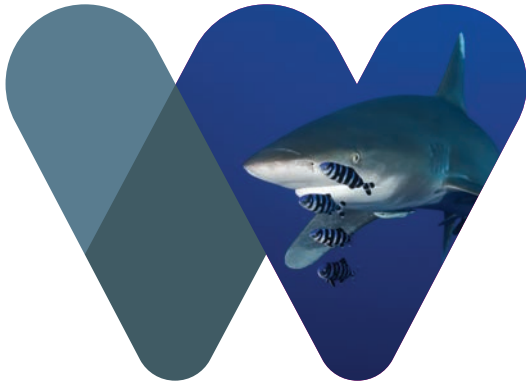




Oceans

A WCS Progress Report





We Stand for Wildlife.SM

The world's oceans and seas harbor fantastic biodiversity and serve humanity in incredible ways. They feed over a billion people, provide half of our atmosphere's oxygen, and create hundreds of millions of jobs.

Yet, these waters and the species that depend on them—including humans—are in trouble. The combined effects of overfishing, serial depletion of marine species, poorly managed resource extraction, rising seas, and warming waters have taken a toll. In recent years, we have lost a third of the world's coral reefs and 90 percent of the ocean's top predators.

This WCS Progress Report provides our generous supporters with updates and insights on recent efforts to conserve marine habitats and species across the waters of 23 countries and all 5 oceans. Our marine conservationists are investigating the cause and extent of the challenges facing marine environments. We are designing conservation solutions by convening local communities, governments, and businesses and industries. At WCS's zoos and aquarium, we are inspiring millions to stand with us. These efforts are shaping policies that strengthen protection for our oceans and marine wildlife.

New Trade Protections for Thirteen Shark and Ray Species

Despite the evidence that global shark populations are declining and the growing understanding of their vulnerability, the majority of shark and ray fisheries (as well as trade activities) are unregulated and poorly documented. To address this problem, in 2016, WCS formed the Global Sharks and Rays Initiative (GSRI), a coalition with other shark experts from Shark Advocates International, the Shark Trust, TRAFFIC, WWF International, and the IUCN Shark Specialist Group.

The GSRI launched a global 10-year conservation strategy that sets priorities for improving the status of these species. Since the launch, major efforts of WCS and GSRI partners have focused on advancing international trade controls for sharks and rays under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). At the 17th meeting of the CITES Conference of the Parties, which convened in September of 2016, nine species of devil rays, three species of thresher sharks, and the silky shark were officially listed under CITES Appendix II. This listing puts international trade restrictions in place to ensure that exports of the species are sustainable and legal. In addition, governments around the world will act to reduce the overfishing that threatens these species.

This listing puts international trade restrictions in place to ensure that exports of the species are sustainable and legal.

Working with the GSRI, WCS provided technical expertise and led efforts to advocate and engage governments in support of the shark and ray listings. The proposals were supported by more than the two-thirds majority required for adoption. WCS continues to participate and closely advise CITES committees on the implementation and enforcement of the new trade obligations, including improving traceability of shark and ray products. Expanding international cooperation and reducing illegal trade activity will prevent further declines and improve the outlook for these vulnerable and valuable species. ♡



5 FACTS ON SHARKS AND RAYS: MISUNDERSTOOD AND ON THE DECLINE

- 1 There are an estimated 1,250 species of sharks and rays.
- 2 25% of all species are threatened with extinction.
- 3 Overfishing is the primary threat to this group of species.
- 4 28 shark and ray species are currently listed under CITES, which enacts international trade restrictions.
- 5 In 2016, 13 species were listed under CITES: 9 devil rays, 3 thresher sharks, and the silky shark.

Researchers Discover Genetically Distinct Dolphins in Bay of Bengal

Marine scientists from WCS and partners recently discovered that two dolphin species in the waters of Bangladesh are genetically distinct from those in other regions. This finding is the result of a recent study of the genetics of Indo-Pacific humpback dolphins and Indo-Pacific bottlenose dolphins. Researchers found that populations of both species differ substantially from those in other parts of the Indian Ocean and western Pacific Ocean, indicating a strong connection

Researchers found a strong connection between the dolphins' characteristics and the unique oceanic habitat.

between their characteristics and the unique oceanic habitat found in the Bay of Bengal.

Located in the northern Indian Ocean, the Bay of Bengal is a biologically productive coastal region, rich with mangroves and a complex interchange of currents from converging rivers. With WCS's leadership, Bangladesh's first marine protected area was declared in 2014, protecting the "Swatch-of-No-Ground" underwater canyon. The canyon recycles vital nutrients for the Bay's thriving fisheries and provides important habitat for sea turtles, sharks and rays, and marine mammals such as the Indo-Pacific humpback and bottlenose dolphins. This study supports growing evidence that the unique features found in the Bay isolate the marine habitat from surrounding areas and drive evolutionary processes.

The results of this study raise important questions about the conservation status of these dolphins in the Bay, and whether they might be designated as separate species from the Indo-Pacific humpback and bottlenose dolphins outside of the Bay. Further investigation will help WCS scientists learn how these dolphin species have evolved over time, and point to the ways in which WCS and partners can better protect the unique biodiversity of this region. 🐬



INDO-PACIFIC HUMPBAC DOLPHIN

(*Sousa chinensis*)

NT NEAR THREATENED

INDO-PACIFIC BOTTLENOSE DOLPHIN

(*Tursiops aduncus*)

THREATENED

Not officially classified due to insufficient data

BAY OF BENGAL





New Generations of Sea Turtles in the Caribbean

WCS scientists recently reported that the coral reefs within the protected waters of Glover's Reef Atoll in Belize are now home to more than 1,000 juvenile hawksbill sea turtles, a healthy number for the recovery of this Critically Endangered species. Glover's Reef Atoll was declared a marine reserve in 1993 and is part of the Mesoamerican Barrier Reef Reserve System, a UNESCO World Heritage site. WCS helped develop a strategic conservation plan for Glover's Reef Atoll, which includes the hawksbill as an important keystone species in need of protection.

The newly published study is the result of field research conducted between 2007 and 2013, when 12 sets of snorkel surveys were conducted. One particular monitoring method called distance sampling was used for the first time ever during these in-water assessments of turtles, providing a precise yet cost-effective technique for abundance estimates of hawksbills. In 2017, WCS will expand its sea turtle monitoring efforts in Belize to include health and diet assessments, as well as long-range movement tracking using satellite tags on the turtles.

Further southeast in nearby Nicaragua, WCS has been leading conservation efforts of hawksbill turtles in the Pearl Cays Wildlife Refuge since 2000. A total of 602 clutches were recorded in the 2016 to 2017 season, a 9 percent increase in turtle nesting from the 2015 to 2016 season. Our team continues to be encouraged by the results year over year. In fact, this is the greatest number of clutches in the 17-year history of the project. The project's success can be attributed to WCS's outreach and educational activities, which have improved awareness and perception of sea turtles in the area, ultimately triggering a significant reduction in poaching rates. WCS continues to improve management of the marine protected area at Pearl Cays, which will further safeguard critical species and their habitat. 🐢

HAWKSBILL TURTLE

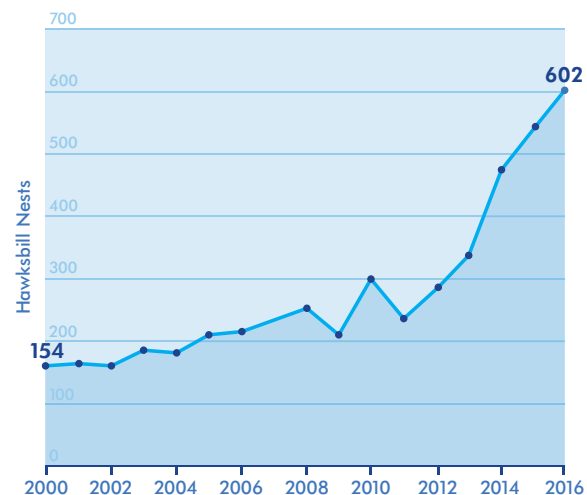
(*Eretmochelys imbricata*)

CR CRITICALLY ENDANGERED

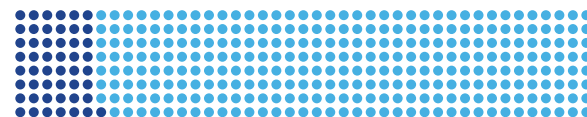
80% decrease globally since 2001 ↘

HAWKSBILL SEA TURTLES IN NICARAGUA'S PEARL CAYS

INCREASE IN ANNUAL NESTS



601% INCREASE IN ESTIMATED NUMBER OF ANNUAL HATCHLINGS



● = 100 HATCHLINGS

● 2001


● 2016 INCREASE

Investing in Marine Protected Areas

Today, while close to 15 percent of land is set aside for conservation, only 3.5 percent of oceans are formally protected. WCS's data show that designating marine areas for protection demonstrably improves fishery sustainability, reverses the decline of threatened species, and protects what remains of critical ocean habitat for a more secure future. With this in mind, in 2015, we established the WCS Marine Protected Area Fund to raise a minimum of \$15 million and ensure an additional 1.4 million square miles of previously unsecured oceans are formally protected, an area roughly the size of India. The Waitt Foundation has committed \$5 million, contingent upon WCS raising \$10 million over the next five years. Already, the blue moon fund, The Tiffany & Co. Foundation, and generous individuals have contributed \$4.5 million towards the match, and WCS marine protected area (MPA) expansion programs are underway in Chile, Fiji, and Congo.

In addition to creating protected areas, managing them effectively is an essential component of ensuring that the

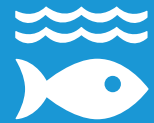
ocean habitats and marine wildlife within them can function well. In Nicaragua, WCS will develop a national model for MPA management starting in 2017. While much of the land along the Caribbean coast of Nicaragua is already within a formal protected area, the nation lacks the in-country technical support and resources, like enforcement, to ensure these areas are more than just "paper parks." Through support from the WCS Marine Protected Area Fund, we will partner with local agencies and communities to set the stage for stronger management of these essential places.

While governments around the world have made a commitment to halt further ocean degradation, many countries do not have the capacity to undertake this work alone. The Fund will channel new resources toward the expansion and improved effectiveness of MPAs across the world's oceans. Through the WCS Marine Protected Area Fund, we aim to safeguard a minimum of 10 percent of the world's oceans by 2020, and help achieve one of the 17 United Nations Sustainable Development Goals. 



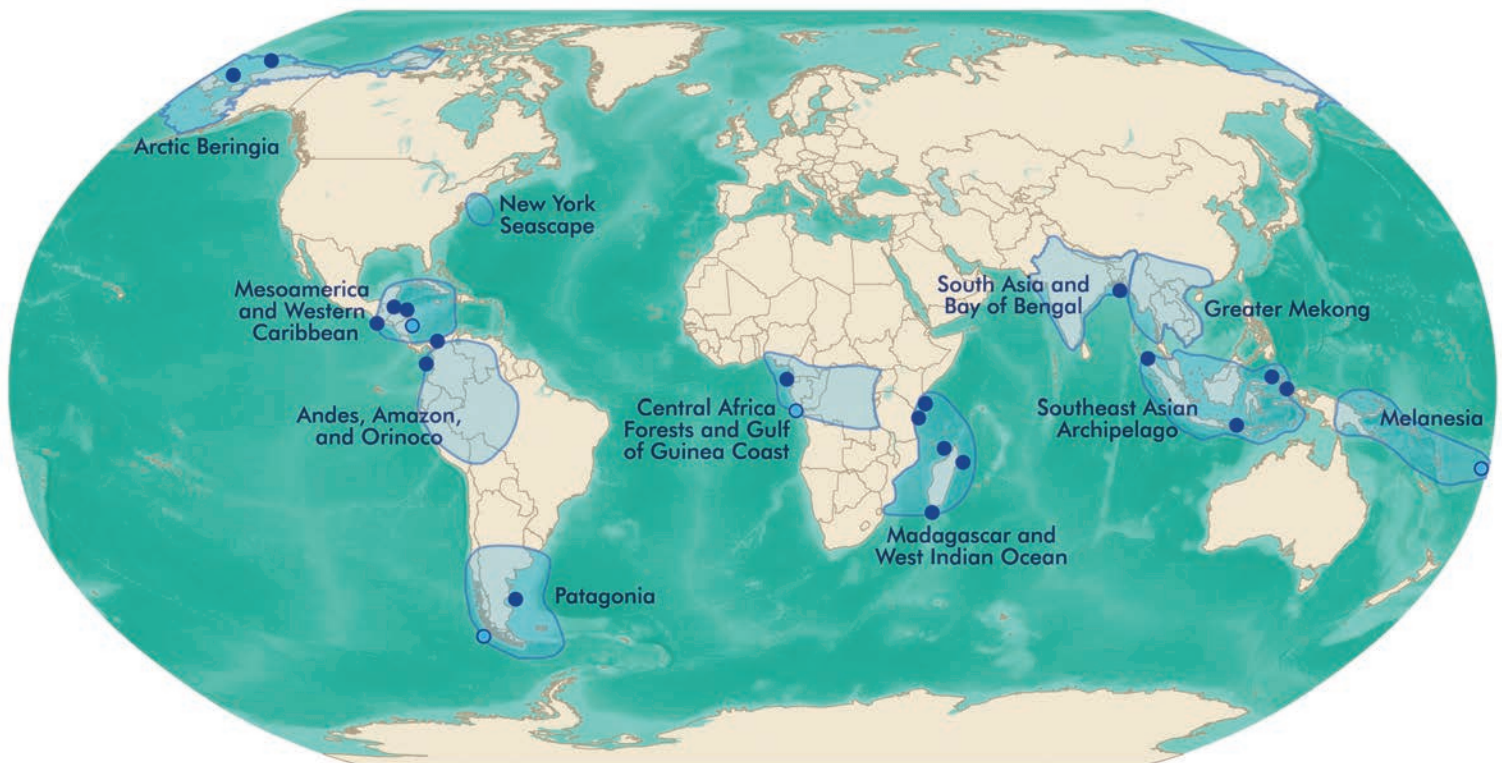
THE GLOBAL GOALS
For Sustainable Development

14 LIFE BELOW WATER



THE WCS MARINE PROTECTED AREA FUND WILL HELP ACHIEVE UN SUSTAINABLE DEVELOPMENT GOAL NUMBER 14.

PLANNED MPAs BY 2020





Scientists Point to Lighter Fishing Practices for Higher Value Yields

In a novel study that investigated how humans alter the food chains of 253 coral reef sites in the Indian Ocean, scientists from WCS and other organizations recently published insights on fisheries aiming to maintain a preferred catch of top predators, such as snapper and grouper.

Top-level fish command a high price in fish markets, and these resources support fishing communities across the tropics. Previous WCS research determined target levels of biomass (mass of organisms in a given area) needed to sustain fisheries for a diverse array of species, while maintaining

This new study identifies a more ambitious target for fisheries that aim to maintain valuable predatory fish.

a fully functioning ecosystem. This new study identifies a more ambitious target for fisheries that aim to maintain valuable predatory fish. We determined that fisheries can support and manage these top-level fish properly if lightly harvested. Furthermore, the study demonstrates that once these fish are depleted, a collapse of other species ensues. According to the study, this collapse is likely due to competition among other reef organisms, such as sea urchins.

Millions of people in coastal communities around the world rely on natural resources from coral reefs. Targets from this study cast a new light on how to manage tropical fisheries and will help guide policy for maintaining intact food webs. 🐟

FISH DISTRIBUTION



HEALTHY REEF



UNHEALTHY REEF



Published by WCS and the University of Toronto, Current Biology



Laying a Foundation for Marine Planning in Myanmar

With approximately 1,491 miles of intact, pristine coastline and more than 1,700 islands, Myanmar's coastal waters are thought to harbor some of the world's most important marine biodiversity. In addition to providing rich habitat for threatened species like sea turtles, dugong, and coral, Myanmar's ocean provides its fish-dependent communities with food and jobs. Recent political and economic reform has opened Myanmar up for rapid economic growth. Since 2011, the country has seen an unprecedented boom in tourism, coastal development, and foreign investment, most notably in gas exploration. Against a backdrop of increasing human pressures on coastal environments, there is a growing appreciation of the importance of the country's natural resources and the benefits of sustainable management for biodiversity conservation, livelihoods, and security.

WCS is leading efforts on long-term planning for marine conservation and development in Myanmar, and recently produced a marine spatial planning strategy and a first-ever biodiversity, resource-use, and habitat atlas of Myanmar's coastal environment. The Marine Biodiversity Atlas details Myanmar's physical marine environment, oceanography, marine habitats, biodiversity, and fisheries, and highlights important human influences. This data is now available to government agencies, regional bodies, NGOs, research institutes, and oil and gas companies; Myanmar's public and private sector now have the information they need to work together toward a sustainable ocean economy. This atlas will also enable WCS to shape fisheries governance reform, innovate and test models for conservation and restoration, secure a new marine protected area network, and inform strategies for protecting key species, such as sharks, rays, sea turtles, and dugong. 🐡

COASTAL COMMUNITIES RELY HEAVILY ON MYANMAR'S RICH MARINE LIFE, AND WCS IS ADDRESSING THREATS TO THIS NATURAL RESOURCE.

WCS PRIORITIES FOR CONSERVING MYANMAR'S MARINE RESOURCES

- Effective marine planning
- Sustainable fisheries
- Threatened species protections
- Safeguards for mangroves and other habitats



MYANMAR'S COASTAL WATERS

1,491 miles of coastline

1,700 islands

<1% formally protected



A Conversation with Sangeeta Mangubhai

Sangeeta Mangubhai is the Director of WCS's conservation program in Fiji. She works with communities and government officials to improve fisheries and coastal management, and to preserve the archipelago's remarkable biodiversity and natural resources in terrestrial protected areas. In the aftermath of Cyclone Winston (a Category 5 cyclone that struck Fiji in 2016), Sangeeta and her team continue to assess damage and recovery of natural resources, coral reefs in particular, while helping communities put resiliency plans in place.

How has WCS been involved in the recovery efforts after Cyclone Winston?

SANGEETA MANGUBHAI:

Right after the cyclone, we did two evaluations: one underwater audit to assess damage on coral reefs, and another to assess the impact to fish-dependent communities. We've been using these assessments to advise government agencies and communities on fisheries management regarding issues like the number of fishing licenses that damaged areas can sustain and what low-impact fishing gear to use, given the level of damage to various coral reefs.

We also guided the recovery efforts of other organizations, advising them on

which communities are most in need of assistance, and what level of support is most appropriate.

Can you describe some of the damage you have seen?

SM: There is extensive damage to coral reefs, even as far as 65 to 95 feet below water. Large areas of the reef matrix had been broken off, turned upside down, or smashed. Above the water, an incredible amount of damage to infrastructure occurred, including the loss of schools and homes. A year later, communities are still struggling to recover. But while there's an incredible amount of damage, huge parts of the country remained unharmed. Areas that survived are still vibrant and important for tourism.

Are you optimistic that these reefs and fisheries have a chance for long-term survival?

SM: There's more room for hope than pessimism. WCS has been working in Fiji for 16 years on natural resource management with local communities and the government. We have a great foundation and strong partnerships in place. Communities have been proactive; for example, they have kept the majority of their marine protected areas closed and reduced the number of commercial fishing licenses in their fishing grounds this year. Those things make me feel positive. Our local communities are committed to recovery.

We are working with the Fiji government to better evaluate communities' vulnerability to natural disasters, and will facilitate training in 2017 on how to incorporate disaster risk reduction into community planning processes. Already, the government is having discussions with communities about moving them further away from coasts to other places within their own lands where they will be safer. There is a deepening understanding about the role that species and healthy ecosystems play in reducing the communities' vulnerability. 💙

New York Aquarium and the Local Seascape

WCS's New York Aquarium originally opened at Castle Clinton in Lower Manhattan in 1896, and has a long, rich history. This year marks the anniversary of two events, both especially significant for the Aquarium: the 60-year anniversary of the relocation to Coney Island, and the 5-year anniversary of Hurricane Sandy.

As we complete construction of the *Ocean Wonders: Sharks!* exhibit, we would like to thank our supporters who are helping us give New York the aquarium it deserves: an awe-inspiring center for learning and marine conservation. In the face of both great challenges and ambitious endeavors—from the aftermath of Sandy to our extensive expansion—you have been with us every step of the way.



Completing *Ocean Wonders: Sharks!*

The interior of *Ocean Wonders: Sharks!* is rapidly changing as life support systems and infrastructure are put in place. Finishing touches and trims are being added to the galleries, including the many decorative and functional details like doors, windows, and moldings. In addition, final reinforcements to ensure exhibit tanks are fully water-proof are being installed and tested.

The outside roof, concrete façade, and preliminary shimmer wall elements were set up over the winter, and the installation of cabling and the 30,000 individual metal panels begins this spring. By the end of summer, a 1,000-foot dynamic and glittering surface will wrap the exterior of *Ocean Wonders*.

In December 2016, thanks to generous supporters like you, we exceeded our \$100,000 fundraising goal for the virtual shimmer wall in support of the Campaign for the New York

Aquarium. We also signed the agreement with the City of New York in December to receive FEMA funding of \$102 million to restore the portions of the Aquarium previously damaged by Sandy. Extensive flood mitigation measures will be installed during the renovations, including a flood wall along the perimeter, protection along individual buildings, and elevated

Thanks to generous supporters like you, we exceeded our \$100,000 fundraising goal.

emergency generators on the west side of the campus. Restored exhibits will highlight climate change and invertebrate biodiversity, and include an interactive play area for children. The renovation will begin this year and continue once *Ocean Wonders* opens in 2018, resulting in a substantially new visitor experience. ♡

NEARLY COMPLETE, THE UNIQUE THIRD FLOOR LEARNING LABORATORY WITHIN OCEAN WONDERS: SHARKS! WILL PROVIDE STUDENTS OF ALL AGES WITH PRACTICAL SCIENCE EXPERIENCE.



Remembering Sandy

In October 2012—five years ago—Hurricane Sandy ravaged the Northeast and struck the New York Aquarium with devastating force. Thanks to the unwavering dedication of our keepers, maintenance staff, electricians, and volunteers, the safety of the animals was ensured and the Aquarium got back on its feet.



"I siphoned fuel out of my car so we could pump water out of the buildings around the clock."

DENNIS ETHIER

DIRECTOR, PLANT ENGINEERING



"I had lost my home. But caring for them was like a relief."

MARTHA HIATT

SUPERVISOR OF BEHAVIORAL HUSBANDRY

Leading the Coalition for a Mid-Atlantic Marine Sanctuary

In November, WCS's New York Aquarium submitted a proposal to the National Oceanic and Atmospheric Administration (NOAA) to nominate the Hudson Canyon as a National Marine Sanctuary. Located just 100 miles from New York City, the Hudson Canyon is the Atlantic Coast's largest submarine canyon, rivaling the Grand Canyon in scale and majesty. Federal designation as a sanctuary will help safeguard the astonishing array of marine life that relies on the canyon for food and shelter, including whales, sharks, and sea turtles. The sanctuary can help protect the canyon's fragile ecosystem from threats created by human activity, such as potential oil, gas, and mineral exploration and extraction, while supporting the commercial and recreational fisheries as well as the whale- and bird-watching cruises that depend on the area.

The proposal submission was the first step in a multi-year, stakeholder-driven process required before a new National Marine Sanctuary can be established. The New York Aquarium is building a coalition comprising local businesses, NGOs, and elected officials, and has already submitted 1,700 drawings and 20,200 petition signatures to NOAA from New York Aquarium and zoo visitors and from WCS online supporters advocating for the sanctuary. In February, NOAA agreed that the Hudson Canyon met their criteria as an ecological site of national significance worthy of protection, and placed it in their inventory of areas to be considered for future National Marine Sanctuary designation. The Aquarium continues to build critical public support and political will, while calling on NOAA to initiate the designation process. 🐋

Support the designation of the Hudson Canyon as a National Marine Sanctuary by visiting blueyork.org and signing the petition.



HUDSON CANYON

Located 100 miles southeast of New York City

Extends 350 miles seaward

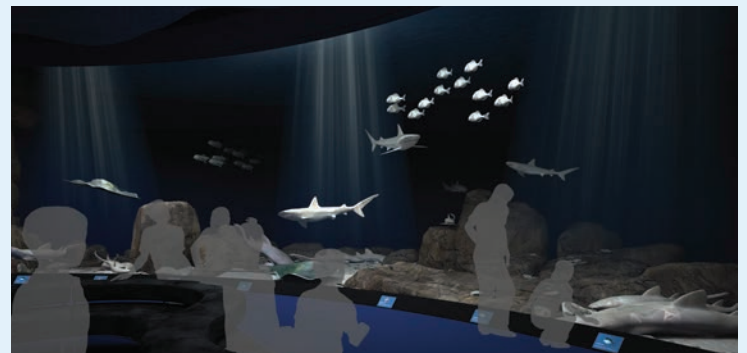
Up to 2.5 miles deep and 7.5 miles wide

SUPPORTS THREATENED AND ENDANGERED SPECIES

- Marine mammals
- Sea turtles
- Sharks

SUPPORTS ECOLOGICALLY AND COMMERCIALY VALUABLE SPECIES

- Hundreds of fish and invertebrates
- Deep sea corals



THE UNIQUE HABITATS OF THE HUDSON CANYON WILL BE FEATURED IN THE NEW YORK AQUARIUM'S UPCOMING OCEAN WONDERS: SHARKS! EXHIBIT, SCHEDULED TO OPEN IN 2018.



— SHARK TRACKER

TRACKED ACTIVITY AS OF APRIL 2017 OF “MANHATTAN,” A MALE, SATELLITE-TAGGED WHITE SHARK. TO TRACK “MANHATTAN” AND OTHER SHARKS WITH US IN REAL TIME, VISIT OCEARCH’S GLOBAL SHARK TRACKER AT OCEARCH.ORG. Source: *OCEARCH data*

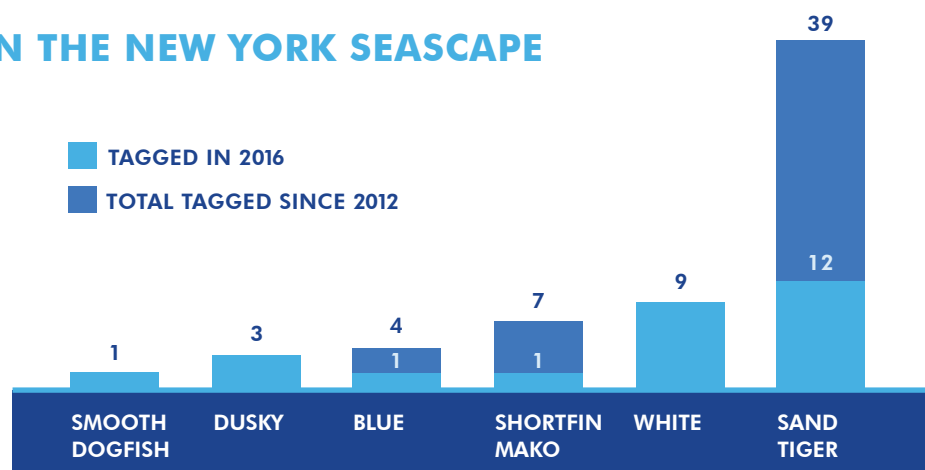
New York Aquarium Scientists Contribute to OCEARCH Shark Expedition

As part of the New York Aquarium’s ongoing shark research, in summer 2016, scientists participated in an OCEARCH expedition to study the interaction and movement of white sharks off the coast of Long Island, New York. OCEARCH, an organization that specializes in tracking sharks, brought its unique at-sea research laboratory, the *MV OCEARCH*, to New York waters for the first time for this expedition. With OCEARCH, New York Aquarium scientists helped tag nine juvenile white sharks with near real-time satellite tags. The tracking data suggest that coastal waters off Long Island may be an important nursery habitat for these depleted predators. These satellite tags will transmit to our scientists and their colleagues information about the sharks’ movements up and down the East Coast for the next several years. This will provide baseline information on migratory patterns previously unknown for Northwest Atlantic juvenile white sharks. The data will contribute to our greater understanding of the New York marine ecosystem, and strengthen our ability to protect the habitats and wildlife that depend on these waters.

During the expedition, New York Aquarium and OCEARCH scientists also tagged three dusky sharks and a smooth dogfish, and collected health samples to share with collaborating institutions. Combined with assessments made on previously tagged sharks, these evaluations will be used to develop health parameters for future field studies and to guide conservation and management of these species. 🐟

SHARKS TAGGED IN THE NEW YORK SEASCAPE

NEW YORK AQUARIUM SCIENTISTS HAVE BEEN TRACKING THE MOVEMENTS OF BLUE, MAKO, AND SAND TIGER SHARKS IN NEW YORK WATERS SINCE 2012, AND RECENTLY DOCUMENTED A SAND TIGER SHARK NURSERY IN LONG ISLAND’S GREAT SOUTH BAY.





Acoustic Buoy Yields New Data on Endangered Whales

An acoustic buoy deployed last summer by the New York Aquarium and the Woods Hole Oceanographic Institution has detected four species of great whale, including the highly endangered North Atlantic right whale, the humpback whale, and the sei whale, an elusive species rarely seen in New York. Fin whales, the second largest animal to have ever lived, have been detected most days since June 2016. Information about sounds detected by “Melville” the buoy, particularly whale vocalizations, are transmitted by satellite in near real time. Eventually, this technology can be used to help ships avoid whales by alerting ship captains to their presence.

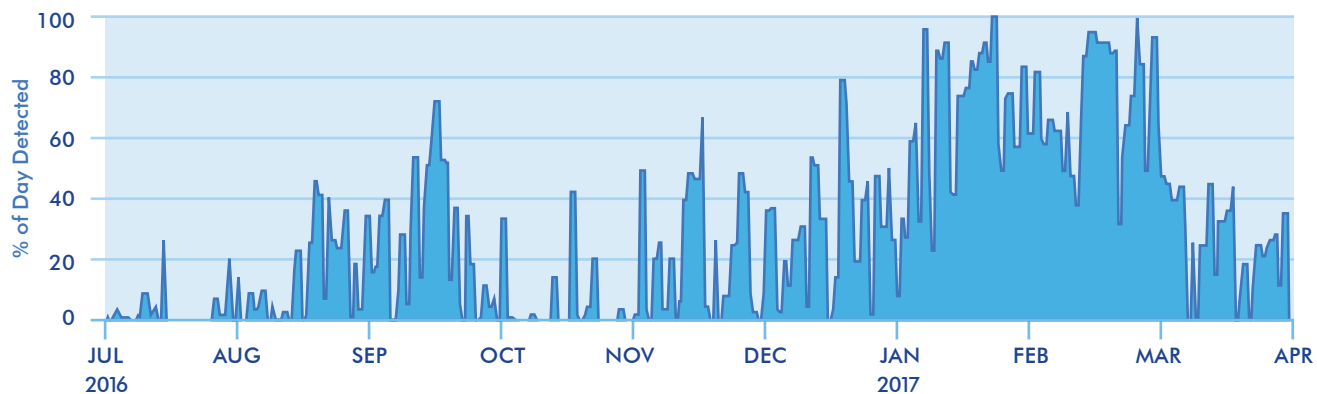
The East Coast’s highest number of ship strikes (collisions between marine animals and vessels) for whales occurs in areas between the New York Bight and Chesapeake Bay. On October 26, a North Atlantic right whale was detected by the buoy outside of the New York Harbor Seasonal Management Area, a zone established to protect the slow-swimming whales with boat speed restrictions during the whales’ migration periods. Filling information gaps on these giants is helping WCS protect their passage through the bustling waters of New York. In addition, WCS scientists are analyzing data from other sources, including whale-watching tour operators in Brooklyn and Long Island, to better understand the presence and movements of whales in relation to ships and emerging industries.

Our conservationists are also advocating for protection against ship strikes on a global scale. In February, WCS co-hosted a panel discussion at the United Nations about the impacts of the shipping industry on whales. Participants from government agencies, scientific organizations,

Filling information gaps on these giants is helping WCS protect their passage through the bustling waters of New York.

and the shipping industry examined the threats of collision and ship noise to these acoustically sensitive marine mammals, and discussed potential solutions. Additionally, WCS and partners successfully urged former President Obama to deny seismic oil and gas surveys in the Mid-Atlantic and South Atlantic. In our multi-year effort, WCS noted the surveys would significantly impact North Atlantic right whales, jeopardizing their survival. There is no better time to seek solutions on how to best protect marine mammals in New York’s busy waterways and neighboring habitats, and WCS is proud to be a leader in this movement. 💙

FIN WHALE DETECTIONS



To view more information in near real time about whale vocalizations detected by “Melville,” an acoustic buoy named by WCS supporters, visit blueyork.org/whales.



Thank you for helping us save wildlife and wild places around the globe.

Learn more at wcs.org



Oceans: A WCS Progress Report • 2017

With deep appreciation to:

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