based on data collected by nine independent research groups and photographs taken between 1991 and 1993. More recent photo-identification effort has occurred, but because of uncertainty in assigning animals to a stock, this information was not used to calculate revised abundance estimates. No population trend has been calculated for this stock.

Central North Pacific stock

The central North Pacific stock of humpback whales is generally defined as those whales migrating between winter/spring calving and mating areas in the Hawaiian Islands to summer/fall feeding areas off northern British Columbia and southeast Alaska, Gulf of Alaska/Prince William Sound, west to Kodiak Island.

The central North Pacific stock of humpback whales is estimated at 4,005 individuals, based on data collected by nine independent research groups and photographs taken between 1991 and 1993. More recent photo-identification effort has occurred that identifies animals in what are believed to be discrete feeding aggregations within the central north Pacific stock: Prince William Sound (estimate of 149 animals), Kodiak Archipelago (estimate of 651 animals), and Southeast Alaska (estimate of 951 animals). Some of these estimates should be considered minimum population estimates. Data support an increasing population size for the entire central stock; however, the limited nature of the data does not support a trend estimate at this time.

Eastern North Pacific stock

The eastern North Pacific stock of humpback whales is generally defined as those whales migrating between winter/spring calving and mating areas off coastal Central America and Mexico to summer/fall feeding areas from coastal California north to British Columbia.

The minimum population estimate for the eastern North Pacific humpback whale stock is 681 individuals. Mark-recapture population estimates increased steadily from the period 1988–1990 to the period 1997–1998, at about 8 percent per year. The stock appears to have decreased in abundance between 1998 and 1999, but the most recent mark-recapture estimate shows the eastern North Pacific stock appears to be increasing in abundance.

Threats and Impacts:

Western North Atlantic Ocean – Gulf of Maine stock

The total level of human-caused mortality and serious injury is unknown, but the level reported in the most recent stock assessment report (2003) for the Gulf of Maine stock of humpback whales is a minimum of 2.6 animals per year. Given the potential biological removal rate (PBR) of 1.3, no mortality or serious injury for this stock can be considered insignificant. The human-caused mortality and serious injury estimates are derived from two components: (1) non-observed fishery entanglement records and (2) ship strike records.

North Pacific Ocean stocks

- Incidental take in fisheries
  - Threats and impacts to the humpback whale include incidental catch in commercial fisheries. The estimated human related annual mortality rate in commercial fisheries for the western North Pacific stock is 0.8, which exceeds the calculated PBR level of 0.7 animals. At least one of the mortalities occurred in the United States.
  - Incidental catch in commercial fisheries also impacts the central North Pacific stock. The estimated annual mortality and serious injury rate for the entire stock is 5.0, with 3.6 of that total being fishery-related. This represents a minimum estimate and it is unclear whether the level of human-caused mortality and serious injury exceeds the PBR level of 7.4 animals for the entire stock.
  - NMFS has observed the incidental take of humpback whales in the California/Oregon swordfish/thresher shark drift gillnet fishery. NMFS expects humpback whales are also taken in drift gillnet fisheries off Baja California, but detailed information regarding takes in these fisheries is not available.
- Ship strikes
  - There is a potential for humpback whales to be killed or seriously injured by ship strikes; ship strikes are implicated in the deaths of four blue whales off California since 1980.
- Entanglement
  - North Pacific humpback whales are impacted by entanglement in commercial, sport, or subsistence fisheries (mainly pot gear).
  - Because humpback whales migrate annually from Hawaii to northern British Columbia, Southeast Alaska and Prince William Sound west to Kodiak, the potential exists for them to become entangled in gear from several fisheries and possibly drag an extensive amount of gear. Longline gear, crab pots, and other non-fishery-related lines have been implicated in humpback whale entanglements in Hawaii.
- Whale watching
  - The central North Pacific stock is the focus of a developed whale watching industry on its wintering grounds in the Hawaiian Islands. The feeding aggregation in southeast Alaska is also the focus of a developing whale watching industry that exerts pressure in localized geographic areas of southeast Alaska.
- Habitat loss or degradation
  - Loss of habitat is directly linked to increased human activity in and along marine environments. Landfills, harbors, shipping channels, fisheries, and aquaculture

(fish farms) may all occupy or destroy areas needed by humpbacks for resting and breeding. Recreational use of marine areas, including resort development and increased boat traffic (thrill craft), may displace whales that would normally use an area. The growth of the whale watching industry is a concern as preferred habitats may be abandoned if disturbance levels are too high. In Hawaii, acoustic impacts from vessel operation, oceanographic research using active sonar, and military operations are also of increasing concern.

Conservation Actions:
The following section describes conservation actions undertaken during 2002–2004 for the recovery of humpback whales:

Western North Atlantic – Gulf of Maine stock
For conservation measures concerning fishing gear interactions, see the section on the Northern Right Whale. North Atlantic right, humpback, and fin whales are all managed under the Atlantic Large Whale Take Reduction Plan implemented through the Marine Mammal Protection Act. Although the right whale Ship Strike Strategy does not apply to humpback whales, it is expected to yield a cumulative benefit to humpback whales.

North Pacific Ocean stocks
- Reduction of incidental take
  - Much effort in 2002–2004 was put into disentangling animals caught in fishing gear in southeast Alaska, and in education and outreach regarding entangled animals.
  - Regulations were developed in 2001 to limit the approach of vessels to humpback whales within waters off Alaska to minimize "taking" from approaches. These regulations mirror those already in existence in waters off Hawaii, giving the animals the same protections on the summering grounds as on the wintering grounds.
  - NMFS implements marine mammal take reduction measures identified in the Pacific Offshore Cetacean Take Reduction Plan (including the use of acoustic pingers) to reduce the bycatch of marine mammals, with Marine Mammal Protection Act (MMPA) funding.
  - The Hawaiian Islands Humpback Whale National Marine Sanctuary continues to play a leading role – locally, nationally, and internationally – in mitigating the impact to humpback whales from entanglement in man-made ropes and nets. Locally, the sanctuary is conducting training of select personnel, acquiring specialized equipment caches for islands with histories of events, and responding to all calls to NOAA concerning humpback whales in distress.
  - The Hawaiian Islands Humpback Whale National Marine Sanctuary Advisory Council and its partners convened a Ship Strike Mitigation Meeting with resource managers, scientists, and representatives of the maritime community to assess ship strike risks in Hawaii and to identify possible actions to reduce the occurrence of vessel/whale collisions.
  - The Hawaiian Islands Humpback Whale National Marine Sanctuary is working with the U.S. Coast Guard, the State of Hawaii, the Sanctuary Advisory Council,

and the Ocean Tourism Coalition (OTC) to conduct a study to create a statewide anonymous reporting system for whale and vessel collisions in Hawaiian waters.

- Surveys and research
  - NMFS monitors the status of the eastern North Pacific stock via shipboard surveys, which are conducted every 3 years, and mark-recapture studies conducted annually (MMPA funding).
  - NMFS places observers onboard vessels in the California/Oregon swordfish/thresher shark drift gillnet fishery to monitor for the take of protected species, including marine mammals (MMPA funding).
  - The SPLASH project (structure, levels of abundance, and status of humpbacks) is an international cooperative research effort to understand the population structure of humpback whales across the entire North Pacific. Taking place from 2004 to 2007, the project will involve research conducted in many different regions frequented by the North Pacific stocks of humpback whales.
  - The Hawaiian Islands Humpback Whale National Marine Sanctuary (HIHWNMS) released the results of a research project describing the distribution and composition of humpbacks off the west coast of the Big Island of Hawaii.[5]
  - The Hawaiian Islands Humpback Whale National Marine Sanctuary staff have continued to build partnerships (e.g., with Fagatele Bay National Marine Sanctuary and the Center for Coastal Studies) to conduct marine mammal surveys, concentrating on humpback whales, in the waters surrounding American Samoa. Because more humpbacks were found than had been expected, project staff have been invited to attend the Southern Ocean Whale Research Consortium's annual meeting to place the role of the American Samoan humpback population in the larger context of the South Pacific.
- Education and outreach
  - The 2002 State of the Sanctuary Report for the Hawaiian Island Humpback Whale National Marine Sanctuary provides an overview of activities, programs, and projects, as well as marine resources and management issues pertinent to the sanctuary's development.
  - Ship strike mitigation signage (boater safety signs) to remind Hawaii's ocean users to practice safe boating around whales were finalized and will soon be installed at six of the State's most popular harbor boat ramps.
  - The Hawaiian Islands Humpback Whale National Marine Sanctuary is involved in numerous local education and outreach initiatives aimed at increasing ocean literacy among residents and visitors to Hawaii. These programs include the Hiialakia Education Cruise to teach students about conservation issues impacting Hawaii, supporting native Hawaiian culture and education, hosting the National Geographic Field Studies program, the two day "Dive Into Education" workshop which exposed local teachers to ocean education, the distribution of newspaper inserts dedicated to increasing public knowledge on marine conservation, educational school visits, and lunchtime whale watches.

[5] Trends in Relative Distribution, *Megaptera novaeangliae*, in Kawaihae Bay, Island of Hawaii 1988 – 2003. Researchers: C.M. Gabriele, S.H. Rickards, S.E. Yin, and A.S. Frankel. Affiliation: Hawaii Marine Mammal Consortium.

Priority Recovery Actions Needed:

Western North Atlantic – Gulf of Maine stock

NMFS will continue its efforts to address human-caused mortality and serious injury of humpback whales associated with gear and vessel interactions. Additional work is needed to complete the development and implementation of a more comprehensive ship strike strategy that encompasses large cetacean species in addition to right whales. Although substantial work has already been done concerning gear modifications to address entanglement risks associated with the groundline of pot/trap gear, additional work is needed to better understand the entanglement risk posed by the endlines (buoy lines) of fixed gear, and humpback behavior once whales become entangled. Additional studies must also be conducted to evaluate the effectiveness of the right whale measures on humpback entanglements.

North Pacific Ocean stocks

Recovery actions specific to the western North Pacific stock have a low priority until further research is done. No priority recovery actions have been officially identified specific to the central North Pacific stock; however, the issue of entanglement continues to be a local priority for education and mitigation. Other priority actions needed in the North Pacific include:

- Ensure completion of the SPLASH research project
- Ensure full analysis and dissemination of SPLASH results. NOAA can be best informed of the progress and nature of North Pacific humpback recovery by fully analyzing the results of the 3-year SPLASH effort and making the results available to government managers and other conservation organizations.
- Continue collaborative threat reduction and impact mitigation efforts. Current efforts to address entanglement, ship strike, habitat degradation, and other threats and impacts should be continued and enhanced. Collaboration between NMFS, NOAA National Marine Sanctuaries Program (NMSP), the National Park Service (NPS), the States of Hawaii and Alaska, and other organizations should be further encouraged and facilitated.
- Continue education and outreach – Community support for conservation should be further strengthened through continued NOAA-facilitated, collaborative education and outreach activities.

Recovery Priority Number: 3

The species recovery priority reflects a high magnitude of threat, a medium recovery potential (because levels of fishing gear and vessel interactions appear to be increasing), and the presence of conflict (because restrictions on commercial fishing and shipping would potentially create a significant conflict).

Northern Right Whale (*Eubalaena glacialis)*

Date Listed: June 2, 1970

Legal Status: Endangered

Recovery Plan Status:
In December 1991, NMFS published the recovery plan for the northern right whale. NMFS revised the recovery plan for the North Atlantic right whale population in 2001 and requested public comment on the draft. Because significant changes were made to the draft, NMFS published a new draft for public comment on August 31, 2004. A final revised plan will be published in 2005.

A recovery plan addressing the North Pacific population of the northern right whale is currently under development, pending taxonomic and listing decisions.[1]

Species Status:
The pre-exploitation distribution of the northern right whale in the North Atlantic probably included coastal and continental shelf waters in temperate to subarctic latitudes. Post-exploitation distribution is much more limited. It remains unclear whether the present North Atlantic right whale population abundance is static or in decline. In the eastern North Atlantic, the northern right whale population probably numbers only in the low tens of animals at best, and based on the rarity of sightings and the current distribution and migration patterns (which remain unknown), the eastern North Atlantic population is not considered a functioning extant unit and may be considered a "relict" population(s).[2] In the western North Atlantic, the northern right whale minimum population estimate was 291 individuals in 1998, based on a census of individual whales identified using photo-identification techniques. However, because of heterogeneity of capture probabilities (relating to either distribution of individuals and/or of sighting effort), it is difficult to calculate an unbiased point estimate of abundance for this population; furthermore, measures of survival are considered to be more important than absolute abundance estimates. The size of the stock is considered extremely low relative to its estimated optimal sustainable population (OSP) level.

[1] Since the listing of the right whale in 1970, NMFS has interpreted right whale taxonomy as consisting of two separate species – northern right whale (*Eubalaena glacialis*) in the Northern Hemisphere, and southern right whale (*Eubalaena australis*) in the Southern Hemisphere – which was consistent with the view of most taxonomists at the time of listing. On April 10, 2003, NMFS published a final rule (68 FR 17560) that split the single species "northern right whale" (*Eubalaena glacialis*) into two separate species – the North Atlantic right whale (*Eubalaena glacialis*) and the North Pacific right whale (*Eubalaena japonica*). However, NMFS has determined that this technical change was procedurally and substantively flawed, and on January 11, 2005 (70 FR 1830), published a final rule removing the technical revision and reinstating the designation of one endangered right whale species in the Northern Hemisphere – *Eubalaena glacialis*. NMFS plans to conduct a status review of the northern right whale to determine whether it consists of more than one species as defined by the ESA, and to follow the appropriate ESA section 4 listing procedures if necessary to reclassify the northern population as two separate species.

[2] Best, P.B. 2001. Report of the workshop on the comprehensive assessment of right whales: a worldwide comparison. J. Cetacean Res. Man. (Special Issue) 2:1- 60.

Very little information exists on the northern right whale population in the North Pacific. The pre-exploitation size of this stock probably exceeded 11,000 animals, but whaling from 1835 to 1971 severely reduced the population. Soviet catches of right whales from 1963 to 1966 almost wiped out the eastern North Pacific population, which today likely numbers in the tens of animals. Surveys from the summer of 2004 in the Bering Sea indicate a minimum population count of approximately 24 animals, including three calves. In the western North Pacific, the population is thought to be in the hundreds, but no reliable estimate is available. The size of both eastern and western North Pacific populations is extremely low relative to the OSP.

Threats and Impacts:
Ship collisions and fishing gear entanglements are the most common anthropogenic causes of mortality in the western North Atlantic right whale population. Other potential threats to this population are habitat degradation, noise, contaminants, bombing activities, and climate and ecosystem change. The total level of human-caused mortality and serious injury is unknown, but the reported human-caused mortality and serious injury contained within the most recent stock assessment report (2003) is a minimum of 2.07 per year. Given that the potential biological removal rate (PBR) is set at zero, no mortality or serious injury for this stock can be considered insignificant.

The threats and impacts to right whales in the North Pacific are currently unknown because the distribution of these animals is not well understood. Entanglement in gear could be a threat; however, the extent of this problem is not well defined. Gillnets were implicated in the death of a right whale off the Kamchatka Peninsula (Russia) in 1989. No other incidental takes of right whales are known to have occurred in the North Pacific, but entanglement scars have been observed on some animals. Any mortality incidental to commercial fisheries would be considered significant. It is possible that right whales in the North Pacific are vulnerable to mortality from ship strikes and entanglements in fishing gear, as these are significant sources of right whale mortality in the North Atlantic. However, due to the rare occurrence of North Pacific right whales and their scattered distribution, it is impossible to assess the threat of ship strikes or entanglement to the North Pacific stock of right whales at this time.

Conservation Actions:
The following conservation actions were undertaken between 2002 and 2004 for the North Atlantic right whale:

The NMFS Northeast Region (NER) has drafted a comprehensive management plan that addresses interactions between fisheries and the North Atlantic right whale population. The strategy identifies the shortfalls of NMFS' management scheme and NER's ongoing and future actions designed to rectify these shortfalls. The foundation of the strategy focuses on fishing regulations, gear research, outreach and education, enforcement, cooperative efforts with states, whale research, disentanglement, monitoring and evaluation, coordination with Canada, and critical habitat. The following activities undertaken by NER illustrate the steps taken by NMFS to reduce entanglement and serious injury as a result of entanglement:

Outreach and Education

- Conducted dockside outreach meetings in Maine, Massachusetts, Rhode Island, New Jersey, Delaware, Maryland, Virginia, North Carolina and Florida
- Collaborated with fishing associations throughout the mid-Atlantic on Atlantic Large Whale Take Reduction Plan (ALWTRP) issues
- Provided Level 1 disentanglement training for fishermen, the U.S. Coast Guard (USCG), and Marine Patrol
- Expanded weak link (gear designed to break if entangled) photo workbook
- Improved ALWTRP outreach by creating a Dynamic Area Management (DAM) Zone Outreach Supplement for each DAM zone
- Developed NER Right Whale Grants Program website

ALWTRP Actions

- Conducted DAM program implementation, with approximately 20 DAMs implemented between October 2002 and September 2004
- Drafted a proposed rule to amend the ALWTRP
- Prepared the Draft Environmental Impact Statement on the next phase of rulemaking to implement gear modifications to the ALWTRP
- Developed a comprehensive management plan that addresses interactions between fisheries and the North Atlantic right whale
- Convened a meeting of the ALWTRT in February 2004

Ship Strike Coordination

- Prepared the Advance Notice of Proposed Rulemaking (ANPR) for the Ship Strike Strategy and conducted press interviews and presented the strategy at various meetings
- Briefed port groups and interested shipping parties from Maine to New Jersey during the development of the Ship Strike Strategy
- Negotiated and prepared a Letter of Agreement with the U.S. Army Corps of Engineers, Cape Cod Canal, to implement the first completed element of the NMFS Ship Strike Strategy
- Developed a Ship Strike/Whale Avoidance web page, and maintained and expanded the Ship Strike/Whale Avoidance distribution list
- Distributed over 1,700 right whale “pilot” packages to shipping industry members
- Coordinated with the Office of Coastal Survey, Coast Pilot Branch, to incorporate updated right whale information in the Coast Pilots publication
- Coordinated with the USCG District 1 to include weekly information on right whales in the Local Notice to Mariners
- Improved the effectiveness and compliance of the Mandatory Ship Reporting System from 60 to 76 percent
- Investigated and researched possible ship strikes of right whales in the Great South Channel

Enforcement Coordination

- Conducted investigations on gear removed from entangled whales, dolphins, and sea turtles

- Provided enforcement support:
    - Provided training on ALWTRP and disentanglement issues to the USCG in alternating months
    - Held Joint Enforcement Agreement (JEA) training seminars with Maine, Massachusetts, Rhode Island, and Virginia

Northeast Implementation Team (NEIT) for Right Whale Recovery

- Restructured the NEIT to focus on ship strike reduction
- Solicited, evaluated, and approved NEIT research proposals focused on ship strike mitigation measures
- Negotiated a cost-share agreement with the Massachusetts Port Authority for the economic analysis of the Ship Strike Strategy

Navy Coordination

- Convened the Navy/NMFS Gulf of Maine Complex meeting to discuss comprehensive ESA section 7 consultations on all Gulf of Maine naval activities
- Convened the Brunswick/NMFS working group meeting to coordinate naval bombing training activities in Gulf of Maine
- Developed a procedure for the Navy to provide a monthly ordnance exercise schedule and for NOAA to provide advance notification to the Navy for any Gulf of Maine DAMs that might overlap with Navy exercise areas

Gear Research

- Placed load cells on lobster, gillnet, shark, black sea bass, and conch fisheries throughout the mid-Atlantic and Southeast regions
- Tested methods to achieve a lower profile groundline through a collaborative project with the Maine Division of Marine Resources
- Coordinated gear research with fishermen in the following modified gear projects:
    - Time tension line cutter
    - Zap buoy/pop-up buoy system
    - Zap link (detachable when the groundline is pulled in the non-hauling direction)
    - Modified, low-profile lobster trawl groundline
    - Sea trials for 1,100 lb weak rope for gillnet head rope
    - Rope abrasion machine
    - Float rope recycling testing for use in wood composite decking material
    - Sea trial testing of Seasonal Area Management (SAM) gear in non-SAM areas

Grant Programs

- Implemented the NER Research Grant Program
- Conducted the Mini Grant Program for small gear research projects under $20,000
- Implemented a cooperative conservation program to enhance cooperative state/Federal management efforts in the recovery of right whales – This program comprises approximately $2 million annually.
- Expanded the gear research program by developing and implementing a new Challenge Grant Program – This is a new pilot program to solicit from students and subsequently

develop innovative gear designs that reduce serious injury and mortality to whales that become entangled in fishing gear.

Critical Habitat

- Drafted the 90-day finding and 12-month final determination on the petition to revise critical habitat (both Atlantic and Pacific)

The following conservation actions were undertaken during 2002–2004 for the North Pacific right whale:

- Continued surveys of the Bering Sea to expand the understanding of right whale occurrence and distribution
- Used autonomous underwater recording devices to detect right whale calls, which provide further information on a continual basis
- Successfully deployed (in 2004) a satellite-monitored radio tag, which provided additional information on the movements of a North Pacific right whale; this tagging program will be expanded in summer 2005
- Drafted the 90-day finding and 12-month final determination on the petition to revise critical habitat (both Atlantic and Pacific)

Priority Recovery Actions Needed:

For right whales in the western North Atlantic, NMFS will continue its efforts to address human-caused mortality and serious injury of right whales associated with gear and vessel interactions. Additional work is required to complete the development and implementation of the right whale Ship Strike Strategy. Although substantial work has already been conducted concerning gear modifications to address entanglement risks associated with the groundline of pot/trap gear, additional work is needed to better understand the entanglement risk regarding the endlines (buoy lines) of fixed gear, and right whale behavior once whales become entangled.

For right whales in the North Pacific, the most urgent recovery need is better information on the basic distribution and occurrence of right whales in the eastern North Pacific, including identification of their wintering areas, which remain unknown. Surveys need to be continued, as well as the use of autonomous underwater recording devices and satellite-monitored radio tags. Additional specific recovery actions for this population will be specified upon completion of the recovery plan.

Recovery Priority Number: 1

The species recovery priority is based on three criteria. The first criterion is the magnitude of threat, which is clearly high due to extremely low population numbers and continuing threats to recovery. The second criterion is recovery potential; because the two main sources of right whale mortalities and serious injury (fishing gear and vessel interactions) are human-induced, the potential to address these issues is categorized as high. The third criterion is conflict; because any regulatory action taken would likely involve restrictions on commercial fishing and shipping, the economic impacts would potentially create a significant conflict. After tallying the scores for each criterion, right whales would receive a priority number of one.

Sei Whale (*Balaenoptera borealis*)

Date Listed: June 2, 1970

Legal Status: Endangered

Recovery Plan Status:
No recovery plan currently exists for the sei whale. A draft joint recovery plan was generated in 1998 for the sei and fin whales; this plan is currently being updated.

Species Status:
Sei whales live in temperate regions of all oceans in the Northern and Southern Hemispheres and are not usually associated with coastal features. Worldwide, sei whales were severely depleted by commercial whaling activities. In the Southern Hemisphere, it is estimated that between 63,000 and 65,000 sei whales existed prior to commercial exploitation.[1] Current estimates for sei whale abundance in the southern oceans range from 9,718 to 12,000 whales.[2] In the North Pacific, the pre-exploitation population estimate for sei whales is 42,000 whales.[3] The most current population estimate for sei whales in the entire North Pacific (from 1977) is 9,110 whales.[3] In the entire North Atlantic, information is not available on the pre-exploitation population size of sei whales; the most current population estimate (from 1991) is a low-precision estimate of approximately 4,000 whales.

The stock identity of sei whales in the North Atlantic poses a major research challenge; however, NMFS provisionally recognizes one stock in U.S. waters – the Nova Scotia stock, which is found in continental shelf waters of the northeastern U.S. and ranges northeast to waters south of Newfoundland. In the North Pacific, there is one stock of sei whales in U.S. waters – the eastern North Pacific stock, found east of 180° W longitude.

Nova Scotia stock (Atlantic)
No estimates of the pre-whaling population size are available for sei whales in the North Atlantic Ocean. A current minimum population size and trend for the Nova Scotia stock of sei whales cannot be estimated because there are no abundance estimates within the past 10 years.

Eastern North Pacific stock
Pre-whaling abundance of sei whales in the North Pacific is estimated at 42,000 whales, as mentioned above. Based on 1996 and 2001 shipboard surveys, the minimum population estimate for sei whales in California, Oregon, and Washington waters out to 300 nautical miles is 35 whales. However, reliable estimates of the current minimum population size of the eastern North Pacific stock are not available. There are no data on population trends in sei whale abundance in eastern North Pacific waters.

[1] Includes: International Whaling Commission. 1980. Report of special meeting on Southern Hemisphere sei whales. Rep. Int. Whal. Comm. 30: 493-511.
[2] Includes: IWC (1980); International Whaling Commission. 1996. Report of the sub-committee on Southern Hemisphere baleen whales, Annex E. Rep. Int. Whal. Comm. 46:117-131.
[3] Tillman, M.F. 1977. Estimates of population size for the North Pacific sei whale. Rep. Int. Whal. Comm., Spec. Iss. 1:98–106.

Threats and Impacts:

Nova Scotia stock (Atlantic)

Sei whales in the western North Atlantic are occasionally impacted by ship strikes. NMFS' stranding and entanglement records from 1997 through 2001 yield an average of 0.2 human-caused mortalities of sei whales per year as a result of one confirmed record from May 2, 2001, when a sei whale carcass was recovered in New York harbor after it slid off the bow of an arriving ship. The only other NMFS record of human-caused sei whale mortality was from November 17, 1994, when a sei whale carcass was observed on the bow of a container ship as it docked in Boston.

Eastern North Pacific stock

Threats and impacts to the eastern North Pacific stock of sei whales are relatively unknown at this time. There is a potential for bycatch of sei whales in drift gillnet fisheries off of California and Mexico. There is also a potential for sei whales in the North Pacific to be killed or seriously injured by ship strikes.

Conservation Actions:

Nova Scotia stock (Atlantic)

There are no specific conservation actions for the Nova Scotia stock of sei whales at this time.

Eastern North Pacific stock

Conservation actions for the sei whale in the western North Pacific include the following:

- Monitoring the status of the California/Oregon/Washington stock of sei whales via shipboard surveys, which are conducted every 3 years, with Marine Mammal Protection Act (MMPA) funding
- Placing observers onboard vessels in the California/Oregon swordfish/thresher shark drift gillnet fishery to monitor for the take of protected species, including marine mammals (MMPA funding)
- Implementing marine mammal take reduction measures identified in the Pacific Offshore Cetacean Take Reduction Plan (including the use of acoustic pingers) to reduce the bycatch of marine mammals (MMPA funding)

Priority Recovery Actions:

Continue current conservation actions.

Recovery Priority Number: 3

This recovery priority number reflects a high degree of threat, low to moderate recovery potential, and potential conflict.

Sperm Whale (*Physeter macrocephalus*)

Date Listed: June 2, 1970

Legal Status: Endangered

Recovery Plan Status:
No recovery plan for the sperm whale has been completed.

Species Status:
Sperm whales occur throughout all ocean basins from equatorial to polar waters, including the entire North Atlantic, North Pacific, northern Indian Ocean, and the Southern Oceans. Reliable estimates of current and historical sperm whale abundance across each ocean basin are not available. Five stocks of sperm whales are recognized in the U.S. Exclusive Economic Zone (EEZ): the North Atlantic stock, the northern Gulf of Mexico stock, the Hawaiian stock, the California/Oregon/Washington stock, and the North Pacific stock.

North Atlantic and Gulf of Mexico stocks
The geographic distribution of the North Atlantic stock appears to have a distinct seasonal cycle, ranging from being concentrated offshore Cape Hatteras (in winter), to being widespread throughout the central portion of the mid-Atlantic bight up to Georges Bank (in spring and including the continental shelf south of New England in summer), to being concentrated on the continental shelf south of New England and along the continental shelf edge into the mid-Atlantic bight (in fall). The minimum population estimate for the western North Atlantic sperm whale stock is 3,505 individuals. There are insufficient data to determine the population trend for this stock.

Sperm whales are present year-round in the Gulf of Mexico. The minimum population estimate for this stock of sperm whales is 1,114 individuals. There are insufficient data to determine the population trend for this stock.

North Pacific stocks
Sperm whales are widely distributed across the entire North Pacific Ocean and into the southern Bering Sea in summer, but the majority are thought to be south of 40^{o}N in winter. Estimates of pre-whaling abundance in the North Pacific are considered somewhat unreliable, but may have totaled 1,260,000 sperm whales. Whaling harvests between 1800 and the 1980s took at least 436,000 sperm whales from the entire North Pacific Ocean.

The Hawaiian Islands marked the center of a major 19^{th} century whaling ground for sperm whales, and at present the waters around Hawaii contain one of three sperm whale stocks in the U.S. Pacific EEZ. The sounds of sperm whales have been recorded throughout the year off Oahu. In addition to the main Hawaiian Islands, sperm whales have also been sighted around several of the Northwest Hawaiian Islands. Based on abundance estimates from 1993–1998, the current minimum population estimate for this stock is 43 sperm whales. This includes only areas within about 25 nautical miles of the main Hawaiian Islands and does not include animals that

were diving and unable to be seen. No data are available on the current population trend for this stock.

The geographic distribution of the California/Oregon/Washington stock of sperm whales varies seasonally. Sperm whales are found year-round in California waters, but peak in abundance from April through mid-June and from the end of August to mid-November. Off Washington and Oregon, whales from this stock are present in every season except winter. Based on 1996–2001 summer/fall ship surveys off California, Oregon, and Washington, the current minimum population estimate for this stock is approximately 885 whales. Sperm whale abundance appears to have been rather variable off California and does not show any apparent trend at this time.

Sperm whales in the North Pacific stock are found in Alaskan waters (Gulf of Alaska, Bering Sea, and Aleutian Islands) and have a northern boundary extending from Cape Navarin (62^{o}N) to the Pribilof Islands. The number of sperm whales of the North Pacific occurring within Alaskan waters is unknown, and at this time it is not possible to produce a reliable estimate of minimum abundance for this stock. Reliable information on population trends in abundance for this stock is currently unavailable.

Threats and Impacts:

- For the California/Oregon/Washington stock, NMFS has observed the incidental take of sperm whales in the California/Oregon swordfish/thresher shark drift gillnet fishery. The average estimated incidental take for this fishery is 1.0 sperm whale per year from this stock. NMFS expects sperm whales are also taken in drift gillnet fisheries for swordfish and sharks off Baja California, but detailed information regarding takes in these fisheries is not available.
- Sperm whales in the North Pacific stock are also known to interact with fisheries. Sperm whale interactions with longline fisheries in the Gulf of Alaska are known to occur and may be increasing in frequency. NMFS has observed sperm whales feeding off longline gear in the Gulf of Alaska for both the sablefish and halibut fisheries. The total estimated mortality and serious injury incurred by this stock as a result of interactions with fisheries from 1997–2001 is 0.4 whales per year.
- Sperm whales in the North Atlantic stock are known to interact with fisheries as well. The total annual estimated fishery-related mortality or serious injury from 1996–2000 was 0.2 sperm whales per year. In 2000, a sperm whale was found stranded off Florida with fishing gear in its blowhole, and in 1995 one sperm whale was entangled in a pelagic drift gillnet and was released alive with gear around several body parts (the latter interaction was not used to estimate mortality). From August 1993 to May 1998, three sperm whales in this stock were entangled in various fishing gear, including longline gear, fine mesh gillnet, and fishing net with three buoys attached. Bycatch of sperm whales has been observed by NMFS in the pelagic drift gillnet fishery, with one sperm whale in 1990 and one in 1995. No mortalities or serious injuries of this stock have been documented in the pelagic longline, pelagic pair trawl, sink gillnet, coastal gillnet, or bottom trawl fisheries.
- There is a potential for sperm whales to be killed or seriously injured by ship strikes. In May 1994, a sperm whale was involved in a ship strike south of Nova Scotia, and in May 2000 a merchant ship reported a ship strike in Block Canyon, which is a major pathway

for sperm whales entering southern New England continental shelf waters in pursuit of migrating squid.

- A potential human-caused source of mortality in sperm whales is from accumulation of stable pollutants, such as polychlorobiphenyls (PCBs), chlorinated pesticides (e.g., DDT, DDE, and dieldrin), polycyclic aromatic hydrocarbons (PAHs), or heavy metals. These stable pollutants may affect the health or behavior of North Atlantic sperm whales.
- Sperm whales may also be impacted by global sea temperature change and altered prey distribution.
- For the Gulf of Mexico stock of sperm whales, disturbance by anthropogenic noise may become an important habitat issue, notably in areas of oil and gas activities or where shipping activity is high.

Conservation Actions:
The following conservation actions were undertaken during 2002–2004 for the recovery of the sperm whale:

- Monitoring the status of the California/Oregon/Washington stock of sperm whales via shipboard surveys, which are conducted every 3 years, with Marine Mammal Protection Act (MMPA) funding
- Placing observers onboard vessels in the California/Oregon swordfish/thresher shark drift gillnet fishery to monitor for the take of protected species, including marine mammals (MMPA funding)
- Implementing marine mammal take reduction measures identified in the Pacific Offshore Cetacean Take Reduction Plan (including the use of acoustic pingers) to reduce the bycatch of marine mammals (MMPA funding)

Priority Recovery Actions Needed:
Continue current conservation actions.

Recovery Priority Number: 7
This recovery priority number reflects a moderate magnitude of threat, low to moderate recovery potential, and the presence of conflict.

APPENDIX A. Pacific Salmon Supplemental Information

Table A-1. Summary of Status and Trends for 27 ESUs of Pacific Salmon (*Oncorhynchus* spp.) on the West Coast.

Qualitative trends in abundance, productivity, spatial structure, and diversity of each ESU since time of listing, or since the time of first review, are described for each ESU. NMFS evaluates the viability of salmon and steelhead ESUs based on these four criteria[1]. Please note the list of caveats in the footnotes below [4-6].

Summary Information			*Qualitative Trends in Viability Criteria: current status vs. at time of listing or first review*			
Species	ESU	Current ESA Listing Status	Abundance	Productivity	Spatial Structure	Diversity
Sockeye Salmon	Snake River	*Endangered* [1]	*Improved*	*Improved*	*Unchanged*	*Unchanged*
	Ozette Lake	*Threatened* [3]	*Uncertain*	*Uncertain*	*Unchanged*	*Unchanged*
Chinook Salmon	Snake River Spring/Summer-run	*Threatened* [2]	*Improved*	*Improved*	*Unchanged*	*Unchanged*
	Snake River Fall-run	*Threatened* [2]	*Improved*	*Improved*	*Unchanged*	*Improved*
	Puget Sound	*Threatened* [3]	*Unchanged*	*Unchanged*	*Unchanged*	*Unchanged*
	Lower Columbia River	*Threatened* [3]	*Unchanged*	*Unchanged*	*Unchanged*	*Unchanged*
	Upper Willamette River	*Threatened* [3]	*Unchanged*	*Unchanged*	*Unchanged*	*Improved*
	Upper Columbia River Spring-run	*Endangered* [3]	*Improved*	*Improved*	*Unchanged*	*Improved*
	Sacramento River Winter-run	*Endangered* [2]	*Improved*	*Improved*	*Unchanged*	*Unchanged*
	Central Valley Spring-run	*Threatened* [3]	*Improved*	*Improved*	*Unchanged*	*Unchanged*
	California Coastal	*Threatened* [3]	*Unchanged*	*Unchanged*	*Unchanged*	*Unchanged*

(table continues)

Table A-1 (continued). Summary of Status and Trends for 27 ESUs of Pacific Salmon (*Oncorhynchus* spp.) on the West Coast.

Summary Information			*Qualitative Trends in Viability Criteria: current status vs. at time of listing or first review*			
Species	ESU	Current ESA Listing Status	Abundance	Productivity	Spatial Structure	Diversity
Coho Salmon	Southern Oregon/Northern California	*Threatened* [2]	*Unchanged*	*Unchanged*	*Unchanged*	*Unchanged*
	Oregon Coast	*Proposed* [3]	*Improved*	*Improved*	*Unchanged*	*Improved*
	Lower Columbia River	*Proposed*	*Decreasing*	*Decreasing*	*Decreasing*	*Decreasing*
	Central California Coast	*Threatened* [2]	*Decreasing*	*Uncertain*	*Decreasing*	*Decreasing*
Chum Salmon	Hood Canal Summer-run	*Threatened* [3]	*Improved*	*Improved*	*Unchanged*	*Improved*
	Columbia River	*Threatened* [3]	*Improved*	*Improved*	*Unchanged*	*Unchanged*
Steelhead	Upper Columbia River	*Endangered* [3]	*Improved*	*Improved*	*Unchanged*	*Unchanged*
	Snake River Basin	*Threatened* [3]	*Unchanged*	*Unchanged*	*Unchanged*	*Improved*
	Lower Columbia River	*Threatened* [3]	*Improved*	*Improved*	*Unchanged*	*Improved*
	Upper Willamette River	*Threatened* [3]	*Improved*	*Improved*	*Unchanged*	*Improved*
	Middle Columbia River	*Threatened* [3]	*Improved*	*Improved*	*Unchanged*	*Unchanged*
	Northern California	*Threatened* [3]	*Decreasing*	*Unchanged*	*Unchanged*	*Unchanged*
	Central California Coast	*Threatened* [3]	*Decreasing*	*Unchanged*	*Decreasing*	*Unchanged*
	South-Central Coast	*Threatened* [3]	*Uncertain*	*Uncertain*	*Unchanged*	*Unchanged*
	Southern California	*Endangered* [3]	*Uncertain*	*Uncertain*	*Unchanged*	*Unchanged*
	California Central Valley	*Threatened* [3]	*Uncertain*	*Uncertain*	*Unchanged*	*Unchanged*

(table continues)

Table A-1 (continued). Summary of Status and Trends for 27 ESUs of Pacific Salmon (*Oncorhynchus* spp.) on the West Coast.

[1] McElhany, Ruckelshaus, Ford, Wainright, and Bjorkstedt. 2000. Viable Salmonid Populations and the Recovery of Evolutionarily Significant Units. NOAA Technical Memorandum NMFS-NWFSC-42.

[2] Critical habitat designations are in place.

[3] Critical habitat designations were recently proposed (December 14, 2004; 69 FR 74572).

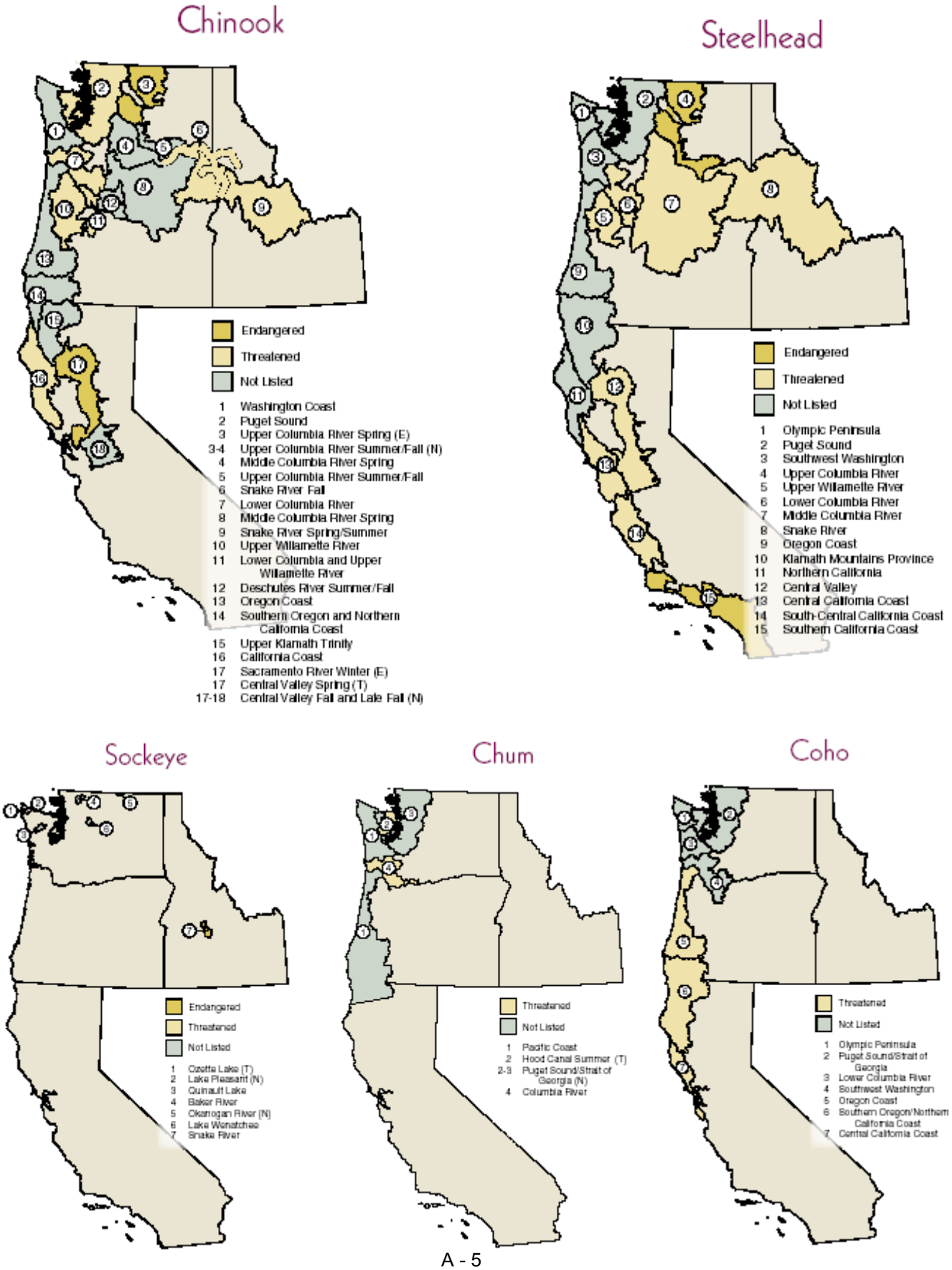
Caveats associated with the status information presented above and in Figures A2(A)-A2(D) include:

[4] The ESA listing status of these eighteen ESUs is currently under review, and scheduled to be finalized by June 2005.

[5] The sources for historical abundance estimates vary considerably among the ESUs. Historical abundance estimates may be derived from past surveys or peak catch data, anecdotal accounts, estimates of habitat carrying capacity, best professional judgment, etc. Additionally, the timeframe referenced by historical abundance differs among ESUs, ranging from 30 to over 100 years ago.

[6] The ESU abundance estimates depicted in the figures and table were derived from information presented in the *Updated Status of Federally Listed ESUs of West Coast Salmon and Steelhead* (West Coast Biological Review Team. Draft Report. July 2003). These estimates represent the average abundance of populations within an ESU for which data is available. The sources of the abundance data vary considerably among and within ESUs, spanning the full spectrum of estimation methods (e.g., direct counts of returning salmon at dams, spawner estimates from redd surveys, etc.). The ESU abundance estimates presented, therefore, are intended to provide only a rough indication of salmon and steelhead abundance and trends in these ESUs. The actual values of the estimates should be regarded with healthy skepticism.

Figure A-1. Distribution of Pacific Salmon ESUs



APPENDIX B. NMFS Recovery Priority Number Guidelines

6/15/90

National Oceanic and Atmospheric Administration

[Docket No. 71015-0067]

Endangered and Threatened Species; Listing and Recovery Priority Guidelines

AGENCY: National Marine Fisheries Service (NOAA Fisheries), NOAA, Commerce.

ACTION: Notice.

SUMMARY: NOAA Fisheries issues guidelines for assigning priorities to species for listing, delisting, and reclassification as endangered and threatened under the Endangered Species Act of 1973 (Act) and for developing and implementing recovery plans for species that are listed under the Act.

FOR FURTHER INFORMATION CONTACT: Patricia Montanio, Protected Species Management Division, Office of Protected Resources and Habitat Programs, National Marine Fisheries Service, 1335 East West Highway, Silver Spring, MD 20910, (301/427-2322).

SUPPLEMENTARY INFORMATION:

Background

For those species under the jurisdiction of the Secretary of Commerce, section 4(a) of the Act requires NOAA Fisheries to determine whether any species of wildlife or plant should be: (1) Listed as an endangered or threatened species (listing); (2) changed in status from threatened to endangered or changed in status from endangered to threatened (reclassification); or (3) removed from the list (delisting). Section 4(h) of the Act requires that NOAA Fisheries establish agency guidelines which include a priority ranking system for listing, reclassification, or delisting.

Section 4(f) of the Act requires NOAA Fisheries to develop and implement recovery plans for the conservation and survival of all endangered or threatened species, unless such a plan will not promote the conservation of the species. In general, listed species which occur entirely outside U.S. jurisdiction are not likely to benefit from recovery plans. Foreign species are more likely to benefit from bilateral or multilateral agreements under section 8 of the Act and other forms of international cooperative efforts. Section 4(f) of the Act also requires NOAA Fisheries to give priority to those endangered or threatened species (without regard to taxonomic classification) most likely to benefit from such plans, particularly those species that are, or may be, in conflict with construction or other developmental projects or other forms of economic activity. Section 4(h) of the Act requires that NOAA Fisheries establish a system for developing and implementing recovery plans on a priority basis.

The assignment of priorities to listing, reclassification, delisting, and recovery actions will allow NOAA Fisheries to use the limited resources available to implement the Act in the most effective way. On May 30, 1989, NOAA Fisheries published proposed guidelines in the **Federal Register** (54 FR 22925) and requested comments. No comments were received from the public. NOAA Fisheries issues these final guidelines with only slight modifications from the proposal based on internal reviews.

These guidelines are based primarily on guidelines published by the U.S. Fish and Wildlife Service (FWS) on September 21, 1983 (48 FR 43098). NOAA Fisheries believes that, to the extent practical, both agencies should follow similar priority guidelines for listing, reclassification, delisting and recovery. To the extent possible, NOAA Fisheries has adopted the priority guidelines in use by FWS. However, due to the smaller number of listed species and the anticipated smaller number of candidate species under NOAA Fisheries jurisdiction, NOAA Fisheries believes that fewer priority categories are necessary and the FWS guidelines have been modified accordingly.

These priority systems are guidelines and should not be interpreted as inflexible frameworks for making final decisions on funding or on performance of tasks. They will be given considerable weight by the agency in making decisions; however, the agency will also evaluate the cost-effectiveness of funding and tasks and take advantage of opportunities. For example, the agency may be able to conduct a relatively low priority item in conjunction with an ongoing activity at little cost.

A. Listing, Reclassification, and Delisting Priorities

1. Listing and Reclassification From Threatened to Endangered

In considering species to be listed or reclassified from threatened to

endangered, two criteria will be evaluated to establish four priority categories as shown in Table 1.

TABLE 1.—PRIORITIES FOR LISTING OR RECLASSIFICATION FROM THREATENED TO ENDANGERED

Magnitude of threat	Immediacy of threat	Priority
High	Imminent	1
	Non-Imminent	2
Low to Moderate	Imminent	3
	Non-Imminent	4

The first criterion, magnitude of threat, gives a higher listing priority to species facing the greatest threats to their continued existence. Species facing threats of low to moderate magnitude will be given a lower priority. The second criterion, immediacy of threat, gives a higher listing priority to species facing actual threats than to those species facing threats to which they are intrinsically vulnerable, but which are not currently active.

2. Delisting and Reclassification From Endangered to Threatened

NOAA Fisheries currently reviews listed species at least every five years in accordance with section 4(c)(2) of the Act to determine whether any listed species qualify for reclassification or removal from the list. When a species warrants reclassification or delisting, priority for developing regulations will be assigned according to the guidelines given in Table 2. Two criteria will be evaluated to establish six priority categories.

TABLE 2.—PRIORITIES FOR DELISTING AND RECLASSIFICATION FROM ENDANGERED TO THREATENED

Management Impact	Petition status	Priority
High	Petitioned action	1
	Unpetitioned action.	2
Moderate	Petitioned action	3
	Unpetitioned action.	4
Low	Petitioned action	5
	Unpetitioned action.	6

The priorities established in Table 2 are not intended to direct or mandate decisions regarding a species' reclassification or removal from the list. The priority system is intended only to set priorities for developing rules for species that no longer satisfy the listing criteria for their particular designation under the Act. The decision regarding whether a species will be retained on the list, and in which category, will be based on the factors contained in section 4(a)(1) of the Act and 50 CFR 424.11.

The first consideration of the system outlined in Table 2 accounts for the management impact entailed by a species' inclusion on the list. Management impact is the extent of protective actions, including restrictions on human activities, which must be taken to protect and recover a listed species. If the current listing is no longer accurate, continuing protective management actions could divert resources from species more in need of conservation and recovery efforts, or impose an unnecessary restriction on the public. Because the Act mandates timely response to petitions, the system also considers whether NOAA Fisheries has been petitioned to remove a species from the list or to reclassify a species from endangered to threatened. Higher priority will be given to petitioned actions than to unpetitioned actions that are classified at the same level of management impact.

There is no direct relationship between the systems outlined in Tables 1 and 2. Although the same statutory criteria apply in making listing and delisting determinations, the considerations for setting listing and delisting priorities are quite different. Candidate species facing immediate, critical threats will be given a higher priority for listing than species being considered for delisting. Likewise, a delisting proposal for a recovered species that would eliminate unwarranted utilization of limited resources may, in appropriate instances, take precedence over listing proposals for species not facing immediate, critical threats.

B. Recovery Plan Preparation and Implementation Priorities

The recovery priority system will be used as a guide for recovery plan development, recovery task implementation and resource allocation. It consists of two parts—species recovery priority and recovery task priority. Species recovery priority will be used for recovery plan development. Recovery task priority, together with species recovery priority, will be used to set priorities for funding and performance of individual recovery tasks as explained below.

1. Species Recovery Priority

Species recovery priority is based on three criteria—magnitude of threat, recovery potential and conflict. These criteria are arranged in a matrix yielding twelve species recovery priority numbers (Table 3).

TABLE 3.—SPECIES RECOVERY PRIORITY

Magnitude of threat	Recovery potential	Conflict	Priority
High	High	Conflict	1
		No conflict	2
	Low to moderate.	Conflict	3
		No conflict	4
Moderate	~~Low to high moderate~~	Conflict	5
		No conflict	6
	Low to moderate.	Conflict	7
		No conflict	8
Low	High	Conflict	9
		No conflict	10
	Low to moderate.	Conflict	11
		No conflict	12

The first criterion, magnitude of threat, is divided into three categories: High, moderate, and low. The high category means extinction is almost certain in the immediate future because of a rapid population decline or habitat destruction. Moderate means the species will not face extinction if recovery is temporarily held off, although there is a continuing population decline or threat to its habitat. Taxa in the low category are rare, or are facing a population decline which may be a short-term, self-correcting fluctuation, or the impacts of threats to the species' habitat are not fully known.

The second criterion, recovery potential, assures that resources are used in the most cost effective manner within each magnitude of threat ranking. Priority for preparing and implementing recovery plans would go to species with the greatest potential for success. Recovery potential is based on how well biological and ecological limiting factors and threats to the species' existence are understood, and the extent of management actions needed. A species has a high recovery potential if the limiting factors and threats to the species are well understood and the needed management actions are known and have a high probability of success. A species has a low to moderate recovery potential if the limiting factors or threats to the species are poorly understood or if the needed management actions are not known, are cost-prohibitive or are experimental with an uncertain probability of success.

The third criterion, conflict, reflects the Act's requirement that recovery priority be given to those species that are, or may be, in conflict with construction or other developmental projects or other forms of economic

activity. Thus, species judged as being in conflict with such activities will be given higher priority for recovery plan development and implementation than non-conflict species within the same magnitude of threat/recovery potential ranking. Species in conflict with construction or other developmental projects or other forms of economic activity would be identified in large part through consultations conducted with Federal agencies under section 7 of the Act.

2. Recovery Task Priority

Recovery plans will identify specific tasks that are needed for the recovery of a listed species. NOAA Fisheries will assign tasks priorities of 1 to 3 based on the criteria set forth in Table 4.

TABLE 4.—RECOVERY TASK PRIORITY.

Priority	Type of task
1	An action that must be taken to prevent extinction or to identify those actions necessary to prevent extinction.
2	An action that must be taken to prevent a significant decline in population numbers, habitat quality, or other significant negative impacts short of extinction.
3	All other actions necessary to provide for full recovery of the species.

It should be noted that even the highest priority tasks within a plan are not given a Priority 1 ranking unless they are actions necessary to prevent a species from becoming extinct or to identify those actions necessary to prevent extinction. Therefore, some plans will not have any Priority 1 tasks. In general, Priority 1 tasks only apply to a species facing a high magnitude of threat (species recovery priority 1–4).

When the task priorities (Table 4) are combined with the species recovery priority (Table 3), the most critical activities for each listed species can be identified and evaluated against other species recovery actions. This system recognizes the need to work toward the recovery of all listed species, not simply those facing the highest magnitude of threat. In general, NOAA Fisheries intends that Priority 1 tasks will be addressed before Priority 2 tasks and Priority 2 tasks before Priority 3 tasks. Within each task priority, species recovery priority will be used to further rank tasks. For example, a Priority 1 task for a species with a recovery priority of 4 would rank higher than a priority 2 task for a species with a recovery priority of 1; and, a Priority 1 task for a species with a recovery priority of 2 would rank higher than a Priority 1 task for a species with a recovery priority of 4. For tasks with the same priority ranking, the Assistant Administrator will determine the appropriate allocation of available resources.

C. Recovery Plans

As recovery plans are developed for each species, specific recovery tasks are identified and prioritized according to the criteria discussed above. As new information warrants, these plans, including tasks and priorities, will be reviewed and revised. In addition, funding and implementation of the tasks identified in recovery plans will be tracked in order to aid in effective management of the recovery program.

NOAA Fisheries believes that periodic review and updating of plans and tracking of recovery efforts are important elements of a successful recovery program. Information from tracking and implementing recovery actions and other sources will be used to review plans and revise them as necessary. These and other elements of NOAA's recovery planning process will be discussed in more detail in Recovery Planning Guidelines that the agency is developing.

Classification

The General Counsel of the Department of Commerce certified to the Small Business Administration that these guidelines would not have a significant economic impact on a substantial number of small entities because they do not direct or mandate decisions on a species' listing, reclassification or delisting. Rather, they set up priorities for later decisions as to agency review of species, recovery plan development and recovery task implementation. As a result, a regulatory flexibility analysis was not prepared.

Dated: June 8, 1990.

William W. Fox, Jr.,

Assistant Administrator for Fisheries, National Oceanic and Atmospheric Administration.

[FR Doc. 90-13895 Filed 6-14-90; 8:45 am]

BILLING CODE 3510-22-M