NEWSWAVE

Stories from the U.S. Department of the Interior's Ocean, Great Lakes and Coasts

Summer 2024

Our Blue Portfolio

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Above: USFWS staff in the Caribbean Field Office recently completed seasonal tagging efforts to monitor roseate terns, who undergo extensive migrations. This individual (ROST LY2) was tagged by Pedro Lima on 1-25-2020 in Brazil, before migrating in late spring/summer to nest in offshore cays of La Parguera, Lajas, Puerto Rico. These nesting cays are vulnerable to sea-level rise and storm surge because of their low elevation. Photo by JP Zegarra / USFWS.

Cover photo (top): A collection of micro ocean-bottom seismometers ready to be deployed by the Weepecket Islands, off the coast of Massachusetts. Photo by Nathan Miller / USGS.

Cover photo (bottom): State, county, and local officials, the U.S. Army Corps of Engineers, and BOEM Office of Strategic Resources Chief Dr. Megan Carr shovel the first sand at the groundbreaking of a critical beach resilience project in Florida. Photo by Dr. Megan Carr / BOEM.

In This Issue:

Secretary Haaland's *NEWSWAVE* 5

By Secretary Deb Haaland

Each *NEWSWAVE* issue, Secretary Haaland shares five selected highlights of the work DOI is doing to bolster our Blue Portfolio.
See these and other press releases at: https://www.doi.gov/news

1. Salt Marsh Keystone Initiative

In January, I traveled to Portsmouth, New Hampshire, where U.S. Fish and Wildlife Service (USFWS) Director Martha Williams and I celebrated the launch of our Department's Salt Marsh Keystone Initiative. As one piece of our overarching restoration and resilience framework, the Keystone Initiative leverages funding from President Biden's Investing in America agenda to restore critical salt marsh ecosystems that line the Atlantic coast. Salt marsh ecosystems – also known as tidal wetlands – are where the ocean meets the land, creating a globally unique home to native birds, fish, and other wildlife that live nowhere else. During our visit, we toured the Fair Hill Marsh site, where restoration work is being advanced with critical guidance from our team members at USFWS and with a $2 million investment from the America the Beautiful Challenge. These conservation efforts are historic, and I can't wait to see the progress they achieve for critters and communities up and down the East Coast.

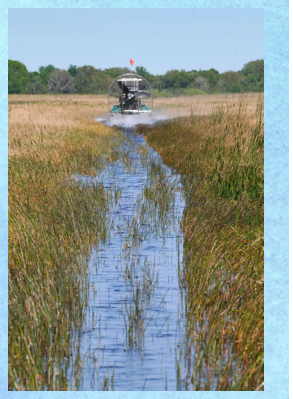
2. OSW Progress - South Fork

When I came to the Interior Department, the United States had zero approved offshore wind energy projects. Today, thanks to the Biden-Harris administration and the talented employees at the Bureau of Ocean Energy Management (BOEM) and Bureau of Safety and Environmental Enforcement (BSEE), we have nine projects and counting. That includes South Fork Wind off the coast of New York, which will deliver 130 megawatts of clean, renewable wind energy - enough to power over 70,000 homes and businesses. Earlier this year, I joined New York State and South Fork Wind officials to celebrate and quite literally flip the switch on this historic project.

3. USGS Great Lakes Science Center

Across our nation, scientists at the U.S. Geological Survey (USGS) put funding from the President's Bipartisan Infrastructure Law to good use advancing science that underpins many decisions we make at Interior. This summer, I visited the USGS Great Lakes Science Center in Michigan, where officials briefed me on the tools they use to combat aquatic invasive species in the region. Some of the USGS efforts supported by BIL funding include developing methods to detect invasive species in lakes and waterways across the country. Invasive species threaten to erode hard-fought conservation progress in countless ecosystems, and advancing science-based tactics for eradicating them is so crucial to our vibrant shared future. The work of the USGS to support control of invasive species is vital not just to the Great Lakes region, but for scientists and communities everywhere to benefit from.

4. Creation of Everglades to Gulf Conservation Area



The conservation of the Everglades is a remarkable success story for this irreplaceable ecosystem, the countless critters that depend on its health, and the local communities who have fought for decades to ensure this special place thrives. Despite our progress, we know this work isn't finished yet, as threats like the climate crisis and human development continue to jeopardize the region. This year, our team celebrated the creation of the Everglades to Gulf Conservation Area as the 571st unit of the National Wildlife Refuge System. This new, four-million-acre conservation area, which borders Everglades Headwaters National Wildlife Refuge and Conservation Area, will mean strengthened resilience for animals and plants alike. I was honored to tour this region with federal, state, and local leaders and members of the community.

5. Katmai National Park and Preserve

Responsibly stewarding the priceless landscapes and waterways that countless species depend on is one of our Department's most vital missions. That includes the miraculous ecosystem in Southern Alaska's Katmai National Park and Preserve, which serves as one of the world's best bear-watching locations. I joined National Park Service (NPS) employees this summer to learn more about this region, where bears fill up on fresh sockeye salmon from the Brooks River ahead of their winter hibernation (as well as NPS' annual Fat Bear Week!). The work of NPS officials to ensure this region stays pristine – and that onlookers can enjoy watching the bears safely – is so crucial to the park and the surrounding community, and I was thrilled to observe their efforts up close.

National Ocean Month

The ocean connects the world in a way that no other natural resource does. As part of Nation Ocean Month, the Department recognizes the broad responsibility we have for maintaining healthy ocean and coastal resources, and the impact our work has around the globe.

Secretary Haaland and BOEM Director Elizabeth Klein delivered remarks at events throughout the week of June 4-6, 2024 to highlight Interior's commitment to implementing environmental justice measures throughout its ocean conservation work, including the development of a new offshore wind industry and collaboration with coastal, insular and island communities on climate adaptation.

USFWS and National Oceanic and Atmospheric Administration (NOAA) Fisheries released long-awaited final management plans for the Northeast Canyons and Seamounts and Mariana's Trench Marine National Monuments. These monuments will continue to serve as invaluable refuges for climate and biodiversity in our ocean.

At Interior, we manage, protect and provide access to:

- More than 35,000 miles of coastline
- 34 million acres in 88 marine and coastal national parks
- 183 marine and coastal national wildlife refuges
- 1,100 miles of coastline of the California Coastal National Monument
- More than 855.4 million acres in marine national monuments and national wildlife refuges.
- Energy, mineral and aggregate resource development on 2.3 billion underwater acres of the Outer Continental Shelf

Images: National Ocean Month infographic (NOAA). National Ocean Month insignia (DOI).

Capitol Hill Ocean Week 2024

Capitol Hill Ocean Week (CHOW), convened by the National Marine Sanctuary Foundation, took place June 4-6 in Washington, D.C. CHOW is the nation's premier ocean and Great Lakes policy conference, bringing together policymakers, scientists, managers, business leaders, conservationists, educators, students and members of the public to discuss and debate significant issues impacting our ocean and Great Lakes, while proposing innovative policies and partnerships to address these challenges. The theme of CHOW 2024 was "Leadership: the vision, ambition, innovation, cultures and collaborations of leaders power the movement to protect our ocean and our blue planet by tearing down systemic inequities, reversing biodiversity loss and tackling climate change."

BOEM Director Liz Klein represents Interior at the Capitol Hill Ocean's Week Plenary Deep Dive: "The Path Forward for Responsible Offshore Energy" panel.

USFWS and BSEE staff at the CHOW Ocean Awards Gala.

USFWS and BSEE sponsored CHOW 2024, with staff engaging at public exhibits, hosting and participating in panel discussions, and attending the Foundation's Ocean Awards Gala, which recognizes champions of marine and Great Lakes stewardship with Leadership, Lifetime Achievement, Conservation Innovation, and Sanctuary Wavemaker award.

This year, the Foundation honored Violet Sage Walker, chairwoman of the Northern Chumash Tribal Council, with special recognition for the late Chief Fred Collins; White House Council on Environmental Quality Chair Brenda Mallory; and National Geographic Pristine Seas.

National Marine Sanctuary Foundation honorees Chief Fred Collins, Brenda Mallory and Violet Sage Walker.

Thank you to these leaders and organizations for their work in protecting our ocean by addressing systemic inequities, reversing biodiversity loss, and tackling climate change. See you next year at Capitol Hill Ocean Week!

BSEE Encourages Offshore Energy Industry to Reduce Single-Use Plastics

By Ramona Sanders, Jordan Creed, and Isabel Benemelis, BSEE

The Bureau of Safety and Environmental Enforcement protects the environment across nearly 3.2 billion acres of the U.S. Outer Continental Shelf, and marine debris prevention is a critical component of BSEE's environmental stewardship mission.

In support of President Biden's Executive Order 14057 and Secretary Haaland's Secretary's Order 3407, BSEE has undertaken efforts to reduce the use of single-use plastics within federal buildings and operations. To further this effort, BSEE recently launched an initiative to better inform and encourage the offshore industry to reduce its use of single-use plastics during operations on the Outer Continental Shelf. BSEE kicked off this campaign during June 2024 Ocean Month with a Letter to Lessees encouraging the reduction of single-use plastics. Clean drinking water is essential for offshore work, and single-use disposable water bottles provide a convenient and effective means to supply that need. However, the quantity of bottles used by the offshore energy industry is staggering.

United States Department of the Interior
BUREAU OF SAFETY AND ENVIRONMENTAL ENFORCEMENT
WASHINGTON, DC 20240-0001

June 3, 2024

LETTER TO LESSEES, OPERATORS, AND CONTRACTORS ENGAGED IN AUTHORIZED ACTIVITES ON THE OUTER CONTINENTAL SHELF

Sustainability: Reduce Single-Use Plastics Offshore

Marine debris prevention is a critical component of the Bureau of Safety and Environmental Enforcement's (BSEE's) environmental stewardship mission. The Marine Debris Program within BSEE's Environmental Compliance Program focuses on reducing the offshore industry's contribution to marine debris. Plastic beverage bottles and caps have consistently ranked in the top five marine debris items found in the ocean each year.[1] BSEE inspections have shown that storage space for plastic water bottles on offshore facilities is minimal. Often, packages of plastic water bottles are stored outside on the decks and subjected to the elements. Several inspections have found plastic packaging left out on facility decks, as well as numerous empty plastic water bottles not properly disposed of and unsecured outside. These can easily be picked up by the wind and blown overboard. Single-use plastics, such as plastic water bottles, that end up as marine debris negatively impact the marine ecosystem and the services it provides to the ocean economy. The prevention and reduction of marine debris will benefit the ocean economy by providing marine and coastal protection, and by supporting revenue generation, sustainable livelihoods, and the well-being of communities and citizens.[2]

BSEE, along with the rest of the Department of the Interior, is undertaking efforts to reduce the use of single-use plastics within our federal buildings and operations.[3] Similarly, we encourage the offshore industry to reduce single-use plastics during operations related to their work on the Outer Continental Shelf. We recognize some lessees, operators, and contractors may have already instituted plastic-reduction programs and cultures. If your company is currently employing programs to reduce the use of single-use plastic products, especially plastic water bottles, we would like to hear from you and learn more about your program. Our objective is to learn about good practices, benefits, and challenges to incorporating single-use plastic reduction strategies on offshore installations and support vessels. We also look forward to spotlighting company practices that may serve as a model for others in the offshore industry.

Please contact environmentalstewardship@bsee.gov if you are interested in a meeting with BSEE or have any questions about this letter.

Kevin M. Sligh, Sr.
Director

[1] National Oceanic and Atmospheric Administration, Marine Debris Program. https://marinedebris.noaa.gov/what-marine-debris/plastic
[2] United Nations Environment Programme (2017). Marine Litter: Socio-economic Study. https://wedocs.unep.org/20.500.11822/26014.
[3] Department of the Interior (2022). Secretary's Order 3407: Department-wide Approach to Reducing Plastic Pollution. https://www.doi.gov/sites/doi.gov/files/elips/documents/so-3407.pdf

Letter to lessees from BSEE Director Kevin Sligh.

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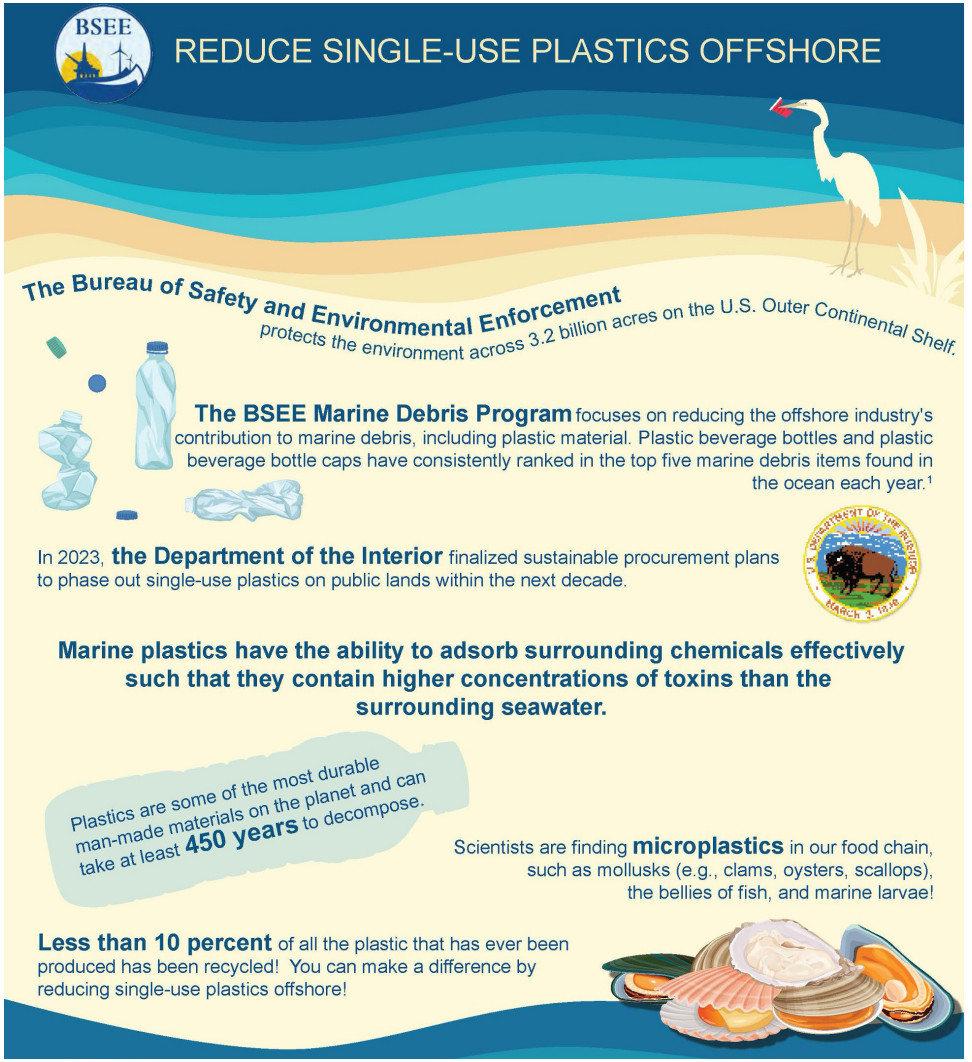
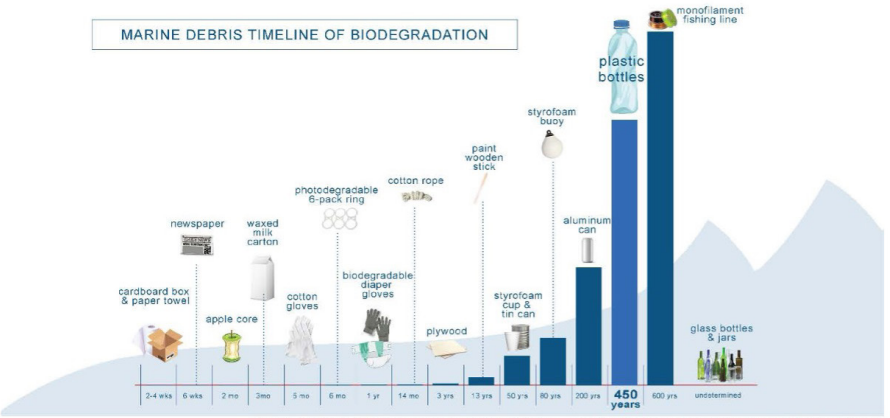
BSEE recognizes there may be lessees, operators and contractors that have already instituted plastic-reduction programs and cultures. BSEE would like to hear from companies that are currently employing programs to reduce the use of single-use plastic products, especially plastic water bottles. BSEE's objective during phase one of the initiative is to learn about good practices, benefits and challenges to incorporating single-use plastic reduction strategies on offshore installations and support vessels. BSEE will also use the information to spotlight company practices that may serve as a model for others in the offshore industry.

For additional information please visit BSEE's Marine Debris Program webpage or contact environmentalstewardship@bsee.gov.





Above: Reduce Single Use Plastics flyer for Capitol Hill Oceans Week.
Below: Marine Debris Timeline of Biodegredation.

Searching for Signs of the Aleutian Tern Along Alaska's Coasts

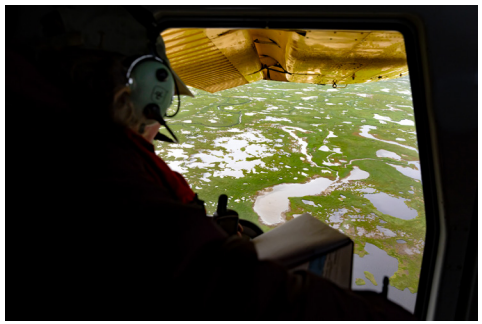
By USFWS Alaska Region

Second field season is a success for massive three-year statewide survey

An Aleutian tern in flight, taking a small forage fish back to a nest. Photo by USFWS.

The Aleutian tern is a connoisseur of coasts. Each August, this small, elegant, pale gray and white seabird leaves coastal colonies around the edges of Alaska and travels thousands of miles: out along the Aleutian Island chain, past the coasts of Japan, China, and southeast Asia, to wintering grounds in the western Pacific, including islands of Indonesia and the Philippines.

In June of 2024, teams of scientists and observers also traced hundreds of miles of Alaska's southcentral and southwestern coast. They flew for hours in small planes, closely following the sea's edge and then zigzagging in tight transects over grassy lowlands, searching for signs of nesting terns.



Low-level aerial surveying for Aleutian terns. Photo by USFWS.

If someone in the plane noticed a tern lifting from the ground, hovering, or wheeling around in a group, the pilot would dip a wing and circle the area for observers to confirm the sighting, record the location, and estimate a count. A second team of observers followed these aerial surveys, visiting selected colonies on the ground, traveling by skiff, plane, helicopter, or overland on foot to count and identify between Arctic and Aleutian terns.

At the end of weeks of searching, team members described a rollercoaster of impressions: the beauty of flights over vast, wild places; the essence of landscapes like Bristol Bay, where boats fished for salmon and bears walked the streams, with an occasional walrus sighting. They recounted the thrill of spotting a potential colony from the air and the anticipation and hope of finding nesting Aleutian terns on the ground. But they also faced uncertainty

Aerial views of Aleutian tern habitat at Togiak National Wildlife Refuge. Photos by USFWS.

and disappointment: known colonies that aerial surveyors could not locate, ground crews later confirmed as absent, and aggregations of Aleutian terns with, in some cases, no signs of nesting.

Both tern species have declined over the past several decades, but the Aleutian tern appears to be in the most trouble. They nest within only a few kilometers of the coast in Alaska and the Siberian Far East, and biologists have tracked an over 90% decline since the 1960s at monitored colony sites across Alaska. At large colonies in the Siberian Far East, recent counts also suggest reduced colony sizes. Recent counts at large colonies in the Siberian Far East also suggest reduced colony sizes. The surveys this summer mark the second year of a massive, collaborative three-year effort to search for Aleutian tern colonies throughout their range in Alaska. See the Aleutian Tern project page here.

Biologists in a state-wide working group that includes federal, non-profit, and academic partners hope to identify additional colonies and gain a better understanding of the North American population and its trends. With this information, they can potentially improve monitoring and implement conservation measures.

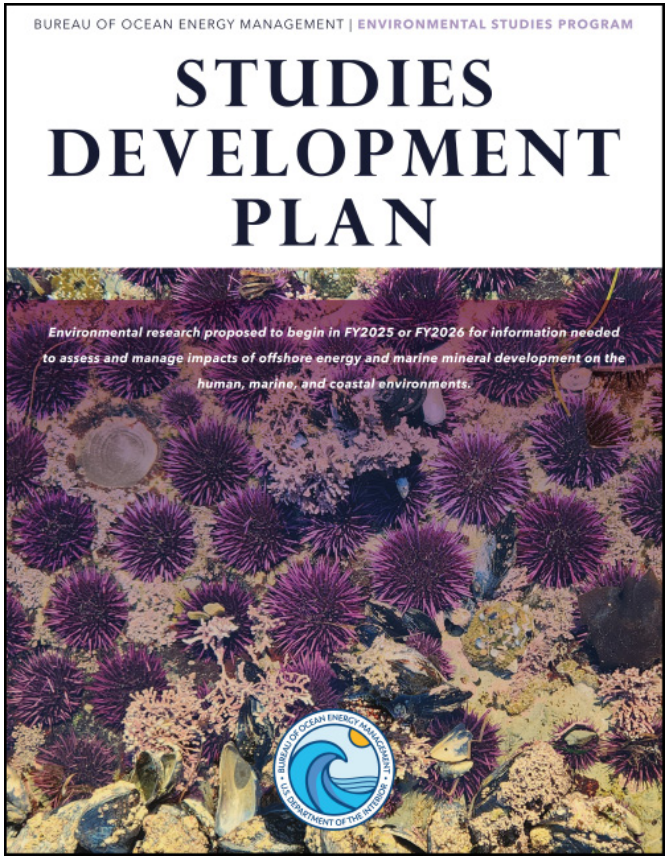
Many miles of the coastline surveyed in 2024 are conserved as public lands, vital for habitat and the wildlife and people who depend on these special places. From the lagoons of Izembek National Wildlife Refuge near the southern end of the Alaska Peninsula to the Bristol Bay seabird and marine mammal sanctuaries of Togiak National Wildlife Refuge and the coastal lowlands of Kenai National Wildlife Refuge, the teams crossed six national wildlife refuges, two national parks, and other public lands set aside as conservation areas. Surveyed areas also included private and Tribal lands, accessed with permission.

Like many other seabird species around the world, Aleutian terns are an indicator of greater marine ecosystem health. As we strive to learn more about Aleutian terns and possible reasons for their precipitous decline, we also find clues that may help us take conservation action to help terns and other species survive and thrive – including our own.

"Gaining a better understanding of the issue and taking action will require us to strengthen existing partnerships within the state and develop new ones far beyond. We need to reach across hemispheres toward colleagues in Indonesia, the Philippines and coastal Asia, and we also need to expand our collaboration in Alaska to work more with local communities that may have knowledge and capacity to help nesting terns."

-Marc Romano, Pacific Seabird Program Coordinator

BOEM Releases Studies Development Plan for Fiscal Year 2025 and 2026



BOEM Studies Development Plan (2025-2026)

As part of BOEM's commitment to using the best available science to inform its decision making, BOEM released its fiscal year 2025-2026 Studies Development Plan in June.

The SDP is an important part of BOEM's rigorous planning, review and procurement process to meet the nation's research needs to inform Outer Continental Shelf environmental analyses.

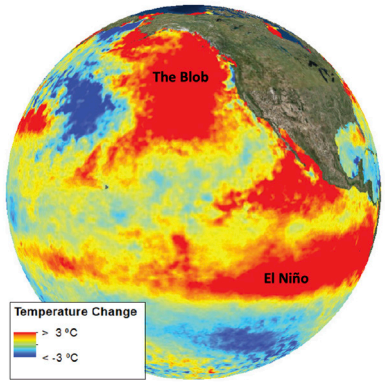
The plan outlines BOEM's research priorities and include brief profiles of proposed studies for the coming fiscal year and one successive year. Proposed studies are evaluated for program relevance, programmatic timeliness and scientific merit. Funded studies will be included on the fiscal year 2025 National Studies List, released in early November 2024.

For more information on BOEM's SDP, please visit their webpage.

Seabirds and Humpback Whales Give Early Warning to Marine Heatwaves

By Lauren Bien, Science Education Coordinator, Prince William Sound Science Center
Mayumi Arimitsu, Research Ecologist, USGS
Robert M. Suryan, Ecosystem Studies Program Leader, NOAA

Between 2014 and 2016, the North Pacific Ocean experienced an extreme marine heatwave known as "the Blob," which severely impacted ecosystems from Southern California to Alaska. With ocean temperatures rising dramatically, the heatwave led to widespread disruption, especially in the Gulf of Alaska. Top predators, including seabirds and whales, suffered from starvation and significant population declines, signaling a deeper crisis in the marine food web. Researchers found that key prey species, like forage fish, experienced reduced growth and nutritional value, further affecting the survival of higher-level predators.



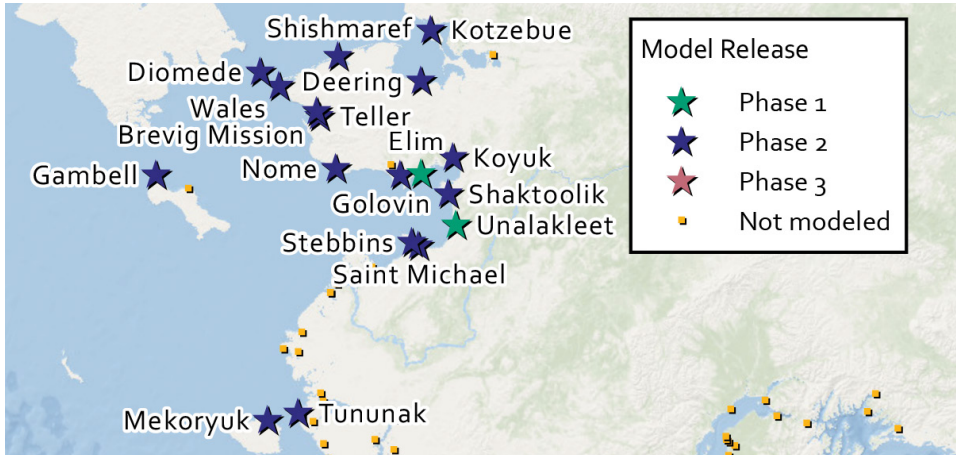
Sea surface temperature anomaly made using NOAA satellite data from July 1, 2015. A strong El Nino year and Blob co-occurred in the Pacific Ocean, creating warmer than usual temperatures (seen in red, orange, and yellow).

Long-term monitoring by Gulf Watch Alaska revealed that the Blob's effects were far-reaching and persisted for years, altering the composition of marine ecosystems. The heatwave not only disrupted

Common murre carcasses in Pigot Bay, Alaska, January 2016. Photo by David Irons.

predator-prey relationships but also caused breeding failures and die-offs across multiple species. As marine heatwaves become more frequent, understanding these ecosystem changes is crucial for future management and conservation efforts.

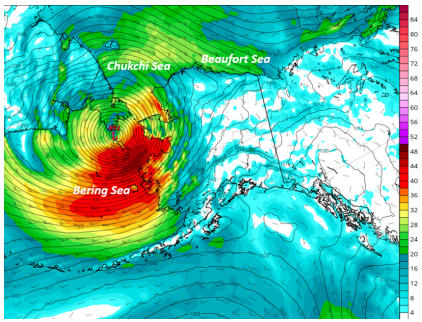
Read the full article here.



Typhoon Merbok modeling sites. Coastal hazard models and maps are being developed for the starred communities. Products will be released in three phases over the next few years.

USGS Aids in Emergency Recovery Efforts Following Extratropical Typhoon Merbok in Western Alaska

By Peter Pearsall, USGS



Atmospheric pressure map of Typhoon Merbok in western Alaska.

In September 2022, Alaska's western coast was hit by extratropical Typhoon Merbok, a storm that caused widespread destruction over 1,300 miles and impacted more than 35 communities. The storm surge led to severe flooding, erosion, and significant infrastructure damage, leaving Alaska Native communities grappling with the immediate and long-term effects. The event highlighted the vulnerability of coastal regions to extreme weather and underscored the urgent need for improved environmental monitoring, planning, and technical support to aid in recovery and future preparedness.

Floodwater damage from Extratropical Typhoon Merbok in Nome, Alaska - A building lifted from its foundation by floodwater is trapped under a bridge in Nome, Alaska.

In response, a collaborative effort involving the USGS and other federal, state, and local agencies was launched. The project aims to provide essential information and resources for rebuilding while enhancing resilience against future extreme weather events. Initiatives include installing permanent flood markers and developing real-time coastal monitoring systems, equipping communities with tools to address challenges posed by climate change.

Read more at the full project page, here.

Repairing the Ikpikpuk River Gage

In February 2023, the Ikpikpuk River gage in northern Alaska stopped transmitting reliable data, disrupting its essential role in monitoring water levels and flood risks for the Utqiagvik community. The Bureau of Land Management (BLM) promptly responded by sending teams into the field to repair and upgrade the gage with new sensors, ensuring the continuation of accurate river data.

Ikpikpuk River gage setup: Meteorological sensors and data logger sit atop the west bank, with cables running to pressure transducers in the river to measure water depth. Photo by K. Drew.

The Ikpikpuk River gage is managed by BLM Arctic District Office in collaboration with the University of Alaska, Fairbanks Water and Environmental Research Center. It is logistically challenging to manage due to its location, so site visits occur opportunistically between late May and early September when other aquatic monitoring is being done within the NPR-A.

Location of the Ikpikpuk River and gaging site (red circle) within the NPR-A.

This restoration is part of BLM's broader mission to maintain infrastructure that supports public safety and environmental monitoring. Reliable data from the gage will help residents prepare for potential flooding in this remote region.

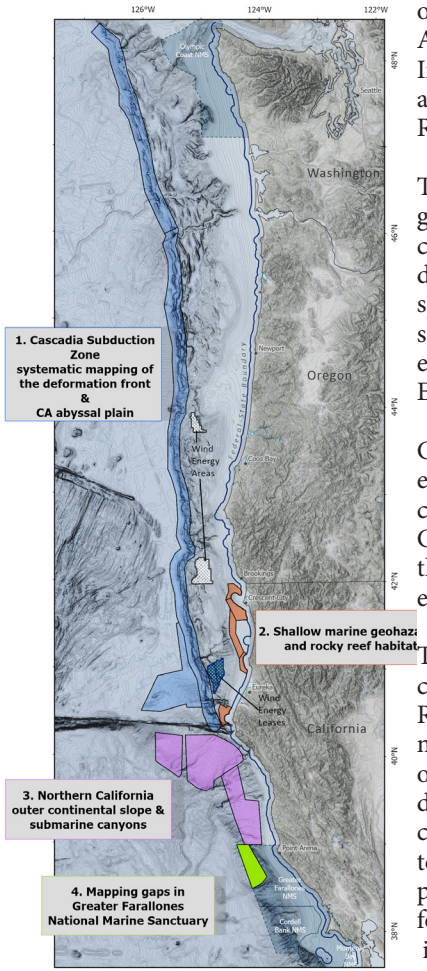
Read the full story here.

Replacing the wind sensor at the Ikpikpuk River gage. Photo by K. Drew.

USGS and Partners Plan Ambitious Seafloor Mapping Expedition Along West Coast in Fiscal Year 2025

By Jane Rudebusch, USGS

Expanding Pacific Exploration and Research of Submerged Systems (EXPRESS) is a partnership of federal and non-federal scientists and resource managers committed to expanding understanding of the deep sea through collaborative, mission-specific studies of marine ecosystems, geohazards and resources. At the helm are two Department of the Interior agencies—USGS and BOEM—as well as NOAA and the Monterey Bay Aquarium Research Institute.



Planned mapping for the Spring 2025 expedition, representing the most ambitious mapping effort by EXPRESS to date.

The USGS has a diverse portfolio of marine geological research, spanning from the continental shelf to submarine canyons and the deep abyssal plain. The bureau brings its highly specialized expertise in subduction zone science, critical global marine minerals, benthic ecosystems and seafloor geomorphology to the EXPRESS partnership.

Capping off a successful six-year interagency effort dedicated to deep-sea exploration, characterization and research on the U.S. West Coast, the USGS is taking the lead in planning the group's most ambitious seafloor mapping expedition to date.

The allocation of 40 days at sea to the EXPRESS campaign in fiscal year 2025 on the NOAA Ship Rainier marks the continued commitment to making substantial investments in the collection of modern, high-resolution seafloor mapping data (bathymetry and backscatter), contributing toward national and global goals to map the world ocean. Beyond simply "mapping the gaps," EXPRESS prioritizes mapping for science—that is, collecting high-quality data in areas of high importance to support effective decision-making in the nation's coastal regions and offshore areas.

EXPRESS will use the 40-day mapping expedition to chart four main areas of interest in northern California and the Pacific Northwest, including a planned systematic mapping survey along the length of the Cascadia Subduction Zone megathrust fault within U.S. waters, providing a seamless, high-resolution digital elevation surface of this major marine geohazard. Other areas planned for mapping will support Interior's decision-making efforts for the future development of renewable offshore wind energy. Visit the USGS project page to learn more!

Detecting the Presence of PFAS in Invasive Blue Catfish

By Megan Evans, USGS

USGS scientists from the Eastern Ecological Science Center (EESC) - Leetown Research Laboratory are sampling blue catfish in five locations of the Patuxent River to measure levels of per- and polyfluoroalkyl substances, or PFAS, in the blood of the invasive species.

Dr. Heather Walsh uses a syringe to extract blood samples from a blue catfish, to be tested for PFAS in the Leetown PFAS Lab. Photo by Megan Evans / USGS.

PFAS are emerging and widespread contaminants associated with human and wildlife health effects, including increased risk of cancer, immunosuppression, fatty liver disease, and reproductive, thyroid, behavioral and developmental effects.

The EESC team, led by Heather Walsh, Ph.D., works in partnership with the Maryland Department of Natural Resources, which uses electrofishing to collect the blue catfish. The objective of the sampling is to determine if there are potential human health concerns for consumption or concerns for the use of blue catfish as animal food or fertilizer.

EESC and MD DNR scientists weigh a large blue catfish as part of sampling to determine PFAS levels in the fish. Photo by Megan Evans / USGS.

The spread of blue catfish is a growing concern for scientists and fisheries managers. The invasive species is quickly becoming abundant in Maryland's rivers and outcompeting native fish for food and habitat.

Dr. Heather Walsh holds a blue catfish pas part of sampling to detemine PFAS levels in the fish. Photo by Megan Evans / USGS.

Recent efforts to reduce blue catfish populations include promoting them as a commercial fishery, highlighting the flaky and delicious nature of the fish's white meat to consumers and restaurant owners. Maryland state officials have proposed adding blue catfish to the menus of state institutions such as hospitals, public schools, universities and prisons. Other proposed efforts to reduce blue catfish abundance include composting them as fertilizer for crops or as food for zoo animals.

Learn more about USGS's Eastern Ecological Science Center at USGS.gov/eesc and Facebook.com/USGSEESC.

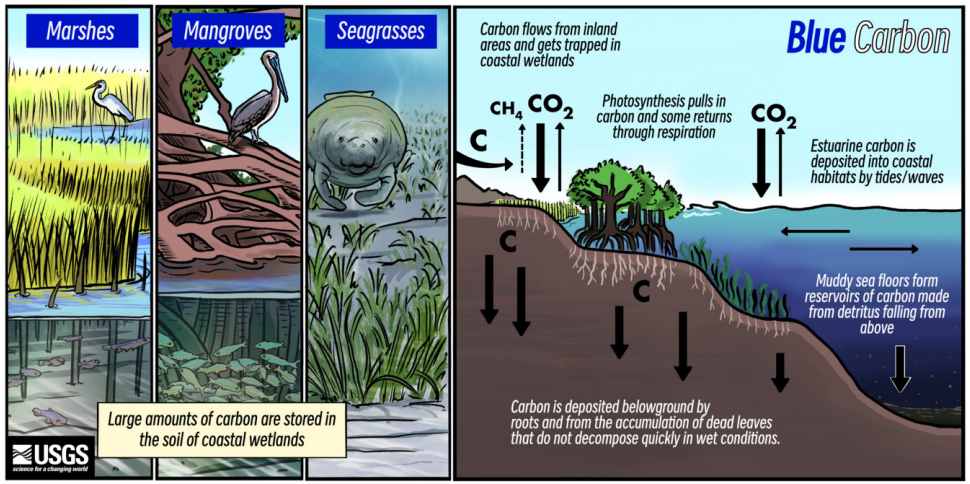
New Website Hub: Blue Carbon Research at USGS

By: Madeline Martin, Sara Ernst, Ariana Sutton-Grier, Kevin Kroeger , USGS

USGS has a robust portfolio of research and projects that relate to "blue carbon" – carbon capture by the world's coastal and ocean ecosystems. That research helps federal, state, and local government entities, as well as private organizations, make decisions regarding climate change mitigation and adaptation, wetland restoration, land management, and coastal resilience.

Until now, that research had not had any central website presence, making it harder for the public and partners to fully grasp and find the breadth and depth of the USGS research portfolio.

In June 2024, the USGS launched its new Blue Carbon Science Explorer topic page, a compilation of project information, publications, news stories and more from across the bureau that relate to blue carbon research. Its creation truly was a team effort with staff from across the organization working together over several months to bring the page to life. The goal is to keep this page up to date as new products and stories emerge, so feedback is always welcome.



For more information, see: www.usgs.gov/blue-carbon

News

Aligning Salt Marsh Science with Management Needs: User Stories Show the Power of Participatory Science

By Sara Ernst, USGS

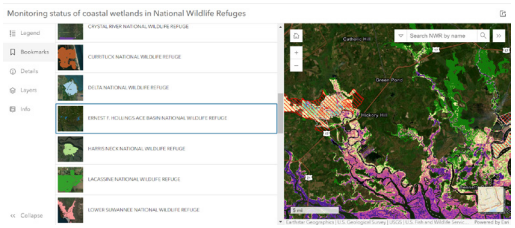
Science is most impactful when end users are actively involved throughout the research process. This is referred to as participatory science. Though there is no single formula for success across different research efforts, at least some level of participatory science helps ensure the research, data or tools being produced reach applicable audiences and address real concerns and needs.

Looking south along a Point Aux Chenes scarped low-marsh shoreline in September 2021. Photo by Alisha Ellis / USGS.

The USGS Estuarine Processes, Hazards and Ecosystems project team excels in creating partnerships and collaborative working groups with federal and state governments as well as non-governmental organizations. Participatory science enables the team to develop geospatial products that directly address specific marsh management questions.

Most of the geospatial products use the unvegetated-vegetated marsh ratio (UVVR), a metric that evaluates the ratio of unvegetated area to vegetated area across an entire marsh system, covering marsh plains, channels, ponds and intertidal flats. Larger UVVR values indicate more open water and less vegetative cover, leading to greater vulnerability to ongoing marsh loss. Due to these collaborative relationships, USGS marsh vulnerability science is being applied to meet specific needs and making a tangible impact on decision-making and on-the-ground management.

USFWS in the Southeast region, the Wells National Estuarine Research Reserve, the U.S. Army Corps of Engineers in Baltimore, Maryland Department of Natural Resources, Atlantic Coast Joint Venture, The Nature Conservancy in Texas, the Chesapeake Bay Program, Audubon and the National Park Service have all benefited from the geospatial products they co-produced with USGS. The products are designed to fit their unique needs, including tracking marsh restoration gains, identifying restoration opportunities and supporting land management decisions.



Hollings ACE Basin National Wildlife Refuge in South Carolina shown in the U.S. Coastal Wetlands Synthesis Applications geonarrative. Photo by Neil Ganju / USGS.

See the website with user stories that show the power of participatory science here.

Unveiling Earthquake History

By Sara Ernst, USGS

Understanding the timing, size, and location of past earthquakes is key for assessing seismic risks and creating hazard models. In earthquake-prone regions like Southcentral Alaska, lake sediments are proving to be an especially reliable indicator of past seismic events. Sediment cores from these lakes provide a detailed timeline of past seismic events.

Geologists look for buried deposits from underwater landslides and turbidity flows triggered by earthquakes to determine when each event occurred. To infer magnitudes and locations of older events, researchers need to know how lake basins respond to seismic waves arriving from different directions and earthquake sizes. The response of a lake basin to seismic shaking can be measured directly by installing seismographs in and around the basin. Combining the geologic and seismic observations enables researchers to extend the modern record of seismic events further back in time.

Nathan Miller and Brian Andrews on the R/V Lutris on Skilak Lake, Alaska. Photo by Rob Witter / USGS.

A team of USGS scientists, in collaboration with partners from the Woods Hole Oceanographic Institution Ocean Bottom Seismic Instrument Center, are creating a record of past earthquakes from Skilak Lake on the Kenai Peninsula of Alaska. In May 2024, they deployed two seismographs on the bottom of the lake, and eight seismographs on land around the lake.

Hannah Brewer and Tim Kane prepare to deploy an OBS on Skilak Lake, to create a record of past earthquakes. Photo by Nathan Miller / USGS.

Each instrument will collect data for about one year. The data collected from these seismographs will offer invaluable insights into how basin shape, sediment types, earthquake size, and location influence shaking intensity. This can enhance seismic hazard models, leading to more accurate risk assessments and better overall preparedness.

Skilak Lake, Alaska. Photo by Hannah Brewer / Woods Hole Oceanographic Institution.

Flood Inundation Mapping Capacity in Puerto Rico

By David Sumner and Legna Torres-Garcia, USGS

Bridge inundation on September 19, 2022 in aftermath of Hurricane Fiona and subsequent high flows in the Rio Grande de Manati, Manati, Puerto Rico. Photo by Julieta Gomez-Fragoso / USGS.

USGS is building technical capacity to provide Flood Inundation Mapping (FIM) to emergency flood responders and urban planners in Puerto Rico. This USGS effort seeks to provide practical support for flood mitigation in Puerto Rico, important in light of statements by the Puerto Rico Planning Board that floods on this tropical storm-prone island endanger about 200,000 homes and can result in fiscal losses in the billions.

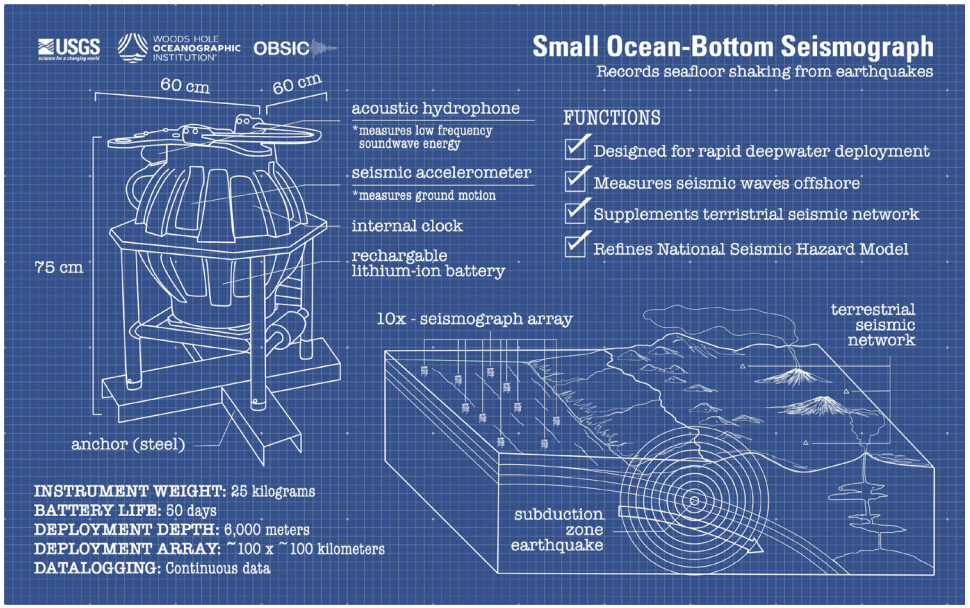
A library of FIM products will be developed in 2024 at two pilot sites in Puerto Rico adjacent to populated areas that have experienced past flooding. This library can be accessed in real time during a flooding event by emergency responders to identify inundated urban areas and respond accordingly with assistance or public announcements. Urban planners can use the FIM library to make risk-based decisions on public infrastructure and conduct preemptive storm response planning.

FIM products will be archived and freely accessible to the public here.

A cooperative partnership with the Graduate School of Planning at the University of Puerto Rico-Rio Piedras is intended to ensure the social relevance of the products. This work is funded by the Consolidated Appropriations Act, 2023—USGS Disaster Emergency Recovery Activities. Learn more at the USGS website.

Rapid Response Seafloor Seismology

By Sara Ernst, Steven Sobieszćzyk, and Nathan Miller, USGS



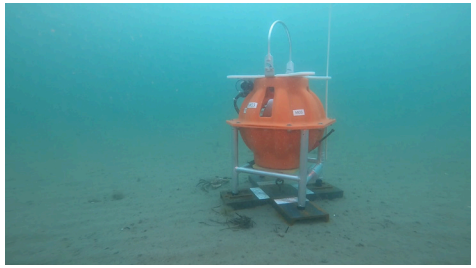
Infographic description features and function of micro ocean-bottom seismometers. Photo by Steven Sobieszćzyk / USGS.

Small ocean-bottom seismographs being deployed in Atlantic Ocean to test their ability to be rapidly deployed. Photo by Nathan Miller / USGS.

Collection of micro ocean-bottom seismometers ready to be deployed by the Weepecket Islands, off the coast of Massachusetts. Photo by Nathan Miller / USGS.

Marine geohazards, such as earthquakes, submarine landslides, tsunamis and volcanoes, can threaten lives and critical infrastructure. USGS studies the historical impact of these hazards and forecasts future risks in the regions they occur. We use ocean-bottom seismographs to record shaking from seismic waves. Traditional ocean-bottom seismographs weigh hundreds of pounds and require large research vessels to transport them out to sea. While these instruments are well-suited for long-term research, they are large, cumbersome and expensive to deploy. This limits their effectiveness for rapidly responding to marine geohazards. Typically, it takes months to deploy them—meaning we miss out on the critical first few weeks to months of seismic data.

To address the need for more mobile equipment, USGS partnered with the Woods Hole Oceanographic Institution to maintain and operate a fleet of small ocean-bottom seismographs dedicated to rapid-response efforts. The new instruments were successfully tested offshore Cape Cod, Massachusetts, in April 2024. A response plan for providing on-call staff and equipment for rapid deployments offshore California, the Pacific Northwest, Alaska and the Caribbean is being developed. The goal is to be able to mobilize and deploy the fleet within two weeks of marine seismic events.



Testing small ocean-bottom seismograph deployed along the seafloor in Atlantic Ocean. Photo by Nathan Miller / USGS.

This next-generation fleet can provide high-value data to the scientific community and help enhance our understanding of seismic and other geohazards. The critical data collected in the first few weeks to months of an event can enhance seismic hazard models, leading to more accurate risk assessments and better overall preparedness. Engineers, policymakers and other decision-makers use our hazard maps and models to help mitigate risks to people and property.

BOEM to Lease Sand to Replenish Shoreline in Flagler County, Florida as Part of the Coastal Storm Risk Management Project

By Brian Walch, BOEM

On June 17, 2024, BOEM joined the groundbreaking ceremony for the Flagler County, Florida, Coastal Storm Risk Management (CSRM) Project, which aims to protect and enhance a portion of Florida's critically eroded beaches. Coastal resilience efforts strengthen the ability of individuals, communities and infrastructure to recover after hazardous weather events.

State, county, and local officials, the U.S. Army Corps of Engineers, and BOEM Office of Strategic Resources Chief Dr. Megan Carr shovel the first sand at the groundbreaking of a critical beach resilience project in Florida. Photo by Dr. Megan Carr / BOEM.

BOEM joined state, county and local officials and the U.S. Army Corps of Engineers (USACE) Jacksonville District to mark a significant milestone in these efforts. Dr. Megan Carr, chief of BOEM's Office of Strategic Resources, praised the many integrated partnerships and collaborative efforts required to support coastal resilience.

BOEM Office of Strategic Resources Chief Dr. Megan Carr offers remarks at a major recreational beach renourishment project in Flagler County, Florida. Photo by Dr. Megan Carr / BOEM.

Earlier this year, BOEM signed an agreement with USACE and Flagler County authorizing the use of Outer Continental Shelf sand resources for the project's initial construction. USACE committed to maintaining the project through its 50-year authorization process. BOEM will remain engaged throughout dredging operations, providing resource stewardship guidance and environmental oversight as the project progresses.

This project exemplifies collaboration between BOEM, counties, local communities and USACE to reduce storm damage, preserve recreational beaches and ensure the continued prosperity of our coastal communities and their tourism-driven economies.

Restoring sand beaches using heavy machinery. Photo by BOEM.

Why are Marine Minerals Important?

Demand for offshore sand resources is increasing along the Atlantic and Gulf coasts. In some areas, the supply of beach-compatible sand is far less than the demand. As the sole steward of these finite minerals in federal waters, BOEM must know the location, quantity and character of sand resources available for coastal protection and restoration projects. BOEM invests millions annually in state-of-the-art science to identify mineral resources, along with environmental research to support these crucial projects that preserve America's beautiful beaches.

Restored beach in Florida. Photo by Olsen Associates.

Jupiter Inlet Lighthouse ONA Staff Host Palm Beach County Boys and Girls Club

By Hunter Paffrath, BLM

A group of girls poses with the Jupiter Inlet Lighthouse in the background. Photo by Sudani Knowles / BLM.

Jupiter Inlet Lighthouse Outstanding Natural Area (ONA) staff hosted the Palm Beach County Boys and Girls Club for a day of environmental education at the ONA. BLM partners from the Loxahatchee River District's River Center and volunteers assisted with educating the young men and women on topics including mangrove restoration and water quality, while ONA staff gave the students a tour of the lighthouse and briefed them on its historical significance and the surrounding area.

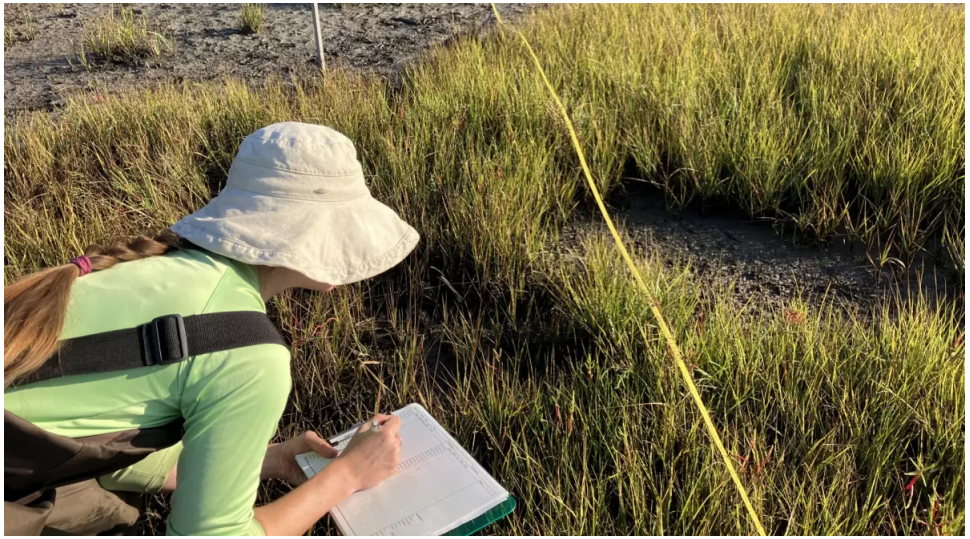
The youth worked hands-on with volunteer Keith Rossin as they learned how to prepare young mangroves to be planted to restore coastal ecosystems. The children didn't mind getting their hands dirty for a good cause, as this activity involved potting mangroves in fresh compost. The mangroves planted will be transferred to a site along the Treasure Coast at a later date.

Loxahatchee River Center works with youth testing the salinity of a water sample. Photo by Sudani Knowles / BLM.

Loxahatchee River Center employees educated the boys and girls on the water quality of the Loxahatchee River, which borders the ONA to the south. Boys and Girls Club members took water samples and tested various properties, including salinity, turbidity, pH levels, acidity and more. This activity was a hit, with one young aspiring scientist saying it was "very cool" to learn about because they thought water was only fresh or salty. They said it was awesome to know that all water is different and that environmental conditions and humans can heavily affect the properties of water.

Restoring Salt Marshes for People and Wildlife

By Kathryn Reshetiloff and Katherine Stahl, USFWS



Biologist surveys vegetation in salt marsh habitat. Photo by Katherine Stahl / USFWS.

Salt marshes are critical ecosystems that provide essential services such as flood protection and habitat for wildlife along the Atlantic Coast. Unfortunately, these areas have been significantly impacted by climate change and human development. In response, USFWS has implemented restoration projects like the Rum Pointe Marsh Restoration in Maryland, using innovative techniques to combat waterlogging and promote marsh plant growth.

Efforts such as restoration, monitoring and eduction improve vital habitats, enhance community resilience and foster clean air and water in coastal communities.

Read the full story here.

Digging a runnel in salt marsh habitat. Photo by Katherine Stahl / USFWS.

Understanding Sea Otter Population Change in Southeast Alaska

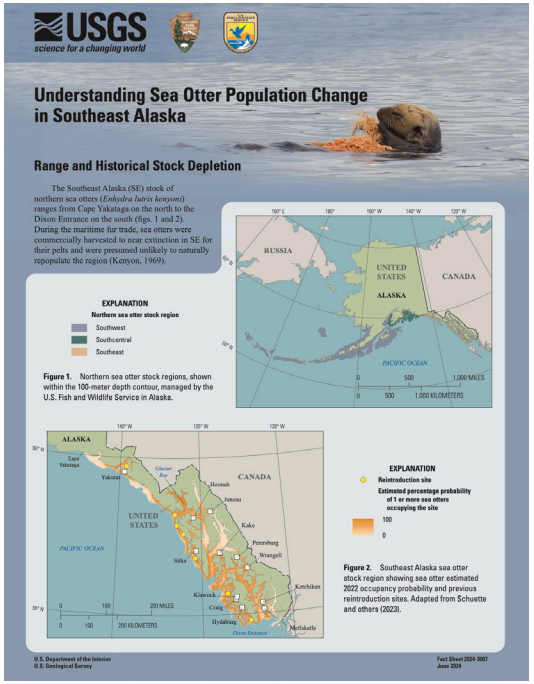
By Joseph Michael Eisaguirre, Toshio D. Matsuoka, George G. Esslinger, Benjamin P Weitzman, Paul A. Schuette, and Jamie N. Womble

Since sea otters were reintroduced to Southeast Alaska in the late 1960s, several efforts over the years have contributed to our present understanding of the population. Many of these efforts used different methods that occasionally led to different estimates of sea otter population abundance in the region.

Given recent survey efforts and advances in statistical methods, this fact sheet summarizes how our understanding of the sea otter population in Southeast Alaska has changed over time as new data were collected and new methods were developed.

USGS Alaska Science Center scientists Joe Eisaguirre, George Esslinger, and Toshio Matsuoka, along with colleagues at the USFWS and NPS, co-authored the fact sheet that is available here.

The fact sheet also highlights ongoing research and next steps by USGS and collaborators to better understand the population ecology of sea otters and inform management in the region.


USGS
science for a changing world

Understanding Sea Otter Population Change in Southeast Alaska

Range and Historical Stock Depletion

The Southeast Alaska (SE) stock of northern sea otters (*Enhydra lutris kenyoni*) ranges from Cape Yakataga on the north to the Dixon Entrance on the south (figs. 1 and 2). During the maritime fur trade, sea otters were commercially harvested to near extinction in SE for their pelts and were presumed unlikely to naturally repopulate the region (Kenyon, 1969).

RUSSIA
UNITED STATES
CANADA
ALASKA
PACIFIC OCEAN
EXPLANATION
Northern sea otter stock region
Southwest
Southcentral
Southeast
0 500 1,000 MILES
0 500 1,000 KILOMETERS

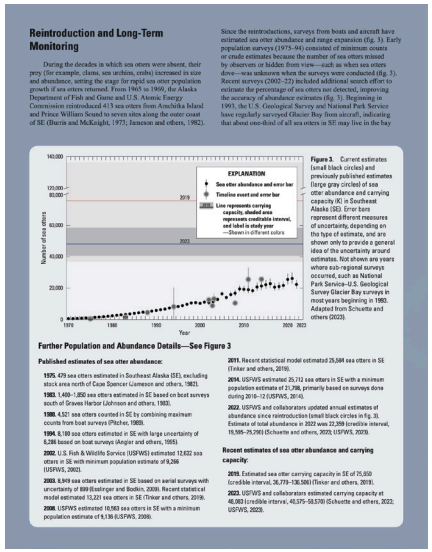
Figure 1. Northern sea otter stock regions, shown within the 100-meter depth contour, managed by the U.S. Fish and Wildlife Service in Alaska.

ALASKA
CANADA
UNITED STATES
PACIFIC OCEAN
Cape Yakataga
Yakutat
Glacier Bay
Hoonah
Juneau
Kake
Petersburg
Wrangell
Sitka
Ketchikan
Klawock
Craig
Hydaburg
Dixon Entrance
Metlakatla
0 100 200 MILES
0 100 200 KILOMETERS
EXPLANATION
Reintroduction site
Estimated percentage probability of 1 or more sea otters occupying the site
100
0

Figure 2. Southeast Alaska sea otter stock region showing sea otter estimated 2022 occupancy probability and previous reintroduction sites. Adapted from Schuette and others (2023).

U.S. Department of the Interior
U.S. Geological Survey
Fact Sheet 2024-3007
June 2024

Pictured: USGS fact sheet on Understanding Sea Otter Population Change in Southeast Alaska.


Reintroduction and Long-Term Monitoring

During the decades in which sea otters were absent, their prey (for example, clams, sea urchins, crabs) increased in size and abundance, setting the stage for rapid sea otter population growth if sea otters returned. From 1965 to 1969, the Alaska Department of Fish and Game and U.S. Atomic Energy Commission reintroduced 413 sea otters from Amchitka Island and Prince William Sound to seven sites along the outer coast of SE (Burris and McKnight, 1973; Jameson and others, 1982).

Since the reintroductions, surveys from boats and aircraft have estimated sea otter abundance and range expansion (fig. 3). Early population surveys (1973–94) consisted of minimum counts or crude estimates because the number of sea otters missed by observers or hidden from view—such as when sea otters dove—was unknown when the surveys were conducted (fig. 3). Recent surveys (2002–22) included additional search effort to estimate the percentage of sea otters not detected, improving the accuracy of abundance estimates (fig. 3). Beginning in 1993, the U.S. Geological Survey and National Park Service have regularly surveyed Glacier Bay from aircraft, indicating that about one-third of all sea otters in SE may live in the bay

EXPLANATION
Sea otter abundance and error bar
Timeline event and error bar
Line represents carrying capacity, shaded area represents credinable interval, and label is study year
—Shown in different colors
Number of sea otters
Year

Figure 3. Current estimates (small black circles) and previously published estimates (large gray circles) of sea otter abundance and carrying capacity (K) in Southeast Alaska (SE). Error bars represent different measures of uncertainty, depending on the type of estimate, and are shown only to provide a general idea of the uncertainty around estimates. Not shown are years where sub-regional surveys occurred, such as National Park Service–U.S. Geological Survey Glacier Bay surveys in most years beginning in 1985. Adapted from Schuette and others (2023).

Further Population and Abundance Details—See Figure 3

Published estimates of sea otter abundance:

1975. 479 sea otters estimated in Southeast Alaska (SE), excluding stock area north of Cape Spencer (Jameson and others, 1982).

1983. 1,400–1,850 sea otters estimated in SE based on boat surveys south of Graves Harbor (Johnson and others, 1983).

1988. 4,521 sea otters counted in SE by combining maximum counts from boat surveys (Pitcher, 1989).

1994. 8,180 sea otters estimated in SE with large uncertainty of 9,286 based on boat surveys (Angliss and others, 1995).

2002. U.S. Fish & Wildlife Service (USFWS) estimated 12,632 sea otters in SE with minimum population estimate of 9,266 (USFWS, 2003).

2003. 8,949 sea otters estimated in SE based on aerial surveys with uncertainty of 899 (Esslinger and Bodkin, 2009). Recent statistical model estimated 13,221 sea otters in SE (Tinker and others, 2019).

2008. USFWS estimated 10,563 sea otters in SE with a minimum population estimate of 9,136 (USFWS, 2009).

2011. Recent statistical model estimated 25,684 sea otters in SE (Tinker and others, 2019).

2014. USFWS estimated 25,712 sea otters in SE with a minimum population estimate of 21,798, primarily based on surveys done during 2010–12 (USFWS, 2014).

2022. USFWS and collaborators updated annual estimates of abundance since reintroduction (small black circles in fig. 3). Estimate of total abundance in 2022 was 22,289 (credible interval, 15,595–29,290) (Schuette and others, 2023; USFWS, 2023).

Recent estimates of sea otter abundance and carrying capacity:

2019. Estimated sea otter carrying capacity in SE of 75,650 (credible interval, 36,778–136,566) (Tinker and others, 2019).

2023. USFWS and collaborators estimated carrying capacity at 48,083 (credible interval, 40,575–58,570) (Schuette and others, 2023; USFWS, 2023).

(Williams and others, 2017, 2019; Esslinger, 2019, 2020; Tinker and others, 2019; Lu and others, 2020; Womble and Taylor, 2020; Eisaguirre and others, 2021, 2023). Over the years, advances have been made in the statistical methods used to develop a population estimate from the survey counts (Williams and others, 2017, 2019; Tinker and others, 2019; Lu and others, 2020; Eisaguirre and others, 2021, 2023) (fig. 3). Given these continuing advances, each analysis or re-analysis of historical data may provide different results depending on the methods and data used. For example, many historical estimates incorporated only a single year of data, whereas contemporary methods can use data from multiple or even all years. Schuette and others (2023) used all aerial survey data collected through 2022 and recently developed statistical methods to provide an updated understanding of sea otter population change in SE since reintroduction (fig. 3).

Next Steps

Ongoing and upcoming research includes:

- Continuing to improve statistical modeling, including using harvest data directly in estimating abundance, as well as including other types of survey data, such as boat- and eventually drone-based data;
- Working toward incorporating biological data to evaluate how accounting for predator-prey dynamics between shellfish and sea otters may improve estimates of abundance and monitoring;
- Adapting monitoring plans to accommodate localized survey efforts—conducted by members of coastal communities, agency and academic partners, and Alaska Native Tribes—that may occur more regularly; and
- Developing streamlined ways to update abundance estimates efficiently as localized surveys occur.

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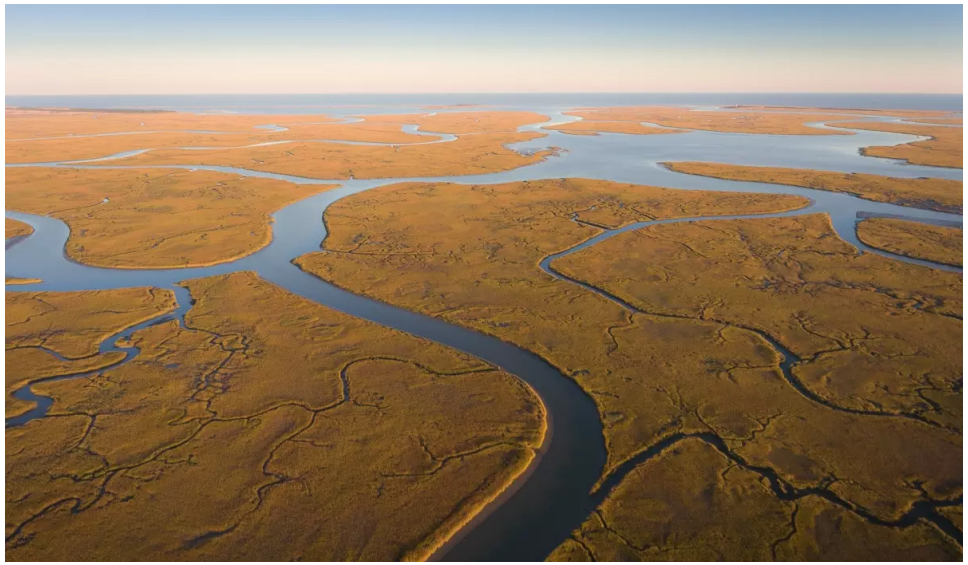
Photograph credits: Sea otter (*Enhydra lutris kenyoni*) eating a basket star (*Gorgonocephalus eucnemis*; banner image) and sea otter nursing her small pup (background image above). Photographs by Nicole LaRoche, U.S. Geological Survey.

Gaining Ground at Cape Romain National Wildlife Refuge

By Jennifer Koches, USFWS


Aerial view of Cape Romain NWR. Photo ©Mac Stone / Open Space Institute, All Rights Reserved.

The Cape Romain National Wildlife Refuge recently expanded by acquiring a 420.96-acre tract in McClellanville, South Carolina, funded through the Migratory Bird Conservation Fund. This acquisition enhances the refuge's ability to support wintering waterfowl and waterbirds while offering new recreational opportunities. Historically accessible mainly by boat, the refuge will now open up for activities like hiking, birdwatching, and photography.

This expansion strengthens conservation efforts, especially in the face of climate change and rising sea levels. Learn more about this project here.


Wetlands at Cape Romain NWR, Mac Stone / Open Space Institute, Copyrighted, All Rights Reserved.

Read *NEWSWAVE*: *www.doi.gov/ocean/newswave*
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Blue carbon research: USGS scientists Sophie Kuhl and Kevin Kroeger work with NPS scientist Petra Zuniga to collect a soil core from a salt marsh site where the mineral olivine was applied to study its role in capturing carbon dioxide in tidal wetlands. The site is located along the Herring River at Cape Cod National Seashore in Massachusetts. Photo by USGS.