Looking back on the 2015 Fiscal Year with the NOAA Marine Debris Program, I am proud of the work that we have achieved. We have removed significant amounts of debris from coastal waters, reached hundreds of students, brought together marine debris communities to help make tackling this issue a priority in coastal states, and funded research that has helped us to understand the science behind marine debris. We have made progress toward making our vision—an end to marine debris—a reality.

However, there is still a long way to go and we must continue to think about our future. Over the past year, I’ve had the opportunity to work with our team to chart the NOAA Marine Debris Program’s coming years. I’m excited to announce we have developed a strategic plan that will lead us to be more resilient to natural disasters, increase our understanding of marine debris sources and impacts through research, expand our education and outreach efforts across the nation, and target marine debris removal from our coastal waters— all through improved coordination with partners.

Looking to the future, I know the health of our ocean and coasts depends on us. Every action that we take, no matter how big or small, makes a difference. I’m proud of the efforts put forth by the Program and looking forward to its future achievements. I am pleased to present the NOAA Marine Debris Program’s accomplishments from 2015.

Nancy Wallace,
Director, NOAA Marine Debris Program
The NOAA Marine Debris Program envisions the global ocean and its coasts free from the impacts of marine debris.

The mission of the NOAA Marine Debris Program is to investigate and prevent the adverse impacts of marine debris.

NOAA Marine Debris Program Strategic Plan

This year, the NOAA Marine Debris Program charted out a new multi-year strategic plan. The Program is poised to tackle marine debris challenges and to find solutions that help eliminate debris through proactive approaches through research, removal, prevention, emergency response, and coordination. Take a closer look at the Program’s goals for 2016-2020.
Marine debris comes in all sizes, from a large vessel to the smallest microbead. Over the past year, the NOAA Marine Debris Program has funded projects that mitigate impacts and address the damage marine debris has caused to critical habitats such as salt marshes, mudflats and coral reefs. Here are some examples from 2015:

**Restoring Critical Habitat in Remote Alaska Communities**

The Bering Sea Region of Alaska is very remote and sparsely populated; several of the communities there have populations numbering only in the hundreds. The Sitka Sound Science Center worked with some of these communities to remove shoreline debris: 10,000 pounds of mostly fishing nets and line over ten days at St. George Island, and 19,000 pounds of debris from roughly 45,000 yards of shoreline over 25 days at Savoonga on St. Lawrence Island.

**Marine Debris Removal from Kaho‘olawe, Hawaii**

Kaho‘olawe is the smallest of the eight main Hawaiian Islands, located just seven miles southwest of Maui. The island’s remoteness poses a challenge for marine debris removal. However, despite extremely difficult removal logistics, the Kaho‘olawe Island Reserve Commission removed marine debris from three sites on the island.

Of the 11.94 tons of debris that were removed, 1.12 tons were recycled or re-used.

**Removal**

Restoring Critical Habitat in Remote Alaska Communities

Marine Debris Removal from Kaho‘olawe, Hawaii

6 major cleanups with 329 volunteers contributing 4,004 hours to help restore 2.65 acres of shoreline.

All collected debris had to be helicoptered off Kaho‘olawe Island for removal!
Northwestern Hawaiian Islands Marine Debris Removal

The Papahānaumokuākea Marine National Monument (PMNM), located around the mostly uninhabited Northwestern Hawaiian Islands, is a World Heritage Site and one of the largest marine conservation areas in the world. It is home to more than 7,000 marine species, many unique to Hawaii, including endangered or threatened species such as the green sea turtle or Hawaiian monk seal. Centrally located within the North Pacific Gyre, the PMNM is prone to marine debris accumulation that presents potentially lethal threats to numerous marine and avian species.

After a 33-day removal mission conducted by 17 NOAA divers and additional crew including two Program staff aboard the NOAA Ship Oscar Elton Sette in October 2014, approximately 57 tons of derelict fishing nets and plastic debris were removed from the monument. NOAA has led this mission since 1996, removing a total of 904 tons of marine debris, including this year’s haul.

465 smaller nets were also collected, making for a total of 57 tons of derelict fishing gear removed.

2,306 foot derelict vessels, confirmed to be marine debris from the Japan tsunami were removed.

The “monster net,” 30 feet long - 8 feet wide - 16 feet deep, weighed in at 11.5 tons and took NOAA divers 4 days to cut into 4 parts in order to bring it on-board the ship.

7,436 plastic fragments
3,758 bottle caps
1,469 plastic bottles
477 lighters
During the height of the salmon fishery in the Puget Sound, thousands of nets were lost or abandoned in the region. For thirteen years, the Northwest Straits Foundation worked to remove derelict fishing gear that has posed a threat to navigation safety and damaged critical marine habitat. The NOAA Marine Debris Program supported this long-term effort since 2005. This year, we are proud to announce that the effort is complete.

A video was produced by Oregon Sea Grant to highlight this net removal project operation: https://vimeo.com/92878422

Since the project began in 2002, the Northwest Straits Foundation removed more than 5,660 derelict fishing nets and 3,800 shellfish pots from Puget Sound.

15 acres of marine habitat were restored.
120 nets that contained nearly 18,100 entangled animals were removed.
2.1 tons of lead line were recycled.
8 Indian Tribes, and 750 scientists, resource managers, and policy makers were included in the effort to improve reporting and prevention of lost nets.

A video was produced by Oregon Sea Grant to highlight this net removal project operation: https://vimeo.com/92878422

Large Derelict Fishing Net Removal in Puget Sound, Washington

Working with the Olympic National Park and the Olympic Coast National Marine Sanctuary, the Student Conservation Association removed marine debris from remote beaches not easily reached by volunteers during scheduled cleanups. Teams of local high school students and adult leaders covered 73 miles of the Olympic National Park coastline, removing over 5,200 pounds of debris of various types, which included food packaging, other consumer debris, and lost fishing lines and floats. With the help of the National Park Rangers, the teams hauled debris by foot to a collection point, sometimes miles away through rugged terrain. Additionally, students learned about marine debris and its impacts through hands-on lessons.

Volunteers camped for two weeks each near the beaches they cleaned and then carried all the debris they collected on their backs to a location accessible by vehicles for disposal.

Marine Debris Removal for the Olympic Coast in Northwest Washington
During storm events, high volumes of trash and larger debris washes downstream from Mexico, threatening and degrading the Tijuana River Valley’s valuable ecological, cultural, recreational and economic resources. The Goat Canyon Sediment Basin, part of the Tijuana River Valley on the U.S. side of the Mexico Border, is a collection zone for sediment, trash and other pollutants carried in stormwater runoff. The Southwest Wetlands Interpretive Association and the Tijuana National Estuarine Research Reserve are working together to upgrade debris boom structures, educate students in Mexico about marine debris and its impacts on our coastal environment, and organize local volunteers to remove trash from the Tijuana River watershed.

During a March 7, 2015 cleanup, 134 volunteers removed and prevented 5.5 metric tons of debris from entering the Pacific Ocean.

This year, derelict traps were removed at a rate of over 76 traps per day.

Historically, the Long Island Sound was a thriving commercial fishing ground for catching lobsters. Today, thousands of derelict traps clutter the Sound’s floor, continuing to catch lobsters and other marine species, a process known as “ghost fishing.” In an effort to clear the waterways, the Cornell Cooperative Extension worked with commercial lobstermen to remove derelict lobster traps from the New York waters of Long Island Sound. This year, they removed 1,752 traps during 23 days on the water.

Jamaica Bay is surrounded by densely populated commercial and residential populations of New York City. The region is also home to salt marshes, salt meadows, mud flats and aquatic habitats where fish spawn, feed, and grow to maturity. This year, the American Littoral Society (ALS) engaged community volunteers to remove 28 metric tons of debris from the critical habitat. Volunteers were also educated about marine debris impacts after cleaning the area, which will help prevent future marine debris accumulation.

Since the beginning of the project in 2014, more than 34 metric tons of debris have been removed from Jamaica Bay. ALS is targeting to remove 59 metric tons by June 2016.
The Charleston Harbor watershed is comprised of salt marshes, tidal basins, and rivers that are critical habitat for fish breeding and nurseries. Human impacts, including those from marine debris, have affected these essential resources in the region. This year, the South Carolina Sea Grant Consortium removed nine derelict vessels based on their proximity to sensitive habitats and resources in the region.

Volunteers from the Consortium collected and disposed of 10 tons of marine debris, primarily made up of unwanted fishing and boating gear, during a county-wide Clean Marine event this past April.

Environmental Action Initiative in Lake Worth, Florida

The Intracoastal Waterway in Palm Beach County, Florida is part of the Everglades watershed, an area encompassed with salt marshes, seagrass beds, mangroves and oyster beds. Abandoned and derelict vessels are a common type of debris in this region and can often lead to habitat damage. Over the past year, LagoonKeepers.org has removed a total of seven derelict and sunken vessels, weighting more than 145,000 pounds.

49 kayakers and volunteers have supported this project through water clean-up efforts to remove debris, and by participating in outreach events about the local sources and impacts of marine debris.
Preventing marine debris is our first priority when it comes to finding solutions for this problem. For the past year, our education and outreach partners across the country have inspired thousands of people of all ages to become better ocean stewards. In 2015, the Program funded new curriculum development, outreach to teens, social marketing campaigns, teacher workshops, fisherman education, and hands-on cleanups to help stop debris at its source. Here are some examples from 2015:

**Students and teachers took a pre and post test to evaluate the program’s effectiveness. Results showed a dramatic increase in the children’s understanding of marine debris and its impacts.**

**Marine Debris Education and Action**

With its sandy beaches, rocky headlands and sea stacks, the Olympic Coast boasts incredible scenery and abundant marine wildlife in the Pacific Northwest. Unfortunately, like many other beach landscapes, marine debris plagues this shoreline. To help raise awareness in the local community, Feiro Marine Life Center, collaborating with Washington CoastSavers and Olympic Coast National Marine Sanctuary, conducted a marine debris workshop for sixteen teachers from schools in the Port Angeles area and along the Olympic Peninsula’s outer coast. They engaged additional teachers through beach cleanups reaching a total of 38 teachers and 886 fourth and fifth graders.

**Engaging Students in Marine Debris Efforts Utilizing a Comprehensive, Integrated STEAMSS Curriculum**

Marine debris curriculum plays an important role in helping teachers and students understand human impacts to our coastal resources. Oregon State University developed a web-based curriculum for 4th - 12th grade students. Aligned to Science, Technology, Engineering, Art, Math, and Social Studies (STEAMSS) standards, the curriculum covers four categories: marine debris composition and abundance, sources and transport, impacts, and solutions through hands-on experience.

Over the course of the project, 20 teachers attended the workshop and more than 1,600 students were reached.

Download the finalized web-based marine debris curriculum online at: http://oregoncoaststem.oregonstate.edu/marine-debris-steamss
Marine Debris - The Ocean and Me
To develop ocean stewards, the Santa Barbara Museum of Natural History took a multi-step outreach approach to engage local elementary schools, middle schools, high schools and tourists with hands-on education, classroom presentations, and community outreach at local businesses, hotels and events.

The museum reached nearly 1,000 students through elementary school participation in “Marine Debris, the Ocean, and Me,” and through high school students’ presentations to middle school classrooms at 3 different area schools.

543 signatures were collected for the related “Pledge to Fight Trash,” sponsored by Ocean Conservancy, which shows strong support for change.

Using Outreach and Education to Reduce Marine Debris and Fishing Net Loss in Lake Superior
Lake Superior, the largest of the Great Lakes, has a ghost net problem. Part of this problem are storms, wind, shifting ice and waves that cause fishers to lose gill nets, a type of durable fishing net commonly used in the Lake Superior fishery. Once lost, the nets continue to drift beneath the water’s surface for years, impacting both the fishery and fishers’ livelihoods. University of Wisconsin Sea Grant and marine debris stakeholders in Wisconsin formed a partnership to address this issue. They developed an education and outreach plan to prevent gill net loss and reduce this threat to the Lake Superior fishery through workshops and outreach products.

University of Wisconsin Sea Grant produced an educational video: Avoid the Trap: What Anglers Should Know about Commercial Fishing Nets.

Reducing Marine Debris by Targeting Youth and Teenage Litterers
Youth and teenagers are more likely to litter. However, if they better understand the marine debris problem and their connection to creating it, they will be less likely to litter and more inclined to dispose of trash properly, ultimately preventing debris from entering our waterways. Using this philosophy, The Alice Ferguson Foundation (AFF) developed “Your Litter Hits Close to Home,” a marine debris prevention campaign to reach youth in Maryland, the District of Columbia and Virginia. As a part of this project, AFF enlisted students, teachers, and schools in Trash Free Schools, a program that conducts cleanups, delivers marine debris lessons, and aligns with local green school standards to reduce waste.

Lake Superior, WI

Talking Trash for Clean Oceans
Understanding where marine debris comes from is essential to preventing trash in our waters. Salem Sound Coastwatch has put together a community-based campaign working with low income teens in Salem, Massachusetts to help raise awareness about how trash in their neighborhood trickles down the watershed and becomes marine debris. As part of this campaign, students participated in the “Talking Trash for Clean Oceans” Teen Leadership Project, a six-month-long service-learning project, where they learned about marine debris and collected data in five local neighborhoods to determine quantity, sources and types of street trash.

Salem, MA

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Washington, DC

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Lake Superior, WI
A Rising Concern: Reducing Balloon Release and Debris through a Social Marketing Campaign

People intentionally release balloons into the environment to celebrate events and commemorate special occasions. Unfortunately, balloon debris often ends up in streams, rivers, and the ocean. Marine animals, such as sea turtles, frequently ingest these discarded balloons or become entangled by their strings, causing great injury and even death. The Virginia Department of Environmental Quality has developed a social marketing campaign to reduce balloon debris. Through formative research -- interviews, focus groups, and surveys -- project staff will determine the underlying drivers of the balloon-release behavior and the barriers to using a different method of expressing emotions at important events.

Virginia Department of Environmental Quality staff is designing and testing a social marketing strategy for alternatives to balloon releases.

Clean Community, Clean Coast

The University of South Florida and several other partners worked to change behaviors that contribute to the marine debris problem through their "Clean Community, Clean Coast" project. They engaged communities in St. Petersburg, Florida, where debris easily enters storm drains and releases out into local waterways, including beaches. The campaign was comprised of: 5 environmental awareness focus group forums with 47 middle schoolers, a professional development workshop for teachers, and community volunteers also used trash collected from debris cleanups to help create the 40-ft by 30-ft "Current Collections" art sculpture that reflects the movement of trash in our oceans.

"Think before you drop it": A Research-based Litter Reduction Campaign

In Puerto Rico, the Guánica-Río Loco Watershed filters down to nine beaches and feeds into one of the region’s well known coral reef ecosystems. It is also home to the endangered Puerto Rican Crested Toad and several sea turtle species. Debris on these beaches poses a threat to this critical habitat and wildlife. Working with ten local students, Protectores Cuencas Inc. has developed strategic education campaigns that include a photography contest and beach cleanups to help raise awareness and reduce marine debris impacts in their local communities.

The “Current Collections” sculpture reached more than 25,000 people at the Fourth Annual St. Petersburg, Florida Science Festival. The sculpture was also showcased in Atlanta’s Centennial Park.

Richmond, VA

St. Petersburg, FL

Guánica, Puerto Rico
The NOAA Marine Debris Program has collaborated with various NOAA partners to raise awareness about marine debris at local visitor centers across the nation. We have worked closely with National Estuarine Research Reserves, National Marine Sanctuaries and Sea Grants to develop marine debris exhibits that highlight local issues and showcase the marine debris problem our ocean and Great Lakes face today. Take a look at where these exhibits are located:

**MARINE DEBRIS ON EXHIBIT**

The NOAA Marine Debris Program and NOAA Ocean Today partnered to produce Trash Talk, a six-part educational video series and special feature that encourages audiences to take action through a fun, fast-paced, deep-dive on marine debris that will inspire solutions and grow a movement.

**VIDEO SERIES: TRASH TALK**

- **What is marine debris?**
- **Where does marine debris come from?**
- **How does marine debris impact the animals?**
- **Why is plastic marine debris so common?**
- **What is the Great Pacific Garbage Patch?**
- **What can we do about marine debris?**
The Marine Debris Program continued efforts to implement actions outlined in the completed Great Lakes and Hawaii Marine Debris Action Plans, and to help support the state-developed Virginia plan. This year, advanced planning efforts began in Florida and the Mid-Atlantic regions.

In the southeastern states of North Carolina, South Carolina and Georgia, state and local stakeholders continued to make progress on local actions to reduce debris. In Florida, the Program hosted a second meeting with state and local decision makers including non-governmental organizations to refine a state-wide plan to reduce debris.

Marine debris ends up in the ocean every day as a result of littering and poor waste management, but occasionally, large amounts enter nearshore coastal waterways all at once, especially during natural disasters. Abandoned and derelict vessels, construction and demolition debris, and household hazardous waste are just a few of the types of marine debris we find in waterways after a disaster. This debris can be a hazard to navigation, damage habitat, and pose pollution threats.

In an effort to increase preparedness for acute marine debris events in Alabama, the NOAA Marine Debris Program partnered with eight federal agencies, nine state agencies and two local counties to develop the Alabama Incident Waterway Debris Response Plan and Field Guide. As part of this project, NOAA worked with the Alabama Department of Conservation and Natural Resources to host a multi-agency workshop to identify existing response capabilities and receive feedback on what partner agencies would like to see in a response plan for marine debris. Alabama's plan is the first in a planned series of state plans intended to improve preparedness and facilitate a coordinated, well-managed and immediate response to this type of marine debris.
More than four years have passed since the March 2011 earthquake and tsunami in Japan. Following this event, the Program worked with impacted states to determine where marine debris removal was needed. With a generous goodwill gift from the Government of Japan, NOAA worked with the five impacted states (HI, AK, WA, OR, CA) through formal agreements to remove and monitor debris. NOAA continues to work with states and local groups to address marine debris from the disaster that continues to wash up on U.S. shorelines.

In August, 3,400 super-sacks of marine debris, collected from remote and rugged beaches off of Alaska and British Columbia, arrived in Seattle, WA, to be sorted. This multi-year debris removal effort from across Alaska was coordinated by the Gulf of Alaska Keeper and funded in large part by a gift from the Government of Japan administered by NOAA and the State of Alaska. The debris, which was placed into large plastic bags called super-sacks and moved to a transport barge via helicopter, included everything from fishing nets, lines and buoys to consumer plastics and different kinds of foam. Over the course of three weeks, from the barge’s first pickup to its arrival in Seattle, helicopters made 1,154 trips from shore to the boat. A diverse team collaborated to collect the debris including participants from the National Park Service, non-profit organizations, professional crews and volunteers from across the state.

During the 2012 hurricane season, Sandy inflicted severe damage to communities and coastal resources over large areas of the Mid-Atlantic and Northeast states, leaving a swath of destruction and large amounts of debris in the waters and marshes of affected states. This debris still poses hazards to navigation, commercial fishing grounds and sensitive ecosystems.

NOAA has been leading efforts with federal, state, and local partners to collect data, assess the debris, and reduce possible impacts to our natural resources and coastal communities.

Sandy-related debris removals are ongoing in New York City, Connecticut and Rhode Island. New York State completed the removal of large amounts of debris from parks, marshes and beaches on Long Island. New Jersey completed a large debris removal effort that removed seven vessels, including four houseboats, a submerged dock and other debris items from impacted wetlands.
Marine Debris Program-funded research allows us to identify, determine sources of, and assess the adverse impacts of debris so that we may forge ahead to find solutions through targeted prevention and reduction activities. This year, the Program supported a number of research projects that will help us answer questions surrounding the issue of microplastics, including developing methodologies for counting microplastic particles from surface water samples, identifying changes in the distribution of microplastics in water bodies over time, and determining how levels of land use within a watershed contribute to microplastic loadings. The Program also continued to add partners to our growing database of beach monitoring sites.

The “Laboratory Methods for the Analysis of Microplastics in the Marine Environment” manual outlines step-by-step instructions to measure microplastics in marine environmental samples. The project aimed to streamline terminology and techniques used to assess microplastic concentrations and to develop laboratory procedures to quantify microplastic particles in marine surface waters, bed sediments and personal care products.

Guidelines from this manual allow scientists and educators to follow simple, standardized techniques that are reproducible and robust without requiring extensive equipment. These methods can be easily adopted by groups around the world, and allow for comparison of results. The manual’s techniques can be used to calculate concentrations of microplastics using a variety of metrics, including per mass and per volume. These protocols are currently being used by academics and other governmental agencies in the United States.

The University of Maryland published results of a lab analysis of NOAA-collected surface-water samples from Chesapeake Bay tributaries. The analysis showed that population densities and urban/suburban land uses within watersheds are linked to surface-water microplastic concentrations. Furthermore, microplastic concentrations appeared to peak shortly after major rain events. These results support prioritization of upstream prevention efforts in urban locations and provide baseline data for developing effective prevention and management options.

The NOAA Marine Debris Monitoring and Assessment Project is an initiative to collect information on types and amounts of debris in the environment. Since the project’s inception in 2012, 176 shoreline sites have been monitored, 3,704 surveys have been entered into the database, and more than 40 partner organizations have been involved.

The program has partnered with two National Marine Sanctuaries on monitoring efforts with Sanctuary volunteers. The Greater Farallones National Marine Sanctuary has six shoreline sites and 140 completed surveys, and the Olympic Coast National Marine Sanctuary has eight shoreline survey sites with 528 surveys completed.
We’ve made great advancements in FY2015 and are excited to see what the new year will bring. You can find our latest projects and ways to get connected with the program by visiting us online: [www.MarineDebris.noaa.gov](http://www.MarineDebris.noaa.gov).

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