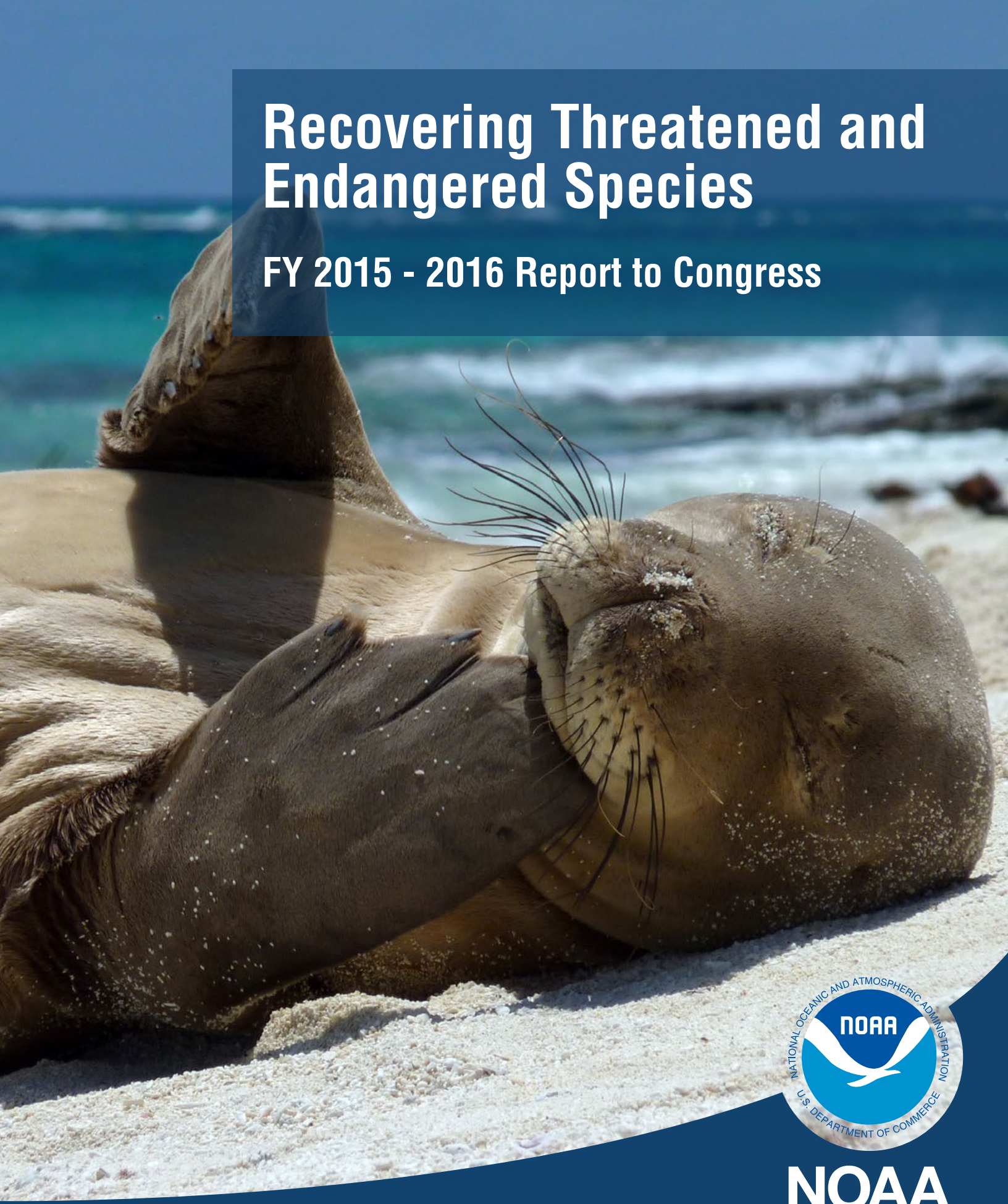
Recovering Threatened and Endangered Species

FY 2015 - 2016 Report to Congress



NOAA FISHERIES

Recovering Threatened and Endangered Species

FY 2015-2016 Report to Congress

U.S. DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Office of Protected Resources

NOAA FISHERIES

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Letter from the Assistant Administrator

Congress recognized, when enacting the Endangered Species Act (ESA) in 1973, that collaboration between federal agencies, states, and interested stakeholders was essential to recovering species listed under the Act. Thanks to the combined efforts of government agencies and our partners, we have had success in preventing the extinction of over 100 species protected under the ESA. While this is a substantial and laudable achievement, it is only half of the battle. By working together, government agencies and our partners can ensure these species and their habitats recover and thrive, benefiting coastal communities and all Americans for generations to come.

In 2015, we announced the National Marine Fisheries Service (NMFS) Species in the Spotlight initiative in the FY 2013–2014 Report to Congress. We launched the initiative as a way to marshal resources within NMFS, as well as those of vital partners, and garner greater support of the American public to address immediate needs to help stabilize the declining populations of eight endangered species. Our goal is to recover species to the point where they no longer need the protections of the ESA and can be removed from the list. To achieve that goal, we must start by halting species population declines. We developed five-year action plans, created with the involvement of local partners and stakeholders, to focus collective efforts to benefit the recovery of our Species in the Spotlight. We are seeing results. This report contains an update on the progress being made for each species and highlights "Species in the Spotlight Heroes" who are making this progress possible.

The report provides a snapshot of the status of the domestic species we work to conserve and recover under the ESA. We know federal agencies cannot do this alone. Our strategy is to expand our engagement with federal, state, tribal, local agencies, industries, non-governmental organizations, academia, foundations, and the public to take actions to promote species recovery. We know this approach is working as we have seen with recent conservation successes of humpback whales, green sea turtles, and the Eastern distinct population segment of Steller sea lions.

In 2016, NMFS determined that 9 out of 14 distinct population segments of humpback whales, including Hawaii and West Indies, did not warrant listing under the ESA. These distinct population segments are now healthy and threats have been abated largely through the efforts of our national and international partners. Examples of efforts to protect humpback whales include vessel approach regulations off Alaska to prevent disruption of normal feeding, breeding, nursing, or resting activities. The United States is also a party to the International Convention for the Regulation of Whaling, which set a zero catch limit for humpback whales beginning in 1985 that remains today.

When green sea turtles were listed under the ESA in 1978, the future for the breeding populations in Florida and the Pacific coast of Mexico did not look bright. In those and many other places around the world, it was common for people to kill nesting green sea turtles, collect their eggs, and capture and kill the turtles in their feeding areas for commercial and local consumption. Green sea turtles were also commonly killed as a result of bycatch and drowning in commercial and artisanal fisheries, including in gillnets, trawls, pound nets, and on hook-and-line gear. Years of coordinated conservation efforts have resulted in increasing numbers of turtles nesting in Florida and along the Pacific Coast of Mexico. As a result, distinct population segments that encompass those breeding populations were classified as threatened rather than endangered.

Reported previously, the Eastern distinct population segment of Steller sea lions was removed from the ESA list in 2013. The delisting of this population of Steller sea lions—which was once threatened by direct harvests, predator control programs, and intentional shooting—demonstrates that species can recover with targeted conservation efforts. Special protections were put in place to prohibit shooting at or within specified distances of Steller sea lions, and this action brought about heightened public awareness of the species' plight, enhanced its conservation, strengthened our ability to reduce illegal shooting, reduced disturbance to the species on terrestrial sites, helped maintain the conservation values of its habitat, and ultimately allowed for its recovery.

Despite the successes for species under our jurisdiction, conservation efforts and partnerships will continue to be essential for species at risk of extinction. For example, while in the late 1990s and early 2000s, there were positive signs that the critically endangered population of North Atlantic right whales was recovering, new information received after this report went to press indicates that the species has been in a state of decline since 2010. Additionally, this summer the species suffered a mortality of nearly 3 percent of its population, with most of the deaths observed in Canadian waters. We have updated this report's table of species status to reflect the new information. We will determine whether to add North Atlantic right whales to our Species in the Spotlight list for the next Biennial Report.

The species faces the continued threat of human-caused mortality primarily due to lethal interactions with commercial fisheries and shipping traffic. And we are still uncertain what the long-term effect entanglements and other environmental stressors may have in limiting right whale calving and recovery. Management measures in the United States have been in place for an extended period, and through those efforts we have made significant progress in reducing lethal interactions with human activities. However, these threats are not limited to the United States. We are expanding our partnership with Canada to collectively address the North Atlantic right whale's decline. Those efforts include convening expert working groups to determine the effectiveness of current management measures, investigating the recent mortality events to understand the cause of those deaths, and convening a recovery team to focus on key recovery actions for this species given the new information.

We are improving NMFS programs for recovering threatened and endangered species. In April of 2016, NMFS hosted a National Recovery Program Review with outside experts to evaluate the efficacy of the recovery planning process, including the quality of the recovery plans, the implementation of recovery actions, and the monitoring of recovery progress. The panelists offered recommendations to build upon successes and improve the recovery program. We are acting on many of these recommendations, including enhancing recovery priorities based on more detailed and transparent criteria (see Table 1). With more improvements like this, NMFS looks forward to greater success for our species in the years to come.

We all depend on and enjoy the same clean ocean and beaches, running rivers, clear air, and hardy underwater habitats. Our efforts to recover threatened and endangered species also benefit commercially and recreationally valuable marine species, and in turn the coastal communities that depend upon them for fisheries and tourism. For example, river herring are a very important commercial species in Maine, as they are the most sought after and desired bait sources for Maine's most profitable fishery—the lobster fishery. In the Penobscot River, annual river herring returns were about 1,000, but now exceed 1.8 million because dams were removed to protect Atlantic salmon. We look forward to your continued support and help to ensure we do not lose any of the species in our charge.

Chris Oliver
Assistant Administrator for Fisheries

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Background

The primary purpose of the Endangered Species Act (ESA) of 1973, as amended (16 United States Code sections 1531–1544) 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 two 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 14th Report to Congress on the status of the recovery program for these species.

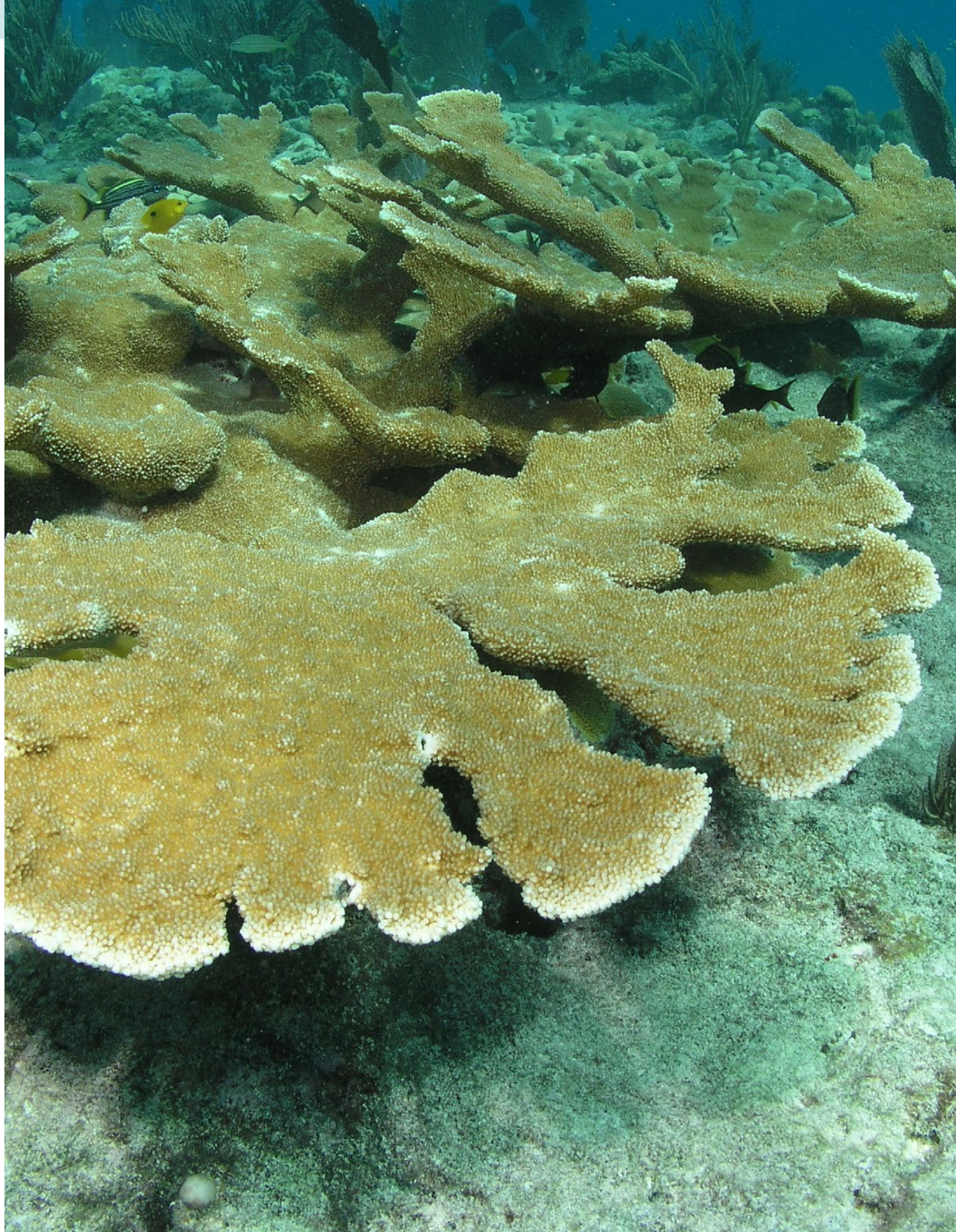


Photo Credit: Michael Barnette NOAA

Overview

Photo Credit: NOAA

Recovery is the process of restoring listed species and their ecosystems to the point they no longer require the protections of the ESA. A recovery plan serves as a road map for species recovery—it lays out where to go and how to get there. Without a plan to organize, coordinate, and prioritize recovery actions, the efforts by so many agencies, non-profit organizations, tribal entities, stakeholders, and citizens may be inefficient, ineffective, or misdirected. Recovery plans are guidance documents, not regulatory, and the ESA clearly envisions recovery plans as the central organizing tool guiding each species' progress toward recovery.

This report summarizes efforts to recover all domestic species under NMFS' jurisdiction from October 1, 2014, through September 30, 2016. It includes a summary table (Table 1) outlining the status of each species the Secretary has found would benefit from having a recovery plan, the status of the recovery plan, and the date the last five-year review was completed.

With this report, NMFS is updating progress made on its strategic approach to endangered species recovery that focuses agency resources on species for which immediate, targeted efforts are needed to stabilize their populations and prevent extinction. This report highlights progress made on recovery efforts for the eight species identified in the Species in the Spotlight initiative. They are notable because the best available information points to their extinction in the near future because of rapid population decline or habitat destruction. These species need focused human intervention to stabilize their population declines and prevent their extinction.

During the two years covered in this report (October 1, 2014 – September 30, 2016), the number of listed species under NMFS jurisdiction increased 18 percent. During that period, we managed 93 domestic (includes some transnational) species of salmon, sturgeon, sawfish, seagrass, mollusks, sea turtles, corals, and marine mammals, and 54 foreign species. In this report, we address the 87 domestic species for which a recovery plan was found to promote its conservation, including 10 newly listed domestic species[1]:

- 3 Humpback Whale Distinct Population Segments (DPSs) (2 foreign for total 5 listed): Central America and Western North Pacific DPSs listed as endangered and Mexico DPS listed as threatened on September 8, 2016 (81 FR 62259)

- 6 Green sea turtle DPSs (5 foreign for total 11 listed): Eastern Pacific, Central North Pacific, North Atlantic, and South Atlantic DPSs listed as threatened and Central West Pacific and Central South Pacific DPSs listed as endangered on April 2, 2016 (81 FR 20057)

- Nassau Grouper listed as threatened on June 29, 2016 (81 FR 42268).

Between October 1, 2014, and September 30, 2016, of the 87 domestic listed species for which a recovery plan was found to promote its conservation, 44 had final recovery plans, 3 had a draft recovery plan, 19 plans were in development, and 21 species recovery plans had not been started. Because we have many multispecies plans, as well as multiple plans for one species (marine turtles), the number of plans does not directly correspond with the number of species.

Between October 1, 2014, and September 30, 2016, the status of the 87 domestic endangered or threatened species for which recovery plans have or will be developed was:

- 27 (31%) were stabilized or increasing.
- 16 (18%) were known to be declining.
- 12 (14%) were mixed, with their status varying by population location.
- 32 (37%) were unknown, because we lacked sufficient trend data to make a determination.

Since the FY 2013–2014 Biennial Report on status of population trends, these percentages reflect a 4% increase in declining trends; a 3% decrease in increasing trends; a 5% increase in mixed trends; and a 6% decrease in unknown trends. A list of the domestic species managed by NMFS and for which recovery plans have been found to benefit such species (87 species) is provided in Table 1. The table lists the status of each species/subspecies/Evolutionarily Significant Unit (ESU)/DPS (unknown, decreasing, mixed, stable, or increasing), the recovery priority number, the status of the recovery plan, and the date the last five-year review was completed. Additional information on these species is available online at http://www.fisheries.noaa.gov/ species-directory/threatened-endangered.

Recovery plans are available online at https://www.fisheries.noaa.gov/national/endangered-species-conservation/recovery-species-under-endangered-species-act#recovery-plans

Recovery plans may also be requested by writing to:

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 https://www.fisheries.noaa.gov/feature-story/endangered-species-biennial-report-2014-2016

[1] The ESA defines a species as 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.

Table 1: ESA Listed Species Under NMFS Jurisdiction

ESA listed species under NMFS Jurisdiction through September 30, 2016, for which recovery plans were determined to promote the conservation of the species, including listing status, trends, priority number, recovery plan status, and 5-year review completion.

Species Subspecies ESU/DPS	Date Listed Reclassified	ESA Status	Trend	Recovery Priority Number[1]	New Proposed Recovery Priority Number[2]	Status of Recovery Plan	Date 5-Year Status Review Completed[3]
SEA TURTLES							
GREEN SEA TURTLE							
-Central North Pacific DPS	07/1978; 04/2016	T	Increasing	7	17	1978 Listing: Completed 01/1998 (Pacific); 10/1991 (Atlantic); 2016 Listing: Not Started	03/2015
-Central West Pacific DPS	07/1978; 04/2016	E	Unknown	3	12	1978 Listing: Completed 01/1998 (Pacific); 10/1991 (Atlantic); 2016 Listing: Not Started	03/2015
-Central South Pacific DPS	07/1978; 04/2016	E	Unknown	3	12	1978 Listing: Completed 01/1998 (Pacific); 10/1991 (Atlantic); 2016 Listing: Not Started	03/2015
-South Atlantic DPS	07/1978; 04/2016	T	Mixed	5	10	1978 Listing: Completed 01/1998 (Pacific); 10/1991 (Atlantic); 2016 Listing: Not Started	03/2015
-East Pacific DPS	07/1978; 04/2016	T	Mixed	5	15	1978 Listing: Completed 01/1998 (Pacific); 10/1991 (Atlantic); 2016 Listing: Not Started	03/2015
- North Atlantic DPS	07/1978; 04/2016	T	Increasing	5	8	1978 Listing: Completed 01/1998 (Pacific); 10/1991 (Atlantic); 2016 Listing: Not Started	03/2015
Hawksbill Sea Turtle	06/1970	E	Mixed	3	6	Completed 01/1998 (Pacific); 12/1993 (Atlantic)	06/2015
Kemp's Ridley Sea Turtle	12/1970	E	Unknown	5	1	Completed 08/1992; Revision Completed 09/2011	07/2015
Leatherback Sea Turtle	06/1970	E	Mixed	1	3	Completed 01/1998 (Pacific); 04/1992 (Atlantic)	11/2013
LOGGERHEAD SEA TURTLE							
-Northwest Atlantic Ocean DPS	07/1978; 09/2011	T	Stable	5	8	12/1991; Revision Completed 01/2009	08/2009 (full status review)
-North Pacific Ocean DPS	07/1978; 09/2011	E	Stable	3	10	Completed 01/1998; Revision Under Development	08/2009 (full status review); 5-Year Review Initiated 10/2016
OLIVE RIDLEY SEA TURTLE							
- Breeding colony populations of Pacific coast Mexico	07/1978	E	Mixed	5	10	Completed 01/1998	06/2014
-Rangewide	07/1978	T	Mixed	5	15	Completed 01/1998	06/2014

Species Subspecies ESU/DPS	Date Listed Reclassified	ESA Status	Trend	Recovery Priority Number[1]	New Proposed Recovery Priority Number[2]	Status of Recovery Plan	Date 5-Year Status Review Completed[3]
PACIFIC SALMON							
CHINOOK							
Chinook, Puget Sound ESU	03/1999; 06/2005[4]	T	Stable	9	8	08/2011; Review Initiated 2/2015	05/2016
Chinook, Lower Columbia River ESU	06/2005[4]	T	Stable	9	8	Completed 07/2013	05/2016
Chinook, Upper Columbia River, Spring-run ESU	03/1999; 06/2005[4]	E	Stable	5	4	Completed 10/2007	05/2016
Chinook, Snake River Fall-run ESU	04/1992; 06/2005[4]	T	Increasing	9	7	Draft Completed 11/2015	05/2016
Chinook, Snake River Spring/ Summer-run ESU	04/1992; 06/2005[4]	T	Stable	9	7	Draft Completed 10/2016[5]	05/2016
Chinook, Upper Willamette River ESU	03/1999; 06/2005[4]	T	Decreasing	9	4	Completed 08/2011	05/2016
Chinook, California Coastal ESU	09/1999; 06/2005[4]	T	Unknown	5	4	Completed 10/2016[5]	05/2016
Chinook, Central Valley Spring-run ESU	09/1999; 06/2005[4]	T	Decreasing	5	4	Completed 07/2014	05/2016
Chinook, Sacramento River Winter-run ESU	11/1990; 1/1994[7]; 06/2005[4]	E	Decreasing	1	1	Completed 07/2014	12/2016
CHUM							
Chum, Hood Canal Summer-run ESU	03/1999; 06/2005[4]	T	Increasing	9	8	Completed 05/2007	05/2016
Chum, Columbia River ESU	03/1999; 06/2005[4]	T	Stable	9	4	Completed 07/2013	05/2016
COHO							
Coho, Lower Columbia River ESU	03/1999; 06/2005[4]	T	Stable	9	4	Completed 07/2013	05/2016
Coho, Oregon Coast ESU	08/1998[4]; 02/2008	T	Increasing	11	8	Completed 12/2016[5]	05/2016
Coho, Southern Oregon/ Northern California Coast ESU	05/1997; 06/2005[4]	T	Unknown	5	4	Completed 09/2014	05/2016
Coho, Central California Coast ESU	10/1996; 06/2005[4]	E	Unknown	1	1	Completed 09/2012	05/2016
SOCKEYE							
Sockeye, Ozette Lake ESU	03/1999; 06/2005[4]	T	Stable	6	7	Completed 05/2009	05/2016
Sockeye, Snake River ESU	11/1991; 06/2005[4]	E	Increasing	5	7	Draft Completed 07/2014	05/2016
STEELHEAD							
Steelhead, Puget Sound DPS	05/2007	T	Stable	11	13	Under Development	05/2016
Steelhead, Lower Columbia River DPS	03/1998; 01/2006[4]	T	Stable	9	8	Completed 07/2013	05/2016
Steelhead, Upper Columbia River DPS	08/1997; 01/2006[4]	T	Increasing	9	8	Completed 10/2007	05/2016
Steelhead, Middle Columbia River DPS	03/1999; 01/2006[4]	T	Stable	9	8	Completed 09/2009	05/2016
Steelhead, Upper Willamette River DPS	03/1999; 01/2006[4]	T	Decreasing	9	4	Completed 08/2011	05/2016

Species Subspecies ESU/DPS	Date Listed Reclassified	ESA Status	Trend	Recovery Priority Number[1]	New Proposed Recovery Priority Number[2]	Status of Recovery Plan	Date 5-Year Status Review Completed[3]
PACIFIC SALMON (CONTINUED)							
STEELHEAD							
Steelhead, Snake River Basin DPS	08/1997; 01/2006[4]	T	Stable	9	7	Draft Completed 10/2016[5]	05/2016
Steelhead, Northern California DPS	06/2000; 01/2006[4]	T	Unknown	5	4	Completed 10/2016[5]	05/2016
Steelhead, Central California Coast DPS	08/1997; 01/2006[4]	T	Unknown	5	4	Completed 10/2016[5]	05/2016
Steelhead, South-Central California Coast DPS	08/1997; 01/2006[4]	T	Unknown	3	4	Completed 12/2013	05/2016
Steelhead, Southern California Coast DPS	08/1997; 05/2002[6]; 01/2006[4]	E	Unknown	3	1	Completed 01/2012	05/2016
Steelhead, California Central Valley DPS	03/1998; 01/2006[4]	T	Unknown	5	4	Completed 07/2014	05/2016
ATLANTIC SALMON							
Gulf of Maine DPS	11/2000; 06/2009[8]	E	Decreasing	1	1	2000 Listing: Completed Listing 11/2005[8]; 2009 Revised Listing: Draft Completed 05/2015	12/2016
NON-SALMONID FISH							
ATLANTIC STURGEON							
-Gulf of Maine DPS	02/2012	T	Stable	5	7	Not Started	N/A
-New York Bight DPS	02/2012	E	Decreasing	5	2	Not Started	N/A
-Chesapeake Bay DPS	02/2012	E	Decreasing	5	2	Not Started	N/A
-Carolina DPS	02/2012	E	Unknown	5	2	Not Started	N/A
-South Atlantic DPS	02/2012	E	Unknown	5	2	Not Started	N/A
Bocaccio - Puget Sound/Georgia Basin DPS	04/2010	E	Unknown	1	3	Draft Completed 08/2016	05/2016
Eulachon, Southern DPS	03/2010	T	Increasing	7	11	Draft Completed 10/20165	05/2016
Green Sturgeon, Southern DPS	04/2006	T	Stable	5	7	Co-Manager Draft 03/2017	08/2015
Gulf Sturgeon	09/1991	T	Mixed	7	17	Completed 09/1995	09/2009
Nassau Grouper	06/2016	T	Unknown	5	10	Not Started	N/A
Shortnose Sturgeon	03/1967	E	Mixed	5	7	Completed 12/1998	In progress
Smalltooth Sawfish, U.S. DPS	04/2003	E	Increasing	5	7	Completed 01/2009	10/2010; Initiated 5-Year Review 01/2016
Yelloweye rockfish – Puget Sound/ Georgia Basin DPS	04/2010	T	Unknown	5	10	Draft Completed 08/2016	05/2016

Species Subspecies ESU/DPS	Date Listed Reclassified	ESA Status	Trend	Recovery Priority Number[1]	New Proposed Recovery Priority Number[2]	Status of Recovery Plan	Date 5-Year Status Review Completed[3]
PLANTS							
Johnson's Sea-grass	09/1998	T	Stable	5	4	Completed 09/2002	11/2007
INVERTEBRATES							
Black Abalone	01/2009	E	Mixed	5	1	Under Development	In progress
White Abalone	05/2001	E	Unknown	1	1	Completed 10/2008	In progress
Lobed Star Coral	09/2014	T	Decreasing	7	4	Recovery Outline Completed 03/2015	N/A
Mountainous Star Coral	09/2014	T	Decreasing	7	4	Recovery Outline Completed 03/2015	N/A
Boulder Star Coral	09/2014	T	Decreasing	7	4	Recovery Outline Completed 03/2015	N/A
Pillar Coral	09/2014	T	Decreasing	7	4	Recovery Outline Completed 03/2015	N/A
Rough Cactus Coral	09/2014	T	Stable	7	8	Recovery Outline Completed 03/2015	N/A
7 Indo-Pacific Corals (15 listed but at least 7 species within U.S. jurisdiction	09/2014	T	Unknown	7	17	Recovery Outline Completed 06/2015	N/A
Elkhorn Coral	05/2006	T	Decreasing	7	4	Completed 03/2015	08/2014
Staghorn Coral	05/2006	T	Mixed	7	4	Completed 03/2015	08/2014

Species Subspecies ESU/DPS	Date Listed Reclassified	ESA Status	Trend	Recovery Priority Number[1]	New Proposed Recovery Priority Number[2]	Status of Recovery Plan	Date 5-Year Status Review Completed[3]
SEALS AND SEA LIONS							
Bearded Seal DPS,- *Beringia*	12/2012	E	Unknown	7	22	Under Development	N/A
Hawaiian Monk Seal	11/1976	E	Mixed	1	1	Completed 03/1983; Revision Completed 08/2007; Amended with Main Hawaiian Island Monk Seal Management Plan 01/2016	08/2007
Stellar Sea Lion DPS - *Western*	04/1990; 01/26/1990; 5/5/1997	E	Mixed	7	13	Completed 12/1992; Revision Completed 03/2008	In progress
WHALES							
Beluga Whale DPS - *Cook Inlet*	10/2008	E	Decreasing	5	1	Completed 01/20175	02/2017
Blue Whale	06/1970	E	Stable	11	20	Completed 07/1998; Notice to Revise 04/2012	In progress
False Killer Whale DPS - *Main Hawaiian Islands Insular*	11/2012	E	Decreasing	3	9	Under Development	N/A
Fin Whale	06/1970	E	Unknown	11	12	Completed 07/2010	12/2011

ESA-Listed Species Under NMFS Jurisdiction

Species Subspecies ESU/DPS	Date Listed Reclassified	ESA Status	Trend	Recovery Priority Number[1]	New Proposed Recovery Priority Number[2]	Status of Recovery Plan	Date 5-Year Status Review Completed[3]
WHALES							
HUMPBACK WHALE							
– Central America DPS	06/1970; 09/2016	E	Unknown	3	2	1970 Listing: Completed 11/1991; 2016 Listing: Not Started	N/A
– Mexico DPS	06/1970; 09/2016	T	Unknown	7	7	1970 Listing: Completed 11/1991; 2016 Listing: Not Started	N/A
– Western North Pacific DPS	06/1970; 09/2016	E	Unknown	7	16	1970 Listing: Completed 11/1991; 2016 Listing: Not Started	N/A
Killer whale DPS - *Southern Resident*	11/2005	E	Decreasing	1	5	Completed 01/2008	12/2016
North Atlantic Right Whale	06/1970; 03/2008	E	Decreasing	3	1	Completed 05/2005	09/2012
North Pacific Right Whale	06/1970; 03/2008	E	Unknown	3	16	Completed 06/2013	07/2012
Sei Whale	06/1970	E	Unknown	11	12	Completed 12/2011	06/2012
Sperm Whale	06/1970	E	Unknown	7	16	Completed 12/2010	06/2015

[1] Recovery Priority Numbers are designated according to guidelines published by NMFS on June 15, 1990 (55 FR 24296).
[2] Draft Revised Recovery Priority Guidelines published on May 31, 2017 (82 FR 24944).
[3] For species listed within 5 years, a N/A (Not Applicable) is applied to the 5-Year Review Status.
[4] In Alsea Valley Alliance v. Evans, 161 F. Supp. 2d 1154 (D. Or. 2001) (Alsea), the U.S. District Court in Eugene, Oregon, ruled that NMFS could not exclude hatchery fish within the ESU when listing. Although the Alsea ruling affected only one ESU, subsequent to the ruling, NMFS initiated new status reviews for 27 ESUs and, in 2005, re-listed 15 ESUs of salmon with revised definitions of the populations to be included in the ESU, delisted one ESU (OR Coast coho) and listed one ESU (Lower Columbia River coho); and in 2006, re-listed 10 ESUs of steelhead (and called them DPSs).
[5] Completed outside of reporting period 10/1/2014 through 9/30/2016.
[6] 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.
[7] 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.
[8] The Gulf of Maine Atlantic Salmon DPS was originally listed on November 17, 2000 (65 FR 69469) and was revised to include the Androscoggin, Kennebec, and Penobscot River basins in 2009 (74 FR 29344, June 19, 2009). A recovery plan was completed in 2005 for the 2000 listing and a new recovery plan is under development for the 2009 revised listing.

Photo Credit: John Durbin NOAA

Recovery – Our Journey

Photo Credit: V. O'Connell, 2011

Recovery of threatened and endangered species is a long-term challenge requiring many partners interested in ensuring the health of our environment and our communities. We are required to conserve these species to a point that the protections provided under the ESA are no longer necessary. Our partners' scientific and technical expertise are essential to effective on-the-ground recovery activities such as management, monitoring, research, and education and outreach. All told, NMFS turns to thousands of partners daily in the reach for recovery.

Building on the concept that coordinated efforts across many partners will help us achieve recovery, in the FY 2013–2014 Report to Congress, NMFS announced the Species in the Spotlight initiative to target recovery efforts for eight species considered most at-risk of extinction. We are seeing results from the initiative due largely from the efforts of our partners, detailed throughout this report. We developed five-year action plans, created with the involvement of local partners and stakeholders, to focus collective efforts to benefit the recovery of our Species in the Spotlight. While NMFS is working to recover all listed species under our jurisdiction, the following stories on the Species in the Spotlight highlight progress and challenges since the last report. Equally important, the stories highlight our numerous partners and call out several partners who have put forward exceptional efforts to help conserve these valuable natural resources.

Action Plan Implementation Highlights 2016

Atlantic Salmon

- Completed **30 connectivity projects** in Maine to restore aquatic connectivity and stream processes.
- These projects restores access to **35 miles of streams** important to Atlantic salmon and other economically important fish including river herring.
- Improved downstream smolt survival by modifying design and operations of 2 dams in the Penobscot River.

Pacific Leatherback

- Awarded over **$300,000 in grants** to assess leatherback interactions in coastal fisheries of 5 countries (Panama, Columbia, Peru, Chile, Philippines).
- Supported conservation of key nesting beaches in Indonesia, Papua New Guinea, Solomon Islands, Mexico, Nicaragua and Costa Rica.
- Supported bycatch reduction projects to benefit Pacific leatherbacks.
- Strengthened international cooperation with several governments, particularly **Indonesia and Mexico.**
- Hosted 1st annual NOAA celebration of California Pacific Leatherback Day.

Central California Coho Salmon

- Conservation hatchery efforts prevented extinction and improved genetic diversity, leading to successful reproduction of returning salmon in previously unoccupied areas.
- Released over **106,000 smolts** from Scott Creek captive rearing program over 4 years (2013–2017).
- **3,800 acres** of the Ten Mile River in a working lands conservation easement and 64,000 more acres planned for protection.
- Over **200 miles** of streams restored within 5 years.

Sacramento River Chinook salmon

- Improved **Shasta Reservoir** cold water management to increase salmon egg survival in 2016.
- Completed plan to reintroduce winter-run Chinook salmon into Battle Creek.
- Constructed a fish barrier in 2015 to reduce straying of adult winter-run Chinook salmon on their upstream migration to spawning grounds.
- Used real-time data from acoustically tagged winter-run Chinook salmon juveniles in 2015 and 2016 to **minimize water export impacts.**

Cook Inlet Beluga Whale

- Continued supporting partner's long-term research project to catalog this cryptic population via **non-invasive photo ID methods.**
- Continuing a biopsy sampling study initiated in 2016 which resulted in six biopsy samples to gain insight into genetics, sex, reproductive status, and contaminant loads.
- Garnered support of over **20 partners** to plan the first annual large-scale Cook Inlet beluga whales community outreach effort "Belugas Count!" for September 9, 2017.
- Increased partner interest has helped double the number of Cook Inlet beluga research studies in 2017 vs. 2016.
- Continued support for biennial summer aerial surveys to assess abundance and population trends **(which estimated 328 belugas in 2016)**, and began working with BOEM to conduct aerial surveys of winter habitat use.

Southern Resident killer whale

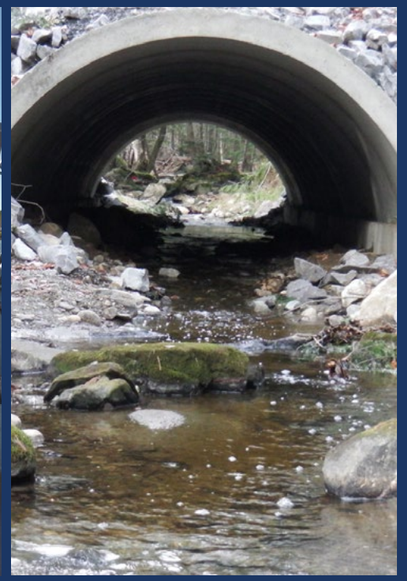
- Received over **$2.5 million in NFWF grants** and matching funds in 2015–2016 to fund research and conservation projects.
- Expanded enforcement and outreach efforts to help reduce impacts of vessel noise and improve compliance with whale-watching rules and guidelines in Puget Sound.
- Photographed all 83 SRKWs, **conducted 15 biopsies**, and collected 50 fecal and prey samples to help assess health of the population.
- Taught a record high of **12,742 students** in 206 schools along the West Coast about killer whale science via the non-profit Killer Whale Tales program.

Hawaiian Monk Seal

- Population **increased by 3% annually** between 2013–2016, and now estimated to be ~1,400 seals.
- Launched first ever effort to vaccinate a wild population in 2016, beginning with 42 seals in the main Hawaiian Islands and expanding to the Northwestern Hawaiian Islands in 2017.
- Between 2015 and 2016, performed **114 interventions** such as de-hooking and disentanglement to improve individual seals' survival prospects.
- More than **6,100 sightings** of monk seals called into public hotlines on Kauai, Oahu, Maui, and Hawaii Island in a single year.
- In commemoration of 10 years since the publication of the revised Recovery Plan for the Hawaiian Monk Seal and news of population increase, worked with partners to declare 2017 the **"Year of the Monk Seal."**

White abalone

- U.S. Navy committed to provide **$2.1 million** for supporting NOAA Fisheries research through a 7-year cooperative agreement.
- Collected wild broodstock to introduce genetic diversity to the captive population, including a female that contributed over **700,000 eggs** to a successful spawning attempt in 2017.
- Raised thousands of healthy, captive white abalone in 6 culture facilities across CA, from Bodega Bay to San Diego.
- Formed new partnerships with **2 commercial aquaculture farms,** the Honda Marine Science Foundation, the U.S. Navy, and scientists in Baja California, Mexico.



SPECIES *in the* SPOTLIGHT

Atlantic Salmon Gulf of Maine Distinct Population Segment

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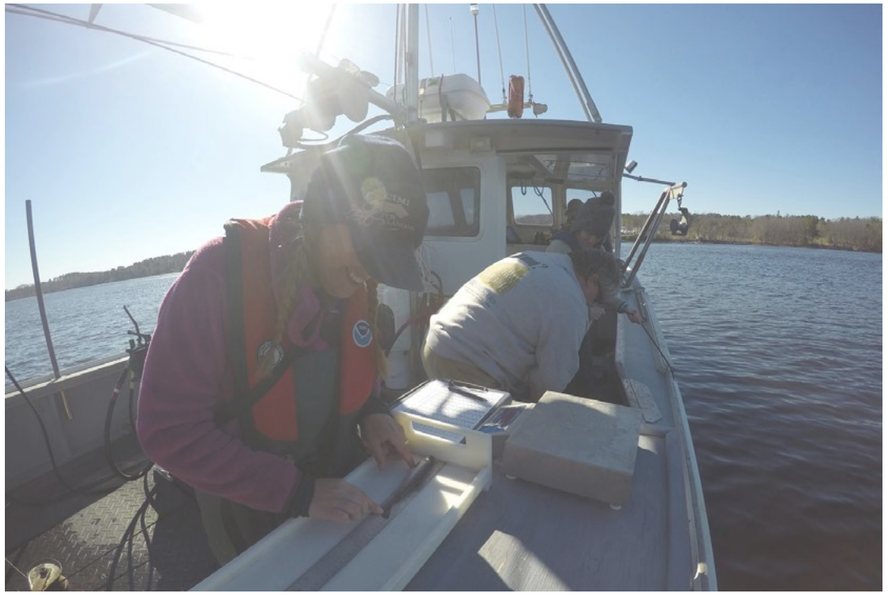


Photo Credit: Don Dow, NMFS Greater Atlantic Region

The Atlantic salmon (*Salmo salar*) Gulf of Maine DPS is critically endangered. They meet the criteria for being one of the eight spotlight species because of their current dangerously low abundance and continuing declining population trend. Atlantic salmon are anadromous fish. They spend the first half of their life in freshwater rivers and streams and then mature in the seas between Northeastern Canada and Greenland before returning to their natal rivers to spawn. In the United States, Atlantic salmon populations historically extended as far south as Long Island Sound. However, all southern populations have been extirpated. Today, the only remaining population of Atlantic salmon in U.S. waters exists in a few rivers and streams in central and eastern Maine.

Recovery Progress

Since the launch of the Species in the Spotlight initiative in May 2015, we and our partners have been working to implement a five-year action plan for Atlantic salmon. These actions represent a critical subset of recovery actions identified in the U.S. Fish and Wildlife Service and NMFS draft recovery plan.

The action plan focuses on four key actions that may contribute significantly to Atlantic salmon recovery:

1. Reconnect the Gulf of Maine with headwater streams.
2. Increase the number of fish successfully entering the marine environment.
3. Reduce international fishery mortality in West Greenland.
4. Increase our understanding and ability to improve survival in the marine environment.

Reconnect the Gulf of Maine with Headwater Streams

Atlantic salmon require a diverse array of well-connected habitat types. Yet, salmon cannot access high quality habitats due to manmade barriers such as dams and culverts. High quality habitats exist throughout the state of Maine. However, dams block or impede access to more than 90 percent of Atlantic salmon's historical freshwater habitat. Restoring access to as many habitats as possible within the range of the species is essential to preventing its extinction.

In 2016, 30 connectivity projects were completed in Maine. The primary goal of these projects is to reconnect aquatic habitat and restore ecological stream processes. More than 35 miles of stream were made accessible as a result of these projects. These efforts were made possible due to strong partnerships including Natural Resource Conservation Service; Penobscot Indian Nation; Project SHARE (a nongovernmental organization focused on salmon restoration efforts in Eastern Maine); Maine Department of Inland Fisheries and Wildlife; Maine Department of Marine Resources; Maine Department of Agriculture; Conservation and Forestry; Atlantic Salmon Federation; U.S. Fish and Wildlife Service; The Nature Conservancy; Downeast Lakes Land Trust; municipalities; lake associations; towns; and numerous private landowners.

Atlantic salmon smolts (approximately two years of age) can become trapped and die in turbines while migrating downstream. The major hydro-electric developer in Maine, Brookfield Renewable Energy, is working with us to identify and implement design and operational changes at their dams that work to minimize harm to Atlantic salmon while still enabling the company to generate power effectively. In 2016, downstream smolt survival goals were achieved at two of their hydro- electric dams in the Penobscot River through project modification and operational changes. Some project operational changes at dams on the Penobscot and Kennebec rivers were also made to improve upstream passage effectiveness, but studies have not yet been completed to assess the conservation benefit that these changes may provide to salmon.

In 2016, NMFS funded several projects that, when completed, will improve stream connectivity and survival of Atlantic salmon. These projects include evaluating fish passage at three impassable dams on the Orange River; removing five major road-crossing barriers on the Narraguagus River; and removing the Coopers Mills Dam on the Sheepscot River.

Increase the Number of Fish Successfully Entering the Marine Environment

In addition to restoring connectivity between marine and freshwater habitat, more smolts need to migrate from the rivers into the marine environment. To ensure recovery, Atlantic salmon need maximum smolt production during periods of low marine survival. Wild smolt production remains low for a variety of reasons including problems with connectivity and habitat quality.

Project SHARE is leading an effort to increase habitat suitability in the Narraguagus River. In 2016, Project SHARE conducted several instream restoration techniques to restore side channel habitat and restore habitat complexity in the Narraguagus River as part of the effort to increase the number of salmon smolts leaving the Narraguagus River and entering the ocean. Project SHARE is collaborating with the U.S. Fish and Wildlife Service, NMFS, the University of Maine, Maine's Department of Marine Resources, Boston College, Connecticut College, and the Canadian Rivers Institute on this effort.

Reduce International Fishery Mortality in West Greenland
High mortality rates in the marine environment represent an ongoing and significant threat to the species. The threats associated with low marine survival have propelled already low populations of Atlantic salmon in U.S. waters to the point of near extinction. U.S.-origin salmon are being captured in the mixed stock fishery at West Greenland, which poses a significant threat to Atlantic salmon recovery efforts in Maine.

Two key objectives of the U.S. delegation to North Atlantic Salmon Conservation Organization (NASCO) are to reduce the fishery at West Greenland to the lowest possible level and improve the monitoring and control of the fishery. In 2015, the West Greenland Commission adopted a new regulatory measure for the fishery. Key provisions of the regulatory measure include: export of Atlantic salmon is not allowed; any harvest above the quota level results in a reduction of the quota the following year; and increased monitoring, control, and surveillance of the fishery. However, a quota level could not be agreed to by all Parties to the West Greenland Commission. In the absence of a mutually-agreed quota, Denmark (in respect to the Faroe Islands and Greenland) unilaterally set a quota of 45mt in 2015. The report on the fishery in 2015 revealed that the fishery exceeded the quota by at least 13mt. Consequently, Denmark reduced the quota for 2016 to 32mt (a 13mt reduction from the unilaterally set level of 45mt). Further, Denmark has agreed to continue to advance the monitoring and control of the fishery by requiring all fishers to have a license and to report what they catch, or potentially risk losing their license.

Increase our Understanding and Ability to Improve Survival in the Marine Environment
We are assessing the level of catch and mortality of U.S.-origin Atlantic salmon in distant water fisheries to understand the impacts on recovery. Natural marine survival will be assessed by:

Photo Credit: NMFS

Credit: Larry Shaw, NEFSC/NOAA

1. Monitoring smolt production and adult returns.
2. Indexing estuary and coastal mortality and identifying location, intensity, and causes of high mortality.
3. Describing return migration of sub-adults from West Greenland.
4. Quantifying and addressing the impacts of the reduced abundance and fitness of capelin, the primary prey resource for Atlantic salmon in the marine environment. This assessment will help inform management decisions and support U.S. negotiations at NASCO.

NMFS partnered with Department of Fisheries and Ocean Canada, Laval University, and the U.S. Geological Survey to complete mixed-stock analyses for West Greenland and Canadian fisheries. Although U.S. stocks contributed about 1 percent of catch, this harvest could still hinder the recovery of Atlantic salmon. These published studies support NMFS efforts to reduce harvest of U.S.-origin fish. Marine survival was documented by monitoring smolt emigration and adult returns through a cooperative agreement with the Maine Department of Marine Resources. Smolt monitoring was conducted in the Narraguagus and Sheepscot River systems and adult returns monitored in all rivers within the area designated as critical habitat. Naturally-reared fish continue to have higher marine survival than hatchery smolts, but overall return rates were low in 2016. Telemetry reports for the Dennys and Kennebec River systems, documented relatively high coastal mortality. Telemetry studies also continue in cooperation with the Greenland Institute of Natural Resources, Arctic University of Norway, and Centre for Environment, Fisheries and Aquaculture Science of the United Kingdom. A shift in salmon diet has been detected in pre-spawned adult salmon captured at Greenland. Salmon appear to be shifting their diet away from forage of capelin to other fish and invertebrates. These prey items are lower in calories compared to capelin. In addition, caloric content in many forage species has decreased significantly since the 1960s, which may impact Atlantic salmon.

Summary
The conservation efforts in 2016 substantially contributed to restoring the ecosystems upon which Atlantic salmon depend. Since 2013, we have seen a significant biological response to the tremendous work of all the stakeholders and partners engaged in restoration efforts for Atlantic salmon and the co-evolved suite of diadromous fish. The Penobscot River is a great example of these conservation successes. Although we acknowledge that Atlantic salmon continue to be a critically endangered species and much more work is needed to achieve recovery, we believe that the actions and protections afforded to salmon through the ESA have provided considerable conservation benefits to some of Maine's most economically important fisheries resources.

Credit: Betty Holmes, NEFSC/NOAA

For example, other sea-run species have responded quickly and significantly to the restoration efforts. Because of barrier removals within the Penobscot River, alewives and blueback herring (collectively referred to as river herring) that were once constrained to the lower 30 miles of the Penobscot River have now been observed more than 130 miles upstream from sea. Before the dams were removed, annual returns of river herring numbered around 1,000. Just three years after dam removal more than 1.8 million river herring returned to the Penobscot River. In addition, the American shad, a very popular sport fish, and the federally endangered shortnose sturgeon have also responded to dam removals and fish passage improvements. Before 2011, both were constrained to the lower 30 miles of the river. However, in 2016, following dam removals and improved passage at dams, shortnose sturgeon were observed using their historic habitat for the first time in over 100 years. Furthermore, more than 7,000 American shad were observed passing through a new state of the art fishway at what is now the lowermost dam in the Penobscot and were observed up to 70 miles upstream from the sea. For the first time since people can remember, anglers are once again seeking out American shad as a viable sport fish in the Penobscot River.

In addition to the ecological role that river herring and shad play, they are also an integral part of Maine's economy. River herring and American eel, that are both benefiting from dam removal and fish passage improvements, are great examples of how sea-run fish play a vital role in Maine's economy. River herring are a very important commercial species in Maine as they are the most sought after and desired bait sources for Maine's most profitable fishery—the lobster fishery. The recovery actions taken to protect Atlantic salmon have, and will continue, to provide considerable conservation benefits to some of Maine's most economically important fisheries resources.

Atlantic Salmon Gulf of Maine Spotlight Hero Andy Goode

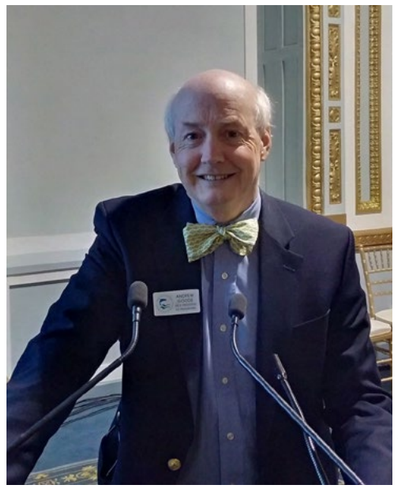
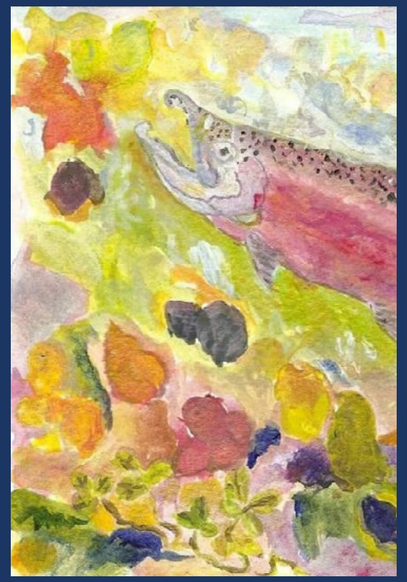
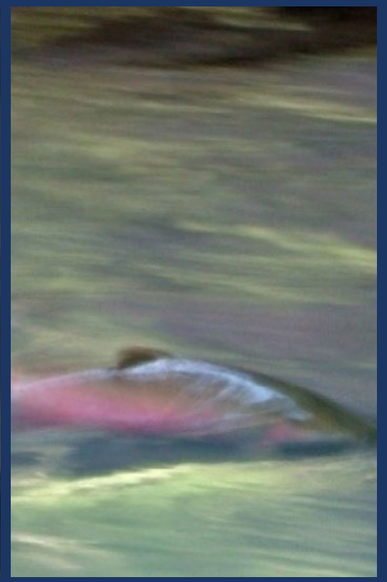


Photo Credit: Anonymous

Andy Goode, Vice President of U.S. Programs for the Atlantic Salmon Federation, has been a leader in negotiating dam removals throughout the State of Maine. He was instrumental in negotiating and implementing the Penobscot River Restoration Project—a project that removed two mainstem dams on one of the last remaining Atlantic salmon rivers in the United States. Most recently, he successfully negotiated the removal of Coopers Mills Dam on the Sheepscot River. The dam, which has been a significant obstruction to Atlantic salmon, is a problem for which NGOs, the local community, state and federal partners have tried to find a collaborative solution for over 20 years. The issues with this dam were further complicated because of its use as a water source for local firefighting, as well as having important cultural connections to the community. Through perseverance, partnerships, and hard work, Andy Goode and the community were able to agree on a compromise. The solution creates a visitor's area that memorializes the cultural and historical significance of the structure, ensures a water source for fire-fighting, and above all, allows for free passage of Atlantic salmon by removal of the dam. Because of Andy's efforts in this restoration project and others, critically endangered Atlantic salmon will benefit from improved connectivity to important habitats vital to their recovery.





SPECIES *in the* SPOTLIGHT

Central California
Coast Coho

Central California Coast Coho

Coho salmon (*Oncorhynchus kisutch*), commonly known as silver salmon, are an iconic part of California's natural heritage, and their recovery will help ensure the ecological, economical, and recreational well-being of future generations. Central California Coast (CCC) coho salmon were first listed as a threatened species in 1996, and subsequently reclassified as endangered in 2005. CCC coho represent the southern extent of the species' range, and recent assessments of the species' status indicate they continue to be at a high risk of extinction. California's Coastal Monitoring Program has continued to expand into CCC coho salmon watersheds and is providing data informing the NMFS Five-Year Status Reviews. Over time, these data will expand our knowledge on the status of CCC coho salmon and improve our understanding of the species' viability.

Recovery Progress

Since the Species in the Spotlight initiative was launched in May 2015, substantial progress has been made regarding CCC coho salmon recovery efforts, including advancement of each of the actions in the five-year action plan. The California Department of Fish and Wildlife (CDFW) has been a vital and trusted partner in these advancements and the agencies will continue to work closely to recover this species and bring wild CCC coho salmon back to California's coastal rivers.

The five-year action plan for CCC coho salmon outlines the following four priorities:

1. Continue and expand conservation hatchery programs to prevent extinction.
2. Continue and expand restoration and funding partnerships through implementation of priority recovery actions in targeted locations.
3. Restore key habitats for conservation hatchery outplanting and improve freshwater Survival of coho salmon.
4. Ensure adaptive management for conservation hatchery programs and restoration is informed by monitoring and research.

Continue and Expand Conservation Hatchery Programs to Prevent Extinction

Conservation hatchery efforts are intended to prevent extinction and improve distribution, abundance, and genetic diversity of populations while other recovery efforts are underway. The two conservation hatchery programs are the Don Clausen Warm Springs Hatchery and Coho Salmon Conservation Program on the Russian River in Sonoma County, California, and the smaller Kingfisher Flat Hatchery on Scott Creek, Santa Cruz County, California. While differing in size and funding, both programs were initiated in 2001 in response to severely depressed coho salmon abundances. Fish are collected from the wild, brought into the hatcheries, genetically tested, and spawned to maximize diversity and avoid inbreeding. In the hatchery, fish are raised to various ages, fed krill, and tagged. From April through May, phased releases of these fish into streams is conducted to coincide with off-shore ocean conditions. This release strategy allows the fish to imprint on the creek with the aim that they will return to these streams as adults so they can spawn naturally.

The multiagency/stakeholder Don Clausen Coho Salmon Conservation Program is realizing its intended goals by effectively increasing coho salmon populations in the Russian River through habitat restoration and advancements in hatchery practices and monitoring. Today, there are more observations of adult coho salmon spawning in Russian River streams than have been seen in two decades. Current progress includes continued coordination of the

Photo Credit: Rosalind Alley Santa Cruz, CA

Technical Advisory Committee, the development of a Hatchery and Genetic Management Plan, new incubators that are improving egg survival, and discussions of future program expansion to boost populations in other Sonoma County and Mendocino County watersheds facing extirpation of CCC coho salmon. The success of the program is due in large part to Mr. Michael A Dillabough, Chief of Operations and Readiness Division, Army Corps of Engineers San Francisco District, who has been instrumental in advancing CCC coho salmon recovery efforts and almost two decades of work at the Warm Springs Hatchery. Mr. Dillabough recently received special recognition for his contributions and diligence in problem solving, creativity, partnerships, and outstanding leadership towards conservation and recovery efforts for CCC coho salmon.

In early 2016, staff from NMFS' Southwest Fisheries Science Center (SWFSC) and CDFW formed a technical team to develop plans for relocating the existing captive broodstock program for endangered CCC coho salmon from the existing Kingfisher Flat Hatchery to a new hatchery facility south of San Francisco. Although the Kingfisher Flat facility has been critical in saving the region's coho salmon from extinction, the size of the facility and available water cannot support expansion of the conservation program to a level needed for species recovery. The technical team is refining the hatchery production goals needed for recovery and identifying the water resource needs for a new facility to achieve those production goals. The team is meeting with local landowners and partners to review and evaluate alternative locations for the new facility. The CCC coho salmon Species in the Spotlight hero, Dr. Brian Dietterick, has been instrumental in these discussions. The team will soon begin work on a Project Work Plan that will be needed to inform future feasibility studies and designs. Securing funding for construction, equipment, and operations will continue to be a primary focus of the technical group.

Continue and Expand Restoration and Funding Partnerships through Implementation of Priority Recovery Actions in Targeted Locations

The state's Fisheries Restoration Grant Program, funded in part by the Pacific Coastal Salmonid Recovery Fund (PCSRF), supports restoration projects that align with recovery actions identified in State and Federal recovery plans. NMFS and CDFW work together each year to develop and revise a "Focused" restoration strategy. The restoration blueprint builds directly from the CDFW 2004 Coho Salmon Recovery Strategy, NMFS 2012 CCC Coho Recovery Plan, and NMFS 2016 Multi-Species Recovery Plan (which includes CCC, Northern California Steelhead, and California Coastal Chinook Salmon). In accordance with the PCSRF Federal Funding Opportunity, these funds are focused on projects and activities benefiting ESA-listed populations and addressing the limiting factors and priority actions specified in these recovery plans.

Photo Credit: Morgan Bond/NOAA

CDFW has embraced the Species in the Spotlight initiative and is seeking ways to prioritize funding for CCC coho salmon actions. One example includes a NMFS and CDFW "Priority Action Coho Team" (PACT) who have assembled State and Federal recovery plan priorities and developed a shared vision of recovery. PACT is designed to relay information to recovery partners regarding conservation hatchery objectives, water conservation needs, regulatory streamlining opportunities, habitat restoration priorities, and outreach and education opportunities.

The Highway 1 Bridge over Scott Creek in northern Santa Cruz County is nearing the end of its serviceable life and needs replacement. The Scott Creek floodplain, lagoon, and outlet to the Pacific Ocean were dramatically altered when the bridge was built in 1936. The alterations have resulted in degradation to highflow refugia and marsh plain habitats. The degradation of habitat has impacted survival and fitness of wild and broodstock CCC coho salmon in Scott Creek. Replacement of the Highway 1 Bridge, to include restoration of the marsh-lagoon complex of Scott Creek, is the highest recovery priority in the Santa Cruz area. Currently a technical advisory team, led by the Santa Cruz County Resources Conservation District, has secured grant funding from the California Coastal Conservancy and the Wildlife Conservation Board that will be used to complete all necessary technical studies and develop designs for the lagoon restoration. This work is anticipated to be conducted throughout 2017 and into 2018.

The Garcia River watershed is comprised almost entirely of agricultural and timber lands with many acres federally owned or under protected easements. A high-priority recovery action is the restoration of estuarine and floodplain habitats that can influence survival and fitness of salmon at population-level scales. Progress to date includes the formation of a multiagency/stakeholder Garcia Technical Advisory Committee, which is completing a Garcia River Estuary Enhancement Plan in 2017. The plan will cover the estuary and include shovel-ready projects on land owned by the Bureau of Land Management in the lower estuary.

The NMFS/The Nature Conservancy (TNC) partnership focuses on protecting and restoring the 71,000-acre Ten Mile River watershed (Mendocino County), and enjoys the support of four state agencies, private timber interests and the U.S. Fish and Wildlife Service. To date, TNC and its partners have permanently protected 3,800-acres—nearly all the land surrounding the Ten Mile River Estuary—using a novel form of working lands conservation easement. Compatible forestry, low-intensity agriculture, and sustainable cattle grazing under the easement are now fully integrated with a TNC/NMFS-led habitat restoration program, focused on restoring degraded floodplains and estuaries. Restoring these environments, where juvenile fish rear, is key to leveraging previous investments to restore the upper watershed, and could serve as a recovery model for other rivers. A $1.5 million-dollar grant from the California Fisheries Restoration Grant Program (funded by PCSRF) was recently awarded to TNC to restore critical over-wintering habitat for CCC coho. The award is being matched by $1.5 million dollars in private donations secured by TNC. Four estuary and floodplain habitat enhancements will be created in 2018 using the Fisheries Restoration Grant Program/PCSRF funds. The effectiveness of these enhancements will be measured by TNC's scientists and natural resource managers using private funds.

TNC and NMFS' Ten Mile River work has led to an exciting opportunity to protect the entire Ten Mile River watershed—from reef to ridge. Working with Lyme Timber Company (a conservation-oriented timber investor), TNC is now developing a 64,000-acre working forest conservation easement that will keep the uplands as sustainably managed working forest in perpetuity while also establishing an 18,000-acre "Riparian Reserve Zone" where the forest is managed and restored to a healthier and more resilient condition. The Lyme/TNC working conservation easement will, if finalized this summer, integrate compatible land management and science-based restoration to accelerate the recovery of CCC coho salmon and other listed anadromous salmonids in the watershed.

In January of 2014, the Governor of California proclaimed a state of emergency due to drought conditions. In response, NMFS and CDFW developed the Voluntary Drought Initiative Program. The purpose of the program is to provide incentives to water users in high priority watersheds throughout the State to reduce the negative effects of the drought on salmon and steelhead. To date, 116 agreements have been signed in the Russian River tributaries. Streamflow gaging records within the region show measurable improvement in drought conditions for coho salmon within portions of streams covered by the flow augmentation agreements. Finally, two projects

within the NOAA Russian River Habitat Blueprint have a direct link to Species in the Spotlight actions. These include the Russian River Focus Area Tributary and Estuary Habitat projects, which are designed to inform streamflow and estuarine habitat restoration projects.

Restore Key Habitats for Conservation Hatchery Outplanting and Improve Freshwater Survival of Coho Salmon
Strategically focused restoration is needed in areas where conservation hatchery broodstock outplanting is conducted or forecasted. Many of these are located on private land (e.g., agriculture, timber operations, etc.). Outreach to these landowners and assistance with project design and permitting has improved the ability to restore key habitats in strategic locations.

A Lower Scotts Creek Floodplain and Habitat Enhancement Project has been underway since 2014. This work has increased habitat complexity and floodplain connectivity along 4,500 feet of the lower mainstem of Scotts Creek (the stream used for outplanting of Kingfisher Flat hatchery coho salmon). A total of 13 instream large wood complexes have been installed, portions of the deteriorating legacy levee system removed, new alcove habitat features were created, and the connection between Scotts Creek mainstem and existing off-channel habitat features and a small tributary was enhanced. The last phase of this project is planned for 2017.

The San Vicente Creek Large Wood Habitat Enhancement Project will be implemented in 2017 and will consist of cutting and dropping 48 standing redwood trees into the San Vicente Creek. The addition of the large wood in the channel and on the floodplain will form complex instream habitat features critical for the overwinter survival of young coho salmon. The wood in the channel will also help facilitate better alluvium sorting and trapping. Both of the above projects have developed robust monitoring programs to evaluate the effectiveness and are being monitored by NMFS' Southwest Fisheries Science Center.

Several other recently completed restoration actions in historic coho salmon populations of the Santa Cruz Mountains include: (1) Large wood installation in the mainstem of San Gregorio and Pescadero creeks (summer 2016); (2) Removal of a long-standing migration impediment in Pescadero Creek at San Mateo Memorial Park (fall 2015); (3) Installation of instream and riparian habitat enhancement features within approximately 1,300 feet of Soquel Creek (summer-fall 2015); (4) Instream channel and floodplain connectivity project was completed in lower Butano Creek, Pescadero watershed (fall 2016); and (5) Development of a Scope of Work for improved fish passage and flow conveyance in lower Butano Creek and Pescadero Marsh (current).

For all of these projects, NMFS has worked closely with its state and local partners, particularly CalPoly and both the San Mateo and Santa Cruz County Resource Conservation Districts. Nearly all of these restoration actions were covered under existing restoration-based programmatic consultations.

In 2016, NMFS completed its first Safe Harbor Agreement in the country in the Russian River tributary, Dry Creek. The agreement creates a new model for endangered species conservation and recovery by engaging the support of landowners who are critical to recovery, while also providing assurances that they will not face new restrictions on their land because of their good stewardship practices. The assurances create an environment for collaborative conservation, building on local knowledge and innovation to inspire on-the-ground action. The partnership among NMFS, the U.S. Corps of Engineers, Sonoma County Water Agency, CDFW, and private

Photo Credit: Marilyn Stubbs/NOAA

landowners in the Dry Creek Valley will support the recovery of endangered coho salmon, and threatened Chinook salmon and steelhead.

Ensure Adaptive Management for Conservation Hatchery Programs and Restoration is Informed by Monitoring and Research
Monitoring and research have provided critical information used to adapt conservation hatchery practices, broodstock release strategies, and restoration work. They also provide needed information on status, trends, conservation, and recovery of coho salmon. Progress to date includes:

- More than 106,000 coho salmon smolts have been released from the Kingfisher Flat Scott Creek captive rearing program between 2013 and 2017.
- Completion of five-year viability assessment (SWFSC) and five-year status review (NMFS West Coast Region California Coastal Office).
- Continued and expanded monitoring of CCC coho salmon populations throughout the ESU in coordination with CDFW.
- An increase in the number of watersheds south of the Golden Gate used by CCC coho salmon which includes successful reproduction in five recovery watersheds due to conservation hatchery efforts: Waddell Creek, Scott Creek, San Vicente Creek, Laguna Creek, and Soquel Creek.
- Improvements to broodstock management including rigorous spawning matrix used for hatchery matings resulting in improved genetic diversity, and outplanting of various life stages to watersheds where local populations had been extirpated (Walker, Salmon, San Vicente creeks).

Summary
The 2015 launch of the Species in the Spotlight initiative for CCC coho salmon came during the worst drought on record in California. California experienced well below average precipitation from 2012 through 2015, record high surface air temperatures in 2014 and 2015, and record low snowpack in 2015. Some paleoclimate reconstructions suggest that this recent drought was the most extreme in the past 500 or perhaps more than 1,000 years. These drought conditions ended abruptly with a series of unrelenting storms and an extremely wet 2016–2017 winter. On the positive side, those storms restored stream flows and off-channel habitats. On the negative side, they destroyed coho spawning beds. Despite poor environmental conditions, CCC coho salmon persist due to the concerted and coordinated restoration and hatchery efforts of stakeholders, agency partners and non-profit organizations who have a keen interest in coho salmon recovery.

The Species in the Spotlight initiative has helped leverage funds for restoration and conservation, brought new partners to coho salmon recovery, energized state and federal collaborations, and affirmed the hard work of dedicated individuals who are involved every day in these conservation hatchery and restoration programs.

Photo Credit: NMFS SWFSC

Central California Coast Coho Spotlight Hero Dr. Brian Dietterick

Photo Credit: Steve Auten, CalPoly

Dr. Brian Dietterick is the director of the California Polytechnic State University Swanton Pacific Ranch and a watershed hydrologist by training. The Ranch, located in the Scott Creek watershed of Santa Cruz County, California, is a CalPoly educational facility and home to the southern-most extant population of coho salmon. Over the last decade, Dr. Dietterick and his staff and students have strengthened and diversified the recovery efforts for CCC coho salmon and provided critical support for NMFS and other resource partners. They have collected and shared data in support of the CCC coho salmon federal recovery plan, hosted meetings and field tours for the Scott Creek Lagoon restoration project, conducted high priority, multi-year restoration projects in Scott Creek to restore habitat complexity and floodplain connectivity, and provided access to habitat on the Ranch so that scientists could calibrate regional estimates of coho salmon. Dr. Dietterick has been a leading voice in discussions regarding the possible construction of a new conservation hatchery for CCC coho salmon. The watersheds in the Santa Cruz Mountains are primarily comprised of private landowners, and Dr. Dietterick has been a vital connection to this important constituency.

Scott Creek is the front line for preserving CCC coho salmon south of San Francisco Bay. The successful recovery of these populations will require forging and maintaining partnerships that use sustainable management approaches in these working landscapes; values that Dr. Dietterick and his staff at Swanton Pacific Ranch practice and teach. Dr. Dietterick is a dedicated leader CCC coho salmon conservation who connects his colleagues, staff, and graduate and undergraduate students with unparalleled opportunities for CCC coho salmon conservation, education, and habitat restoration in the name of species recovery.

SPECIES *in the* SPOTLIGHT

Cook Inlet Beluga Whales

Photo Credit: LGL Alaska Research Associates

The endangered Cook Inlet beluga whale (*Delphinapterus leucas*) has been in decline since 1979. Where once there were an estimated 1,300 of these white whales adjacent to Alaska's most populous region, only an estimated 328 remain. The rapid decline and dire status of the Cook Inlet beluga whale population makes it a priority for NMFS and our partners to prevent extinction and promote recovery of this iconic species. The majority of the decline resulted from unregulated subsistence hunting, but almost 20 years after the hunting was greatly curtailed, and a decade since the last beluga was hunted in Cook Inlet, the population has failed to increase in numbers. The reasons of why the population has not made a comeback are unknown.

Recovery Progress

A main purpose of the overall Species in the Spotlight initiative is to garner public support for recovering highly endangered species. In the case of Cook Inlet beluga whales, NMFS relies heavily on its many partners to advance this effort. To kick off our efforts for the Cook Inlet beluga as a Species in the Spotlight, NMFS held the "Cook Inlet Beluga Whale Management, Research, and Partnership Opportunities" workshop at the 2017 Alaska Marine Science Symposium in Anchorage. That session educated the public about recent management and research efforts specific to Cook Inlet beluga whales, and solicited partnerships for future recovery activities. The most successful partnership outcome from that session has been the development of a committee of 20 partners (so far) to organize a community-based outreach event called "Belugas Count!" The main event was held September 9, 2017, at the Alaska Zoo with viewing and information stations throughout upper Cook Inlet to catch the morning high tide when belugas are more likely to be visible near shore. The "Belugas Count!" event was free to the public and included talks and activities about Cook Inlet belugas. While this initial event introduced the public to the plight of Cook Inlet belugas and how citizens can help, the goal is to host an annual event that will include a citizen count of belugas throughout Cook Inlet. In anticipation of this event, and other opportunistic outreach events (e.g., air, boating, and sportsmen trade shows), we are developing new Cook Inlet beluga whale outreach materials. Materials include a tri-fold informational brochure; elementary school-level curricula about Cook Inlet beluga whales; bookmarks with viewing guidelines for pilots with a slogan "Stay High and Fly By". We are encouraging reporting of stranded Cook Inlet beluga whales, and publishing stories in local newspapers, radio stations and in the Alaska Airmen's Association to educate readers about how they can avoid potential harassment of belugas and help us enhance our response to stranded whales.

Since the launch of the Species in the Spotlight initiative in May 2015, these partnerships have advanced implementation of the five-year action plan for the Cook Inlet beluga whale. The action plan focuses on five critical areas to improve conservation efforts:

1. Reduce the threat of anthropogenic noise in Cook Inlet beluga whale habitat.
2. Protect habitats that support foraging or reproduction of Cook Inlet beluga whales.
3. Gain a better understanding of population characteristics of Cook Inlet beluga whales to ensure effective management actions result in recovery.
4. Ensure healthy and plentiful prey are available.
5. Improve understanding of why Cook Inlet beluga Whales are not recovering by enhancing the stranding response program.

Reduce the Threat of Anthropogenic Noise in Cook Inlet Beluga Whale Habitat

Despite their proximity to Anchorage and nearby cities, Cook Inlet beluga whales are a very difficult species to study. The extraordinarily silty water they live in makes them invisible except for the portions of their bodies that break the surface of the water. Thirty-foot tides, the highest in the United States, and miles-wide mudflats make boating extremely dangerous. For about half the year, belugas dwell among large chunks of ice that tides wash back and forth at the speed of a fit jogger; ice chunks that are big enough to sink a boat. While the harsh conditions may help protect Cook Inlet belugas from killer whales, this dynamic environment severely hinders our ability to understand what may be limiting their recovery.

The turbid waters also limit the whales' ability to see their food and each other. Instead, they see their world through sound, as bats do. Their reliance upon echolocation makes noise pollution in Cook Inlet a potentially serious problem. Cook Inlet is a naturally noisy environment at times, given the hiss of glacial silt in the water, the rushing tides moving rubble around on the bottom, and the cracks and rumbles of shifting ice during much of the year. Although belugas in Cook Inlet live in an area where vision is severely limited and the habitat is naturally noisy, they have managed to adapt to these conditions. What they have perhaps not adapted to as well is human-caused noise from activities such as pile driving, seismic exploration, oil and gas rigs, ship traffic, and military operations.

NMFS, other agencies, and industry partners are continually seeking ways to quiet the belugas' soundscape. Minimizing the presence of industrial noise in the waters within 10 miles of

especially important habitat around the Susitna River Delta is one such measure. The Port of Anchorage has also gone to great effort to test technologies like confined bubble curtains and sonic resonators to reduce the amount of in-water noise from pile driving activities.

The Alaska Department of Fish and Game (ADF&G), working closely with NMFS, deploys passive acoustic recorders around key locations in Cook Inlet to better understand noise in these waters and its potential effects on belugas. These instruments listen to and record sound all year long. They provide information that we need to understand the relative importance of different parts of Cook Inlet to belugas throughout the year, and the degree to which these areas are acoustically impacted by humans. Having information about both natural and human-caused noise levels in beluga habitat can improve our understanding of how noise affects belugas and their use of habitat near industrialized areas. This knowledge will better inform effective management and conservation actions.

Protect Habitats that Support Foraging or Reproduction of Cook Inlet Beluga Whales
Directly across Cook Inlet from Anchorage lies the Susitna River Delta, which appears to function as the very core of essential habitat for these whales. While it is important that these belugas have access to many runs of fish throughout the year at different locations, the Susitna's runs of salmon and eulachon (also called hooligan or candlefish) are the belugas' main food source. And the Susitna River Delta is important for other aspects of beluga life history besides feeding.

On a summer day in 2015, biologist Dr. Tamara McGuire, LGL Alaska Research Associates, Inc., and her skipper, Brad Goetz (also a fifth grade teacher and Bristol Bay salmon fisherman) were conducting photographic identification work on belugas in the Susitna River Delta area. These photographs would later be matched to other images of whales from past years to help track an individual whale's movements and behaviors over time, leading to insights about the entire population. On that day, they were approached by the largest group of belugas either of them had ever seen, perhaps 75 percent of the entire population, all in one group. While Tamara was photographing as many individuals as she could, Brad noticed one lone female off to the side behaving oddly, like a log floating at the surface. Other whales approached the logging female and began splashing and behaving excitedly. A few minutes later, a wrinkled newborn calf bobbed to the surface. But the newborn was listing to one side and not moving. Other whales slapped at it, and after several minutes and a few more slaps, the newborn calf finally righted itself and began to swim and breathe normally. And so it was there amidst the valuable feeding habitat of the Susitna River Delta that the first live birth of a Cook Inlet beluga whale was documented. Information such as this which highlights the importance of the Susitna River Delta region to Cook Inlet belugas for both foraging and reproduction have led to this sensitive area receiving special consideration and protection during ESA section 7 consultations.

Although we have a good understanding of areas important to Cook Inlet belugas in the summer, we currently know little about their winter habits. In an attempt to better document beluga distribution and habitat use throughout Cook Inlet during non-summer months, NMFS is partnering with the Bureau of Ocean Energy Management (BOEM) to implement winter aerial surveys from 2018–2020. This information will also benefit BOEM as that agency prepares for upcoming oil and gas lease sales in Cook Inlet.

Photo Credit: LGL Alaska Research Associates

Gain a Better Understanding of Population Characteristics of Cook Inlet Beluga Whales to Ensure Effective Management Actions Result in Recovery
Our best range-wide population monitoring information for Cook Inlet belugas comes from aerial surveys conducted by the NMFS Marine Mammal Laboratory since 1993, typically in the month of June. These surveys, which are now conducted every other year, estimate the abundance of Cook Inlet belugas throughout their range. The population estimate is corrected for diving animals and observer efficiency. Continuation of this survey, or some variation on it, is our only way to accurately assess population trends over time and the overall status of this species.

For the past several years, NMFS has also supported a partner-led, non-invasive photo-ID research of Cook Inlet belugas from spring to fall. Images collected from long-term beluga observations provided by private contractors, Department of Defense Joint Base Elmendorf-Richardson biologists, and the public are compiled into the Cook Inlet Beluga Whale Photo-Identification Project's catalog. The data obtained from this long-term non-invasive study have provided vital individual-based information to managers, especially in regards to individual survival and reproductive history. Continuing this effort into the future is essential for increasing our knowledge of this cryptic species. This study directly addresses the five-year action plan goal of better understanding beluga population characteristics.

Another route to better understanding what is keeping belugas from recovering is to understand their physiology and body condition. Because these belugas are so few in number, researchers remain cautious about capturing animals to conduct examinations, which can be stressful for the whales. Instead, beginning in 2016 NMFS partnered with the Cook Inlet Beluga Whale Photo-Identification Project, Joint Base Elmendorf-Richardson, and the Group for Research and Education of Marine Mammals to obtain biopsy samples from the whales. Sophisticated analysis of these tiny plugs of skin and blubber can provide insights into genetics, reproductive

status, contaminant loads, and other important parameters. NMFS will likely continue to obtain and analyze these biopsy samples to provide insights into beluga biology that cannot be obtained by any other minimally invasive technique. In 2017, NMFS is also planning to use small unmanned aircraft to collect very detailed aerial imagery of beluga whales in the hopes that the images can be used to assess beluga whale body condition, health, and add to the existing photo-ID catalog.

Ensure Healthy and Plentiful Prey are Available Prey
The reason the Cook Inlet beluga population remains suppressed must have to do with the fact that either they are not reproducing fast enough or their survival rates are too low, or both. The availability of sufficient food could affect either of these factors. Especially important to belugas are the early eulachon runs, affording them their first opportunity to gorge on high calorie fish after a long and lean Cook Inlet winter. NMFS has supported the ADF&G efforts to assess eulachon biomass in the Susitna River. ADF&G conducted a field study in spring 2016, and their results will help determine if eulachon remain abundant. NMFS has also initiated a study to assess the health of beluga prey in Cook Inlet, with emphasis on resident fish. Partnering with staff from Joint Base Elmendorf-Richardson, we are collecting fish and water samples from various locations in upper Cook Inlet to analyze for various contaminants. The fish will be tested for approximately 150 different contaminants of emerging concern.

Improve Understanding of Why Cook Inlet Beluga Whales are not Recovering by Enhancing the Stranding Response Program
Scientists sample dead Cook Inlet beluga whales as a way of searching for clues regarding their lack of recovery. One thing has become clear from these efforts: in order to get the biological information we need from these dead whales, we need to get to them before the process of decay has become advanced. To this end, NMFS is redoubling its efforts to inform area pilots and members of the public to quickly report sightings of dead (or live-stranded) animals so ground crews can respond rapidly. We have also distributed stranding response kits to specially trained partners, giving them the tools to conduct good field examinations of beluga carcasses. We are also pursuing arrangements to make aircraft available to us on short notice to allow access to stranded whales along those portions of Cook Inlet that are not road accessible, which describes the majority of Cook Inlet's shoreline. Our stranding response program has improved and is continuing to improve, as per the five-year action plan. We expect additional insights into the causes of beluga deaths and population health as a result.

Summary
Good progress is being made towards engaging partners who can improve our understanding of Cook Inlet beluga whales and help them to recover. We are also improving our communication with key groups in the region that are well positioned to help avoid beluga harassment. Additional research to identify critical factors limiting the Cook Inlet beluga population is vital to recovery. Continuing to shine a spotlight on this endangered species can only help us succeed, whereas neglecting to push forward could well result in the loss of this irreplaceable species that is so important to tourism and to local residents, including the Native subsistence hunters that hope to reincorporate a sustainable harvest of this once abundant whale back into their culture.

Cook Inlet Beluga Whales Spotlight Hero Chris Garner, Christie Osburn, and Richard Graham

Photo Credit: U.S. Air Force--Airman 1st Class Kyle Johnson

The Joint Base Elmendorf-Richardson (JBER), Environmental Element, Natural Resources Section's Cook Inlet Beluga (CIB) conservation program, especially team members Chris Garner (in photo), Christie Osburn, and Richard Graham epitomizes the cooperative spirit of the NMFS Species in the Spotlight initiative. The program proactively conducts beluga research and conservation activities (many of which address priority actions identified in the five-year action plan), and the program consistently partners, collaborates, and assists with other programs towards the goal of recovering the endangered CIB whale. Their innovative monitoring techniques, long-term monitoring efforts, and data on belugas' responses to noise, have provided NMFS managers with invaluable information on the anthropogenic influences on the population as well as important population characteristics. The program also took proactive steps in 2016 to help ensure healthy and plentiful prey for the whales by eradicating predatory northern pike in salmon-bearing waterways on JBER lands. Furthermore, the program and its team have contributed resources and staff for numerous other beluga projects, including: assisting the stranding response program; organizing trainings for other beluga researchers to access military lands; partnering with the CIB acoustics group; sharing data with the CIB Photo-ID Project and NMFS's CIB Scientific Sightings Mapper; and contributing resources to the 2016 CIB Biopsy Feasibility Study.

SPECIES *in the* SPOTLIGHT

Hawaiian Monk Seal

Hawaiian Monk Seal

The Hawaiian monk seal (*Neomonachus schauinslandi*) is the world's only surviving tropical seal species. Hawaiian monk seals are endemic to the Hawaiian Archipelago, which stretches 1,500 miles from Hawaii Island to Kure Atoll. There are only about 1,400 Hawaiian monk seals left in the world. While recent population assessments have yielded some encouraging results, the predominant trend has been a steep population decline since the 1950s.

Photo Credit: Tracy Mercer, 2013

Recovery Progress

Since the launch of the Species in the Spotlight initiative in May 2015, we have been working with our partners to implement a five-year action plan for Hawaiian monk seals. The five-year action plan lays out five key actions intended to provide significant recovery benefit to monk seals along with increased collaboration with partners:

1. Improve survival of juvenile and adult female seals in the Northwestern Hawaiian Islands.
2. Manage and mitigate human-seal interactions to ensure natural population growth, minimize conflict, and foster coexistence.
3. Detect and prevent catastrophic disease outbreak and disease-related mortality.
4. Develop and implement strategic communications plan and social marketing strategy.
5. Encourage community-led monk seal stewardship and citizen science.

Improve Survival of Juvenile and Adult Female Seals in the Northwestern Hawaiian Islands

The 2016 annual population assessment showed that Hawaiian monk seals have increased in numbers by about 3 percent annually since 2013, reversing a multi-decade trend of population decline. The population is now estimated to be around 1,400 seals, with about 1,100 of those seals in the Northwestern Hawaiian Islands (NWHI). This represents a significant shift over previous years when the main Hawaiian Islands (MHI) population, although smaller overall, was growing and the number in the NWHI was declining—the recent growth trend is primarily due to increased juvenile survival in the NWHI and stability or growth of the six NWHI subpopulations. Rapid growth trends in the MHI subpopulation appear to have slowed or stopped, and the number of recorded births in the MHI as well as overall population numbers have remained stable since 2013.

The species was in decline for over six decades and current numbers are still only about one-third of historic population levels. A slowed rate of decline leading up to the recent population increase is due in many ways to NMFS' recovery efforts. In fact, an estimated 30 percent of the seals alive today are here because they benefited from a lifesaving intervention performed by NMFS, such as disentanglement or de-hooking. A total of 78 interventions to improve individual seals' survival prospects were performed in 2015–2016 in the NWHI. These included translocation of 28 pups from high shark predation risk areas to lower risk sites within French Frigate Shoals atoll, releasing 18 seals entangled in marine debris and five seals trapped behind the Tern Island sea wall, and 19 miscellaneous interventions, including a monk seal world first—removal of an eel from a juvenile seal's nasal passage. Additionally, since its opening in 2014, nineteen malnourished seals have been taken from the NWHI to The Marine Mammal Center's Ke Kai Ola facility on Hawaii Island, which is dedicated solely to monk seal rehabilitation. As of March 2017, 15 seals have been successfully rehabilitated and released, and four more are currently being fattened-up and awaiting their summer 2017 return home to the NWHI. As a result, this year's Species in the Spotlight hero for monk seals is the Marine Mammal Center's Ke Kai Ola facility.

Manage and Mitigate Human-Seal Interactions to Ensure Natural Population Growth, Minimize Conflict, and Foster Coexistence

Monk seals were essentially extirpated from the MHI for many years, although in recent decades they successfully reestablished a small but thriving population. While this is a hopeful sign for recovery of the species, a human population unfamiliar with seals has resulted in negative human-seal interactions such as harassment of seal hauled out on beaches, hookings, intentional killing, and more. There has been a noticeable shift in public attitude towards the positive in recent years, due partially to the fact that seals have now been in the MHI long enough that residents are getting used to their presence and younger generations on islands with larger seal populations are growing up seeing them on a regular basis. The shift is also due in part to the work of NOAA, our partners, and community members sharing information, educating the public, and engaging with local community encouraging coexistence.

While attitudes are shifting and NOAA and partners have a strong presence in the community, there are still occasional interactions that could be detrimental to individual seals and/or the population as whole. We continue to work with local fishermen and available data on recreational fishing to attempt to understand the nature of hooking risk across the MHI and develop appropriate placed-based and audience-based solutions. Behavior modification protocols to keep seals away from areas where their safety or the safety of humans could be in danger, such as certain heavily crowded beaches, were approved and were in early stages of testing in 2016, primarily on the island of Kauai. Removal of fishing hooks and/or fishing line was performed on nine seals in 2016 alone, and all nine seals survived. Seven seals were treated for miscellaneous existing or potential injuries/illnesses in 2016 including one abscess,

one dog bite, antibiotics to prevent infection post-de-hooking, and one instance of ventral wounds from an unknown source.

Detect and Prevent Catastrophic Disease Outbreak and Disease-Related Mortality
Infectious disease is a risk to all wildlife populations, but not all infectious diseases are the same. Currently our program is focusing on two diseases that are very different, but both carry serious potential consequences for monk seals: morbillivirus and toxoplasmosis.

Morbillivirus is widespread and outbreaks of the disease have caused the deaths of thousands of dolphins and seals around the world, including the northeast coast of the United States. This family of viruses includes measles, which human children are immunized against, and distemper, which is part of a core vaccination series for pet dogs. The disease has not yet been documented in monk seals in Hawaii, but could potentially be contracted from unvaccinated dogs or from other marine mammals such as whales and dolphins. Once introduced into the small population of monk seals, an outbreak could set back recovery efforts for decades, or eliminate hope for the species altogether.

In February 2016, after years of investigation and safety and effectiveness trials, NMFS began vaccinating wild monk seals. Our goal was to achieve "herd immunity" on Oahu and Kauai by October 2016, when the current supply of vaccines was due to expire, by vaccinating a large enough percentage of the population to prevent an outbreak. Modeling results indicate that the herd immunity goal was achieved on Oahu, with full vaccination of 21 seals, and on Kauai, with 18 seals fully vaccinated. We were also able to vaccinate three seals on Molokai, and seven seals undergoing rehabilitation at the Ke Kai Ola facility were vaccinated prior to their April 2016 release.

A new batch of 1,660 vaccines arrived in March 2017, and we plan to expand our efforts into the NWHI, as well as continue efforts in the MHI by vaccinating new pups on Oahu and Kauai, vaccinating any adults that may have been missed during the first round, and achieve greater coverage on Molokai. This is the first ever effort to vaccinate a wild marine mammal species, and NOAA hopes this will lay the foundation for future efforts to vaccinate marine wildlife against preventable diseases and safeguard populations against potentially devastating losses.

Feral, abandoned, and other outdoor cats (also called "at-large"cats) have substantial, documented negative impacts on wildlife and are responsible for numerous mammal, reptile, and bird species extinctions. Cats function as vectors for several diseases, some of which have deleterious effects on human, wildlife, and domestic animal health. Cats are the sole definitive hosts of the protozoal parasite Toxoplasma gondii, which spreads when the cat sheds the oocysts (eggs) in their feces.

Feral cats and toxoplasmosis have long been known as threats to terrestrial species, but in recent years, it has become apparent that toxoplasmosis also poses a major threat to marine mammals, most notably the endangered Hawaiian monk seal. While all cats have the potential to carry the disease, indoor pet cats are much less likely to spread the disease as long as their litter is properly disposed of. Feral cats in particular are thought to be the primary vectors of the disease in Hawaii.

Photo Credit: Jason Jones, 2010

On the island of Oahu alone, there are an estimated 50,000–300,000 feral cats. Since 2001, there have been a minimum of eight monk seal deaths attributable to toxoplasmosis in the Hawaiian Islands, including at least three since April 2014. An additional two deaths are suspected, and these numbers are likely a significant underestimate as NMFS is unable to recover every monk seal carcass, and, of those we do recover, some have decomposed beyond the point where identification of diseases like toxoplasmosis is possible.

NMFS staff from the Pacific Islands Regional Office and Fisheries Science Center, in collaboration with the Department of Land and Natural Resources Division of Aquatic Resources, convened a workshop in May 2016 that included representatives from state and federal agencies. The goals of the workshop were to learn about the impacts of toxoplasmosis and feral cats on wildlife and human health, discuss solutions, and focus on implementing next steps to reduce the negative impacts of toxoplasmosis. One of the outcomes was the creation of an interagency working group—the Toxoplasmosis and At-large Cat Technical Working Group (TACTWG)—consisting of federal, state, and county agencies committed to sharing information and resources to reduce the impacts of feral, abandoned, and outdoor cats. This working group continues to grow and develop, reaching out to potential partner agencies, engaging with stakeholders, discussing community outreach messaging, initiating literature reviews to better understand proposed solutions to the problem, and organizing symposia at local conservation conferences among other actions.

Encourage Community-led Monk Seal Stewardship and Citizen Science
NMFS' community engagement and monk seal monitoring efforts are cornerstones of our recovery program, and they dovetail in the form of a dedicated network of volunteers. Volunteers across the islands work with various partner agencies and organizations to report seal sightings and observe seals on local beaches. Volunteers also spend many hours answering questions and educating visitors and community members about the Hawaiian monk seal. NOAA Fisheries and partners maintain a seal reporting "hotline" and coordinate a network of partners, staff, and volunteers throughout the MHI that responded to more than 7,000 reports of monk seal sightings, haul-outs, and other incidents in 2016.

As of May 22, 2016, NOAA Fisheries welcomed a new grantee partner, the Hawaii Marine Mammal Alliance (HMMA), via a competitive federal funding opportunity award. HMMA assumed volunteer coordination duties on the islands of Oahu and Molokai. Between June and December of 2016, they received 1,445 sightings reports, spent 3,675 hours on the beach sharing information with community members and tourists about monk seals, and spoke to 12,806 members of the public. HMMA has also provided a weblink where members of the public can submit information about monk seal sightings, including uploading photos, which was previously unavailable and makes reporting a seal easier for individuals uncomfortable with calling the hotline or who simply prefer to report via the web.

Partnerships like these enable us to have eyes, ears, and hands available to assist with monk seal conservation efforts across the state of Hawaii, and provide outreach and education in more venues than would ever be possible for a single organization acting alone.

Develop and Implement Strategic Communications Plan and Social Marketing Strategy
In commemoration of 10 years since the publication of the revised Recovery Plan for the Hawaiian Monk Seal, NMFS Pacific Islands Fisheries Science Center and Regional Office designated 2017 as the "Year of the Monk Seal." This campaign is comprised of a series of events and recovery actions to thank public and private partners, engage local communities, raise awareness of the plight of monk seals, continue cutting-edge research, and build and momentum for the next 10 years and more of monk seal recovery.

The Year of the Monk Seal is also a celebration of the new, positive population estimate of 1,400 animals, reflecting a 3 percent average annual growth rate since 2013. Though the new population estimate is encouraging and the species appears to be moving in the right direction, monk seals still face numerous threats and will likely experience ups and downs on the road to full recovery.

Over the last decade, NMFS has collaborated with numerous agency, non-governmental, and community partners to engage in concerted research and recovery efforts to save monk seals. In addition, NMFS has provided grant funding and technical support for community-based projects that have sought to engage students, volunteers, and other stakeholder groups in monk seal conservation and outreach activities. These efforts have produced websites devoted to the ecology and conservation of monk seals, and public service announcements, among other outreach efforts.

Summary
Although more work remains to recover the species, NMFS and our partners have made significant headway in reducing the extinction risk of Hawaiian monk seals. We celebrate the encouraging news of the recent population increase, which inspires us to continue to work diligently across the archipelago to combat threats to monk seals and more than six decades of population decline. Through the Species in the Spotlight program, we continue to build and leverage strategic partnerships that will contribute to and complement our recovery efforts as we work toward recovery of Hawaii's native seal.

Hawaiian Monk Seal Spotlight Hero Ke Kai Ola: The Marine Mammal Center

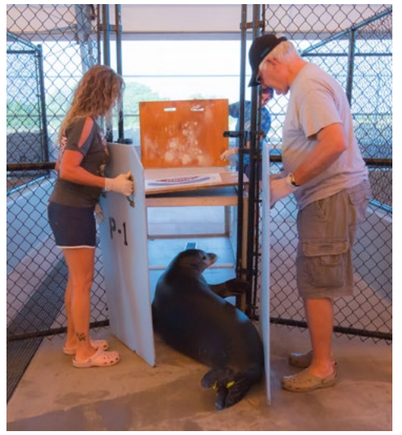
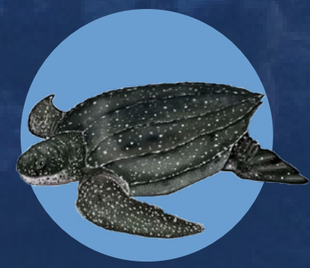


Photo Credit: Julie Steelman, Ke Kai Ola

Since opening in 2014, The Marine Mammal Center's Ke Kai Ola facility has played a critical role in Hawaiian monk seal recovery. The hospital is unique in that it is entirely dedicated to rehabilitating Hawaii's endemic and endangered seal. The Marine Mammal Center has been a valuable partner for many years—decades of experience rehabilitating pinnipeds in California—and with the opening of the Hawaii Island facility, rehabilitation has become an option for more seals and opened a new chapter in monk seal conservation and recovery. A total of fifteen malnourished seals have been successfully rehabilitated and returned to their homes, and four more are currently being fattened- up and awaiting their winter 2017 release to the NWHI. Monk seal rehabilitation presents its own unique set of challenges, which Ke Kai Ola's staff has faced with tireless dedication. With a total population of just 1,400 animals, these rehabilitated seals play an invaluable role in maintaining, and hopefully building, population numbers in the NWHI. Without Ke Kai Ola, many of these seals had virtually no chance of survival, and in only a few short years, Ke Kai Ola has rehabilitated about 1 percent of the total population. In addition to the role Ke Kai Ola has played in rehabilitation, they have also contributed resources and staff for numerous other Hawaiian monk seal projects, including participating in stranding response activities that occur on the island of Hawaii and neighboring islands, engaging communities through outreach on the beach and in the classroom, helping with the initial stages of the morbilivirus vaccination program, and contributing to the long- term monk seal specimen archive. The Ke Kai Ola staff is dedicated to monk seal conservation, incredibly knowledgeable, and exemplifies the collaborative spirit that the Species in the Spotlight initiative seeks to foster and highlight.

SPECIES *in the* SPOTLIGHT



Pacific Leatherback
Sea Turtle

Pacific Leatherback Sea Turtle

Credit: R. Tapilatu

Pacific leatherbacks (*Dermochelys coriacea*) are one of the most endangered of all the sea turtle species in the world. Through the Species in the Spotlight initiative, NMFS and the U.S. Fish and Wildlife Service (the Services), are working with numerous international and domestic partners to strengthen efforts to prevent the extinction of Pacific leatherbacks.

Pacific leatherbacks are composed of two separate nesting populations—the Eastern Pacific and the Western Pacific. The Eastern Pacific population nests mainly in Mexico and Costa Rica, with some additional nesting in Nicaragua, and forages on gelatinous organisms throughout the Eastern Pacific Ocean. The Western Pacific population nests mainly in Indonesia with some additional nesting in Papua New Guinea and the Solomon Islands. This population forages throughout the Western Pacific and Southeast Asian region, and migrates across the Central North Pacific to forage along the West Coast of the United States. NMFS has taken significant efforts to protect Pacific leatherbacks in U.S. waters—from designating critical habitat on the west coast of the United States to management measures that have significantly reduced bycatch of leatherbacks in U.S. federally-managed commercial longline and drift gillnet fisheries. For example, the Hawaii pelagic shallow-set fishery has an annual limit of 34 allowable leatherback interactions. The fishery is closed for the remainder of the year if this interaction level is reached. Further, the Services have worked hard to support capacity building throughout the Pacific on the nesting beaches, as well as to reduce sea turtle bycatch in small-scale coastal fisheries around the Pacific as well as high seas commercial fisheries.

Because the 97 percent decline of the Eastern Pacific population, and the 80 percent decline of the Western Pacific population, these efforts are critical. Sea turtles are long-lived, late maturing species. Leatherbacks reach sexual maturity and reproduce for the first time between 12-30 years old, so it can take years to see the results of conservation activities, depending on what life stage they target.

Further, many threats impact leatherback populations. These threats include fisheries bycatch, directed harvest of turtles and eggs, coastal development, deforestation, pollution, marine debris, disease and climate change. The ESA is a critical tool to protect leatherbacks in the United States and around the world. Because of the dire status of Pacific leatherbacks, consistent and long-term efforts are necessary to achieve recovery. The Species in the Spotlight initiative has enabled us to bring additional attention to the efforts needed to prevent the extinction of Pacific leatherbacks.

Recovery Progress

Since the launch of the Species in the Spotlight initiative in May 2015, the Services and their partners have been working to implement a five-year action plan for Pacific leatherbacks. The action plan focuses on five critical areas to improve conservation efforts:

1. Reduce interactions in fisheries.
2. Improve nesting beach protection and increase reproductive output through outreach and community support.
3. Cooperate with international partners to implement conservation measures and established agreements.
4. Understand migratory and pelagic threats to better implement mitigation measures.
5. Raise awareness and education of actions the public can take to support leatherback turtle conservation.

Reduce Interactions in Fisheries

The Services have, through either direct or in-kind support, aided the efforts of partners across the Pacific to understand and address bycatch of Pacific leatherbacks in various fisheries. The Species in the Spotlight initiative directed all NMFS grant programs to highlight this threat as a priority. As a result, during FY 2015–2016, NMFS awarded over $300,000 in competitive grants to conduct sea turtle bycatch assessments in coastal fisheries of Panama, Columbia, Peru, Chile, and Philippines. These projects identify sources of leatherback bycatch, conduct trials to reduce bycatch, and provide educational outreach to fishermen to raise awareness and technical capacity to reduce bycatch. The U.S. Fish and Wildlife Service provided a grant to the Inter-American Sea Turtle Convention to support an outreach project to bring Peruvian fishermen to Mexican nesting beaches to see where the leatherbacks off the coast of Peru originate. The trip inspired the fishermen to do more to conserve leatherbacks in their waters.

Improve Nesting Beach Protection and Increase Reproductive Output through Outreach and Community Support

Through the U.S. Fish and Wildlife Service, Marine Turtle Conservation Act (MTCA) grant program, critical nesting beach protection has been carried out in Costa Rica, Mexico, and Nicaragua in the Eastern Pacific. In the Western Pacific, the MTCA has supported nesting beach

conservation in the Solomon Islands and Indonesia. NMFS has also provided technical capacity building and training to projects in Mexico and Indonesia. In Papua, Indonesia, the Services have been collaborating with the State University of Papua (UNIPA) over the last decade to develop a strong nesting beach conservation program and to garner community support for leatherback protection. This partnership has been critical to setting the foundation to stabilize and recover Western Pacific leatherbacks at their primary nesting rookery. As a result, this year's Species in the Spotlight hero for leatherbacks is UNIPA.

Cooperate with International Partners to Implement Conservation Measures and Established Agreements
The Services have continued to work through multilateral agreements, such as the InterAmerican Convention for the Protection and Conservation of Sea Turtles, to support efforts to strengthen regional efforts to protect Pacific leatherbacks. The Convention has formed an Eastern Pacific Leatherback Task Force, composed of all of the countries that have nesting beaches and/or important foraging areas that support Pacific leatherbacks. Together the countries are working to identify key activities to reduce threats to leatherbacks. Only when all the range states are taking efforts to conserve Pacific leatherbacks will we be able to stop the decline.

In the Western Pacific, the Services along with U.S. Department of State are working with the government of Indonesia to identify ways to strengthen our shared commitment to protect and recover leatherbacks.

Credit: Scott Benson, NMFS SWFSC

Photo Credit: Scott Benson, NMFS SWFSC

Understand Migratory and Pelagic Threats to Better Implement Mitigation Measures
In September 2016, NMFS' SWFSC conducted integrated studies combining aerial surveys, satellite telemetry, and animal-borne video to document leatherback distribution, density, foraging behavior, and migratory movements. Satellite transmitters were deployed on seven leatherback turtles, and coast-wide aerial surveys identified a single foraging ground with high densities of leatherback prey (brown sea nettles) off San Francisco, CA. This research is part of an ongoing monitoring program to document variation in leatherback distribution and habitat use as ocean conditions change at seasonal, interannual and decadal scales. Such data are essential for developing model-based tools to predict leatherback habitat and distribution, which will allow managers to reduce spatio-temporal overlap between leatherbacks and fisheries that may incidentally harm them. The project is part of NMFS' ongoing research in support of Pacific leatherback recovery and is supported financially by NMFS' Stock Assessment Improvement Plan funding and the Office of Marine and Aviation Operations.

Raise Awareness and Education of Actions the Public Can Take to Support Leatherback Turtle Conservation
A key component to recover Pacific leatherbacks is public support. NMFS has used its website and social media accounts to promote leatherbacks during its annual Sea Turtle Week in June 2016 and 2017. Further, in October 2016, NMFS held its first celebration of California Leatherback Day. The celebration highlighted the Species in the Spotlight initiative, as well as the collaborative work with our international partners and what U.S. fishermen have done to reduce leatherback bycatch. This will become an annual event to highlight the advances made in leatherback conservation as well as to continue to call for action to sustain the conservation and recovery work over time.

Summary
Pacific leatherbacks among the most endangered sea turtles in the world. The Species in the Spotlight initiative has brought renewed attention to their plight. With sustained support and protection under the ESA, the Services are working with domestic and international partners to stabilize the population and move it towards recovery. Over the next three years, the Services will continue to implement actions under the five key areas of the five-year action plan.

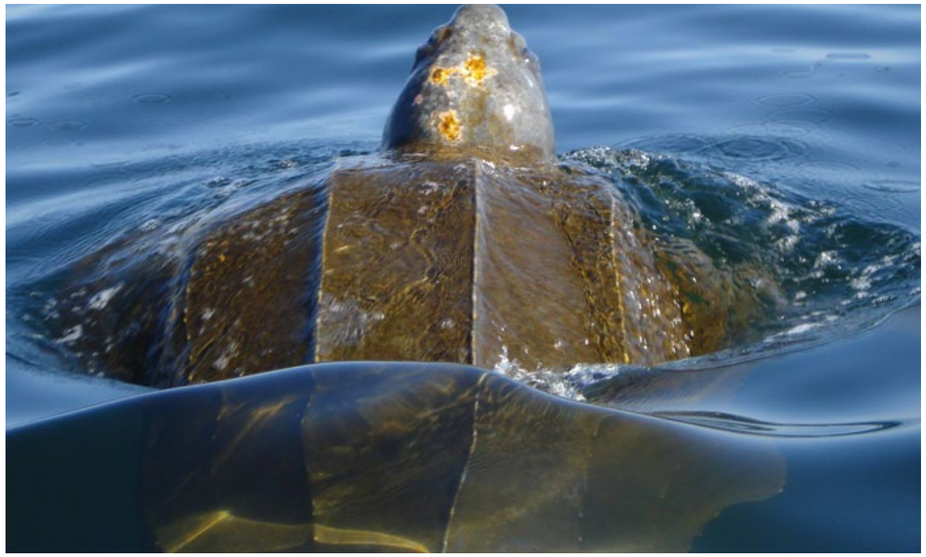
Leatherback Spotlight Hero The State University of Papua

Photo Credit: Julie Steelman, Ke Kai Ola

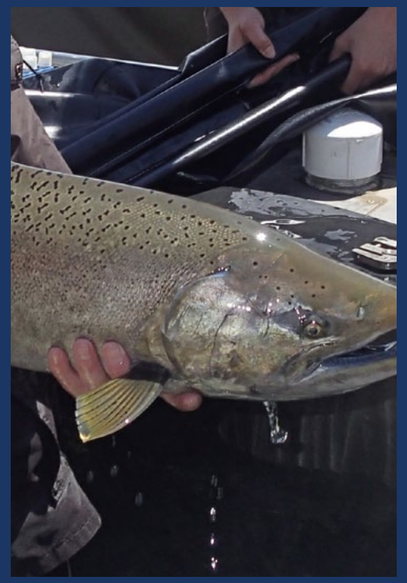
The State University of Papua (UNIPA) has been actively engaged in recovering the largest remaining leatherback nesting population in the Western Pacific for more than 10 years. UNIPA has worked at "ground zero" for leatherback conservation in the Western Pacific and has been an essential partner for implementing NOAA's Species in the Spotlight five-year action plan. UNIPA researchers and students, and their international collaborators, have worked tirelessly to establish a science-based management plan that minimizes nest failure and enhances hatchling production. UNIPA has also worked with communities and local partners, including the Tambrauw government, to gain support and trust, and to engage them as stakeholders in implementing priority conservationactions—ensuring that they benefit from leatherback conservation.

The challenges on the ground are many, but the UNIPA leatherback project continues to persist with unwavering determination. Fitry Pakiding, who has been the heart and soul of the project in recent years, received the award on behalf of UNIPA. Fitry Pakiding has a strong sense of responsibility towards the conservation of this leatherback population, and despite all the challenges, her dynamic involvement, common-sense approach, and wisdom have energized leatherback conservation efforts in Papua.

Credit: Scott Benson/NOAA



Credit: Alex Eilers/NOAA



SPECIES *in the* SPOTLIGHT

Sacramento Winter-Run
Chinook Salmon

Sacramento Winter-Run Chinook Salmon

Photo Credit: Andrew Jensen

Chinook salmon (*Oncorhynchus tshawytscha*), commonly known as king salmon, are an iconic part of California's natural heritage and their recovery will help ensure the economic and recreational well-being of future generations. Endangered Sacramento River winter-run Chinook salmon are particularly important among California's salmon runs because they exhibit a life-history strategy found nowhere else. These Chinook salmon are unique because they spawn during the summer months when air temperatures usually approach their warmest. As a result, winter-run Chinook salmon require stream reaches with cold-water sources to protect their incubating eggs from the warm ambient conditions. Because of this need for cold water during the summer, winter-run Chinook salmon historically spawned only in rivers and creeks fed by cold water springs, such as the Little Sacramento, McCloud, and Pit Rivers, and Battle Creek.

The construction of Shasta and Keswick Dams eliminated access to the Little Sacramento, McCloud, and Pit Rivers, extirpating the winter-run Chinook salmon populations that spawned and reared there. The fish from these three different populations above Shasta Dam were forced to mix and spawn as one population downstream of Keswick Dam on the Sacramento River. Construction and operation of hydropower facilities in Battle Creek made the creek inhospitable to winter-run Chinook salmon, which resulted in extirpation of the population from that area.

Today, only the one population of winter-run Chinook salmon spawning downstream of Keswick Dam exists. Over the last 10 years of available data (2007–2016), the population's abundance of spawning adults ranged from a low of 738 in 2011 to a high of 5,920 in 2013, with an average of 2,704. The earliest abundance data comes from the late 1960s when up to 117,000 winter-run Chinook salmon spawning adults were estimated. The population crashed in the 1970s and has persisted in large part due to managed cold- water releases from Shasta Reservoir from the spring through the fall, and artificial propagation from Livingston Stone National Fish Hatchery's winter-run Chinook salmon conservation program. Thus, winter-run Chinook salmon are dependent on sufficient cold water storage in Shasta Reservoir, and it has long been recognized that a prolonged drought could have devastating impacts, possibly leading to the species' extinction.

Without marshalling our resources and continued and heightened engagement with our vital partners, Sacramento River winter-run Chinook salmon may be lost to future generations.

Recovery Progress

Since the launch of the Species in the Spotlight initiative in May 2015, there has been substantial progress on winter-run Chinook salmon recovery efforts, including advancement of each of the five key actions in the five-year action plan:

1. Improve management of Shasta Reservoir coldwater storage.
2. Restore Battle Creek and reintroduce winter-run Chinook salmon.
3. Reintroduce winter-run Chinook salmon into McCloud River.
4. Improve Yolo Bypass fish habitat and passage.
5. Manage winter and early spring delta conditions to improve juvenile survival.

Improve Management of Shasta Reservoir Coldwater Storage

The NMFS' SWFSC has made substantial progress on water temperature modeling and biological models over the past three years. This includes a physical model of Shasta Reservoir that has been coupled with a Sacramento River model. Together, these models can provide seasonal forecasts of water temperature in the Sacramento River and the associated impacts on cold water storage in Shasta Reservoir.

The SWFSC also developed a novel egg mortality model to discern how water temperatures are expected to affect Chinook salmon egg survival. The model is a temperature-dependent mortality model for Chinook salmon embryos that differs from previous models in that thermal tolerance parameters were estimated using field egg-to-fry survival data, rather than assuming thermal tolerance parameters measured in laboratory studies. The SWFSC found strong evidence that significant thermal mortality occurred during the egg stage in some years due to a ~5°F reduction in thermal tolerance in the field compared to laboratory studies.

A water temperature control curtain was installed in Whiskeytown Reservoir in May 2016, allowing colder water to be diverted into Keswick Reservoir and down into the Sacramento River.

Restore Battle Creek and Reintroduce Winter-Run Chinook Salmon

The Battle Creek winter-run Chinook Salmon Reintroduction Plan was completed in 2016, providing a strategy to reintroduce winter-run Chinook Salmon into Battle Creek.

Reintroduce Winter-Run Chinook Salmon into McCloud River

A draft pilot plan for reintroducing winter-run Chinook salmon into the McCloud River was released by the California Department of Fish and Wildlife in 2016. Engineering designs for

instream and head-of-reservoir juvenile collectors were submitted by the California Department of Water Resources to the U.S. Bureau of Reclamation in spring 2016 for installation into the McCloud River.

The U.S. Geological Survey is conducting various studies to assess current conditions, including a juvenile salmon transit study through Shasta Reservoir. Initial results have shown higher than expected survival.

Improve Yolo Bypass Fish Habitat and Passage
A fish barrier at the Knights Landing Outfall Gates was designed and constructed in 2015 in order to reduce straying of adult winter-run Chinook salmon on their upstream migration to spawning grounds. This key project helps solve fish migration problems associated with the Yolo Bypass and Colusa Basin Drain. The project was championed by Sacramento Valley farmers (Reclamation District 108) in partnership with The Sacramento River Salmon Recovery Program and state and federal support. The Wallace Weir Fish Rescue Project is under construction and is expected to be completed in the fall of 2017. A major goal of the project is to prevent adult winter-run Chinook salmon from straying into Colusa Basin agricultural ditches and rescue them from the Yolo Bypass so they can be returned to the Sacramento River. The project includes replacing a seasonal earthen dam at Wallace Weir with a permanent, operable structure that would provide year-round operational control, and constructing a fish rescue facility.

Credit: John MacMillian/NOAA Fisheries

Photo Credit: NOAA

Manage Winter and Early Spring Delta Conditions to Improve Juvenile Survival
The Collaborative Adaptive Management Team Salmon Scoping Team Gap Analysis Report was completed in January 2017. This report provides research direction by identifying gaps in the current understanding of water project-linked effects on juvenile salmonid survival in the south Delta.

The Interagency Ecological Program comprised of seven agency directors requested a multi-agency technical team develop a focused framework for winter-run salmon monitoring. A report was completed in July 2016, and several of the recommendations for improved data generation and reporting are being implemented in 2017.

A 90 percent design on an optimized bio-acoustic fish fence alignment at Georgiana Slough has been completed. The California Department of Water Resources and U.S. Bureau of Reclamation are in the process of securing funding.

The SWFSC completed a winter-run life cycle model that can evaluate how different water project operations and management actions (harvest, habitat restoration, and climate change) influence the long-term viability of winter-run. It has been applied in the development of a biological opinion on California Water Fix, a science-driven upgrade to California's aging water system. Improvements to the enhanced particle tracking model for the Delta component of the life cycle model were made in 2016 and continue to be refined.

Acoustically tagged winter-run Chinook salmon juveniles were tracked in winter and spring of 2016 and 2017, providing real-time fish distribution information to help managers determine the survival of the juveniles from their release location in Redding through Chipps Island in the western Delta.

Summary
The 2015 launch of the Species in the Spotlight initiative for winter-run Chinook salmon came during the worst drought on record in California. California experienced well below average precipitation from 2012 through 2015, record high surface air temperatures in 2014 and 2015, and record low snowpack in 2015. Some paleoclimate reconstructions suggest that this recent drought was the most extreme in the past 500 or perhaps more than 1,000 years. Not surprisingly for a species dependent on ample cold water, the viability of winter-run Chinook salmon decreased during the drought. However, the impact could have been worse if not for major efforts to protect winter-run Chinook salmon, including Species in the Spotlight actions. In particular, water temperature management supported by strong science from the SWFSC greatly increased egg-to- fry survival in 2016. Numerous winter-run Chinook salmon actions were undertaken over the last few years and there are reasons for hope. First, as bad as the drought was, the winter-run Chinook salmon population continues to meet the low extinction risk criteria for abundance. Second, significant partnerships have formed with the goal of recovering winter-run Chinook salmon. The Sacramento River Salmon Recovery Program led by the Northern California Water Association, TNC, Cal-Trout, and American Rivers, in partnership with state and federal agencies have greatly accelerated the pace of restoration and the partnership continues to strengthen. Lastly, the drought conditions that started in 2012 have ended with an extremely wet 2016/2017 winter, which bodes well for providing cold water throughout the 2017 spawning and egg incubation season.

Photo Credit: NOAA

Sacramento Winter-Run Chinook Salmon Spotlight Hero Lewis Bair

Photo Credit: Robin Abcarian/Los Angeles Times

Lewis Bair, General Manager of Reclamation District 108, has been a leader in northern California water and salmon issues for many years. As part of the Sacramento Valley Salmon Recovery Program, Lewis has helped implement numerous actions to benefit Sacramento River winter-run Chinook salmon. Most notably, Lewis's efforts led to the funding of two major projects—both of which were included in the five-year action plan: a fish barrier at the Knights Landing Outfall Gates and the Wallace Weir Fish Rescue Project. Reclamation District 108 contributed approximately $500,000 to the permitting and design of the fish barrier at Knights Landing Outfall Gates, which should reduce the straying of adult salmon on their upstream migration to spawning grounds. The Wallace Weir Fish Rescue Project, currently under construction, is expected to prevent adult salmon from straying into agricultural ditches and will help rescue salmon from the Yolo Bypass, so they can be returned to the Sacramento River. Furthermore, the Sacramento Valley Salmon Recovery Program was instrumental in restoring winter-run Chinook salmon spawning habitat with the implementation of the Painter's Riffle Anadromous Fish Habitat Enhancement Project completed in December 2014. This project occurred through significant coordination among water users, the salmon fishing industry, environmental groups, and federal and state agencies, kicking off an accelerated pace of salmon habitat restoration.

SPECIES *in the* SPOTLIGHT

Southern Resident
Killer Whale

Southern Resident Killer Whale

Photo Credit: Candice Emmons NMFS Northwest Fisheries Science Center

Southern Resident killer whales (*Orcinus orca*) experienced ups and downs through 2015 and 2016. From late 2014 through 2015, eight calves were born, and seven of these survived their first year. In 2016, however, the loss of one of the oldest matriarchs J2, also known as Granny, and six other individuals, left only 78 whales remaining in the population at the end of 2016. This is the lowest number since 77 whales were counted in 1985. A 2016 five-year review of the population provides an overview of the population status, a detailed analysis of new information gathered in the last five years, and progress toward meeting the recovery goals (for a list of recent scientific publications see http://www.westcoast.fisheries.noaa.gov/publications/status_ reviews/marine_ mammals/kw-review-2016.pdf). The review concluded that the Southern Residents remain at risk of extinction and should remain listed as endangered. Based on their endangered status, declining population trend and risk of extinction from three primary threats- insufficient prey, high levels of contaminants and disturbance from vessels and sound- the Southern Residents were identified as a Species in the Spotlight in 2015 and a five-year action plan highlights priority actions to take in 2016–2020. Implementing the highest priority near-term actions continues a long-term effort to support research and conservation for Southern Resident killer whales.

Recovery Progress

Over the last two years we have made progress including developing new partnerships, securing some external funding, and implementing a variety of ongoing research and conservation. We worked with our partners to advance each of the five actions in the five-year action plan:

1. Protect killer whales from harmful vessel impacts through enforcement, education, and evaluation.
2. Target recovery of critical prey.
3. Protect important habitat areas from anthropogenic threats.
4. Improve our knowledge of Southern Resident killer whale health to advance recovery.
5. Raise awareness about the recovery needs of Southern Resident killer whales and inspire stewardship through outreach and education.

Protect Killer Whales from Harmful Vessel Impacts through Enforcement, Education, and Evaluation

Protecting the whales from disturbance from boats remains a top priority. In 2016 our partners at Washington Department of Fish and Wildlife (WDFW) secured a second ESA Section 6 grant to reduce disturbance from boats by expanding outreach and education efforts, analyzing vessel interactions, and improving whale-watching guidelines (FY 2016–2018 total $864,473). NMFS and WDFW patrols on the water, supported through a Joint Enforcement Agreement, have been successful in raising awareness and increasing compliance with the Federal and State regulations and Be Whale Wise guidelines. The Soundwatch Boater Education Program provides guidance to boaters and also monitors compliance, documenting the positive influence of enforcement on boater behavior. The Soundwatch compliance data is a key long term data set to inform the ongoing evaluation, to be completed in 2017, of the effectiveness of the current vessel regulations.

To better understand the effects of vessels on the behavior of the whales, the NMFS' Northwest Fisheries Science Center (NWFSC) continues to analyze sound and behavioral data collected from 2010–2014. A new Killer Whale Research and Conservation program in partnership with the National Fish and Wildlife Foundation (NFWF), Sea World, U.S. Fish and Wildlife Service and NMFS started in 2015, and is providing additional support for these analyses. To date, this study has found that the speed of vessels was the most important factor determining the level of sound the whales receive. The study is also evaluating whether the recently implemented vessel regulations have reduced sound and disturbance. Recent studies also calculated the increased energy the whales need to spend when communicating in a noisy environment.

In 2015–2016 NMFS engaged in a new transboundary partnership led by the Port of Vancouver, British Columbia, to understand and manage the impact of shipping activities on at-risk whales in British Columbia, including the Southern Residents. Participating on both advisory and technical committees, NMFS has contributed to setting goals and objectives for the Enhancing Cetacean Habitat and Observation Program (ECHO) to benefit transboundary species.

Target Recovery of Critical Prey

Lack of sufficient salmon prey is potentially a key factor limiting recovery of the population. Knowing where and when the whales are most food-limited is essential for targeting recovery of salmon stocks that will most benefit the whales. Knowing which salmon species and stocks the whales are eating is a critical first step in targeting recovery efforts and is an ongoing research focus. The NWFSC completed a cruise along the West Coast in February and March 2016, which increased our understanding of the whales habitat use and prey needs in coastal areas, including information on specific salmon stocks consumed. The NWFSC also published

new information on prey from fecal samples, including new information on the importance of coho salmon in the diet of the whales. With support from the Pacific Salmon Commission, the NWFSC is continuing their study of both Puget Sound and coastal food webs, focusing on salmon predators. Initial results indicate that other marine mammals, especially increasing populations of seals and sea lions, are major salmon consumers and are likely an important source of competition to the Southern Resident killer whales. Releases of salmon from hatcheries provide an important contribution to the prey base for the whales. With NFWF funding in 2015, the NWFSC is evaluating the effects of hatchery practices on the prey of the whales.

Salmon recovery is a long-term, coast-wide effort to address many threats for multiple salmon species and stocks throughout the west coast (see Sacramento Winter-run Chinook Salmon and CCC Coho Species in the Spotlight updates). NMFS continues to work with partners to connect salmon and killer whale recovery efforts. For example, partners such as the Whale Scout program (http://www.whalescout.org/) engaged whale advocates in 2015 and 2016 to conduct hands-on salmon habitat restoration projects. In 2015, NFWF and others funded the Salish Sea Marine Survival Project to understand sources of mortality of salmon in transboundary waters. In 2016, NFWF funded Restore Americas Estuaries to create juvenile salmon rearing habitat in the Skagit River to increase the prey available to the whales.

Protect Important Habitat Areas from Anthropogenic Threats

Currently, critical habitat for the whales is designated only in the core summer range in the Salish Sea. However, the whales spend most of the winter and a substantial portion of all seasons in outer coastal waters. NMFS is currently developing a revision to critical habitat for the Southern Resident killer whales to include outer coastal areas with essential physical and biological features to support conservation of the whales. To support this effort, the NWFSC analyzed data from satellite tagging, acoustic recorders, coastal sampling and sightings to describe how the whales use outer coastal habitat. New information on outer coastal habitat use, analysis of coastal prey samples, and information on Chinook salmon distribution are all important for understanding the habitat needs of the whales along the outer coast and the benefits of designating particular areas as critical habitat.

Photo Credit: NMFS Southwest Fisheries Science Center and Vancouver Aquarium

NMFS met with colleagues at the Department of Fisheries and Oceans Canada to discuss threats to habitat from acoustic sources. We identified ongoing partnerships and opportunities for collaborating to better characterize the ambient sound levels in killer whale habitat. NMFS is also partnering with the U.S. Navy to support acoustic studies and characterization of different sources of anthropogenic noise.

Improve Our Knowledge of Southern Resident Killer Whale Health to Advance Recovery

In 2015 and 2016 NMFS West Coast Region, NWFSC, SWFSC and partners at University of California Davis held health workshops to bring experts together to evaluate the nutritional status and health of the whales. These workshops included developing health assessment tools, identifying resources for intervention, and pulling data together from multiple studies into a comprehensive database. NFWF supported these efforts with a grant in 2015, and the pilot database developed by the Marine Mammal Foundation was presented at the 2016 workshop. Identifying and incorporating multiple data sets into the database will enable focused analyses to pinpoint which health parameters are most important to the whales and help target management actions to support population growth.

One influential study featured at the health workshops was the ongoing SWFSC-led collaboration with the Vancouver Aquarium to use Unmanned Aerial Vehicles to collect aerial images of both Southern and Northern Residents to evaluate growth, body condition, and pregnancy (Durban et al. 2015). This study has been successful in imaging all members of the SRKW population in 2015 and 2016, with three years of comparative data from Northern residents from 2014–2016. Photogrammetry analyses of these data are underway, and continuing data collection in multiple seasons in 2016 and 2017 is supported through a 2015 NFWF grant, which will provide insight into where and when the whales are food limited. A 2016 NFWF grant expanded this study by comparing the photogrammetry measurements with health biomarkers in skin and blubber, specifically to explore the importance of both nutrition and contaminants, as well as their possible interaction, on whale health. This study will incorporate samples collected and analyzed by the NWFSC to better understand the health factors that may be driving the whale's observed body conditions. In 2016, NFWF also funded the University of Washington to analyze fecal samples to evaluate toxin levels and use hormone assays to infer nutritional status and potential impacts to pregnancy. The NWFSC is working with killer whales at Sea World under a 2016 NFWF grant to assess transfer of persistent organic pollutants from females to their calves. In 2016 NMFS also completed a review on contaminants, including considerations of how mixtures of different compounds interact to affect the whales. There are other ongoing NWFSC studies to evaluate the health implications of inbreeding and to study the health implications of bacteria found in the whales' lungs.

Another source of information on the health of the whales is through investigations of stranded whales. In 2016, two Southern Resident killer whales stranded in Canada and the ongoing investigations are providing new insights into health issues. In March 2016 an adult male, L95, died from a fungal infection that may have been related to a satellite tag attachment. In order to evaluate the risk of this pathogen to other whales, the NWFSC is testing for the presence of this fungus in previously collected killer whale samples and in samples for other stranded marine mammals. At the end of 2016 an adult male, J34, died of blunt force trauma and the case is still under investigation. U.S. and Canadian veterinarians and pathologists are reviewing all killer whale strandings along the west coast and have highlighted the role anthropogenic factors,

such as ship strikes and fishery interactions, and environmental factors, such as disease, can play on health and mortality. Ongoing efforts to combine results using multiple methods through stranding investigations, a health database and new partnerships will greatly expand our knowledge and strengthen the support for conservation actions.

Raise Awareness about the Recovery Needs of Southern Resident Killer Whales and Inspire Stewardship through Outreach and Education
Public support is essential to conservation of at-risk species. The Species in the Spotlight initiativehas created a new campaign to spread messages about the whales through social media, videos, and web pages. Even more importantly, we are developing partnerships that reach new audiences to raise awareness about the whales, and the threats they face. Many partners inspire stewardship of the whales and their habitats by educating concerned citizens about actions they can take to help recovery the whales. NMFS has long-standing partnerships with education and outreach experts at institutions in the region, such as The Whale Museum and Seattle Aquarium. In 2015 and 2016, new opportunities and partnerships have helped expand the reach of several education programs. In 2015, the National Ocean Service Hollings Grant program funded Killer Whale Tales, a classroom program inspiring students and their families to take an active role in conservation. Killer Whale Tales partnered with NOAA's National Marine Sanctuary program and have expanded into California, to cover the full range of the whales. During the 2015–2016 school year, Killer Whale Tales reached 12,742 students in 312 classrooms, and Jeff Hogan, the Executive Director, was recognized as a Species in the Spotlight Hero. In 2016, The Whale Trail received a Hollings Grant to support land-based viewing at a network of sites along the range of the whales and has expanded into California as well as British Columbia with Canadian partners.

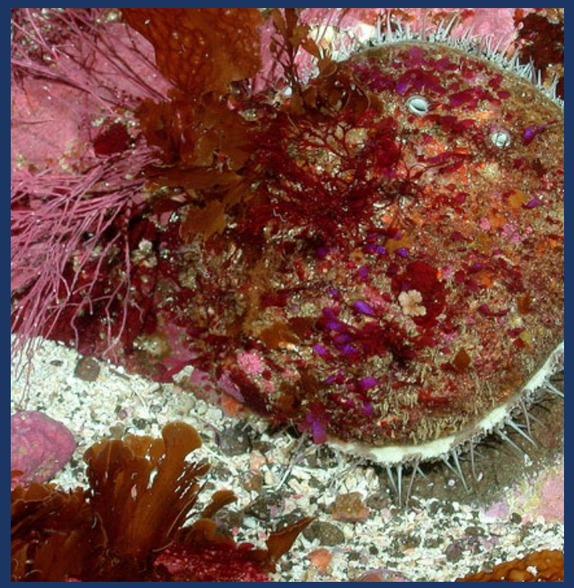
Summary

In summary, over the past two years we have continued to improve our understanding and ability to protect this unique population. Through the work of our scientists and regional partners, we have made significant progress on many of the key actions identified in the Southern Resident Killer Whale five-year action plan. Despite these efforts, the population has not grown and in fact has declined in abundance since it was first listed under the ESA. We clearly still have important work to do to bring Southern Resident killer whales back from the brink of extinction.

Southern Resident Killer Whale Spotlight Hero Jeff Hogan

Photo Credit: Deborah Giles of the Center for Whale Research

Jeff Hogan has partnered with NOAA for over a decade and has helped implement many important recovery actions for endangered Southern Resident killer whales. Jeff is the Executive Director of Killer Whale Tales, an environmental education program that uses storytelling and field-based science to inspire students to take an active role in the conservation of Pacific Northwest killer whales. Jeff has poured his heart and soul into this unique program and has helped promote awareness and conservation of killer whales to an audience that NMFS would normally be unable to reach. During the 2015–2016 school year, Jeff and Killer Whale Tales reached a record of 12,742 students in 312 classrooms at 206 schools, including new students and classrooms in California through an NOS Hollings Grant award and new partnerships with NOAA's National Marine Sanctuaries Program. Partnering with Killer Whale Tales has helped NMFS reach a new audience and successfully implement a variety of important actions in the Recovery and Species in the Spotlight five-year action plans. His program, Killer Whale Tales, inspires active stewardship in students and their families and allows them to participate in actions that make measurable differences for the whales and their environment. No other program takes such an ambitious approach to address multiple aspects of killer whale conservation or has such a strong record of evaluating the on the ground impact of recovery actions taken by dedicated individuals.



SPECIES *in the* SPOTLIGHT

White Abalone

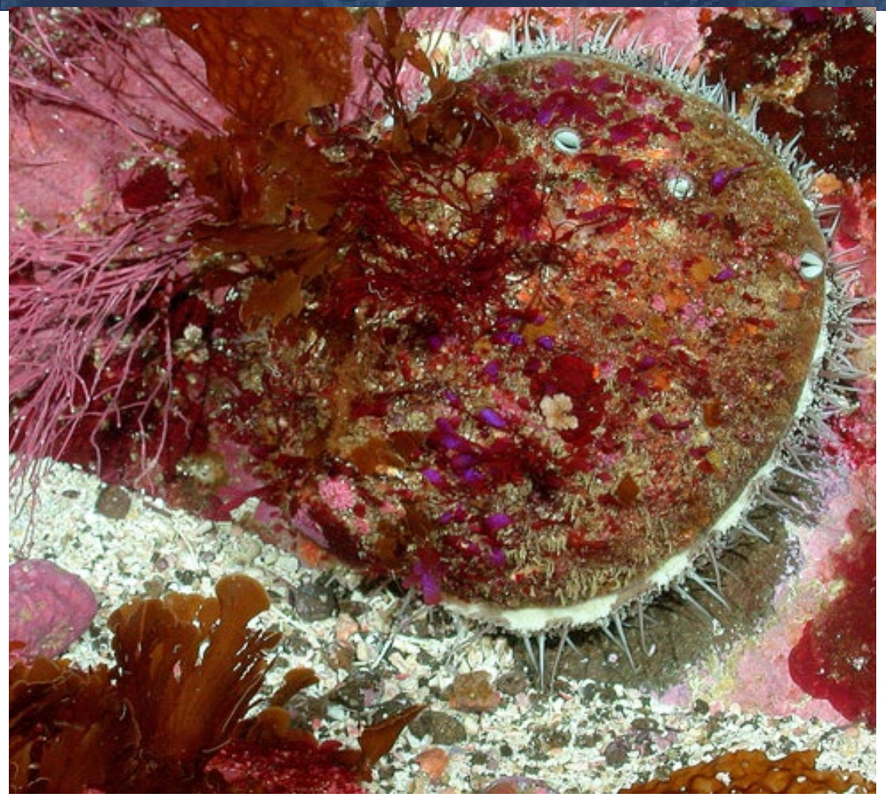


Photo Credit: NOAA

White abalone (*Haliotis sorenseni*) are herbivorous marine snails that historically occupied subtidal rocky reef habitats from Point Conception, California to Central Baja California, Mexico, and the offshore islands and banks. White abalone are thought to help sustain the health and diversity of kelp forest ecosystems through competition for food and space with species like urchins and brittle stars that can decimate kelp forests. Sexes are separate, and gametes are released freely into the ambient sea water during reproduction. Males and females must be in close proximity for successful fertilization to occur and recruitment events are likely episodic. White abalone are estimated to live a minimum of 30 years.

White abalone supported a brief but intense and profitable commercial fishery in southern California during the 1970s. The state fishery historically was managed using size limits and seasons, which did not account for density-dependent reproduction and assumed regular successful recruitment. A combination of factors, most notably overfishing, reduced numbers of this bottom-dwelling species to very low levels, resulting in a fragmented population. Results from remotely operated vehicle (ROV) surveys and population viability analyses suggested that the remaining individuals were too far from potential mates to successfully reproduce in the wild. The fishery closure in 1997 has not reversed this status. In 2001, white abalone was the first marine invertebrate to be listed as endangered under the ESA, a protective step that managers hoped would help white abalone to recover.

Monitoring of wild white abalone has confirmed that populations continue to decline in some areas, and the wild population is at high risk of extinction. Even if limited natural recruitment of white abalone is occurring, it is happening too slowly to give the species the foothold it needs to weather future threats and be viable over the long-term. The best way to safeguard white abalone against extinction is a captive breeding program aiming to produce young abalone. These captive- raised animals can enhance wild populations to the point that densities are boosted enough to sustain healthy and prolific populations without human intervention. One approach aimed at increasing abundance and reproductive success of white abalone in the wild would be to place these captive bred individuals (outplanting) in currently unoccupied areas or in groups of wild abalone and captive bred abalone. Continued monitoring of wild white abalone and their habitat must occur at the same time as captive breeding in order to identify habitats best-suited for future enhancement efforts and to track species' status over time.

Restoring white abalone to subtidal rocky reefs will help ensure a resilient kelp forest ecosystem (one of the most diverse marine ecosystems on earth), keep a culturally iconic species thriving, and ultimately may revive a once-thriving commercial and recreational industry.

Recovery Progress

Since the launch of the Species in the Spotlight initiative in May 2015, we have worked with many partners to make progress on the five key actions in the five-year action plan for the white abalone:

1. Expand a captive propoagation program.
2. Implement a successful outplanting program.
3. Monitor and enhance white abalone populations in the wild.
4. Identify, characterize, and prioritize existing and potential white abalone kelp forest habitat.
5. Develop a comprehensive, multi-institution outreach plan.

Because each of these key actions is intricately linked, we report on progress across all actions in the following narrative.

NMFS' recovery strategy for white abalone includes a captive breeding program to enhance wild populations in strategic locations in Southern California and Mexico (the historic range of the species) and a population and habitat monitoring program that is designed to track populations over time and determine whether the species is sustaining itself in the wild. Conservation efforts have focused on two recovery activities. The first is a captive propagation and enhancement program initiated to increase the number of captive-grown white abalone that can be reintroduced back into the wild. NMFS West Coast Region oversees the program in close coordination with the University of California at Davis' Bodega Marine Laboratory (UC Davis BML) and in partnership with five other facilities. The second is monitoring the demographics of the small population of wild white abalone and characterizing habitat use using ROVs and self-contained underwater breathing apparatuses (SCUBA) in the Southern California Bight and Baja California, Mexico. NMFS oversees this program in close partnership with the California Department of Fish and Wildlife (CDFW) and several other partners.

We have been working to implement four key actions to recover white abalone. The first is to develop methods for reliable and increased production of healthy captive-raised white abalone that will be used to increase the abundance and reproductive success of the wild population. The second is to determine the factors that lead to high survival rates of captive-raised animals in the wild. The third is to develop methods and tools that will effectively monitor the demographics of enhanced white abalone populations over time and gauge the overall success of the program. The fourth is to strengthen existing partnerships and forge new ones through the development of an outreach plan that communicates the key messages of the recovery program and highlights the important roles partners will play in recovering white abalone throughout its range.

The UC Davis BML leads our captive breeding program with six partners: University of California at Santa Barbara, Santa Barbara Natural History Museum Sea Center, Cabrillo Marine Aquarium, Long Beach Aquarium of the Pacific, NMFS SWFSC, and CDFW. The partners are making great strides in understanding what factors are important for successful reproduction of adults and survival of young abalone. For example, laboratory studies to identify the optimal light cycle for adults and field studies to identify the environmental conditions (and behavioral responses to them) that adults experience in nature are leading to improvements in laboratory holding tanks. As a result, production has increased steadily with each annual spawning since 2014. Today there are thousands of healthy white abalone being held in captivity.

NMFS issued an ESA permit last year making it possible to collect new broodstock from the wild for the 2017 spawning season. One of those newly collected animals contributed its eggs to the 2017 cohort, making it the first time since 2003 that new genes have been incorporated into the program. A new injection of genetic diversity into the captive population is intended to promote the overall health and resilience of the captive abalone. This should help improve their chances of surviving the challenge of being returned to the wild during experimental outplanting efforts.

Program scientists are currently trying to figure out what combination of conditions will help improve the chances of a successful transition from a captive setting to a wild subtidal kelp forest. In laboratory studies, young captive abalone are being raised on different substrates and being fed different diets in order to examine which factors influence survival. In nature, experimental outplanting trials with red and green abalone led by the CDFW, Get Inspired, and the Bay Foundation are helping us develop appropriate outplanting methods and determine which habitat features and predator communities may have the most significant impacts on outplant survival.

NMFS continues to lead efforts to track the movement and behaviors of wild white abalone and a closely related species, pinto abalone, in response to different environmental conditions. The collection of acoustic tracking, time-lapse camera, and environmental data will help determine the best timing and placement for outplanting captive-raised white abalone.

NMFS also continues to improve population monitoring accuracy through the use of ROVs and SCUBA. ROVs can cover large areas, but are limited to deeper areas that do not contain thick kelp beds. SCUBA surveys can effectively cover smaller areas in shallower water that have dense kelp. Combining the two sampling techniques allows for greater spatial coverage of rocky reefs, better population estimates, and better habitat characterizations. We are looking forward to adding other instruments to the ROV that may help improve abalone detection rates. SCUBA

Photo Credit: John Butler/NOAA

efforts provide opportunities for the collection of additional white abalone broodstock, monitor the health and demography of wild populations, and gather information on the factors that influence experimental red and green abalone outplantings. Data resulting from SCUBA efforts will be critical in the future to ensure a successful white abalone outplanting program.

Our partner list has expanded and now includes regular cooperation with two commercial aquaculture farms, the U.S. Navy, academic and governmental scientists in Baja California Mexico, and the Honda Marine Science Foundation. Within NMFS, the Protected Resources Division continues to work across NOAA programs, including the NOAA Restoration Center, Aquaculture, Science and Technology, the SWFSC, and Sanctuaries to carry out a variety of recovery activities. Our new relationships were forged and our current partnerships sustained by holding workshops, attending meetings, developing interagency agreements. For example, we signed a Memorandum of Agreement with the Navy solidifying their commitment to provide over $2.1 million in total funding over 7 years to support core research and survey needs for white abalone recovery at the Tanner and Cortes Banks and also near other critical Navy facilities on San Clemente Island and at Point Loma in southern California. We continue to implement grant programs (e.g., ESA Section 6 Grants to States), and communicate a unified message for recovery. Outreach and education programs at our partner institutions and the Species in the Spotlight initiative, accompanied by the NMFS Communications Team White Abalone Outreach Campaign, have helped highlight our program to perspective partners and funding agencies.

Summary

In summary, our captive propagation program has expanded to the point that thousands of healthy animals, suitable for outplanting, are currently in captivity. The methods for captive spawning and rearing have improved, factors that lead to higher rates of spawning and survival are being identified, health care protocols are being employed and improved when necessary, and additional partners with unique skill sets are contributing to the program. We are moving towards our first experimental outplanting of captive-raised white abalone by perfecting methods for outplanting closely related species, incorporating new genetic material into the captive breeding program through the collection of wild broodstock, identifying and characterizing habitat and environmental characteristics that will promote the long-term survival of outplanted abalone. We currently are developing an application for an ESA permit that will allow for the experimental outplanting of white abalone. We continue to improve ROV, SCUBA, time lapse camera, acoustic tracking, genetic, and health monitoring methods in the field so that we can assess the status of wild and restored white abalone populations. Outreach, education, and communication efforts are highlighting white abalone's imperiled state and form the bases for new partnerships, additional funding, and more effective and efficient implementation of recovery actions.

White Abalone Spotlight Hero Dr. Kristin Aquilino

Dr. Kristin Aquilino has played an instrumental role in shaping the captive breeding program for white abalone. Dr. Aquilino manages the program—charged with rebuilding the declining populations of wild abalone—at the University of California Davis Bodega Marine Laboratory (BML). Under Dr. Aquilino, in 2012 the program had its first successful spawn since 2003 in 2012 and has since documented successful spawns each year. She helped facilitate the construction of a new broodstock facility with improved flow, temperature, and lighting controls that better mimic the abalone's natural environment in southern California, she also aided the design and construction of new rearing tanks that should increase the survival of young abalone through their first year. Since she joined the program in 2011, Dr. Aquilino has worked hard to facilitate collaboration within the BML and between various state and federal agencies, aquariums, and commercial aquaculture facilities to realize the recovery goals for white abalone.

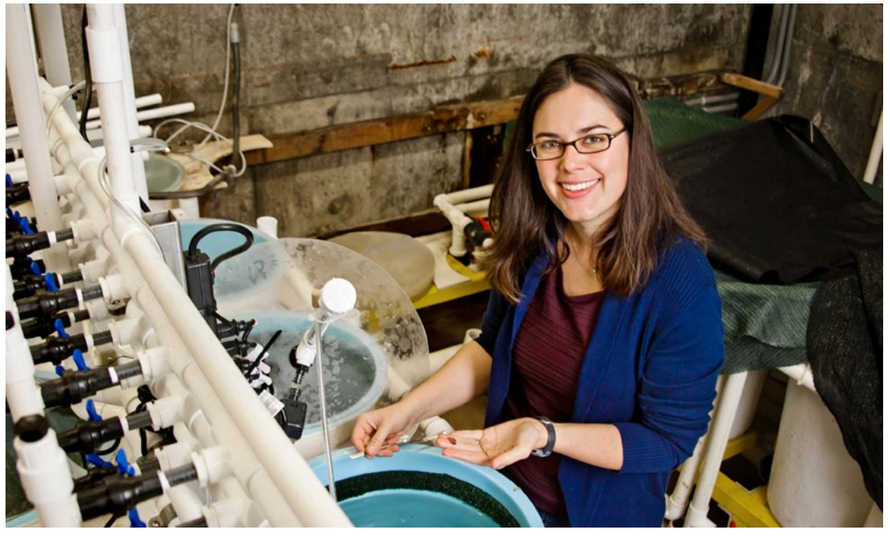


Photo Credit: Sammy Tillery

U.S. Secretary of Commerce
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