# NEWSWAVE

NEWS FROM THE U.S. DEPARTMENT OF THE INTERIOR: OCEAN, GREAT LAKES, AND COASTS

***Special Feature*—Our World Underwater Scholarship at National Parks** ***Spring 2018***


## Interior Issues Offshore Oil and Gas Energy Revenues to Gulf of Mexico States

### Disbursements will fund important coastal conservation, restoration, and hurricane protection projects.


Secretary Zinke (center) shares a large check with governors and congressional representatives of Alabama, Louisiana, Mississippi, and Texas. Photo credit: Tami Heilemann, DOI

In April, Secretary of the Interior Ryan Zinke announced the U.S. Department of the Interior (DOI) will divide about $188 million among Alabama, Louisiana, Mississippi, and Texas (the oil-and-gas producing States on the Gulf of Mexico), and their coastal political subdivisions (CPS). This represents the first disbursement of funds under Phase II of the Gulf of Mexico Energy Security Act of 2006 (GOMESA). The funds are derived from qualified oil and gas leasing revenues on the Outer Continental Shelf (OCS) and disbursed in accordance with GOMESA legislation.

"Under President Trump's America-First energy strategy, we've increased energy revenue by a billion dollars nationally in the first year alone, which creates more funding for important conservation projects in the Gulf," said Secretary Zinke. "Offshore energy production means less oil needed from foreign countries and more jobs for the American people. This $188 million will be dedicated to coastal restoration and other projects important to many communities in the Gulf."

Alabama Governor Kay Ivey said, "As one of the four Gulf producing States, Alabama will use these funds wisely to protect, restore, and provide public access to natural resources in our beautiful State. I appreciate the work of Congress, through GOMESA, to share these revenues with the areas most affected by Outer Continental Shelf activities."

Mississippi Governor Phil Bryant said, "This funding will help initiate projects to improve our water quality and enhance the blue economy of our

*See Energy Revenues page 4*

## $60 Million to Promote Fishing and Boating

### Funds from taxes on fishing equipment and boating fuel.

In February, Secretary Zinke announced a $60 million cooperative agreement with the Recreational Boating and Fishing Foundation (RBFF) to help retain and recruit recreational anglers and boaters. *See related story, page 7*. Zinke also announced $14 million in Boating Infrastructure Grants (BIG), which improve facilities for large transient recreational boats to support water-related outdoor recreation and tourism.

"Outdoor recreation is a key part of our American heritage, and boating and fishing in particular are how many Americans enjoy our public waters," said Secretary Zinke. "The new cooperative agreement with RBFF is going to make sure we are reaching new anglers and boaters from all

An excited young angler shows off his prize catch with Dr. Mike Millard at the USFWS Northeast Fishery Center Kid's Fishing Day, Lamar, PA. Photo credit: USFWS

*See Fishing and Boating page 4*

## In This Edition



***Subscribe or Contribute to NEWSWAVE!***

If you have any questions, comments, or want to receive *NEWSWAVE* by email, contact:
Ann Tihansky: *tihansky@usgs.gov*

**For more information, contact:**


Liza Johnson, Ocean, Great Lakes and Coasts Coordinator
Office of Policy Analysis,
1849 C Street, NW, Mail Stop 3530
Washington, D.C. 20240
Telephone: 202–208–1378
*liza_m_johnson@ios.doi.gov*


## Connect to Images and Multimedia via Social Media

LIKE us on Facebook:
*https://www.facebook.com/USInterioroceanscoastsgreatlakes/*

A Razorbill lands among puffins. Photo credit: Rosie Walunas, USFWS

*See related story, page 5.*


***NEWSWAVE*** is a quarterly newsletter from the Department of the Interior featuring ocean, Great Lakes and coastal activities across the Bureaus.

**Visit us online:** *https://www.doi.gov/pmb/ocean/newswave*

**Editor:** Ann Tihansky (USGS)

**Technical Editor:** Rebekah Davis (USGS); **Layout:** Suzanne Roberts (USGS)

**Contributors:**

DOI
Tami Heilemann (DOI)
Liza Johnson (DOI)
Tanya Joshua (DOI, OIA)
Jason Kirkey (DOI)
Jamie K. Reaser (DOI)
Hilary Smith (DOI)
BOEM
Marjorie Weisskohl (BOEM)
BSEE
NPS
Jamie Hoover (NPS)
Charles Morris (NPS)
USFWS
Samantha Brooke (USFWS)
Isaac Burke (USFWS)
Christopher Eng (USFWS)
Holly Freifeld (USFWS)
Susan Guiteras (USFWS)
Ryan Hagerty (USFWS)
Jennifer Koches (USFWS)
Robby Kohley (USFWS)
Stefan Kropidlowski (USFWS)
David B. Ledig (USFWS)
Roy W. Lowe (USFWS)
Ilana Nimz (USFWS)
Tom MacKenzie (USFWS)
Joe Milmoe (USFWS)
Lauri Munroe Hultman (USFWS)
Darci Palmquist (USFWS)
Marc Romano (USFWS)
Ivan Vicente (USFWS)
Rosie Walunas (USFWS)
Samantha Whitcraft (USFWS)
Bart Wilson (USFWS)
Jed Wright (USFWS)
USGS
Murulee Byappanahalli (USGS)
Heather Dewar (USGS)
Pam Fuller (USGS)
Paul Hershberger (USGS)
Jamie Jones (USGS)
Heidi Koontz(USGS)
Marisa Lubeck (USGS)
W. Scott McBride (USGS)
Matt Neilson (USGS)
Meredith Nevers (USGS)
Jeff Peters (USGS)
John Pohlman (USGS)
Dorothy F. Sifuentes (USGS)
Andrea Toran (USGS)
Nate Wood (USGS)
Thierry Work (USGS)
NOAA
American Littoral Society
Zack Toyle (American Littoral Society)
Ayla Fox (The Coastal Institute-URI)
*Exxon Valdez* Oil Spill Trustee Council
Katasha Cornwell (Florida Department of Transportation)
Aldaron Laird and others (Historical Atlas of Humboldt Bay and Eel River Delta)
Rory Stansbury (Island Conservation)
Kevin Richards (Hawai'i Emergency Management Agency)
LCC Network
Jake Emmert (Moody Gardens Aquarium)
Scott Comings (The Nature Conservancy)
David Brankovits (WHOI)
Cole Goco (illustrator)
Jay Amberg (photographer)
HP Hartmann (photographer)
Carl Johnson (photographer)
Greg Lasley (photographer)
Jacob Pohlman (photographer)
David Smith (photographer)
Shaun Wolfe (photographer)

## New Review Process for Offshore Energy Permits

By BSEE

In March, the Bureau of Safety and Environmental Enforcement (BSEE) implemented a new quality-assurance process for reviewing and assessing its permitting systems to help make offshore energy operations more responsible and efficient. The goals of the new process are to reflect current permits and inform best practices for future offshore energy permitting.

"We owe it to the American people to ensure that our permit processes are efficient and decision-making practices are consistent," said Scott Angelle, BSEE Director. "Taking these actions now will promote BSEE's effective monitoring of permit processes and provide an avenue to progress towards overall improvements such as decreased processing delays."

The new directive, issued by BSEE's Office of Offshore Regulatory Programs, requires BSEE to periodically review and assess permitting processes used within BSEE for consistency, timeliness, and efficiency. Carefully selected teams of BSEE staff will complete this quality-assurance process by developing assessment plans and completing assessments that involve permit reviews and on-site visits, as applicable.

BSEE implemented a new quality-assurance process to increase safety and reliability of offshore energy operations. Photo credit: BSEE

Read the press release: *https://www.bsee.gov/newsroom/latest-news/statements-and-releases/press-releases/bsee-implements-new-quality-assurance*

## Secretary Zinke Moves Forward to Improve Safety Offshore

In March, Secretary Zinke announced new initiatives, including risk-based inspections and more time for physical inspections, to strengthen the Federal offshore oil and gas inspection program. Zinke's announcement at the 2018 CERAWeek® conference coincided with the U.S. offshore's largest oil producing year on record for the U.S. offshore, totaling 629 million barrels during 2017.

CERAWeek is an annual energy conference organized by IHS Markit® in Houston, Texas. The 37th annual CERAWeek conference was held from March 5 to 9, 2018.

"One of the pillars to responsible energy development is ensuring it's done safely," Secretary Zinke told the CERAWeek attendees. "As part of the Trump administration's push for safety in energy development, we are working hard to do our job smarter and ensure industry is exploring and producing safely."

BSEE inspectors started doing risk-based inspections in March as part of the Bureau's overall inspection strategy. This specialized inspection protocol involves analyzing continuous trend data to focus on performance issues.

BSEE Director Scott Angelle explained, "I want BSEE's programs and processes to be the best in the world, and I'm not afraid to subject them to scrutiny to determine where improvements are needed."

Since his arrival in 2017, Angelle has called for BSEE to embrace a process of change management. "The six initiatives we are announcing today are an important set of steps that will keep pace with the increased offshore oil gas and production, ensure safety, and protect the environment," Angelle stated. "They will also help BSEE become a more efficient agency, something the American taxpayers expect and deserve."

Read more: *https://www.doi.gov/pressreleases/secretary-zinke-moves-forward-improve-safety-offshore*

Secretary Zinke swears in Doug Domenech (at left) as the Assistant Secretary for Insular Areas on September 18, 2017. Photo credit: Tami Heilemann, DOI

## Domenech Takes on DOI's Oceans Program

By Tanya Joshua (OIA) and Ann Tihansky (USGS)

On February 1, Secretary Zinke signed Secretarial Order no. 3361, expanding the functions and responsibilities of the Assistant Secretary for Insular Areas Doug Domenech to include the Office of International Affairs and the Ocean, Great Lakes, and Coastal Program (Oceans Program), which was previously under the Assistant Secretary for Policy Management and Budget. The new expanded portfolio will now be called the Office of the Assistant Secretary for Insular and International Affairs. Domenech also serves as the Secretary's appointee to the Advisory Council of the Conservation Trust of Puerto Rico.

"This realignment is part of the Department's overall efforts to reorganize for the next 100 years and improve mission achievement," said Secretary Zinke. "By elevating the profiles of all three of these components within Interior, we aim to renew and strengthen U.S. strategic interests, strengthen relationships and policies for U.S. oceans, Great Lakes, and coastal communities, and enhance collaboration globally on behalf of the American people."

Learn more: *https://www.doi.gov/asiia*

*Energy Revenues continued from page 1*

Gulf coast. I am grateful to Secretary Zinke and everyone else who made this disbursement a reality."

Louisiana Governor John Bel Edwards said, "This revenue stream is one we have planned our coastal program around, and we are happy to finally be able to put it to use to help address our land loss crisis. A healthy coast is absolutely essential to a healthy oil and gas industry in Louisiana, as well as our economy overall. The dedication of these funds to address our coastal issues is the smartest investment we can make." Senator John Neely Kennedy (R–LA) said, "More of Louisiana's coast disappears every day. I am glad to finally see these GOMESA dollars coming in. This money will help us restore our beautiful coast so that we can continue to provide oil, natural gas and seafood to the rest of the Nation."

Texas Governor Greg Abbott said, "We look forward to using these funds for projects that reinforce our conservation and restoration efforts, and will allow generations of Texans to enjoy. As the State of Texas continues to recover from the damage and devastating flooding that impacted 240 miles of Texas coastline, we are grateful for the GOMESA funds that will help strengthen and restore the State's vibrant coastal region."

The DOI Office of Natural Resources Revenue (ONRR) manages and ensures payment of revenues owed for energy and natural resources development on the OCS and Federal and Tribal lands. On average, ONRR collects more than $10 billion of non-tax revenue annually. Details about revenue-sharing allocations and disbursements for fiscal year (FY) 2017 were published in April on the ONRR website: *https://www.onrr.gov*

Read the press release: *https://www.doi.gov/pressreleases/interior-issues-188-million-energy-revenues-fund-conservation-and-storm-prep*

*Fishing and Boating continued from page 1*

ages to get out on the water. The BIG grants help ensure that those new recreationists, as well as those who have enjoyed these activities for years, experience improved access to fishing opportunities with safer and more user-friendly recreational boating facilities."

"The Recreational Boating and Fishing Foundation, in partnership with the Secretary of the Interior, the U.S. Fish and Wildlife Service, State natural resource agencies, and industry stakeholders has increased fishing participation by nearly 20 percent over the past 10 years," said Glenn Hughes, American Sportfishing Association's (ASA) Vice President of Industry Relations. "ASA is very pleased that RBFF's grant was renewed for another five years, ensuring that there are a many programs and campaigns to recruit, retain and reactivate anglers."

"The role of RBFF and the work they do helping Americans get on the water, which in turn supports the conservation and restoration of our Nation's aquatic resources, has an incredibly positive and lasting impact on the recreational boating and fishing industries," said Thom Dammrich, President of the National Marine Manufacturers Association. "We applaud the Department of the Interior for recognizing RBFF's significant contribution to outdoor recreation, and we look forward to continuing to support their efforts on behalf of the 142 million Americans who go boating each year."

Read more: *https://www.doi.gov/pressreleases/secretary-zinke-announces-60-million-cooperative-agreement-promote-fishing-and-boating*

Illustration credit: Cole Goco

# Protected Places for Puffins

By Ann Tihansky (USGS)

Few other seabirds call as much of the Pacific home as do the puffins. National parks and USFWS National Wildlife Refuges provide important areas for breeding and protecting these truly remarkable birds. Nicknamed "sea parrots" or "clowns of the sea," the Tufted Puffin (*Fratercula cirrhata*) and the Horned Puffin (*Fratercula corniculata*) are iconic species of the north Pacific coasts. Their bright, bold markings and striking colorful bills make them undeniably attractive birds. They only live in the Northern Hemisphere and are members of the Alcidae family (or alcids) that consists of seabirds that can both fly and swim with their wings.

The Tufted Puffins have blonde head plumes, an orange bill, and snow-white mask against its dark body plumage. The Horned Puffin is distinguished easily by its mostly yellow bill with orange tip. The Horned Puffin receives its name from the horny projections that extend above its eyes. During winter, the bills and feet of puffins fade to dull shades of their summer colors. Every spring, their beaks and feet turn a colorful orange in preparation for the breeding season.

Puffins spend their winters on the open ocean, chasing fish and invertebrates by "flying" underwater, hundreds of feet below the waves. To nest, they use their bills and sharp-clawed feet to dig in soil and rocky crevices to create a nesting burrow that extends several feet in length and is lined with feathers and grass to cushion the one egg that the female lays inside. Sometimes, building a nest can take a whole breeding season, so puffins often use the same burrow year after year. They usually don't breed until five years old, and may live up to 20 years in the wild.

A trio of Horned puffins perched at Alaska Maritime NWR. Photo credit: USFWS

Close look at the Horned Puffin. Photo credit: Rory Stansbury, Island Conservation

A pair of Tufted Puffins at the Alaska Maritime NWR. Photo credit: Ilana Nimz, USFWS

Tufted Puffin in flight. Photo credit: Ilana Nimz, USFWS

The parents take turns feeding the hatchlings, called pufflings, a diet of almost entirely small fish. Although the adults feed mostly on anchovies and other small fish, they also can eat squid, octopus, crabs, zooplankton, and jellyfish.

Among all alcids, Tufted Puffins are the most latitudinally distributed, ranging from Japan to the U.S. west coast.

Learn more: *https://www.nps.gov/kefj/learn/nature/puffins.htm*

A Tufted Puffin at home on the rocky cliffs on Hawadax Island in the Bering Sea, Alaska, part of the Alaska Maritime NWR. Photo credit: Marc Romano, USFWS

*https://www.fws.gov/refuge/Oregon_Islands/wildlife_and_habitat/tufted_puffin.html*

Read the fact sheet: *https://www.fws.gov/refuges/about/pdfs/FactSheetTuftedPuffin.pdf*

Pictures: *https://www.flickr.com/photos/islandconservation/sets/72157635407502583/*

# Restoring Injured Resources

By USFWS

You know that old adage, if you have lemons, make lemonade?

The Natural Resource Damage Assessment and Restoration Program (NRDAR) does basically the same thing by making the most of any sour situation. When oil and other hazardous substances harm fish, wildlife, and other natural resources, the USFWS, along with other Federal, State, and Tribal partners, act as trustees for natural resources in these claims. Trustees work with the responsible party to identify which natural resources are injured, determine the extent of the injuries, recover damages from the responsible party, and plan and complete restoration activities to mitigate the injuries. This program has put more than $13.5 million on the ground for the benefit of the American people after public lands were affected negatively.

In 2017, nearly 400 river miles and 3,500 acres were made better for fish, wildlife, and the public. Some example projects in coastal areas include habitat restoration along the Gulf of Mexico coast (*Deepwater Horizon* oil spill), Termination Point in Alaska's Prince William Sound (*Exxon Valdez* oil spill—25 years later), Aramburu Island in San Francisco Bay (*Cosco Busan* oil spill), and 2017 hurricane response in Puerto Rico.

Oil spill response actions near a drill site on May 27, 2010. Photo credit: Tom MacKenzie, USFWS

Photos clockwise from top:

A sea turtle drenched in sludge is picked up by a USFWS employee. Photo credit: NOAA

An oiled cormorant (*Phalacrocoracidae* sp.) on the rocky shore of Prince William Sound after the *Exxon Valdez* oil spill in 1989. Photo credit: *Exxon Valdez* Oil Spill Trustee Council

Brown pelican being rinsed after extensive cleaning at the Theodore Oiled Bird Rehabilitation Center in Alabama. Photo credit: Tom MacKenzie, USFWS

Two rehabilitated brown pelicans (*Pelecanus occidentalis*) are released into the wild after being relocated to Aransas National Wildlife Refuge in Texas in June 2010. Photo credit: USFWS

The primary goal of the NRDAR Program is to restore injured resources to benefit the American people. Read the 2017 NRDAR Program's accomplishments report: *https://www.fws.gov/ecological-services/es-library/pdfs/NRDAR-FY2017-Report.pdf*

# Herring Restoration Plan

## Addressing Long-Term Effects of the *Exxon Valdez* Oil Spill

By Paul Hershberger (USGS)

Nearly 30 years ago, on March 24, 1989, 10.8 million gallons of crude oil were spilled when the oil tanker, *Exxon Valdez*, struck Bligh Reef, Alaska. The spilled oil inundated areas where adult Pacific herring were preparing to spawn, so herring (*Clupea pallasii*) that spawned as eggs during the spill largely failed to recruit into the adult population. The spawning biomass declined from 120,000 tons (in 1989) to 30,000 tons (in 1993), which resulted in severe curtailment of commercial fishing. The herring stock still have not recovered; less than 10,000 tons returned in 2017.

Pacific herring are important in marine ecosystems of the North Pacific Ocean because they are an essential source of food for larger fish, seabirds, and marine mammals. Herring also are economically important because they are commercially fished for food and bait. Because herring have not rebounded after more than 25 years, and because of the importance of herring, the *Exxon Valdez* Oil Spill Trustee Council began an ambitious multidisciplinary effort to restore the herring resources. *See related story, page 1*.

A team of USGS scientists are designing a 20-year Integrated Herring Restoration Plan (IHRP) to better understand chemical, physical, and biological processes that control herring abundance and recruitment. The IHRP extends across scientific disciplines and institutional boundaries with partners from the United States and Canada.

Read more: *https://wfrc.usgs.gov/newsletter/Issue6.1January2018.pdf*

# The "BIG" Program and RBFF Agreement

## Sport Fish Restoration and Boating Trust Fund

Nearly $10 million will be awarded competitively for 10 projects in seven States under the BIG Program Tier II subprogram. The USFWS also will release $4 million to fund 33 projects in 23 States, commonwealths, and territories under the BIG Tier I subprogram. States and their partners will provide more than $16 million in non-Federal matching funds toward these projects. These grants are awarded on an annual basis.

Funding for the BIG Program comes from the Sport Fish Restoration and Boating Trust Fund. Since 2000, the BIG Program has awarded $194 million to projects for large transient recreational boats, including the construction of more than 5,000 berths for boaters across most States and U.S. territories.

BIG Program funds support a wide variety of infrastructure features that add to the safety and enjoyment of America's waters. These features include restrooms, bulkheads, day docks, dinghy docks, transient slips, mooring buoys, floating docks and fixed piers, dockside water supplies, marine fueling stations, and navigational aids such as channel markers.

Learn more about the BIG Program: *https://wsfrprograms.fws.gov/subpages/grantprograms/big/big.htm*

Full list of projects and funding here: *https://wsfrprograms.fws.gov/Subpages/GrantPrograms/BIG/BIG_Funding.htm*

Photo credit: USFWS

## RBFF Agreement

Like the BIG Program, the RBFF agreement is funded through the Sport Fishing and Boating Trust Fund. In FY 2017, this trust fund provided $349.4 million in sport fish restoration funds to States, insular areas, and the District of Columbia to conserve, protect, and enhance fish, wildlife, their habitats, sport fishing, and recreational boating opportunities.

Since 1998, RBFF has spearheaded innovative national outreach and education programs to promote fishing and boating and to educate the public on its conservation benefits. RBFF was selected as the grant recipient because of this extensive experience and proven success in marketing, outreach, and education. The cooperative agreement implements the National Outreach and Communications Plan (NOCP), which was established to address declining trends in fishing and boating participation.

RBFF's work has affected many levels; for example, RBFF launched its 60 in 60 campaign in 2016, which seeks to reach 60 million anglers in 60 months. The Association of Fish and Wildlife Agencies, which represents all 50 States, several Federal agencies, and industry, has embraced this campaign and is working with RBFF to reach this ambitious goal. In addition, First Catch Centers are being piloted to bring angling skills to new participants. Several of these will be on DOI lands in Pennsylvania and Texas (including at the John Heinz National Wildlife Refuge [NWR], Laguna Atacosa NWR, and Inks Dam National Fish Hatchery).

Read more about RBFF: *https://www.takemefishing.org/*

Press release: *https://www.fws.gov/news/ShowNews.cfm?ref=secretary-zinke-announces-$60-million-cooperative-agreement-to-promote-&_ID=36225*

## Results of Gulf of Mexico Region-Wide Oil and Gas Lease

By BOEM

In March, Joe Balash, Interior Assistant Secretary for Land and Minerals Management, announced that the Gulf of Mexico Lease Sale 250 generated $124,763,581 in high bids for 148 tracts covering 815,403 acres in Federal waters of the Gulf of Mexico. In total, $139,122,383 in bids were submitted by 33 companies. The sale supports President Donald J. Trump's America-First Offshore Energy Strategy. Money received from OCS leases are directed to the U.S. Treasury, Gulf coast States, the Land and Water Conservation Fund, and the Historic Preservation Fund.

"Today's lease sale is yet another step our Nation has taken to achieve economic security and energy dominance," said Balash. "Today's results will help secure high-paying offshore jobs for rig and platform workers, support staff onshore, and related industry jobs, while generating much needed revenue to fund everything from conservation to infrastructure."

Lease Sale 250 was the second offshore sale held under the 2017–22 National OCS Oil and Gas Leasing Program. In total, 10 region-wide lease sales (two each year) are scheduled for the Gulf of Mexico, where resource potential and industry interest are high, and oil and gas infrastructure is well established. The sales will include all available blocks in the Western, Central, and Eastern Gulf of Mexico Planning Areas.

"Today's sale is a continuation of our all-of-the-above energy strategy," said Vincent DeVito, Counselor to the Secretary of the Interior for Energy, "and will result in responsible development of American energy resources."

Leases issued because of this sale included stipulations to protect biologically sensitive resources, mitigate potential adverse effects on protected species, and avoid potential conflicts associated with oil and gas development in the region.

Additionally, the Bureau of Ocean Energy Management (BOEM) included appropriate fiscal terms that consider market conditions and ensure taxpayers receive a fair return for use of the OCS. The royalty rate for leases in less than 200 meters of water depth was 12.5 percent, whereas the royalty rate for other leases was 18.75 percent to reflect current hydrocarbon price conditions and the marginal nature of remaining Gulf of Mexico shallow water resources.

See all terms and conditions for the sale in the Final Notice of Sale information package: *http://www.boem.gov/Sale-250/*

Read the press release: *https://www.doi.gov/pressreleases/interior-announces-results-gulf-mexico-region-wide-oil-and-gas-lease*

## Proposed Sale for Wind Energy Off Massachusetts Coast

### Sale Would Offer Nearly 390,000 Acres

In April, Secretary Zinke announced the proposed lease sale for two additional areas offshore Massachusetts, totaling nearly 390,000 acres, for commercial wind energy leasing.

"The Trump Administration supports an all-of-the-above energy policy and using every tool available to achieve American energy dominance. The proposed sale area has tremendous offshore wind energy potential and the responsible development of it continues to play a big role in the Administration's America-First Offshore Energy Strategy," said Secretary Zinke. "This area represents the Department's willingness to listen to stakeholder feedback, including the fishing community, and make the right adjustments."

The proposed sales are "the result of extensive work with our partners in the Commonwealth and with a broad community of engaged stakeholders, including fishing communities," said Interior Counselor for Energy Policy, Vincent DeVito. "Together, we identified areas that can support a large-scale commercial wind project, while minimizing the impacts to fishing habitats, marine species, and other uses of the OCS."

"This Administration's bold vision for our energy future is reflected in its commitment to a diverse energy portfolio," said BOEM Acting Director Walter Cruickshank. "We have come a long way, and I look forward to working with all of our partners and stakeholders in achieving a balanced approach to offshore wind development."

Renewable energy, including offshore wind, is part of the Administration's commitment to ensuring an energy-secure future. As of April, BOEM has awarded 13 commercial offshore wind leases with wind energy leases off every State from Massachusetts to North Carolina.

BOEM will host a public seminar to describe the auction format, explain the auction rules, and demonstrate the auction process through meaningful examples. Learn more and submit comments here: *https://www.boem.gov/Massachusetts/*

Read the press release: *https://www.doi.gov/pressreleases/trump-administration-proposes-sale-wind-energy-massachusetts-coast*

## MarineCadastre.gov Receives Champion of the Year Award

By Marjorie Weisskohl (BOEM)

Hearty congratulations to our BOEM and NOAA colleagues who manage the MarineCadastre.gov website. The Federal Geographic Data Committee (FGDC) selected them to receive the 2017 Doug D. Nebert National Spatial Data Infrastructure (NSDI) Champion of the Year Award this summer.

MarineCadastre.gov team members that were recognized included BOEM colleagues Christine Taylor (Sterling), Frank Pendelton (Pacific), Josh Wadlington (OREP Sterling), and Jim Fulmer (retired); NOAA colleagues Dave Stein, Mark Finkbeiner, Cindy Fowler (retired); Adam Bode, Jesse Brass, Nikki Brock, Lindsay Goodwin, Daniel Martin, Caitlyn McCrary, Jodie Sprayberry, Megan Treml, and Anna Verrill.

The FGDC is a 32-member interagency committee composed of representatives from the Executive Office of the President, and Cabinet-level and independent Federal agencies, so this recognition is significant.

The authoritative data at MarineCadastre.gov are fundamental to supporting decisions about developing offshore energy resources, using OCS sand and gravel for shore protection, nourishing beaches, doing wetland restoration projects, and coordinating and planning ocean efforts. This effort is a partnership between BOEM and NOAA's Office for Coastal Management, with support from many other Federal, State, and regional data providers.

"The collaboration between BOEM and NOAA to build and manage this extraordinary platform has had a huge, positive impact on the ability of our agencies, and others active in managing ocean resources, to carry out their missions," said BOEM Acting Director Walter Cruickshank. "MarineCadastre.gov has changed the way we do business for the better, and we greatly appreciate the team's dedication in serving the Nation."

The MarineCadastre.gov team is working continually to increase access to data through data and map services. The services are designed to deliver data without replication and directly from the source. MarineCadastre.gov supports several complementary efforts, including Digital Coast, *Data.gov*, and *Geoplatform.gov*. You are encouraged to use these data map services in your mapping initiative.

MarineCadastre.gov provides data, maps, and tools that are used by stakeholders to address national issues in the areas ranging from energy infrastructure planning to national defense. MarineCadastre.gov not only complies with Section 388 of the Energy Policy Act of 2005 but also is providing the geospatial framework needed for the broader marine spatial planning initiative called for in the National Ocean Policy. If you have data useful for marine planning, please contact the team at *info@marinecadastre.gov*

Read the press release: *https://www.boem.gov/Managing-GIS-Mapping-for-Ocean-Uses/*

### What is MarineCadastre.gov?

*https://marinecadastre.gov/*

MarineCadastre.gov was developed through a partnership between NOAA's Office for Coastal Management and BOEM. MarineCadastre.gov is an integrated marine information system that provides data, tools, and technical support for ocean and Great Lakes planning. MarineCadastre.gov was designed specifically to support renewable energy siting on the U.S. OCS but also is being used for other ocean-related efforts.

## Microplastics—Marine Debris in Ocean, Great Lakes, and Coastal Parks

By Jamie Hoover (NPS)

A project partnership between the National Park Service (NPS), National Oceanic and Atmospheric Administration (NOAA), and Clemson University discovered microplastics and microfibers on 37 NPS beaches in 35 national parks, monuments, seashores, and recreation areas. Microplastics are plastic or other synthetic materials that are less than 5 millimeters in size, whereas microfibers originate from materials such as polyester, rayon, and cotton. Both types of marine debris damage coastal habitats and pose risks to animals and humans from ingestion and potential toxic contamination.

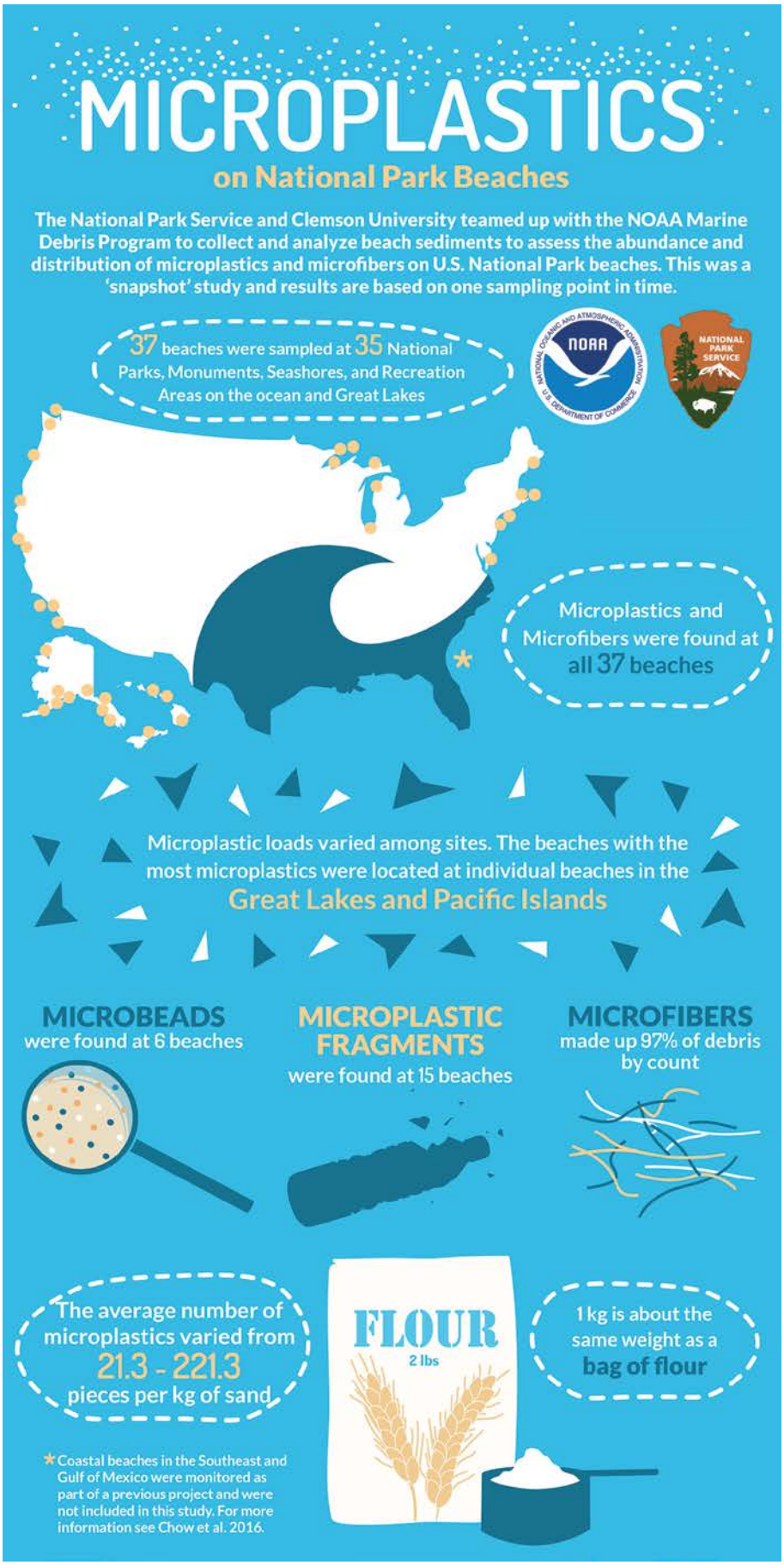
All beach samples, even in remote areas of Alaska, contained microplastics and microfibers, and the largest concentrations were at beaches in the Great Lakes and Pacific Islands. Microfibers were more prevalent overall and made up 97 percent of the debris by count.

A single sample was collected at each site to provide a snapshot of the microplastic distribution along the U.S. coasts. Additional sample sites would be needed to more accurately measure the total abundance and distribution within a given park.

The NPS and NOAA recommendations for reducing microplastic pollution include joining beach cleanups, reducing and recycling plastic use, and reducing the amount of laundry to decrease the number of fibers entering rivers and the ocean.

See the story map: *https://nps.maps.arcgis.com/apps/MapJournal/index.html?appid=9b064e09473c4f7f9c85e1fb8316698b#detail*

Read the report: *https://marinedebris.noaa.gov/reports/quantification-microplastics-national-park-beaches*




Infographic credit: NOAA

# Apps Help YOU Discover Oregon Coastal Treasures

By USFWS

Ushering in an era of digital engagement and fun for the millions of smart device-carrying visitors to Oregon's spectacular coast, the USFWS, in partnership with its Friends Groups, has launched three interactive, place-based game apps. The interactive apps are designed to teach visitors about the diverse seabirds, marine mammals, rocky shore habitats, and creatures that make the Oregon coast such a vibrant and wondrous ecological system.

To play the games, users must be at the respective location. Individuals within a group can compete against one another, or families can opt to work together as a team. Beyond the games, the app offers opportunities for users to capture and post photographs of their discoveries that include field notes such as where Tufted Puffins or Sunflower Sea Stars (*Pycnopodia helianthoides*) are sighted. The discoveries, notes, and photographs are viewable in a digital photo gallery that will be accessible worldwide.

"With these apps, we can reach exponentially more coastal visitors and residents with a fun and interactive experience that leaves them with a greater awareness and appreciation of Oregon coast's seabirds and their habitats," said Dawn Harris, Visitor Services Manager for the Oregon Coast NWR Complex. "Until now, we've been limited in the ways we can deliver the information we know they'll value in a way that's both compelling and entertaining."

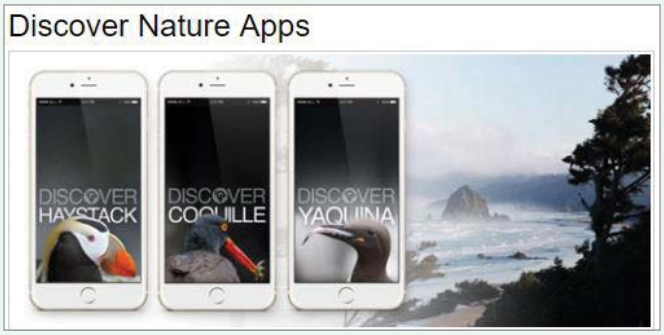
"There's nothing like this on the Oregon coast, and it will serve as a powerful tool for us to engage the public and enlist their support for marine conservation," said Samantha Ferber, Coordinator for the Haystack Rock Awareness Program. "While nothing beats a personal interpreter, the Discover Haystack app fills a vital gap giving people of all ages another avenue to learning through technology."

Funding for these apps came from a special fund created to benefit seabird species that suffered in the aftermath of the February 1999 *New Carissa* oil spill near Coos Bay, Oregon, which killed an estimated 2,465 seabirds and waterfowl along the coast. *See related story, page 5*.

Plan your visit: *https://www.fws.gov/refuge/Oregon_Islands/visit/plan_your_visit.html*

The award-winning, mission-driven app developer, Discover Nature Apps, designed the three apps, which include a GPS-guided nature-based scavenger hunt, allow users to post and view field notes and photographs, and provide users the opportunity to share their experiences on social media. The apps are free; simply search for "Discover Nature Apps" on iTunes or the Google Play Store.

This YouTube video demonstrates the features and functionalities of the Discover Nature Apps platform: *https://www.youtube.com/watch?v=TgqEe1vYUE8&feature=youtu.be*




Crook Point kelp beds adjacent to the Oregon Islands NWR. Photo credit: David B. Ledig, USFWS

Rocks offshore from the Crook Point unit of Oregon Islands NWR are magnets for seabirds. Photo credit: Roy W. Lowe, USFWS

Coquille Point sunset, Oregon Islands NWR. Photo credit: Roy W. Lowe, USFWS

Harbor seals (*Phoca vitulina*) soak up the sun on a beach in the Oregon Islands NWR complex. Photo credit: Roy W. Lowe, USFWS

# Cave Diving in the Yucatan Peninsula

By Andrea Toran (USGS), John Pohlman (USGS), David Brankovits (WHOI), Jake Emmert (Moody Gardens)

Dive Safety Officer (DSO) Jake Emmert from Moody Gardens Aquarium entered a flooded coastal cave beneath the tropical forest of the Yucatan Peninsula through a small open-water pool, locally known as a cenote. Cave diving scientists John Pohlman (USGS) and David Brankovits (USGS/Woods Hole Oceanographic Institution [WHOI]) used the entrances to access a vast network of passages where they are investigating ecosystem dynamics and groundwater quality in this rapidly developing region. The USGS-led team installed a variety of devices specifically designed to sample and collect data in this extreme environment to test the hypothesis that the ecosystem deep within the caves uses methane as a food resource.

Read more: *https://www.usgs.gov/center-news/usgs-scientists-lead-investigation-tropical-subterranean-estuaries-yucatan-peninsula*

In the underground rivers and flooded caves of Mexico's Yucatan Peninsula, where Mayan lore described a fantastical underworld, scientists have discovered a cryptic world.

Here, methane and the bacteria that feed off it form the lynchpin of an ecosystem that is similar to what has been discovered in deep ocean cold seeps and some lakes, according to recent research by Texas A&M University at Galveston (TAMUG), the USGS, and a team of collaborators from Mexico, The Netherlands, Switzerland, and other U.S. institutions.

The research, done by scientists who are trained in cave diving as well as other expertise, is the most detailed ecological study ever for a coastal cave ecosystem that is always underwater. In fact, the scientists had to use techniques that had been used previously by deep-sea submergence vehicles to be able to study the environment.

Cave passage and diver within a section of the Ox Bel Ha cave system where the current study was done. The guideline seen alongside the diver that provides a continuous route to the surface is one of many safety standards the divers follow. Photo credit: HP Hartmann.

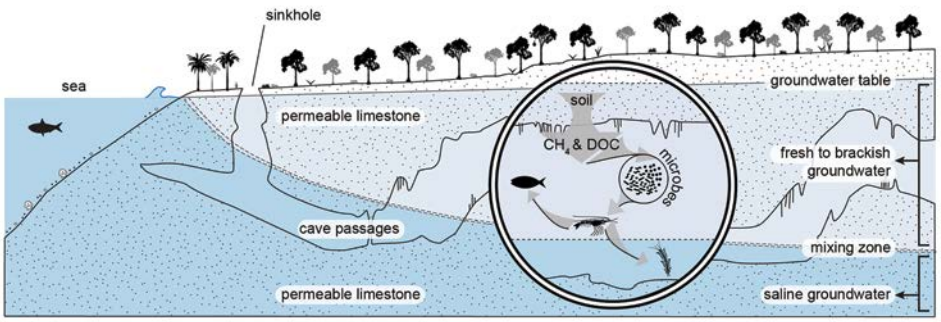
"The opportunity to work with an international team of experts has been a remarkable experience for me," said David Brankovits, who did the research during his Ph.D. studies at TAMUG. "Finding that methane and other forms of mostly invisible dissolved organic matter are the foundation of the food web in these caves explains why cave-adapted animals are able to thrive in the water column in a habitat without visible evidence of food."

The study was done in the Ox Bel Ha cave network of the northeastern Yucatan, which is described as a subterranean estuary because the flooded cave passages contain distinct water layers consisting of freshwater fed by rainfall and saltwater from the coastal ocean. This subterranean estuary complex covers an area about the size of Galveston Bay, the seventh largest surface estuary in the United States.

The freshwater part of the caves and the sinkholes, which are used to access the caves are important sources of freshwater for communities throughout the Yucatan. Methane in the caves forms naturally beneath the jungle floor and migrates downward, deeper into the water and caves. Normally, all the methane formed in soils migrates upward, towards the atmosphere.

This sets the stage for the bacteria and other microbes that form the basis for the cave ecosystem. The microbes eat the methane in the water and other

*See Cave Diving page 13*




Ox Bel Ha cave system cross section. Caves within a karst subterranean estuary are filled with separated fresh (green), brackish (gray), and saline (blue) waters.

*Cave Diving continued from page 12*

dissolved organic material that the freshwater brought with it from the surface. The microbes then fuel a food web that is dominated by crustaceans, including a cave-adapted shrimp species that obtains about 21 percent of its nutrition from methane.

"The processes we are investigating in these stratified groundwater systems are analogous to what is happening in the global ocean, especially in oxygen minimum zones where deoxygenation is a growing concern," says John Pohlman, a USGS biogeochemist whose work from the early 1990s motivated the research. "Although accessing these systems requires specialized training and strict adherence to cave diving safety protocols, relative to the complexity of an oceanographic expedition, the field programs we organize are simple and economical."

One surprising finding was how important the dissolved organic material like methane was to the caves' food web. Prior studies had assumed that most organic material that feeds the microbes of caves came from vegetation and other detritus in the tropical forest that washed into the caves from the cenotes. However, deep within the caves, where the study was done, little of that surface debris is present, so the microbes depend on methane and the other dissolved organics percolating downward through the ceiling of the caves.

Read more: *https://www.usgs.gov/news/mexico-s-yucatan-peninsula-reveals-a-cryptic-methane-fueled-ecosystem-flooded-caves*

Recently featured in "Science in the Extremes," you can watch the video highlighting the cave-diving scientists at work, see footage of the troglodites (cave dwelling creatures), and hear the scientists discuss their research. Watch the episode here: *https://www.facebook.com/ScienceInTheExtremes/videos/345769579245733/*


Ox Bel Ha Cave Project Field Team Members (left to right): David Brankovits (TAMUG), Jake Emmert (Moody Gardens), John Pohlman (USGS), and Francisco Bautista De La Cruz (Speleotech). Photo credit: Jacob Pohlman, public domain

## Cave diving in the Yucatan Peninsula with USGS!

Dive Safety Officer (DSO) Jake Emmert from Moody Gardens Aquarium enters a flooded coastal cave beneath the tropical forest of the Yucatan Peninsula through a small open-water pool, locally known as a cenote. Cave diving scientists John Pohlman (USGS) and David Brankovits (USGS/WHOI) use these entrances to access a vast network of passages where they are investigating ecosystem dynamics and ground water quality in this rapidly developing region. Photo credit: USGS

Cave diving scientist David Brankovits from the USGS and Woods Hole Oceanographic Institution and Jake Emmert, Moody Gardens Aquarium, recover the OctoPiPi (OPP) water sampling device designed and engineered by Emile Bergeron (USGS). The OPP collects samples across a chemical interface where bacteria entrain methane—a dissolved gas—into the food web. The OPP is powered by compressed gas and is able to collect pristine samples separated by a little as 1 inch. Conducting science in this harsh environment safely and effectively requires advanced training, meticulous planning and nerves of steel. Photo credits: Science in the Extremes

This work was featured on "Science in the Extremes." Watch the video: *https://www.youtube.com/watch?v=NHxKqsGShDc&index=7&list=PL6uC-XGZC7X78bfEdFHiVU5ox0h9-OZnu*

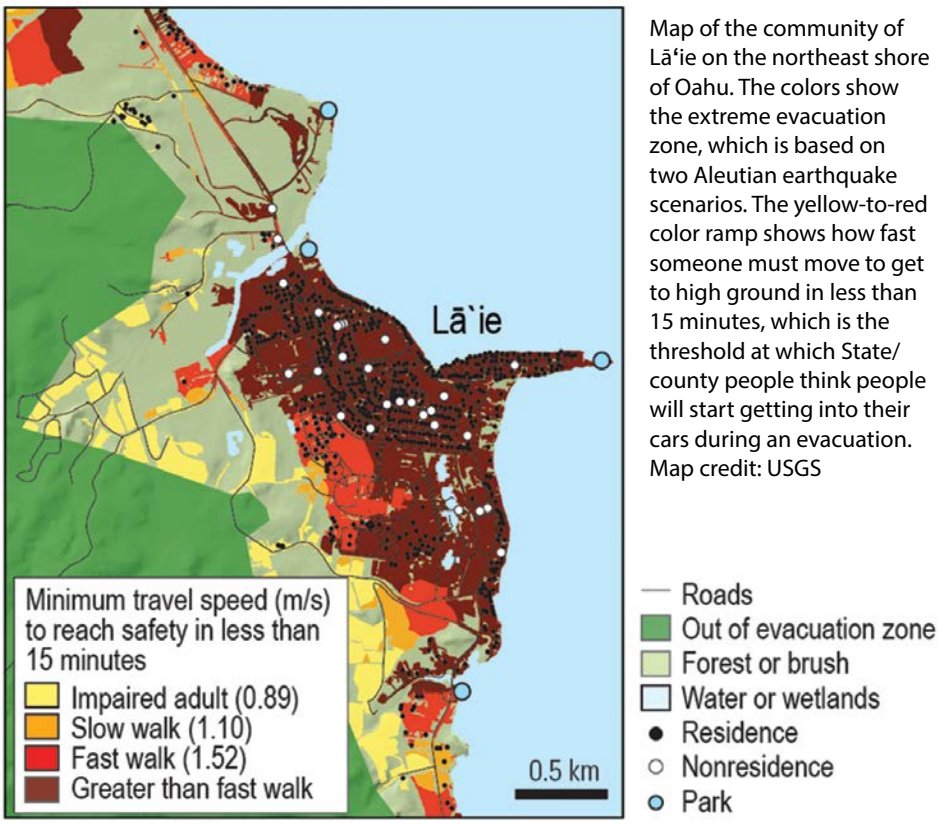
# Can You Walk to Safety?

## Tsunami Risk in Coastal Areas

By Nate Wood (USGS), Jamie Jones (USGS), Jeff Peters (USGS), and Kevin Richards (Hawai'i Emergency Management Agency)

Distant tsunami waves that strike coastlines hours after they are generated elsewhere may seem like easy things to avoid because of the amount of time (usually hours) to evacuate. However, they create logistical challenges to emergency managers because evacuees are more inclined to use vehicles instead of walking to safety. But with too many cars on the road, traffic gridlock can substantially delay evacuation time, resulting in individuals not getting to safety before the tsunami waves arrive. Transportation and emergency planners lack the regional information and tools to determine where successful pedestrian evacuations are possible and therefore where vehicle use could be discouraged.

To help address this demand, U.S. Geological Survey (USGS) researchers collaborated with the Hawai'i Emergency Management Agency to model pedestrian evacuations from distant tsunami threats that could affect Oahu, Hawai'i. The USGS modeling was done using the USGS Pedestrian Evacuation Analyst, which is a geographic information system (GIS)-based tool that can estimate how much time it may take for someone to travel on foot out of a hazardous area. Geospatial data that characterize land cover, elevation, waterbodies, roads, and buildings were used to create maps of pedestrian travel times to safety out of two different tsunami-hazard zones, one based on historical data from past tsunamis that have affected Oahu and another considered to be the probable maximum tsunami based on two Aleutian earthquake scenarios. Population data for residents, employees, hotel visitors, and at-risk facilities (like schools and medical centers) were used to estimate the number of people in each community that would need to evacuate and how many of them could realistically do it in less than 15 minutes.




Map of the community of Lā'ie on the northeast shore of Oahu. The colors show the extreme evacuation zone, which is based on two Aleutian earthquake scenarios. The yellow-to-red color ramp shows how fast someone must move to get to high ground in less than 15 minutes, which is the threshold at which State/county people think people will start getting into their cars during an evacuation. Map credit: USGS


Getting stuck in traffic gridlock during tsunami evacuation can prevent individuals from getting to safety before waves arrive. Photo credit: USGS

The study helps emergency managers to understand whether they should recommend evacuations on foot or by car in each community. Results of the study suggest that foot-based evacuations could reduce potential traffic issues across Oahu for the historic evacuation zone, but traffic management plans may be warranted for the probable maximum event in some communities, such as the use of targeted shuttles. Armed with this new information, emergency managers can develop tsunami outreach efforts and evacuation messaging across a region that can help people reach safety the next time a tsunami hits.

Read more about the study: *https://www.sciencedirect.com/science/article/pii/S2212420918302863*

Access the USGS Pedestrian Evacuation Analyst: *https://geography.wr.usgs.gov/science/vulnerability/tools.html*

# Revising Coastal Barrier Resource Maps

By Ivan Vicente (USFWS)

Coastal barriers protect many mainland communities from storm surges while providing vital habitat to many fish and wildlife species. Coastal barrier ecosystems are not only home to essential natural resources, but also protect public safety and investments of coastal. Undeveloped coastal barriers and wetlands absorb effects of hurricanes and storm surges. A recent study indicated that coastal wetlands helped avoid $625 million in direct flood damages during Hurricane Sandy.

To remove the Federal incentive to develop these biologically important, highly dynamic, and storm-prone areas, Congress enacted the Coastal Barrier Resources Act (CBRA) in 1982. The CBRA and its amendments designated relatively undeveloped coastal barriers along the Atlantic, Gulf of Mexico, Great Lakes, USVI, and Puerto Rico coasts as part of the Coastal Barrier Resources System (CBRS) and made these areas ineligible for most new Federal expenditures and financial assistance for roads, wastewater and potable water systems, disaster assistance, and subsidized flood insurance, which saves taxpayers millions of dollars in spending. The CBRA does not prohibit development and it imposes no restrictions on development done with non-Federal (private, State, or local) funds.

On March 12, the USFWS released proposed revisions to the boundaries of the John H. Chafee CBRS, modifying areas in Delaware, Massachusetts, and New Jersey, and designating a new unit in New Hampshire.

The proposed revisions for 148 units (112 existing units and 36 proposed new units) are designed to fix technical mapping errors and add qualifying areas to the CBRS. More than 50 percent of those structures proposed for addition are on public lands or parks, and the remainder are on private lands.

After Hurricane Sandy in 2012, the DOI provided $5 million through the Disaster Relief Appropriations Act of 2013 to modernize and revise the official maps of the CBRS along the North Atlantic coast. The changes to these maps will improve compliance with the CBRA, will be based on more reliable data, and will include new qualifying areas to the CBRS. Modernizing the maps is a good government effort that will make the CBRS data more accessible and user-friendly for user ranging from public officials to developers that are planning coastal infrastructure projects, habitat conservation efforts, and flood risk mitigation measures.

Learn more: *https://www.fws.gov/cbra/maps/Hurricane-Sandy-Project.html*

Read about the Hurricane Sandy Remapping Project: *https://www.fws.gov/cbra/documents/Sandy/Hurricane-Sandy-Fact-Sheet-3-5-18.pdf*

Read the press release: *https://www.fws.gov/news/ShowNews.cfm?ref=service-announces-proposed-changes-to-coastal-barrier-resources-system-in-&_ID=36231*

## Request for Public Review and Comments

The draft revised boundaries for 148 CBRS units are available for public review and comment at *https://www.fws.gov/cbra/maps/Hurricane-Sandy-Project.html*. We invite you to review the proposed boundaries and provide input to the USFWS during the 120-day public comment period that will close on **July 10, 2018**. You may submit written comments by one of the following methods:

**Electronically:** Go to the Federal e-Rulemaking Portal: *http://www.regulations.gov*. Search for FWS-HQ-ES-2018-0004, which is the docket number for this notice. Then, click on "Comment Now!" to fill out the comment form.

**By hard copy:** Submit by U.S. mail or hand-delivery to: Public Comments Processing, Attn: Docket No. FWS-HQ-ES-2018-0004; Division of Policy, Performance, and Management Programs; U.S. Fish and Wildlife Service; 5275 Leesburg Pike, MS: BPHC; Falls Church, VA 22041–3808.


The CBRS data desktop/mobile viewer. Use this mapper to view the existing CBRS boundaries. This mapper can be used to help property owners, stakeholders (local, State, and Federal), and others determine if properties or project sites may be affected by CBRA. Please read the data disclaimer and use constraints. The proposed revisions to the boundaries can be viewed at *https://www.fws.gov/cbra/maps/Hurricane-Sandy-Project-Batch-1.html*. The website also contains information on how to submit public comments and participate in virtual public meetings to be held through webcast and teleconference.

# Once in a Lifetime Experience at National Parks

By Shaun Wolfe

During his summer as an Our World-Underwater Scholarship Society® (OWUSS) intern, Shaun Wolfe was on 24 flights, did 99 dives, and visited 10 NPS units, which allowed him to explore the diverse submerged NPS resources. Kelly Moore, NPS Diving Officer at Channel Islands National Park, told him to get ready for the summer of a lifetime. The internship is an incredible and unique opportunity for any young SCUBA diver to explore a variety of underwater career paths, as well as contribute to NPS projects. The NPS Submerged Resources Center (SRC) also provided him with all the SCUBA equipment, including a 65-pound Pelican case full of underwater camera equipment.

Shaun shared his OWUSS internship experiences and images in his final report and blog. See more pictures and read the blog: *https://blog.owuscholarship.org/author/swolfe/*

Read the final report: *http://owuscholarship.org/sites/default/files/intern/final_report/Wolfe_NPS_FinalReport_2017.pdf*

A school of small jacks swims quickly by a coral head at Virgin Islands National Park, U.S. Virgin Islands (USVI).




Nothing makes Shaun feel quite as cool as putting on a NPS wetsuit!

For more than 30 years, the OWUSS has offered a variety of experience-based internships. The OWUSS summer internships are offered for a 1- to 3-month period and are directed primarily at college undergraduates and graduating seniors. Internship recipients receive a grant to help cover travel, housing, and living expenses. Learn more: *http://owuscholarship.org/internships*

The NPS sponsors a research internship with the SRC through OWUSS. Typical projects through this position work with leading archaeologists, underwater photographers, and scientists in the NPS and other Federal and State agencies. Specific work projects are determined on the basis of interests of the intern as well as the needs of associated projects. The 2017 NPS Research Intern was Shaun Wolfe. Shaun Wolfe is a master's candidate at the Bren School of Environmental Science and Management at University of California, Santa Barbara focusing in Coastal Marine Resources Management.

One of the hidden gems of the NPS is Ofu Island in the National Park of American Samoa. NPS staff are removing a renegade fishing net, preventing it from causing additional harm in the park.

Green turtles are perhaps the most popular park residents in the 'ai'opio (traditional fish trap wall) at Kaloko-Honokohau National Historic Park, HI.

Park Diving Officer, Shelby Moneysmith, spears an invasive lionfish at Biscayne National Park, FL, as part of the NPS efforts in controlling this invasive species.

The Taino people were some of the first to inhabit many Caribbean islands and you can still see petroglyphs like these at Virgin Islands National Park, USVI.

The Kelp Forest Monitoring Program at Channel Islands National Park, CA, is one of the most complex natural resource monitoring programs that NPS runs. Here, a park diver uses a full face mask system to communicate his survey results with a topside support team that is recording the data.

The economy of the colonial-era Virgin Islands was based on sugar and rum (its by-product), powered by slavery. This is an old piece of machinery at a sugar mill ruin in Virgin Islands National Park, USVI.

Shaun was lucky enough to visit Virgin Islands National Park, USVI, just before Hurricanes Maria and Irma hit St. John and damaged the park's natural resources and island infrastructure. His photos of soft corals in the park like this one were likely some of the last taken before the hurricanes came.

The moat and seawall around Fort Jefferson at Dry Tortugas National Park, FL, was built to protect the fort from intruders. Now, it affords the fort some protection from hurricanes and big swell.

All photos by Shaun Wolfe

# Early Signs of a Stronger Coast—Storm Protection, Recreation, and Wildlife

By Darci Palmquist (USFWS)

Hurricane season starts on June 1, but, as we saw this past winter, hurricanes aren't the only game in town. Powerful Nor'easters battered the East coast over and over, bringing heavy rain or snow, strong winds, and high storm surge. This "wild" Nor'easter season, as The Weather Channel called it, was unusual in the quantity and intensity of the storms.

If Mother Nature has anything to teach us, it's that nothing is certain. Between Nor'easter season (September–April) and hurricane and tropical storm season (June–November), it looks like we now need to be on storm watch most of the year.

*In an age of such extreme uncertainty, a wise response is to build a stronger coast.*

2018 marks five years since Hurricane Sandy-funded restoration and resilience work began up and down the Atlantic coast. Since then, dozens of projects have been completed, and at many sites the USFWS is now moving on to the monitoring phase. We are looking to see how these restoration projects do under future storms; what benefits they provide to wildlife, habitats, and people; and if they are sustainable over time.

Monitoring will last many years, and it's too early to say if we've achieved our goal of resilience. But we're already seeing some promising results at many project sites after this rough season of Nor'easters.

Here are three success stories:

## Recovery at Prime Hook NWR

By Susan Guiteras (USFWS)

Beach and marsh restoration at Prime Hook NWR in Delaware has produced incredible results in just two years, including transforming hundreds of acres of open water into healthy stands of salt marsh grasses and the first piping plover (*Charadrius melodus*) nests. The restored marsh will buffer private property and public infrastructure such as roads from storm surge. Already, residents of the adjacent communities have benefited, with no road closures or effect on agricultural areas because of flooding from recent Nor'easters. Fishing, crabbing, birding, hiking, and other recreational opportunities also have improved.

View of the project at Prime Hook NWR. Photo credit: Bart Wilson, USFWS

A welcome surprise was the formation of an extensive system of *Sabellaria vulgaris* reefs in the intertidal zone, which provides great feeding habitat for fish and helps dampen wave energy. Photo credit: Susan Guiteras, USFWS

## Restoration Project Withstands Powerful Nor'easters

By Zack Toyle (American Littoral Society)

A new box culvert at Wreck Pond in coastal New Jersey is improving water quality and fish passage and reducing flood risk to nearby communities. Despite numerous Nor'easters this winter, Wreck Pond did not overflow into the surrounding neighborhoods, so no properties were damaged. The American Littoral Society is on site to monitor fish passage, and hopes to see big numbers of herring—both alewife (Alosa pseudoharengus) and blueback (Alosa aestivalis)—this year, now that restoration is complete. Historically, river herring migrated into Wreck Pond by the hundreds, traveling up its tributaries to spawn. Restoration involved installing a box culvert designed to reduce flooding of the pond, improve water quality, and allow for fish to pass through to spawning grounds.

*See Stronger Coast page 19*

*Stronger Coast continued from page 18*

Wreck Pond during a 2017 winter storm. Despite heavy rainfall in a relatively short period, the communities around Wreck Pond faced minimal flooding. Photo credit: Jay Amberg

## A Restored River Runs Free

By Isaac Burke and Lauri Munroe Hultman (USFWS)

Restoration of the 34-mile Pawcatuck River to its natural state is helping wildlife and people in Rhode Island, where commercial fishing and water-related recreation contribute billions of dollars to the local economy. The Sandy-funded project included removing White Rock and Bradford dams and repairing the Potter Hill fish ladder. Now fish can pass up the river unimpeded for the first time in centuries. Early surveys in 2017 documented shad, blueback herring (*Alosa aestivalis*), and alewife (*A. pseudoharengus*) above the site of the former White Rock Dam, which was once all but impassable. Monitoring in the spring of 2018 using telemetry will provide better numbers of fish passage. Restoration of the river also is leading to more recreation opportunities, especially for paddlers and wildlife enthusiasts, and reduced risk of flooding to nearby communities. *See related story, page 32.*

An alewife named "Samantha" was caught and tagged during the 2016 sampling and recaptured in 2017 on her return to Wreck Pond to spawn. Photo credit: American Littoral Society


## Don't Let It Loose!

Never release pets, animals, or plants into the wild. Find a good place that will take your unwanted pet. Learn more: *http://www.dontletitloose.com/*

Economic damages from invasive species worldwide totals more than $1.4 trillion—five percent of the global economy.

Native fish and wildlife populations face many dangers when exotic plants and animals are introduced. Never release pets, animals, or plants into the wild (places such as rivers, streams, lakes, or storm sewers). Releasing animals and plants can have unintended, yet very serious, consequences when they reproduce and compete with native flora and fauna. Invasive species threaten our Nation's economy and environment and affect agriculture, recreation, tourism, infrastructure, human health, and natural ecosystems. Find a good place that will take your unwanted pet.

See this related story on PBS NewsHour: *http://to.pbs.org/2ow8AKa*

The flying invaders in the photo are carp. Four Asian carp species (Silver [*Hypophthalmichthys molitrix*], Bighead [*H. nobilis*], Grass [*Ctenopharyngodon idella*], and Black Carp [*Mylopharyngodon piceus*]) are ravaging the Mississippi, Ohio, and Illinois River systems by consuming microscopic organisms that are important to native fish species. Photo credit: Ryan Hagerty, USFWS

# Aquatic Invaders—Protecting What Matters

By Jason Kirkey and Hilary Smith (DOI)

The estimated damage from invasive species worldwide totals more than $1.4 trillion—five percent of the global economy. Invasive species are among the top threats facing native fish and wildlife populations and the lands and waters of the Nation.

National Invasive Species Awareness Week (NISAW) is an annual event designed to help identify solutions at local, State, Tribal, regional, international, and national scales. DOI is a lead partner for NISAW-related events across the Nation. As part of NISAW, Scott Cameron spoke at the Congressional Reception and Agency Fair, highlighting the progress made in the fight against invasive zebra and quagga mussels, and DOI's formal release of the progress report: *https://www.doi.gov/sites/doi.gov/files/uploads/safeguarding_the_west_progress_report_february_2018_final.pdf*

In 2017, DOI spent $8.6 million to address invasive mussels nationwide. Currently (2018), DOI, in cooperation with other Federal, State, and Tribal partners, is working on more than four dozen actions to address invasive mussels including preventing the spread of the species to uninfested waters and containing and controlling them where they are established.

### Highlighted Actions Addressing Invasive Mussels

- Federal, State, Tribal, and non-governmental groups are working together to strengthen watercraft inspection and decontamination programs at infested waters.
- In the Pacific Northwest, the USGS, Pacific States Marine Fisheries Commission, and Columbia River Basin partners are mobilizing to improve regional coordination of monitoring efforts.


Scott Cameron speaking at the Congressional Reception and Agency Fair as part of NISAW. Photo credit: DOI

> *"The Department of the Interior, our sister Federal agencies, our State and local government counterparts, and private land owners need to collaborate to effectively address this threat,"* —said Scott J. Cameron, Principal Deputy Assistant Secretary for Policy, Management, and Budget.

- The USFWS, National Marine Fisheries Service, and Pacific States Marine Fisheries Commission are leading planning efforts to expedite Endangered Species Act Section 7 consultations to ensure a quick response if invasive mussels are detected.
- The Bureau of Reclamation launched a competition seeking innovative, cost effective and environmentally sound solutions to remove invasive mussels from large reservoirs, lakes, and rivers.

"I am pleased to share progress made on honoring those commitments," said Secretary Zinke. "There is more work to do, and Interior is committed to continuing our efforts. With the busy boating season approaching, it is imperative that we are vigilant in taking measures to prevent the spread of invasive mussels and other aquatic invasive species."

"Western Governors remain committed to the fight against invasive species on Western lands, including the threat that invasive mussels pose to Western waterbodies," said the Western Governors' Association (WGA). "Addressing a threat of this magnitude requires leadership, innovation, and coordination at all levels of government."

DOI requested $11.9 million in FY 2018, including an additional $3.4 million for the Bureau of Reclamation to expand on these and to support Federal, State and Tribal efforts to prevent, contain, and control invasive mussels.

Read the press release: *https://www.doi.gov/pressreleases/interior-releases-report-fight-against-invasive-mussels*

The Digital Makerspace is an online platform for posting information on some of the worst invasive species problems and inspiring technology innovators to solve them. Read more: *https://www.doi.gov/invasivespecies/technology-innovation*

Learn more: *https://www.nisaw.org/*


During the meeting, the National Invasive Species Council (NISC) Secretariat released a new publication that highlights invasive species success stories across the Federal government that was written by New York Times bestselling author, Jennifer Holland (pictured above) and released during NISAW. Read more: *https://www.doi.gov/invasivespecies/protecting-what-matters-stories-success*
Photo credit: Jamie K. Reaser, DOI

# Hurricane Floodwaters Spread Non-Native Freshwater Plants and Animals

## Combined USGS Tools Track Dispersal

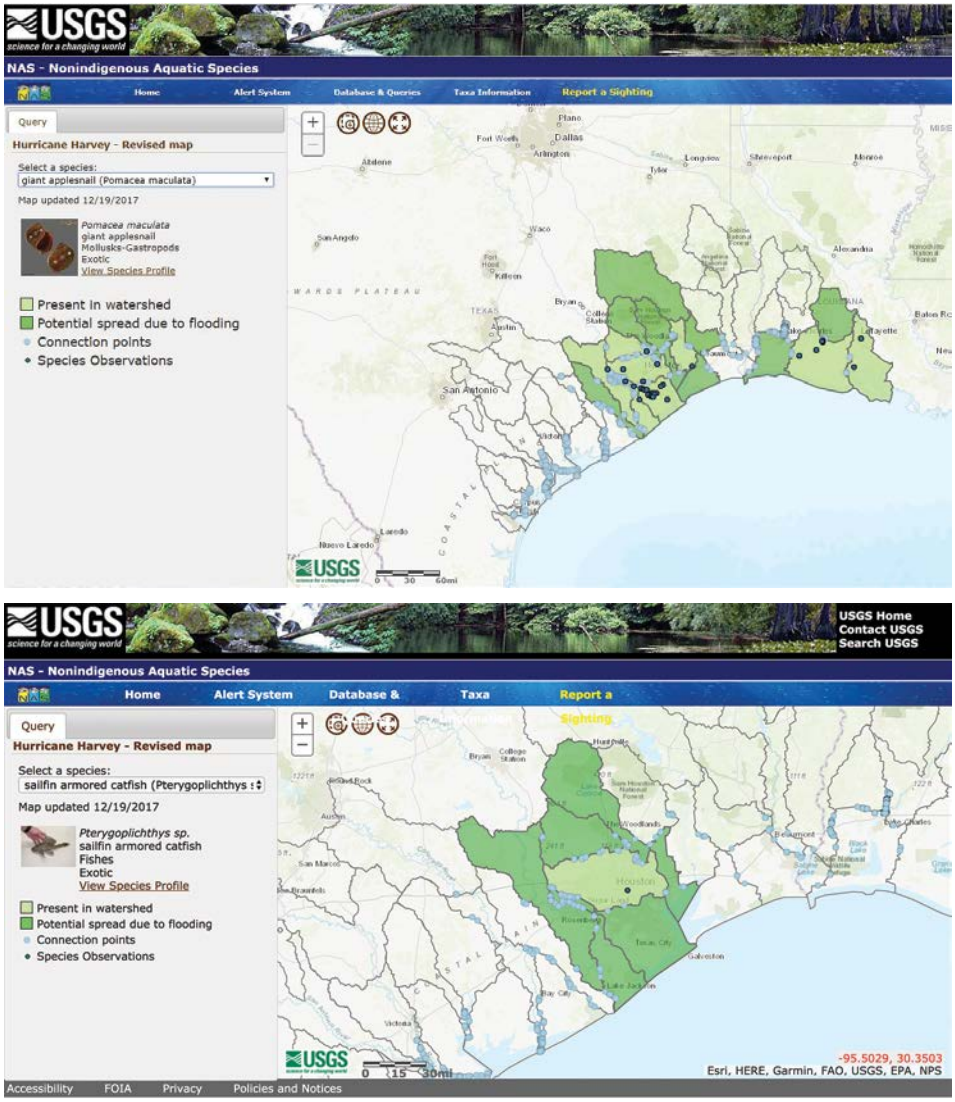
By Matt Neilson, Pam Fuller, Heather Dewar (USGS)

Non-native freshwater plants and animals capable of disrupting living communities and changing the landscape may have been spread into new water bodies by Hurricanes Harvey, Irma, Maria, and Nate. Storm surge and flooding can help expand and distribute non-native aquatic species through connected watersheds, backflow upstream from impoundments, increased downstream flow, or created freshwater bridges.

The invasive Giant Apple Snail is just one of hundreds of non-native aquatic species that might have migrated to new areas because of flooding during the 2017 hurricane season. To help land managers find and manage these flood-borne newcomers, scientists at the USGS have created four online maps (*https://nas.er.usgs.gov/viewer/Flooding/*).

"USGS's stream monitoring showed that as the rivers carried Hurricane Harvey's floodwaters downstream, a freshwater area developed along the Gulf Coast in parts of Texas and Louisiana," Fuller said. "Normally the Gulf acts as a saltwater barrier that blocks freshwater species from moving along the coast. But that barrier was temporarily gone, and freshwater aquatic species could move into new habitats."

"Land managers have been responding to all sorts of hurricane impacts," Fuller said. "It's hard for them to survey all the places where flooding or storm surge occurred. Our results can help them concentrate on areas where non-native aquatic species are most likely to appear."




These "storm tracker" maps allow users to see the potential spread of any of 226 non-native aquatic plant and animal species during the 2017 hurricane season and can help natural resource managers develop a watchlist of potential new species. Top map shows potential spread of channeled apple snail. Bottom hows potential spread of sailfin armored catfish. Map credits: USGS

At left: Channeled apple snail laying an egg mass, which typically contains between 200 and 600 bright pink eggs. Photo credit: Katasha Cornwell, Florida Department of Transportation. At right: These are some of the sailfin catfish species that have been introduced from South America and likely escaped from fish farms or aquarium release. Sailfin suckermouth catfishes (*Pterygoplichthys* spp.) can survive mesohaline conditions for extended periods of time, allowing for the use of estuarine and coastal areas for dispersal.

*See Hurricane Floodwaters page 22*

*Hurricane Floodwaters continued from page 21*

"The U.S. Geological Survey's Flood and Storm Tracker maps are terrific tools we now have available to help determine the spread of aquatic invasive fish, wildlife and plants caused by major storms like the hurricanes we had last fall," said John Galvez, who leads the Peninsular Florida Fish and Wildlife Conservation Office for the USFWS. "The county-by-county maps are helping us make better decisions about where to target surveys and identify ways to eliminate the invaders before they get a foothold in new areas."

USGS maintains the Nonindigenous Aquatic Species database, the Nation's most complete record of freshwater plant and animal species found outside their native range. The researchers used the nationwide database to identify all the non-native plant and animal species found at storm-flooded sites. Then they modeled the height of the floodwaters to identify places where floodwaters overtopped the barriers separating water bodies. The storm trackers show where lakes, rivers, streams, and other waterways merged, giving aquatic species the opportunity to spread.

The Hurricane Harvey tracker was the first map set of its kind, putting USGS hydrologic data and information into a context that "gives us a realistic picture of whether a particular species may have been introduced into new watersheds by Harvey's flooding, and where that introduction may have taken place," said Fuller. "The U.S. Fish and Wildlife Service is using it to decide where to conduct field surveys at national wildlife refuges in Texas and Louisiana."

The sailfin armored catfish (*Pterygoplichthys* sp.), a South American species sold in the aquarium trade as "Plecos," is a good example that shows how storm tracking helps monitor species dispersal. Fuller said one species has been documented in Houston's Buffalo-San Jacinto watershed. With help from floodwaters of Hurricane Harvey, it may have been able to spread to other watersheds around Galveston Bay. Large populations of this non-native species can cause canal and river banks to erode or fail, so the species' spread has the potential to exacerbate ongoing Gulf Coast marsh erosion.

Read more: *https://www.usgs.gov/news/usgs-tracks-how-hurricane-floodwaters-spread-non-native-freshwater-plants-and-animals?utm_source=dlvr.it&utm_medium=facebook&utm_campaign=usgs%20news%3A%20biology*

Kasia Kelly (USGS) uses a long-poled sampler to collect and filter water from Lake Michigan in search of round goby eDNA. Inset: A close up of an invasive round goby. At Indiana Dunes National Lakeshore, the round goby inhabits breakwaters and nearshore areas where their abundant population has edged out native species. Photo credit: USGS

## Saving the Birds from Crazy Ants

By USFWS

On an atoll far, far away, 750,000 square miles from anywhere, Johnston Atoll NWR is one of the only rat free, safe nesting places for seabirds and shorebirds in the Pacific Remote Islands—until the yellow crazy ants invaded.

More than 15 species of birds rely on the refuge for safe nesting sites, including three species of boobies, sooty terns, greyback terns, red-tailed and white-tailed tropic birds, greater frigatebirds, and several species of shorebirds. The only other residents of the island are small teams of USFWS staff and volunteers who have been working to save the birds from these ants since 2010 as part of a USFWS project.

These teams, called Crazy Ant Strike Teams, are at the refuge for six months at a time. Each new team builds on the eradication efforts of previous teams to work towards a goal of completely eradicating yellow crazy ants. Since 2010, the ants have been reduced by more than 98 percent.

Yellow crazy ants swarm a red-tailed tropic bird. Photo credit: Stefan Kropidlowski, USFWS

Crew of *CAST XIV*. Photo credit: USFWS

Watch this video to see what life is like on this remote island: *https://www.facebook.com/USFWSPacific/videos/585163518514936/*

Learn more about this program: *http://usfwspacific.tumblr.com/post/171441288590/do-you-have-what-it-takes*

## eDNA-Tracking Great Lakes Invasive Aquatic Species

By Meredith Nevers (USGS), Murulee Byappanahalli (USGS), and Charles Morris (NPS)

Environmental DNA (eDNA) technology has the potential to expand the frequency and coverage of traditional invasive monitoring techniques because it is a much more efficient method for determining if invasive species are present. Aquatic organisms shed bits of their eDNA into waterbodies where scientists can collect water samples, extract bits of eDNA and then match them with known species-specific DNA. A perfect match signals presence of the invader, allowing resource managers to initiate appropriate actions. In the Great Lakes, researchers from the USGS and the NPS are developing field applications for eDNA to monitor and quantify populations of aquatic invasive species that threaten Great Lakes coastlines and waterways. The round goby fish (*Neogobius melanostomus*) is one Great Lakes invader of interest.

Round gobies are slowly making their way into tributaries and waterways in large numbers, and resource managers are concerned they will soon outcompete native fish species like sculpins. The Great Lakes Science Center and Indiana Dunes National Lakeshore are using eDNA testing to monitor how far round gobies have spread. This will help answer more intricate questions like how recently an invader was present, or how close the invader might be.

This technology also is a valuable tool for detecting rare and endangered species because it can detect small populations or organisms without having to capture or handle them.

Learn more: *http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0191720*

*See related stories, pages 19–24.*

## Lionfish and Unicorns

By Heather Dewar (USGS)

This orangespine unicornfish was removed from the Florida Keys National Marine Sanctuary at Molasses Reef. Photo credit: USGS

On March 27, this orangespine unicornfish (*Naso lituratus*), a popular and venomous aquarium fish native to the Indo-Pacific region, was spotted and removed from the Florida Keys National Marine Sanctuary at Molasses Reef. It is the fourth known record of such a fish in U.S. waters.

USGS and Reef Environmental Education Foundation (REEF) have worked together for more than a decade to detect and quickly remove nonnative marine fishes from Florida waters.

Scientists acknowledge the importance of early detection and rapid response in part because of lessons learned from the lionfish, a destructive marine invader first reported off south Florida in 1985.

Watch the NPS "Outside Science (inside parks)" video from Biscayne National Park to learn about the effects of invasive lionfish and research needed to manage them: *https://www.youtube.com/watch?v=VESetYrGK5w*

Learn more about the non-native orangespine unicornfish: *https://nas.er.usgs.gov/queries/factsheet.aspx?SpeciesID=2553*

## Menacing Mussels

By Heather Dewar (USGS)

Zebra mussels from Lake Huron. Photo credit: USGS

Invasive Zebra (pictured) and quagga mussels are collectively called dreissenid mussels and are causing a range of substantial ecological and economic effects that continue to increase as they spread across North America. Dreissenids affect industrial and municipal infrastructure and recreational water users, and they severely alter aquatic ecosystems.

The USGS has been doing dreissenid mussel control and rapid response research in the Great Lakes and Upper Mississippi River basins for several years including evaluating the application of targeted molluscicides, assessing the effects of molluscicides on nontarget species, and developing genetic tools for dreissenid mussel detection.

In support of this effort, the USGS evaluated genetic markers for dreissenid mussel early detection and is working to improve eDNA sampling and analysis protocols.


A display of invasive zebra mussels shows how they can propagate and foul propellers and clog pipelines. Photo credit: USFWS

Read more: *https://nas.er.usgs.gov/queries/FactSheet.aspx?speciesID=5*

## Protecting Coral Reefs from Invasive Species

By Heidi Koontz, Marisa Lubeck, and Thierry Work (USGS)

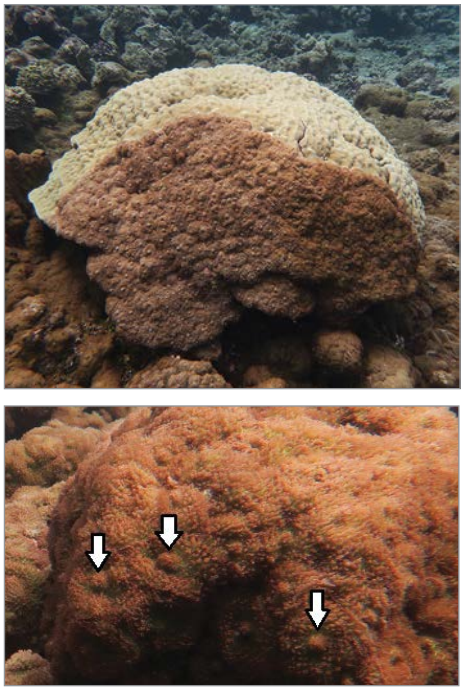
According to a new USGS study at the remote Palmyra Atoll NWR in the Central Pacific, researchers determined that removing shipwreck debris helped reduce the proportion of an invasive anemone known as corallimorph (CM) in infested areas from 21 to 14 percent.

CMs are a type of invasive anemone that typically thrives in coral reefs that have been degraded by environmental or man-made disturbances. CMs can spread rapidly in coral reefs that have been degraded by environmental or man-made disturbances.

In 2007, USGS scientists discovered the CM infestation expanding and smothering otherwise pristine coral reefs in an area near a shipwreck at Palmyra Atoll NWR in the Central Pacific. The infested area had more than tripled by 2011, prompting the USFWS to remove the wreckage in 2013. Coral reefs can experience phase shifts where they quickly transition from coral-dominated to a uniformity of other organisms, typically algae. The Palmyra Atoll NWR is a unique case where a transition from corals to CMs occurred. Starting in 2007, USGS scientists and partners surveyed the CM-infested coral reef before and after removing the shipwreck.

The study marks the first time that shipwreck removal was shown to have beneficial effects for reef recovery from the invasive species.

"Coral reefs are home to a significant diversity of marine life, provide valuable economic and environmental services to millions of people, buffer shorelines from erosion and waves and can serve as a resource for the development of new medicines," said Thierry Work, USGS scientist and the lead author of the study. "Ships are often sunk deliberately to promote diving or recruitment sites for reef organisms, but our study provides a cautionary note for such practices in tropical marine systems." Control efforts such as removing shipwrecks and applying chlorine may help mitigate the damaging effects of CMs on valuable coral reefs in the Central Pacific Ocean.



The structure of corallimorphs (CMs) look very similar to the corals they invade. The arrows in the lower image point to mouths of individual CMs. Each CM mouth is surrounded by a corona of tentacles. Photo credits: Thierry Work, USGS

"Scaling up the control methods tested in our study might provide hope that the Palmyra corallimorph could be contained or possibly eradicated," Work said. "Coupling these methods with shipwreck removal could potentially help control infestations at other sites."

The USGS partnered with the University of Hawai'i, Bigelow Laboratory for Ocean Sciences, the USFWS, and The Nature Conservancy on the new study.

For more information about this research, please visit the USGS National Wildlife Health Center website: *https://www.nwhc.usgs.gov/*

## The 39th U.S Coral Reef Task Force Meeting

By Liza Johnson (DOI)

U.S. Coral Reef Task Force (USCRTF) co-chairs Doug Domenech (Assistant Secretary for Insular and International Affairs, DOI) and Russell Callender (Assistant Administrator for the National Ocean Service, NOAA) convened the 39th USCRTF meeting in Washington, D.C., from February 20 to 23. Marshall Critchfield (Advisor to the Assistant Secretary, DOI/Fish, Wildlife, and Parks) opened the business meeting on behalf of DOI, where he spoke about his passion for coral reefs and associated ecosystems that he learned about while growing up in Florida. More than 180 attendees gathered for the meeting, including those from Federal, State, and territorial government agencies, Congressional offices, research/academic institutions, and nongovernmental organizations.

The Watershed Partnership Initiative (WPI) Working Group held a workshop to support developing implementation plans for the three priority watersheds (Guanica, Puerto Rico; West Maui, Hawai'i; and Faga'alu, American Samoa) and sustainable financing for the future. The WPI Working Group held a local site visit to learn about the Baltimore Waterfront Partnership, which is focused on restoring the water quality in Baltimore Harbor and creating an opportunity to educate visitors. Through a walking tour, the WPI learned about the collaborative efforts and support among city officials, Federal agencies, and local nonprofits. After the tour, the participants toured behind-the-scenes at the coral reef and shark exhibits in the National Aquarium.

The Climate Change Working Group met with members of the WPI Working Group and the U.S. All Islands Coral Reef Committee (AIC) to

*See Coral Reef Task Force page 25*

DOI's Doug Domenech (center) co-chaired the 39th USCRTF meeting in February 2018 at the Main Interior Building, Washington, D.C. Photo credit: Liza Johnson, DOI

*Coral Reef Task Force continued from page 24*

brainstorm ways that their working group can support other USCRTF activities and priorities. The Enforcement Working Group identified broad enforcement-related challenges for which the group may be able to assist. They discussed sharing lessons learned across the jurisdictions from the State of Florida at the fall 2017 meeting.

Congresswoman Madeleine Bordallo (Guam) addressed the USCRTF and meeting attendees and highlighted the importance of coral reefs to Guam's economy, including their role in the livelihood of Guam's people, reducing effects from storms, and fishing. Congresswoman Bordallo also announced that she is preparing to introduce a reauthorization bill for the Coral Reef Conservation Act this year.

The AIC proposed a new focus area for the USCRTF: using adapted corals to restore reefs. The USCRTF members support this new focus area and requested that the Steering Committee present a resolution for decision at the next meeting. The AIC also reported on a variety of on-the-ground activities in each of the coral reef jurisdictions, their capacity building efforts through the Coral Management Fellowship, and their strategic plan implementation.

The USCRTF hosted two panels for the business meeting. The first panel focused on recent hurricanes in the Caribbean and South Atlantic, as well as American Samoa's experience with recovery from the 2009 earthquake and tsunami. The panelists summarized observed damages and triage efforts to date. A speaker from Force Blue, a nonprofit that unites the Special Operations veterans with the world of coral reef conservation, discussed a partnership with NOAA on their recent restoration missions in Florida and Puerto Rico. A Federal Emergency Management Agency representative discussed their hazard mitigation program as it pertains to natural infrastructure.

The second panel focused on the role that coral reefs play in hazard mitigation and risk reduction, as well as long term coral recovery efforts. The speakers discussed how future resilience can be built into coral reef restoration projects. Three speakers focused on different aspects of resilience of corals to stressors, such as high sea surface temperatures and disease, and discussed how more resilient corals can be used in restoration projects. Dr. Mike Beck from The Nature Conservancy presented on his research in partnership with the USGS and the University of California Santa Cruz, funded partially by the DOI Office of Insular Affairs, on the role that coral reefs play in coastal protection, applying a rigorous value to flood protection benefits of coral reefs to nearby shorelines, and how this information can be used to inform coastal management and coral reef restoration efforts.

The meeting concluded with action items to support coral reef restoration initiatives, local capacity building, continuing to fulfill the current USCRTF work plan priorities, and developing products or trainings to support the States, Territories, and Commonwealths in addressing local issues.

The 40th USCRTF meeting, hosted by the Territory of American Samoa, is scheduled for August 13–16, 2018.

Visit *http://coralreef.gov for more information on the USCRTF*.

During the walking tour, Casey Merbler, Project Manager at the Healthy Harbor Initiative, discussed the role of Mr. Trashwheel in removing debris from Baltimore Harbor and raising awareness about water quality. Photo credit: Liza Johnson, DOI

# USFWS Provides Vital Technical Assistance

By Christopher Eng (USFWS)

The USFWS Coastal Program is a voluntary, partnership-based, habitat conservation program. Working on public and private land, locally based field staff provide technical and financial assistance to willing partners to conserve fish, wildlife, plants, and their habitats for the continuing benefit of the American people. Learn more: *https://www.fws.gov/coastal/*

Technical assistance is the cornerstone of the Coastal Program's conservation approach. It allows us to have a broader effect on conservation by facilitating evidence-based decisions, refining conservation plans and policies, and improving the science of restoration.

In Alaska, the Coastal Program provided technical assistance to The Great Land Trust (*http://greatlandtrust.org/*) and Eklutna, Inc. (*https://www.eklutnainc.com/*) by prioritizing habitats for conservation in the Matanuska-Susitna Borough. Photo credit: Carl Johnson

> *"Technical assistance is what we do to understand a problem and develop a solution. It is also the work we do to evaluate the success of our actions, which improves future conservation efforts,"*
> —said Mark Secrist, Coastal Program.

A site visit to a National Coastal Wetland Conservation Grant Program project with the Columbia Land Trust (*https://www.columbialandtrust.org/*), in Willapa Bay, Washington. Photo credit: Samantha Brooke, USFWS

## Advancing Conservation Priorities

Our technical assistance can advance the priorities within our agency and among other Federal agencies. As a community-based conservation program, we can also deliver these priorities to States and local communities when there are shared interests.

Recognizing the importance of island ecosystems and their vulnerability to invasive species, the USFWS and Island Conservation adopted an Island Restoration Memorandum of Understanding. The memorandum promotes the removal of invasive species for the benefit of native island plants and animals. In support of this effort, we prepared a brochure that explains the importance of island conservation and highlights several successful restoration projects with specific biological outcomes: *https://www.fws.gov/coastal/pdfs/FinalIslandRestorationBrochure.pdf*

## Helping State Conservation

Our strategic work plans that guide our conservation activities are influenced by State and community priorities. By providing technical assistance to States and communities, we are helping to deliver on-the-ground conservation. We co-manage the National Coastal Wetland Conservation Grant Program along with the Wildlife Restoration and Sport Fish Restoration Program. Annually, this grant program distributes $18–20 million to States applying to conserve wetlands and uplands that provide important coastal habitat for fish and wildlife, as well as recreational opportunities for people.

Our field staff work with State agencies and other partners to identify and develop high-quality conservation projects and prepare competitive grant applications. Our headquarters and regional staff review, rank, and make recommendations for funding to DOI and USFWS leadership.

*See Technical Assistance page 27*

*Technical Assistance continued from page 26*

*"The success of our National Coastal Wetland Conservation Grant application was possible by the incredible assistance by the Coastal Program. We were able to permanently protect 170 acres of habitat in Richmond County, Virginia. The project also fulfills a conservation priority for the Rappahannock River Valley National Wildlife Refuge,"* —said Estie Thomas, Virginia Outdoors Foundation.

## Helping Community Conservation

We provide technical assistance to local communities seeking to implement habitat conservation that is important to them. Our assistance fosters environmental stewardship and enables communities to contribute to conservation.

In Michigan, local communities are helping with the recovery of the endangered Hine's emerald dragonfly. We train volunteers to record dragonfly locations, evaluate invasive species threats, and identify potential restoration sites. They also are evaluating habitat for the endangered piping plover and eastern massasauga (*Sistrurus catenatus catenatus*; a rattlesnake)—a species considered for listing under the Endangered Species Act. The information gathered resulted in the restoration of over 400 acres of wetland and upland habitat.

Once thought to be extinct, the endangered Hine's emerald dragonfly was rediscovered in Illinois in 1988. Additional populations were later found Michigan, Missouri, and Wisconsin. Photo credit: Greg Lasley, Flickr

Photo credit: Samantha Whitcraft, USFWS

## What is Technical Assistance?

Technical assistance consists of planning and design activities that support habitat conservation, whether or not it leads directly to a specific habitat improvement project. Planning and design is the process of developing strategies and priorities, creating tools and resources, and planning projects to support conservation.

In Alabama, the Coastal Program provides technical assistance by working with Dauphin Island Sea Laboratory (*http://www.disl.org/*), Sea to Shore Alliance (*http://sea2shore.org/*), and others to capture and tag manatees so that scientists can study their movements in the Gulf of Mexico.

We provide technical assistance to other USFWS programs (for example, Endangered Species, National Fish Passage, and Wildlife and Sport Fish Restoration Programs) and partners (for example, land trusts, State agencies, and private landowners) to achieve shared conservation objectives. We are required to be involved substantially in a project for that project to receive Program funding, and our technical assistance is one way that we can have that involvement.

In Hawai'i, we are working with NOAA and Malama na Honu (*http://malamanahonu.org/*) to train local volunteers to document the location and behavior of Hawaiian green turtles. This information will improve our understanding of sea turtle ecology and support the recovery of this federally threatened sea turtle.

In Hawai'i, local communities are helping to monitor the recovery of green sea turtles. Photo credit: NOAA

## Technical Assistance Examples

- Habitat assessments
- Conservation prioritization
- Conservation planning and design
- Restoration monitoring
- Environmental disaster response
- Policy development
- Grant administration
- Assessment protocols and tools
- Capacity building and training
- Conservation education and stewardship

*See Technical Assistance page 28*

*Technical Assistance continued from page 27*

## Supporting the NWR System

Through our technical assistance, we can advance the mission and priorities of the NWR System (*https://www.fws.gov/refuges/*). In addition to assistance on NWRs, we can deliver the mission and priorities to the surrounding communities.

The North Florida Refuge Complex includes the St. Marks NWR, St. Vincent NWR, and conservation easements in Georgia and Florida. The complex protects nearly 95,000 acres of habitat for wildlife.

We provided technical assistance by doing a small mammal survey, which helped to develop a species list for the complex. This information supports the refuges' comprehensive conservation plans, and informs management and public-use decisions.

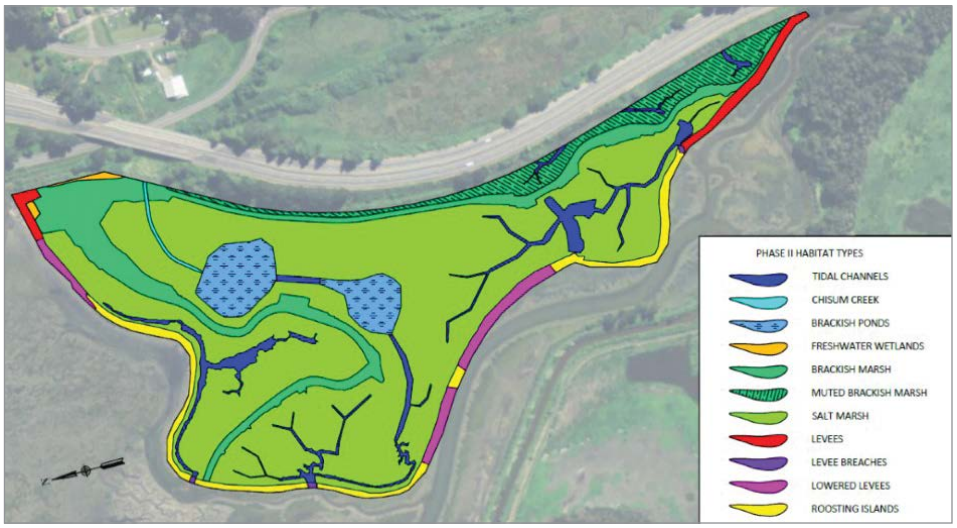
In California, Humboldt Bay has lost 90 percent of its tidal salt marshes. To reverse this trend, the Humboldt Bay NWR is restoring White Slough—a salt marsh that was historically drained and diked for agriculture, and later managed as a freshwater wetland.

We provided technical assistance by doing a topographic survey and preparing the restoration design that will restore 41 acres of tidal salt marsh. We also worked with partners to acquire the regulatory permits and additional project funding, including a $1,000,000 National Wetlands Conservation Grant Program award.

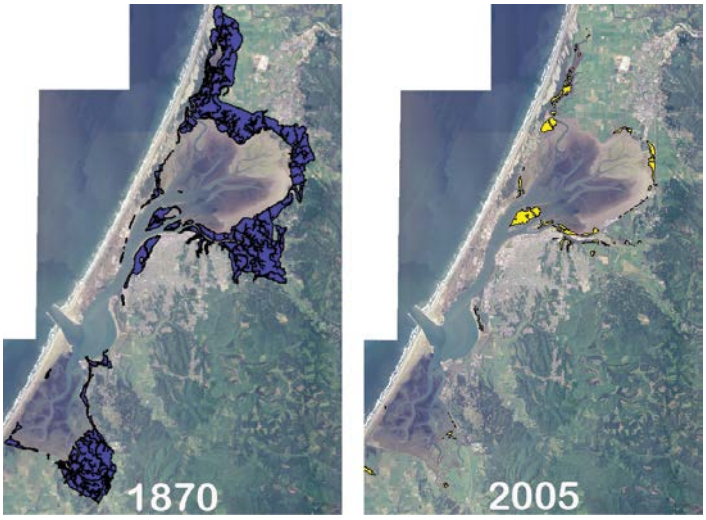
## Building Restoration Capacity

We have a broad impact on conservation through our capacity building among partners and communities. Through this type of technical assistance, we are helping communities to make better decisions and implement more successful restoration projects.

Land use changes are affecting our Nation's rivers and streams. These




The restoration of White Slough on Humboldt Bay NWR began in 2015. When completed in 2020, the project will restore salt marsh among other habitats. Map credit: USFWS




Comparison of salt marsh coverage from 1870 to 2005 in Humboldt Bay, California. Image credit: Aldaron Laird and others, Historical Atlas of Humboldt Bay and Eel River Delta

In the Advanced Stream Simulation Design Course, participants learn to design road-stream crossings that maintain fish passage, support stream processes, and improve public safety. Photo credit: Jed Wright, USFWS

The Coastal Program provides technical assistance by developing and instructing stream assessment and restoration courses. Photo credit: Joe Milmoe, USFWS

*See Technical Assistance page 29*

*Technical Assistance continued from page 28*

changes have resulted in the loss of aquatic and riparian habitats due to erosion, sedimentation, and pollutants. To better balance the needs for conservation and development, we create resources and training courses that improve the science and delivery of stream conservation.

This type of assistance allows us to have a broader effect on conservation by enhancing people's knowledge of stream functions, and improving restoration planning and design. For example, we estimate that participants from one stream assessment course will cumulatively use their training on 60 restoration projects and 30 miles of stream annually.

## Monitoring for Success

We evaluate the success of our conservation by monitoring the outcomes of our actions. We also help partners to monitor their conservation actions. Through this type of technical assistance, we can improve the science and delivery of conservation.

In the Northwestern Hawaiian Islands, we are working with the NWR System, American Bird Conservancy, and others to translocate critically endangered Nihoa millerbirds (*Acrocephalus familiaris kingi*) from Nihoa Island to Laysan Island. The translocation creates a second population of Nihoa millerbirds to reduce their risk of extinction and restore the ecology on Laysan Island, where a closely related millerbird species went extinct.

Our technical assistance includes planning for the translocation and monitoring for biological outcomes. The monitoring shows a robust increase in Nihoa millerbirds on Laysan Island. A study on this project suggests that translocation may be useful model for the recovery of other endangered species. Learn more: *http://www.sciencedirect.com/science/article/pii/S0006320716301872*

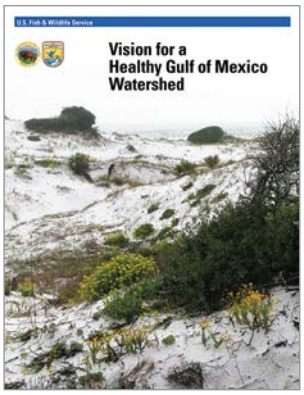
On Laysan Island, the Coastal Program provided technical assistance for the translocation (left) and monitoring of critically endangered Nihoa millerbirds (right). Photo credits: Holly Freifeld and Robby Kohley, USFWS

The Coastal Program provides technical assistance by facilitating critical links among partners planning and implementing restoration in response to environmental disasters, such as the *Deepwater Horizon* oil spill. Photo credit: USFWS

## Responding to Environmental Disasters

Whether it is an oil spill, hurricane, or other environmental disaster, we support the USFWS's response through our technical assistance, including damage assessments, restoration planning, and coordination.

The *Deepwater Horizon* oil spill was catastrophic to the Gulf coast region. To coordinate a strategic response, the USFWS published the "Vision for a Healthy Gulf of Mexico Watershed." We were instrumental in the development of this vision that articulates the conservation priorities and serves as a catalyst for coordinating landscape-scale restoration along the Gulf Coast. See the report: *https://www.fws.gov/southeast/pdf/gulf-vision-document.pdf*



## Rescuing Cold-Stunned Sea Turtles

By Heather Dewar (USGS)

The metabolism of cold-blooded sea turtles slows down when water temperatures drop below 50 degrees Fahrenheit, so much so that they are unable to swim or even lift their heads above the water to breathe. Without warmth or human intervention, they drown.

This winter, on the Florida panhandle, a team of volunteers and wildlife experts braved the icy cold shores of St. Joseph Bay to rescue cold stunned turtles. An estimated 1,000 cold-stunned sea turtles were rescued in early January in what is believed to have been Florida's second-largest mass cold-stunning event of the 21st century, according to USGS research biologist Margaret Lamont. Most of the turtles rescued were threatened green turtles (*Chelonia mydas*), but the teams also brought in endangered


Scientists and volunteers use nets to scoop the immobile sea turtles out of St. Joseph Bay before transporting them to safety. Photo credit: USGS

USGS scientist Margaret Lamont carries a cold-stunned green sea turtle from the mud flats of St. Joseph Bay. Photo credit: USGS

Kemp's ridleys (*Lepidochelys kempii*), threatened loggerheads (*Caretta caretta*), and one endangered hawksbill (*Eretmochelys imbricata*). By January 19th, a rented house where Lamont and two scientists did their research was full of turtles, inside and outside. They were released as soon as conditions warmed up.

"I'm very happy with how we've been able to minimize the mortality to the animals," said Lamont, who has been studying sea turtles in Florida since 1995. "And I'm very proud of how everyone has come together to get it done. I'm especially proud of the volunteers who are out here in the cold and mud, doing exhausting work for no reward and often no recognition."

Padre Island National Seashore Division of Sea Turtle Science and Recovery studies Kemp's ridley and other sea turtles at Padre Island National Seashore and in the Gulf of Mexico. Keep up with their sea turtle work here: *https://www.facebook.com/nps.pais.seaturtles/*

Read more: *https://www.usgs.gov/news/florida-scientists-volunteers-rescue-about-1000-cold-stunned-sea-turtles*

## Wounded Nature—Working Veterans Partner with South Carolina's Coastal Program

By Jennifer Koches (USFWS)

USFWS's South Carolina Coastal Program is one of 24 partnership-driven programs across the Nation. With 2,876 miles of coastal shoreline (measuring outer coast, offshore islands, sounds, bays, rivers, and creeks), South Carolina has the 11th longest coastal shoreline in the United States. Oyster reefs are a vital part of these coastal ecosystems, providing important benefits to water quality through filtration while the reef structure protects adjacent saltmarsh, which provides foraging habitat for birds and spawning habitat for fish and shellfish, supporting marine life from tiny crustaceans and amphipods to sportfish and larger predators.

The USFWS's Coastal Program partners with the South Carolina Department of Natural Resources (SCDNR) through the South Carolina Oyster Restoration and Enhancement (SCORE) program. This key partnership engages community volunteers to work with scientists to restore and monitor oyster habitat along the South Carolina coast. Volunteers recycle and bag oyster shells, construct oyster reefs, collect spat (juvenile oysters),

South Carolina Coastal Program built oyster reef providing erosion control for property in Beaufort County. Photo credit: USFWS

*See Wounded Nature page 31*

*Wounded Nature continued from page 30*


The crowd gathers to receive instructions from Wounded Nature—Working Veterans CEO, Rudy Socha (at left), for the day's cleanup and oyster build. Photo credit: USFWS

and monitor water quality and reef progress. These sites also serve as research platforms for monitoring and improving success for restoration activities.

A new partnership that further enhances the work of SCORE is Wounded Nature—Working Veterans, a 501(c)3 nonprofit founded by veterans, that provides veterans (and nonveterans) an opportunity to make a real environmental difference. Wounded Nature—Working Veterans organizes and completes coastal cleanups in South Carolina, focusing on the large issue of marine debris in coastal communities. Since 2014, by partnering on coastal cleanups, the coastal areas are cleaned up, and oyster reefs are constructed by volunteers.

In March, USFWS Coastal Program staff joined in on the 2018 St. Patrick's Day cleanup of Drum Island in Charleston Harbor. Dozens of community and agency volunteers assisted in the event removing 32 cubic yards of debris from the island. They also created more than 130 linear feet of oyster reef along the shore where it will reduce erosion from boat traffic and encourage regrowth of saltmarsh vegetation.

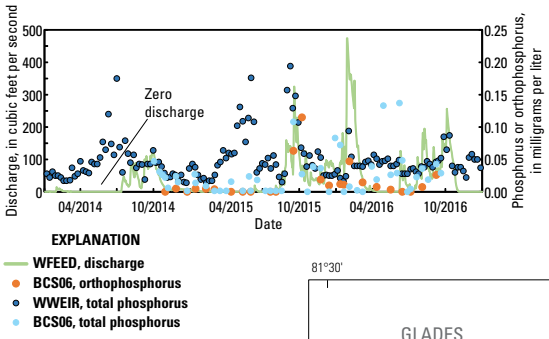
Learn more:
*https://www.fws.gov/southeast/our-services/coastal-conservation/*
*http://score.dnr.sc.gov/*
*http://woundednature.org/*

# Understanding Nutrients in Everglades' Big Cypress Seminole Indian Reservation

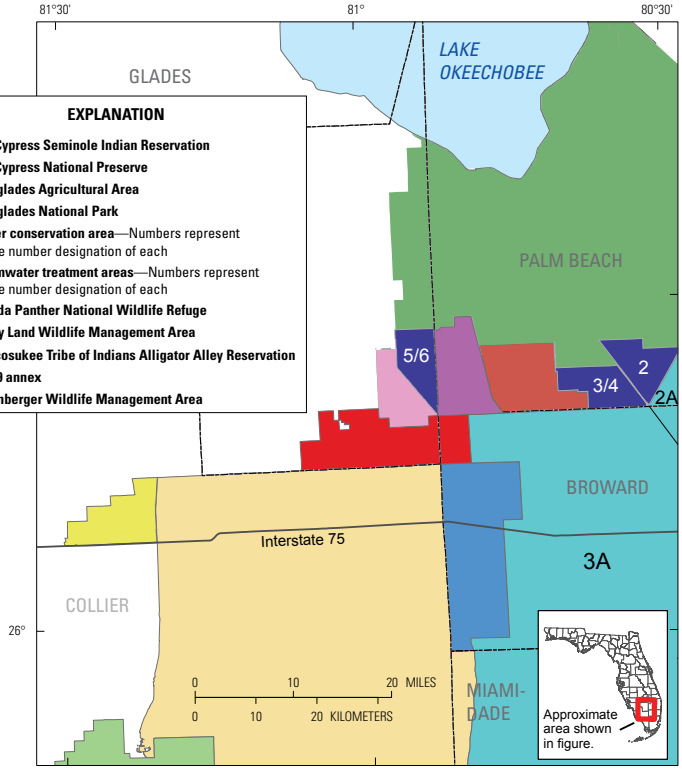
By W. Scott McBride and Dorothy F. Sifuentes (USGS)

The USGS has released a new study looking at relations between phosphorus concentrations and hydrologic conditions to help make informed decisions about water management.

Phosphorus is important because the Everglades ecosystem in Florida, naturally evolved as an oligotrophic (nutrient-poor and low levels of phosphorus) environment, which resulted in endemic plant species that are adapted to very low nutrient conditions. Changes to the hydrology, plus new sources of phosphorus (P), have greatly increased the nutrient load reaching the Everglades ecosystem and causing the growth of undesirable and nuisance plant species.




Above: Graph showing the relation between discharge and phosphorus concentrations.




At right: Map of various land classification areas near the Big Cypress Seminole Indian Reservation (shown in red).
Image credits: USGS

A canal through the sawgrass of the Everglades. Photo credit: LCC Network

To address this issue, the Seminole Tribe is working with the U.S. Environmental Protection Agency to develop a numeric phosphorus criterion for waters entering and exiting the Big Cypress Seminole Indian Reservation (BCSIR) in the central part of the Everglades. The USGS, in cooperation with the Tribe, and the South Florida Water Management District, are using water quality and other hydrologic data to better understand sources and transport of the excess nutrients.

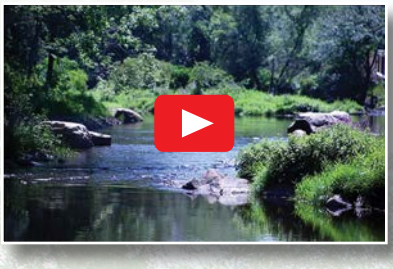
Read more: *https://pubs.er.usgs.gov/publication/ofr20181014*

Photo credit: USFWS

# A River Runs Free in Rhode Island



## Pawcatuck River Videos



**Part 1: The History of the Pawcatuck River:** *https://www.youtube.com/watch?v=fbcJwkMkphc*

**Part 2: Restoring the Watershed:** *https://www.youtube.com/watch?v=WviFpV0Q8Ms*

By Isaac Burke and Lauri Munroe-Hultman (USFWS)

The Pawcatuck River in Connecticut and Rhode Island is coming back to life. Collaborative efforts to remove dams and restore the flow has many benefits. Even with a few projects still waiting in the wings, recent surveys documented shad, blueback herring, and alewife above the site of the former White Rock Dam, which was once all but impassable. *See related story, page 19.*

Visit this StoryMap: *https://fws.maps.arcgis.com/apps/Cascade/index.html?appid=03173cda0f5f4f05ace9aa06224ad792*

This video series shows the Pawcatuck River from formation to restoration. The river has been a bountiful resource because of its plentiful wildlife and clean water for many generations; however, dams, pollution, and overfishing pushed fish populations dangerously low, creating a ripple effect that weakened the entire ecosystem. Fish passage projects supported by the USFWS and other conservation partners are beginning to restore that ecosystem by repairing fish ladders and removing dams, returning much of the river to a natural flow and improving the safety of the watershed for all.

Photo credit: Ayla Fox, The Coastal Institute-URI