



NOAA FISHERIES

Pacific Islands
Fisheries
Science Center

Annual Report 2017

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Message from the Science Director's Office

We are pleased to present this brief overview of our research progress and achievements at the Pacific Islands Fisheries Science Center during 2017. The year was one of change, challenge, and opportunity. Our diverse staff of biologists, oceanographers, mathematical modelers, statisticians, economists, and social scientists addressed many issues and made important scientific advances.

We joined NOAA in completion of the three-year Campaign to Address Pacific monument Science, Technology, and Ocean Needs (CAPSTONE); surveyed and monitored coral reef ecosystems in the Pacific Remote Islands Marine National Monument and Mariana Islands; investigated the coastal ocean of West Hawaii Island marine ecosystem and its underlying oceanography; conducted the Hawaiian Islands Cetacean and Ecosystem Assessment Survey across approximately 1.8 million square nautical miles (2.5 million km²) of ocean; celebrated the Year of the Monk Seal and monitored the population of endangered Hawaiian monk seals across the Hawaiian Archipelago; surveyed pelagic micronekton and plankton off the leeward coast of Oahu; collaborated with fishers and used underwater video to collect data on the Deep-7 bottomfishes across over 400 sites; employed novel approaches to conduct a multi-species stock assessment; and engaged in collaborative exchanges, agreements, and reviews within NOAA and with external organizations, governments, academia, and the public.

In all our scientific work, the Center's administrators, computer systems specialists, database managers, and other devoted technical staff provide support to our mission. As we reach for our goals in 2018, we hope to expand on our recent progress. We will endeavor to provide fishery stakeholders with innovative and relevant science to meet the growing challenges of ecosystem-based fishery management and marine conservation in the Pacific islands and across the nation.

Sincerely,



Mike Seki
Director



Evan Howell
Deputy Director

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Our Research Mission and Challenges

The mission of the Pacific Islands Fisheries Science Center is to conduct high-quality, timely research to support the stewardship of fisheries resources, protected species, and ecosystems in the central and western Pacific Ocean. Our research helps ensure that NOAA and partner organizations have a solid scientific foundation for management decisions and conservation actions affecting marine ecosystems, our economy, and Pacific island fishing communities. Our scientists are active in many research areas: coral reef ecosystem science; marine ecosystem analysis and oceanography; fisheries biology; bycatch mitigation; fisheries monitoring; economic and human dimensions research; protected species population monitoring and recovery research; climate science; and more.

The Center's research supports NOAA Fisheries goals in several broad areas:

Ensuring the sustainability of fisheries and fishing communities

Our science supports domestic and international management of fisheries, enabling maximum long-term benefits to U.S. fishermen, coastal communities, the seafood industry, and consumers.

Recovering and conserving protected species

We assess and monitor populations of marine mammals, sea turtles, and other protected marine species and identify ways to restore them to healthy states.

Improving organizational excellence

This report highlights some of the Center's key accomplishments in these areas of research during 2017.

Visit <http://www.fisheries.noaa.gov/> for more information on our research. Electronic copies of this report are available at: <http://www.fisheries.noaa.gov/resource/document/pacific-islands-fisheries-science-center-annual-report-2017>

Research Highlights 2017

Marine Habitats and Ecosystems

CAPSTONE

The NOAA CAPSTONE (Campaign to Address Pacific monument Science, Technology, and Ocean Needs) wrapped up its 3-year mission.

NOAA's Office of Exploration and Research (OER), PIFSC, PIRO, and many other partners led the initiative to explore the deep ocean biology, geology, and oceanography of the Pacific Islands monuments and nearby areas.

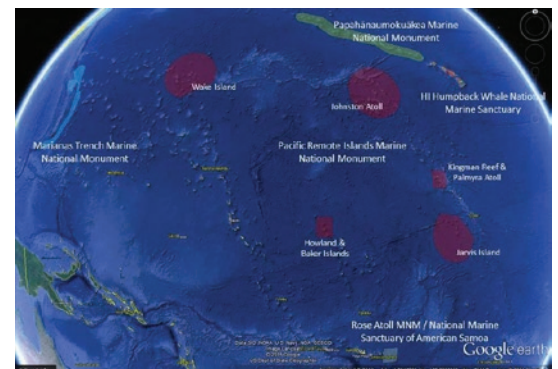
[NOAA CAPSTONE Website](#)

Total Effort:

- 431 days at sea
- 600000 square km of ocean floor mapping
- 188 ROV dives (240 m to 6000 m deep)
- 772 biological samples
- 383 geological samples

The mission identified a large number of deep ocean coral, sponge, and other invertebrate communities throughout the Pacific Islands region, and imaged and collected hundreds of previously undescribed species in the region.

PIFSC Blog: [The Mysterious Identity of the Bright-Red Sea Toad](#)



Pacific Reef Assessment and Monitoring Program (Pacific RAMP)

About Pacific RAMP

From March to June 2017, scientists from PIFSC's Coral Reef Ecosystem Program embarked on two expeditions aboard the NOAA Ship Hi'ialakai to conduct surveys of coral reef ecosystems at unpopulated islands in the Pacific Remote Islands Marine National Monument: Jarvis, Howland, and Baker Islands and Wake Atoll, as well as the Northern and Southern Mariana Islands. The scientists investigated the effects of recent coral bleaching events, and will return in 2018 to track coral mortality and recovery.



About the Jarvis, Howland, and Baker Islands and Wake Atoll cruise: [Coral Reef Research Expedition to the Pacific Remote Islands Marine National Monument](#)

PIFSC Blogs: [A Fish that Shapes the Reef](#) | [What happens to reef fish after coral bleaching?](#)

Monitoring Summaries: [Howland and Baker Islands](#) | [Jarvis Island](#) | [Wake Atoll](#) | [Northern Mariana Islands](#) | [Southern Mariana Islands](#)

Notable 2017 Publication: [Coral Reef Ecosystems of the Pacific Remote Islands Marine National Monument, a 2000-2016 Overview](#)

West Hawaii Integrated Ecosystem Assessment (West Hawaii IEA)

Scientists aboard the NOAA Ship Oscar Elton Sette spent two weeks investigating the coastal ocean of West Hawaii Island marine ecosystem and its underlying oceanography. The West Hawai'i IEA research focuses on exploring why Hawai'i and other tropical coral reef island systems that provide coastal protection are also so biologically productive. Scientists explored the biological importance, physical mechanisms, and ecological relevance of surface slicks, as well as characteristics of the mesopelagic boundary layer community that may be an important food source for higher trophic groups in area waters.



About the cruise: [Scientific Expedition Returns to West Hawai'i to Study Marine Ecosystems](#)

Story Map: [West Hawaii IEA](#)

Blogs: [Checking the Ocean's Pulse with Plankton](#) | [An Ocean Life](#) | [Uncovering the Mysteries of the Mesopelagic](#)

Protected Species

Hawaiian Islands Cetacean and Ecosystem Assessment Survey (HICEAS)

[HICEAS Webpage](#)

The Hawaiian Islands Cetacean and Ecosystem Assessment Survey (HICEAS, pronounced “high-seas”) was a large-scale survey for cetaceans (whales and dolphins) and seabirds within the U.S. waters of the Hawaiian Islands aboard the NOAA Ships Oscar Elton Sette and Reuben Lasker. HICEAS 2017 took place between July 6th and December 1st, 2017, totaling 179 days at sea, and covering approximately 1.8 million square nautical miles (2.5 million km²), including waters surrounding all Northwest and main Hawaiian Islands out to 200 nmi offshore.

HICEAS 2017 was the start of a new multi-agency plan called Pacific Marine Assessment Program for Protected Species (PacMAPPS). PacMAPPS is a partnership among NOAA Fisheries, Bureau of Ocean Energy Management, U.S. Navy, and the U.S. Fish and Wildlife Service to collect data and produce abundance estimates for species of joint management interest. PacMAPPS includes rotational surveys throughout the Pacific to assess the abundance of cetacean species and their ecosystems.

The four major research components to HICEAS are: visual observations for cetaceans (including photo-identification, biopsy sampling, and satellite tagging); passive acoustic monitoring using towed hydrophone arrays and other tools; ecosystem assessment (including visual surveys for seabirds and measurement of oceanographic variables); and other ancillary projects, such as aerial photogrammetry using a hexacopter, testing of new passive acoustic tools, and other projects that support and augment our assessment mission.

HICEAS is a collaboration between the Pacific Islands and Southwest Fisheries Science Centers. HICEAS was also conducted in 2002 and 2010. The goals are to estimate how many cetaceans are in Hawaiian waters, examine their population structure, and understand their habitat. The 2017 survey was especially significant as it provided important data for several management priorities, including:

1. Cetacean and seabird species inventory, abundance, and habitat information for the recently expanded Papahānaumokuākea Marine National Monument.
2. New abundance estimates for false killer whales in support of the False Killer Whale Take-Reduction Plan, and all cetacean species as required under the Marine Mammal Protection Act (MMPA).
3. Updated abundance and distribution data for large whale, sea turtle, and seabird species listed under the Endangered Species Act.
4. Updated cetacean and seabird assessments used to evaluate whether bycatch rates in U.S. fisheries are sustainable under the MMPA and Magnuson-Stevens Fishery Conservation and Management Act.

About the cruise: [Heading to the High Seas: Six-month mission to survey whales and dolphins in the Hawaiian Islands](#)

Story Map: [HICEAS 2017](#)

PIFSC Blogs: [Field Blogs from HICEAS 2017](#)





Year of the Monk Seal

In commemoration of 10 years since the publication of the revised [Recovery Plan for the Hawaiian Monk Seal](#), the Pacific Islands Fisheries Science Center and Regional Office deemed 2017 “Year of the Monk Seal.” The campaign was comprised of a series of recovery actions, cutting-edge research, and public events targeted at building awareness and momentum for the next 10 years and more of monk seal recovery.

The Year of the Monk Seal was a celebration of a new, positive population estimate for the species. The most recent annual population assessment shows that the Hawaiian monk seal, bucking past trends, has increased in numbers by 3% annually for the past three years. The population is now estimated to be around 1,400 seals—about 1,100 seals in the Northwestern Hawaiian Islands (NHWI) and 300 seals in the main Hawaiian Islands (MHI).

The population overall has been declining for over six decades and current numbers are only about one-third of historic population levels, but, importantly, the prolonged decline has slowed over the last 10 years, thanks in many ways to recovery efforts. In fact, all of the major seal populations in the NWHI are either stable or growing, and an estimated 30% of the seals alive today are here because they benefited from a lifesaving intervention or are the child or grandchild of a female that benefitted.

Read more: [NOAA and their Partners Celebrate Year of the Monk Seal](#)

PIFSC Blogs: [Fattened Up on Fish-Popicles: How to Rehabilitate a Hawaiian Monk Seal](#)

On Twitter: [#YOMS2017](#)

[Species in the Spotlight: Hawaiian Monk Seal](#)

Monk Seal and Sea Turtle Field Camps

Teams of Hawaiian monk seal and sea turtle researchers set up camp and monitored these species for three months on remote islands of the Hawaiian Archipelago.

About the research: [Hawaiian Monk Seal Expedition Underway in the Northwestern Hawaiian Islands](#) | [Expedition to Support Monk Seal Research and Recovery Efforts in the Northwestern Hawaiian Islands](#) | [The People Aboard NOAA’s ARC: Team French Frigate Shoals](#)

PIFSC Blogs: [The People Aboard NOAA’s ARC: Team French Frigate Shoals](#) | [The People Aboard NOAA’s ARC: Teams Pearl & Hermes and Kure](#) | [Hawaiian monk seals and pathogens: An ounce of prevention](#) | [The Beginning of the End...of the Season: The 19-day mission to recover monk seal field camps and save seals](#) | [The Root of Everything: Teamwork and the Science of Counting Seals](#) | [It Takes Two: The Conservation Adventures of the Loneliest Monk Seal Camp](#) | [Weaned! The lives and questionable choices of Laysan’s youngest seals](#) | [A day in the life of the East Island Exiles](#)



Sustainable Fisheries and Fishing Communities

Leeward Oahu Pelagic Ecosystem Characterization (LOPEC)

Scientists aboard the NOAA Ship Oscar Elton Sette conducted trawl surveys of pelagic micronekton and plankton along the leeward coast of Oahu. The overarching objectives of this project are to compare species composition and abundance in this collection to baseline data from 1951 to 1978, to establish a time series for ecosystem monitoring, and to delve further into how recruitment and retention of the early life stages of organisms are affected by surface slicks.

About the cruise: [Trawling Through Time in Leeward Oahu](#)

Blog: Checking the [Checking the Ocean's Pulse with Plankton](#)

Hawaii Bottomfish Fishery Independent Surveys (BFISH)

The “Deep 7” are seven fish species that live near the seafloor in deep water off the coast of Hawai‘i: onaga, opakapaka, ehu, kalekale, gindai, lehi and hapu‘upu‘u. The primary goal of the #BFISH survey (Bottomfish Fishery-Independent Survey in Hawai‘i) is to get a snapshot of the numbers and sizes of each species of bottomfish around the main Hawaiian Islands. The Center works with local fishers through the Pacific Islands Fisheries Group (PIFG) to collect data at over 300 sites established around all eight of Hawai‘i’s main islands, and deploys an underwater camera system called MOUSS (Modular Optical Underwater Survey System) to collect data with video footage of bottomfish in their natural habitat at 100 sites around the islands.

About the cruise: [Imaged from the Depths: 2017 Main Hawaiian Islands BFISH Bottomfish Survey](#)

Blog: [BFISH: Studying the Deep 7 to support sustainable fisheries](#)

Notable Publication: [The Modular Optical Underwater Survey System](#)

Bottomfish Heritage Project

It could take a lifetime of sustained effort to become a good bottomfisher, a skill that has a unique tradition in Hawaii dating back to ancient times. To ensure sustainable fishery management for future generations, the Hawaii bottomfishing community, the Western Pacific Regional Fisheries Management Council, and stock assessment scientists at the Pacific Islands Fisheries Science Center want to document the culture, traditions, and fishing techniques unique to Hawai‘i’s bottomfishing community. The PIFSC Socioeconomics Program and the Pacific Islands Fisheries Group are accomplishing this by conducting an oral history of bottomfishing in Hawaii, collecting personal experiences and reflections of past events through stories.



Blogs: [Hawai‘i Bottomfish Heritage Project Underway](#) | [Voices from the Hawai‘i Island Bottomfishery](#) | [Kaua‘i Bottomfishers Face Rougher Ocean Conditions](#) | [Onaga dai Bonkei!](#) | [Hawaii’s Bottomfish Fishermen Catch Their Fish, and Eat It Too!](#)

Multi-Species Stock Assessment

For the first time, PIFSC presented the assessment of 27 different Hawaiian reef fish including kala (bluespine unicornfish), uhu (various parrotfishes), kumu (whitesaddle goatfish), ulua (giant trevally), and many other species. Using the average length of each species to calculate current fishing mortality rates, combined with information on age, growth, and maturity, we were able to calculate current stock condition and compare those conditions to well-established sustainability guidelines. This allowed us to identify which reef fish species were threatened by overfishing and propose options for fisheries management.

More about the assessment: [How are Coral Reef Fish Doing in Hawai‘i?](#)

Notable Publication: [A stepwise stochastic simulation approach to estimate life history parameters for data-poor fisheries](#)

Other Notable Accomplishments

Socio-Economics External Review

Sound science is critical to NOAA's mission. As part of the ongoing systematic peer review process at all six of our regional science centers, experts from within and outside the agency carefully examine NOAA's science programs on a 5-year peer review cycle to improve integration, identify best practices, and share successes and challenges within our science enterprise.

External review of PIFSC's Socioeconomic Program took place 31 July–3 August 2017 at NOAA Fisheries' Pier 38 facility in Honolulu. The review panel consisted of Dr. Sherry Larkin, University of Florida; Dr. Melissa Poe, University of Washington SeaGrant and NOAA Fisheries Northwest Fisheries Science Center; Dr. Kirsten Olsen, University of Hawaii at Manoa; Dr. Ron Felthoven, NOAA Fisheries Alaska Fisheries Science Center.

The activities of the center were presented to the review panel during 24 presentations organized under 7 themes. The panelists provided an independent review report and the program provided an action plan for program adjustments based on panelists' recommendations.

Agenda, Presentations, and Reports: [External Program Review of Economics and Human Dimensions](#)

Peer-to-Peer Exchanges (Phillippines & Indonesia)

NOAA entered a partnership with the U.S. Agency for International Development (USAID) in 2013 with the goal to strengthen the science, service, and stewardship of Asia-Pacific's oceans, coasts, weather, and climate. In June 2017, PIFSC, PIRO, and NOAA's Office of Law Enforcement welcomed delegates from the Philippines to a "peer exchange" to foster relationships between our two governments' scientists and fisheries managers, and to share fisheries management, science, and enforcement approaches across these two countries. The NOAA-USAID Mission Support Program to the Philippines initiated this exchange as a key strategy for expanding and improving marine resource management.



About the peer exchange: [An International Partnership for Ecosystem-Based Fisheries Management and Conservation](#)

Blog: [An Ecosystem Approach to Fisheries Management Planning workshop in North Samar, Philippines](#)

PI-Regional Action Plan Highlights for 2017

In December 2016, NOAA Fisheries released its Pacific Islands Regional Action Plan (PIRAP) for climate science; one of five [Regional Action Plans](#) NOAA Fisheries has released to guide implementation of its [Climate Science Strategy](#) over the next five years. The Regional Action Plans build on current efforts by NOAA Fisheries and partners to better track, forecast, and incorporate information on changing conditions into management of living marine resources.

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The Strategy identifies seven key information needs to fulfill NOAA Fisheries mandates for fisheries management and protected species conservation in a changing climate. Implementing these Regional Action Plans will provide managers with the timely information they need to reduce impacts and increase resilience of fish stocks, fishing-dependent communities, and protected species.

Objective 1 – Identify climate-informed reference points

Objective 2 – Create robust management strategies for a changing climate

Objective 3 – Incorporate adaptive decision processes

Objective 4 – Project future conditions

Objective 5 – Understand how things are changing and why

Objective 6 – Track changes and provide early warnings

Objective 7 – Build our science infrastructure

Read more: [Pacific Islands Regional Action Plan for Climate Science](#)

Climate Science Workshop

A component of the PIRAP for climate science, the first Annual Collaborative Climate Science Workshop was held in Honolulu September 19–21. The goal of the workshop was to identify regional climate-related management questions and the science that can address them. Staff from PIFSC, PIRO, NESDIS, and the WPRFMC were in attendance. PIFSC staff, Phoebe Woodworth-Jefcoats and Jennifer Samson, facilitated the workshop.

Read more: [First Annual Collaborative Climate Science Workshop](#)

Action items accomplished in FY17

The PIRAP identified key needs and actions to implement the NOAA Fisheries Climate Science Strategy in this region over the next five years.

The following were accomplished in FY17:

Paper describing climate impacts from 11 earth system models: [Climate change is projected to reduce carrying capacity and redistribute species richness in North Pacific pelagic marine ecosystems](#)

Paper describing local-scale projections of coral reef futures: [Local-scale projections of coral reef futures and implications of the Paris Agreement](#)

[ICES-PICES workshop on modeling effects of climate change on fish and fisheries](#)

Climate indicators included in: [WPRFMC Annual Stock Assessment and Fisheries Evaluation \(SAFE\) reports](#)

Climate variables included in stock assessment CPUE standardization: [Summary of life history and stock assessment results for Pacific blue marlin, Western and Central North Pacific striped marlin, and North Pacific swordfish](#)

[West Hawai'i integrated ecosystem assessment : ecosystem trends and status report](#)

Study of communities' vulnerability to sea level rise: [University of Hawai'i News: Environmental science undergraduate students make new Hawai'i discoveries](#)

Technical Memorandum of baseline for perceived threat of climate change: [Attitudes and Preferences of Hawaii Non-commercial Fishermen: Report from the 2015 Hawaii Saltwater Recreational Fishing Survey](#)

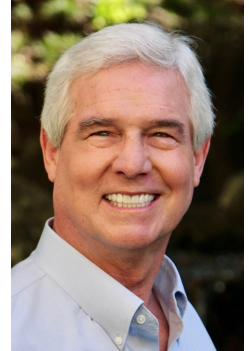


Science Camp at the IRC

PIFSC and the Joint Institute for Marine and Atmospheric Research (JIMAR) convened the annual “Summer Intern Symposium”. Eighteen interns including eight NOAA Hollings Scholars and four PIFSC Young Scientist Opportunity (PYSO) program participants made presentations and shared their summer projects and experiences.

JIMAR Leadership Change

Dr. Doug Luther was named the new Director of the NOAA-University of Hawaii cooperative institute, the Joint Institute for Marine and Atmospheric Research (JIMAR); PIFSC is the lead office for JIMAR. Dr. Luther succeeded Dr. Mark Merrifield who served six years as Director for JIMAR.



Publications

For all PIFSC publications, visit the [PIFSC Library Webpage](#).

Administrative Reports

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Madge L. 2016. Exploratory study of interactions between cetaceans and small-boat fishing operations in the Main Hawaiian Islands (MHI). Pacific Islands Fisheries Science Center, Administrative Report H-16-07, 37 p. DOI: 10.7289/V5/AR-PIFSC-H-16-07.

Madge L. 2016. Preliminary Assessment of Monk Seal-Fishery Interactions in the Main Hawaiian Islands. Pacific Islands Fisheries Science Center, Administrative Report H-16-08, 31 p. DOI: 10.7289/V5/AR-PIFSC-H-16-08.

O'Malley JM, Taylor BM, Andrews AH. 2016. Feasibility of ageing Hawaiian Archipelago uku (*Aprion virescens*). Pacific Islands Fisheries Science Center, Administrative Report H-16-06, 32 p. DOI: 10.7289/V5/AR-PIFSC-H-16-06.

Pan M, Arita S, Bigelow K. 2017. Cost-earnings study of the American Samoa longline fishery based on vessel operations in 2009 and recent trend of economic performance. Pacific Islands Fisheries Science Center, PIFSC Administrative Report, H-17-01, 43 p DOI: 10.7289/V5/AR-PIFSC-H-17-01.

Weijerman M. 2017. Report of the Hawaii Atlantis Ecosystem Model Planning Workshop held in January 2017 in Honolulu. Pacific Islands Fisheries Science Center, PIFSC Administrative Report, H-17-03, 23 p DOI: 10.7289/V5/AR-PIFSC-H-17-03.

Data Reports

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Coral Reef Ecosystem Program, Pacific Islands Fisheries Science Center, NOAA Fisheries. 2017. Pacific Reef Assessment and Monitoring Program Fish monitoring brief: Northwestern Hawaiian Islands, 2016. Pacific Islands Fisheries Science Center, PIFSC Data Report, DR-17-030, 2 p DOI: 10.7289/V5/DR-PIFSC-17-030.

Fisheries Research and Monitoring Division, Pacific Islands Fisheries Science Center, NOAA Fisheries. 2017. PIFSC report on the American Samoa limited-access longline fishery from 1 April to 30 June 2016. Pacific Islands Fisheries Science Center, PIFSC Data Report, DR-17-021, 4 p. DOI: 10.7289/V5/DR-PIFSC-17-021.

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- Fisheries Research and Monitoring Division, Pacific Islands Fisheries Science Center, NOAA Fisheries. 2016. PIFSC Report on the American Samoa Limited-access Longline Fishery from 1 January to 31 December 2014. Pacific Islands Fisheries Science Center, PIFSC Data Report, DR-16-052, 14 p. DOI: 10.7289/V5/DR-PIFSC-16-052.
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HICEAS researcher releases a red-tailed tropicbird.
(Photo: NOAA Fisheries)



Sunset at Moalboal, Philippines.
(Photo: NOAA Fisheries/Megan Moews-Asher)



*Reef sharks and rainbow runners (*Elagatis bipinnulata*), Kingman Reef, Pacific Remote Island Areas .*
(Photo: NOAA Fisheries/Paula Ayotte)



Green sea turtles bask along the shores of French Frigate Shoals, Northwestern Hawaiian Islands. (Photo: NOAA Fisheries/Marylou Staman)



A school of sardines above a coral reef in Cebu, Philippines. (Photo: NOAA Fisheries/Megan Moews-Asher)



*Green sea turtle (*Chelonia mydas*), Baker Island, Pacific Remote Island Areas. (Photo: NOAA Fisheries/Paula Ayotte)*

