

# COASTWATCH

Center for Coastal Studies  
Provincetown, Massachusetts

2019 • Vol. 41

## 2018 Financial Reports





# Letter from the President & CEO

**Q: Where in the World is the Center for Coastal Studies?**

**A: Everywhere!**

literally the stepping-off point for many of our scientists, as is the tiny airport out at Race Point.

From here, CCS researchers spread out to the surrounding water bodies and landscapes:

The Cape Cod National Seashore, a constantly-evolving open-air laboratory for researchers in all fields, but particularly those involved in understanding and protecting the fragile coastline;

Cape Cod Bay and the 'back side' of the Cape, teeming with life, every member of the marine food web represented, from microscopic phytoplankton to apex predators like the great white shark, each one subject to the scrutiny of our scientists and survey teams and each one facing a precarious future, impacted by pollution, climate changes and an increasing number of human activities.

Nantucket Sound, where single families carry on their tradition of weir-fishing and bear close witness to the effects of the shifting marine ecosystem on their catch and their financial stability, and Vineyard Sound, where the potential harvesting of wave and tidal current energy could help reduce our reliance on fossil fuels.

The Gulf of Maine, one of the most productive marine environments in the North Atlantic and the focus of our humpback whale research for more than four decades, where waters are warming faster than 99% of the world's oceans and scientists are racing to understand if and how marine mammals and commercially valuable fish stocks will adapt to rapidly changing habitat and shifting food resources.

Even so, the reach of the Center extends far beyond the waters of New England. Our Marine Animal Entanglement Response team, in partnership with the UK-based International Whaling Commission (IWC), provides training and tools to response teams on the coasts of the US and Canada as well as South America, Europe, the Middle East, Africa, and the Antipodes. Every fall the director of our Humpback Whale Studies program travels to the island nation of American Samoa to study its South Pacific humpback populations.

Our staff contributes its knowledge and expertise to the highest levels of national and international government agencies and policy makers, informing decisions that are critical to the management and protection of our coasts and oceans and the survival of life on our planet as we know it.

This issue of Coastwatch is a snapshot of the Center's work across the Cape, the state and the world. It is by no means a comprehensive list of projects and places, but it does illustrate the reach and range of the work that we do at home and abroad.

*Richard Delaney*

## Climate crisis is the central challenge for oceans and ourselves.



*Waves crashed against houses along Town Neck Beach in Sandwich during the nor'easter of January 2018. Photo courtesy of Steve Heaslip/Cape Cod Times.*

For some time now and for the foreseeable future, all research, education and policy activities here at the Center for Coastal Studies will examine the cross-cutting impacts of rapid warming on our planet. This is our number one concern regarding the future of our ocean, and you will see aspects of our focus on climate change in virtually every program described in this Coastwatch. We are inextricably linked to the ocean, depending upon it to produce 50% of the oxygen we breathe, to moderate our weather, to absorb our excess production of greenhouse gases, to feed billions, to sustain a growing Blue Economy and much more.

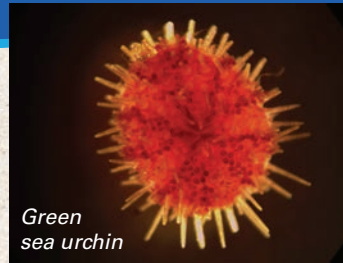
Your generous support will enable us to contribute to a much better understanding of these impacts and will help generate solutions and actions needed to mitigate changes and adapt to a new world that is rapidly changing. Time is of the essence and the challenges are daunting, but together we can and will make a difference. Thank you very much.



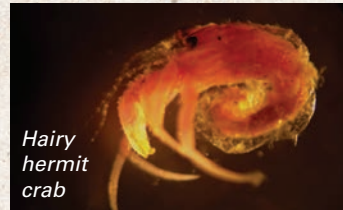
# Marine Geology



*Microscopic benthic invertebrates from Herring Cove*



*Green sea urchin*



*Hairy hermit crab*



*Coastal erosion in front of the original cinder-block bath house at Herring Cove*

The CCS Marine Geology Department is in the final months of a comprehensive multi-year study of the links between coastal processes, human disturbance and seafloor habitat on the shore between Race Point and Long Point in Provincetown.

The main priority of the study is to identify and understand the impacts of human activities, such as construction of coastal erosion mitigation structures (seawalls and groynes) and hydraulic clamming, on sediment erosion, transport and deposition in the area, as well as on the abundance and biodiversity of benthic macroinvertebrates — the tiny, sand-sized animals that live in the top few inches of the seafloor and are a critical part of the food web.

For the last two years our scientists have collected monthly beach profiles (the shape of the beach from the crest to the low water line) and conducted vessel-based sonar surveys of the seafloor to track short-term seasonal changes to the beach. They use an Acoustic Doppler Current Profiler (ADCP) to capture seasonal wave, tide and current data off Herring Cove. They also measure and map quarterly the compaction of the seafloor sediments in the survey area. 192 sediment samples “grabbed” from the seabed are being processed in the lab, and at the time of writing, Center staff and volunteers, led by Dr. Agnes Mittermayr, have identified over 56,000 individual macro-invertebrates, covering 121 species from just 24 samples.

The team collaborated with the Massachusetts Division of Marine Fisheries (MA DMF), CCS Director of Marine Fisheries Research, Owen Nichols, and local commercial fishermen to examine the impacts of hydraulic clamming, also known as clam dredging, on the beach and seafloor. Three test areas were dredged in November 2017. Physical and biological data were collected immediately before and after the event, after six months and again 12 months later, to identify localized off- and on-shore changes and monitor the recovery of the benthic ecology.

We are analyzing this large dataset and preliminary results are expected early in 2020 with the final results to be completed in late 2020.

Situated between Long Point and Race Point, Herring Cove is one of the most highly visited beaches in the Cape Cod National Seashore (CCNS). In recent years the beach and the adjacent parking lot have undergone rapid and significant erosion at rates far exceeding the historic average of three feet per year. Based in part on earlier research by CCS into the coastal evolution at Herring Cove, CCNS is taking action to address and adapt to current and future impacts of sea level rise and storm events on the infrastructure bordering the beach. In 2012 a movable bath house replaced the original cinderblock building. In 2018 and 2019 the north parking lot, by then reduced to just a handful of spaces, was moved back approximately 120 feet to accommodate ongoing coastal erosion and future sea level rise, and ensure continued access to the beach for the next 20-30 years.

*“Science-based management of National Parks is perhaps most acutely needed in coastal settings. Open ocean sandy shorelines are among the most dynamic environments on Earth. Unraveling the natural patterns of change from those superimposed by climate change, sea level rise and anthropogenic alterations in and around park boundaries can be a daunting task. Our work will provide CCNS and town managers with the information they need to be able to react and respond to ongoing short and long-term coastal processes and better plan for future coastal configurations - essential given the necessary lead times in developing and funding coastal management initiatives and projects”.*

Dr. Mark Borrelli, Chair, CCS  
Marine Geology Department



# Marine Debris and Plastics



For most people, garbage hidden beneath the waves is out of sight, out of mind, but when it's scattered across our beautiful beaches our community joins together to tackle the trash.

CCS continues to lead efforts to remove and dispose of derelict fishing gear and other marine debris and plastics from Cape Cod Bay.

Since 2013 through this project, working with local commercial fishermen and others, we've removed over 85,000 pounds of lobster traps, bricks, steel cable, rope, nets and other fishing gear. Of this, we were able to return over 27,000 pounds' worth of gear to owners for reuse; the remaining debris was recycled or incinerated.

We also organize frequent beach clean ups and participate annually in COASTSWEEP, a statewide effort to clean up the Massachusetts shoreline.

On World Oceans Day 2019, more than two dozen volunteers and CCS staff collected, sorted and analyzed 4,996 pieces of garbage. The majority of the items recovered were "consumer debris" – packaging material, food-related items, balloons, and polystyrene foam.



*Volunteers and CCS staff with debris recovered from North Truro beaches on World Ocean Day, 6/8/19 (Demi Fox, NOAA)*



*The top 10 types of trash recovered during the World Oceans Day clean up were:*

- 1: Styrofoam Packaging—935 individual pieces**
- 2: Plastic Wrapping—703**
- 3: Rigid Non-descript plastic—492**
- 4: Construction Material (mostly insulation foam)—350**
- 5: Food Wrappers—350**
- 6: Caps/lids—325**
- 7: Styrofoam cups/pieces—305**
- 8: Rope—246**
- 9: Balloons/balloon strings—226**
- 10: Fisheries-related buoys/floats/pieces—118**

Documentation of trash is just as important as removal, and data submitted to International Coastal Cleanup (ICC) at the Ocean Conservancy are used to identify and understand sources and effects of debris around the globe.

## GROUND-TRUTHING STORM TIDE PATHWAYS



*Bryan McCormack of the CCS Marine Geology Department verifies a point on a storm tide pathway.*

Since March 2019, the Marine Geology Department has identified, mapped and verified over 1000 storm tide pathways (routes to low-lying coastal areas most likely to flood during storm-related high tides) along the Cape Cod Bay shoreline stretching from Sandwich to Provincetown. These maps are essential to town and county preparedness and planning including emergency response and evacuation zones, future infrastructure investments, and coastal flood resilience. The National Weather Service now includes STP data provided by CCS in their online real-time tide and storm surge forecasts, published at [www.weather.gov/box/coastal](http://www.weather.gov/box/coastal).

# Shark Research

One of the Center's newest projects is a collaboration between the CCS Geology Department and Massachusetts Division of Marine Fisheries (DMF) biologist, Dr. Greg Skomal, to study the effects of seafloor topography, tides, currents, waves and weather on the presence and behavior of great white sharks off the Outer Beach in North Truro.

This summer CCS used high resolution side scan sonar to create a detailed map of the nearshore sandbars and troughs, then deployed a dense array of acoustic receivers to track the position of previously-tagged sharks as they pass through the area.

So far over 30 individual tagged sharks have traveled through the receiver array, exhibiting different behaviors and residencies during various tide and wave regimes. This winter we will delve deeper into the data to determine how, where and why the sharks travel along that stretch of coastline.

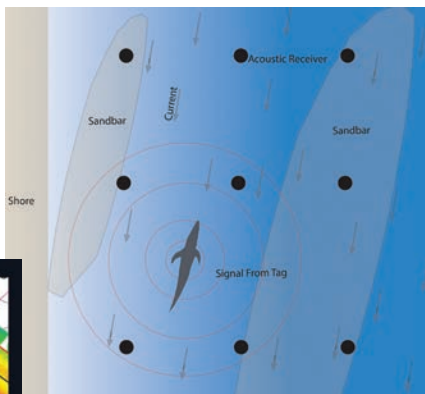
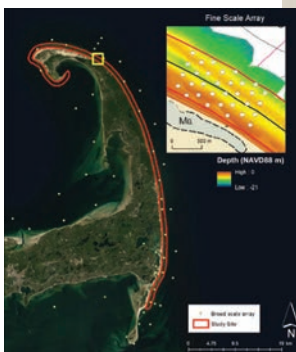


Chart of locations of acoustic receivers around the shoreline of Cape Cod and in the highlighted survey area off North Truro.

In the wake of the state's first fatal shark bite in more than 80 years it's hardly surprising that sharks and human safety are a major topic of conversation among residents and visitors alike.

This summer, in keeping with our efforts to disseminate accurate, balanced information, CCS piloted an education and outreach program at Head of the Meadow Beach in Truro to answer questions about sharks, whales, seals, coastal erosion and other topics.

In just five one-day sessions, we reached over 400 beachgoers. The program was so well received by the public and by Cape Cod National Seashore staff that we plan to expand the program to three area beaches in the summer of 2020.

# Benthic Ecology

Black Mayonnaise is not a culinary experiment; it's the name locals have given to the dense black mud that has cloaked parts of the seafloor in Wellfleet Harbor since the 1980s. The goo is somewhat of a mystery, so the questions at this point are basic: Where is it now and where does it come from? What is it made of? How does it move? What, if anything, can be done to eradicate it before it begins to impact the valuable Wellfleet oyster industry?

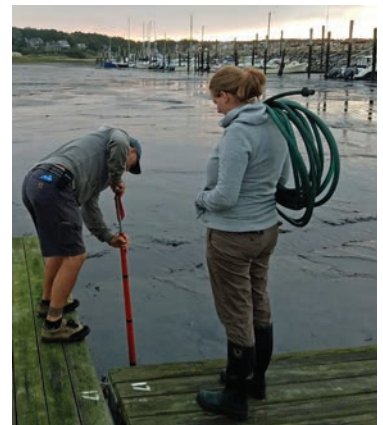
To get to the answers, CCS researchers worked with the Town, Harbor Master and local shellfishers to map the location and extent of the Black Mayo. Core samples collected from the affected areas were used to determine the density and thickness of the deposits. Those cores, along with grab samples from the unaffected areas, then underwent extensive biological, geological and chemical analysis to identify differences (and similarities) between the Black Mayo and the "normal" seafloor sediments.

The presence, number and type of benthic invertebrates as well as grain size and quantity of organic matter were established for each sample. Stable isotope analysis was employed to identify the origin of carbon, nitrogen and sulfur within the Black Mayo particles, be it atmospheric deposition (rain and snow), surface water run-off (primarily fertilizers), groundwater (septic systems), or terrestrial or marine organisms.

Researchers also analyzed water samples from Wellfleet Harbor and Mayo Creek throughout the year to evaluate seasonal and weather-related changes to water quality and composition, and incorporated data from the Center's biweekly water quality monitoring program in Wellfleet Harbor.

And the results? In the manner of all great mystery writers, we must leave you in suspense. But fear not, we will share the outcome of the Case of the Black Mayo in 2020.

*Volunteer Steve Swain and CCS benthic ecologist Agnes Mittermayr collect core samples of the mysterious 'Black Mayo' from Wellfleet harbor.*





# Right Whale Ecology

## RIGHT WHALES – By The Numbers

*This information is excerpted from the 2018-2019 Final Report for Right Whale Surveillance and Habitat Monitoring in Cape Cod Bay and Adjacent Waters, which was prepared for the Massachusetts Division of Marine Fisheries (DMF).*

During the 2018-2019 expanded right whale winter/spring season the CCS aerial survey team conducted 38 surveys from 12 November 2018 through 16 May 2019. Efforts were concentrated on Cape Cod Bay and the area east of Cape Cod, with additional exploratory surveys of Massachusetts Bay and Jeffreys Ledge. A total of 194.6 hours were flown and right whales were seen on all but five of the surveys.

The first right whales sighted by CCS in Cape Cod Bay during the season were documented on 11 December 2018 and last seen by CCS in Cape Cod Bay on 11 May 2019.

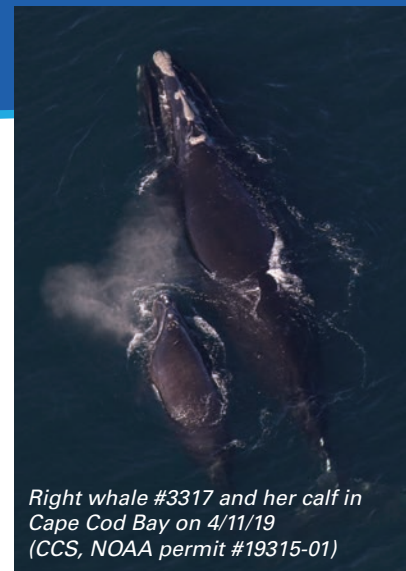
Two hundred and sixty nine individual whales were documented, the second highest percentage of the population (about 66 %) in the history of the CCS study and the greatest percentage of the population recorded in the North Atlantic in the last century. Of the whales documented during the study 151 were male, 91 were female, and 27 were of unknown sex; 220 were adults, 34 were juveniles, 12 were of unknown ages, and four were calves. The first cow-calf pair (one of the seven documented off the birthing grounds of the southeastern US coast) was observed in Cape Cod Bay on 07 April 2019.

One actively entangled right whale was documented and reported by the CCS aerial team in 2019, and subsequently partially disentangled by the CCS Marine Animal Entanglement Response team. Two right whales known to be recently entangled were also documented and confirmed to be gear free.

The CCS right whale habitat research crew conducted 28 research cruises totaling approximately 178 hours at sea before and during the 2019 right whale winter/spring season during which 614 zooplankton samples were collected, counted, and analyzed to map the food resources that control the distribution of right whales in Cape Cod Bay.

Based on the survey data provided by CCS, in early March DMF announced a seasonal small vessel (less than 65 ft) speed limit of 10 knots to protect the large number of right whales in Cape Cod Bay. Then on May 9, CCS surveillance data indicated that the aggregation of right whales had departed from the Bay, and a sharp decline in the zooplankton food resource suggested that they were unlikely to return in 2019. Consequently, DMF lifted the seasonal speed limit and opened the Bay to trap gear fishing.

Thanks in part to the work of CCS in the air, on the water and in the lab, there were no reported vessel strikes or new entanglements of right whales in Cape Cod Bay during the 2019 right whale season.



Right whale #3317 and her calf in Cape Cod Bay on 4/11/19 (CCS, NOAA permit #19315-01)



Right whale ecologist Christy Hudak and intern Keith Hankowsky collect zooplankton samples aboard the R/V Shearwater.



Right whales #3680 and Sea Dragon engaged in a Surface Active Group, a social behavior that may be related to mating, play or social bonding (CCS, NOAA permit #19315-01)

# Water Quality Monitoring



*Jenny Burkhardt (Research Assistant, Water Quality Monitoring Program) collecting water samples from the 'Dead Zone' in Cape Cod Bay (Owen Nichols).*



Under the leadership of Dr. Amy Costa, CCS monitors the quality and health of inland, coastal and marine waters surrounding Cape Cod and the Islands. The information collected through the program expands our understanding of how human activities and management actions affect those bodies of water.

In 2019, in addition to the regular monitoring schedule of more than 120 sites in Cape Cod Bay and Nantucket Sound, the program worked with towns on- and off-Cape on a number of projects including:

- Water quality monitoring of ponds in the Cape Cod National Seashore, the Town of Eastham and select locations in Orleans
- Measuring the effects of shellfish on water quality in the Town of Dennis
- Detection, transport, and fate of contaminants of emerging concern (pharmaceuticals, personal care products) in Cape Cod Bay and Nantucket Sound
- Identification of anthropogenic sources of nitrogen using isotope analysis
- Collaboration with the Cape Cod Commission and other project partners on the Southeast New England Program Watershed Grants to support the "Regional Collection and Analysis of Cape Cod Water Resources Data to Inform Local Decision-Making"
- Collaboration with APCC and others on the State of the Waters Advisory Committee
- Participation in the Northeast coastal acidification monitoring event organized by Northeast Coastal Acidification Network

## INVESTIGATING THE DEAD ZONE

In September 2019 lobstermen working in the southwest of Cape Cod Bay started finding dead lobsters and bycatch in their traps. Investigations by Massachusetts Division of Marine Fisheries, CCS and Woods Hole Oceanographic Institution revealed that the waters in that part of the Bay were critically low in dissolved oxygen, causing trapped animals and other less mobile invertebrates to suffocate. It's likely that the hot, calm, late summer weather was to blame for the hypoxic conditions: Warmer than normal surface waters trapped colder, more dense water at depth for much longer than usual — so long that the bottom-dwelling marine life used up all the available oxygen. Only when a number of storms swept through the region did the well-oxygenated surface water mix with and replenish the depleted bottom layer, allowing the benthic community to breathe again.

Scientists predict that, as the climate continues to warm, the occurrence of these dead zones will become increasingly frequent and may have a significant economic impact on the Cape's lobster and shellfishing industries. Right whale researchers fear that changes to the Cape Cod Bay ecosystem may affect the availability and/or the nutritional value of the zooplankton that draw right whales to the Bay to feed every winter. For a species already on the brink of extinction, those changes may have disastrous consequences.

CCS has been monitoring the water quality in Cape Cod Bay since 2006. Data are collected once a month, year-round. Only twice during this 14-year time period did oxygen levels in the bottom waters drop below 4 mg/L: September 2016 and 2019. Levels in that part of the Bay at that time of year usually range between 5-7 mg/L at depth, and 7-9 mg/L at the surface. Given the changing climatic and environmental conditions, increased monitoring is crucial to understand and address the factors driving this event.



# Marine Animal Entanglement Response (MAER)

CCS MAER team aboard the R/V Ibis successfully disentangled the 2015 calf of humpback whale Jabiru off Chatham in August 2019 (CCS, NOAA permit #18786-03)



The southern Gulf of Maine, including the waters offshore of Massachusetts, has the highest number and diversity of entanglement sightings, with confirmed reports in all months of the year as species filter into and through the area during annual migrations.

The MAER program provides year round on-call entanglement response for protected marine species (live and dead whales and sea turtles) within roughly 100 miles of Provincetown and offshore of Rhode Island and New Hampshire.

So far in 2019, the CCS MAER team has mounted over 35 responses and disentangled, or partially disentangled, one right whale, four humpback whales, one minke whale and 10 leatherback sea turtles.

Outside of this response area and within the Atlantic Large Whale Disentanglement Network (ALWDN), CCS staff advise network members, aid telemetry tracking of entangled whales, give input for action plans and assessments, evaluate advancement of higher-level entanglement responders and respond directly to entangled whales outside of the immediate response area as needed.

## GLOBAL WHALE ENTANGLEMENT RESPONSE NETWORK (GWERN)

Headquartered at CCS, the goal of this joint initiative between CCS and the International Whaling Commission (IWC) is to build a worldwide network of professionally trained and equipped entanglement responders using rescue techniques developed by CCS.

This year CCS hosted entanglement response apprentices from Peru and Norway, as well as California, Oregon and Washington. GWERN coordinator David Mattila led training sessions in the small coastal town of Ullapool, Scotland; Watatmu, Kenya (the first of its kind in Sub-Saharan Africa); and on the coast of northern Patagonia in Puerto Madryn, Argentina. The Puerto Madryn workshop brought together 50 trainees from other parts of Argentina and Uruguay; the Brazilian co-trainer, Leandro Cortese Aranha, was an apprentice here at CCS and attended the entanglement workshop hosted by CCS in 2018.

Since its inception in 2011 the GWERN program has trained 1200 people from 34 countries.

*Trainee entanglement responders brave the harsh weather off Ullapool, Scotland*

*Photo by Ellie MacLennan*



*Participants at the Puerto Madryn workshop (Fundación Cethus)*



# Humpback Whale Studies

The Humpback Whale Studies Program is the longest continuous research program at CCS. Our focus is the Gulf of Maine humpback whale population, which has been under continuous study since the 1970s, but we have conducted research in other parts of the North Atlantic, including the West Indies, where humpback whales from North Atlantic feeding grounds congregate to mate and calve, and in the North and South Pacific.

In October, the Humpback Whales Study program completed its 15th annual research trip to the island of Tutuila in American Samoa, in the Oceania region of the Pacific, a breeding ground for South Pacific humpback whales.

Although the population of humpback whales that breeds in Oceania is no longer on the U.S. Endangered Species List, it is still recovering from historic whaling and faces threats from modern human activities, such as climate change.

Dr. Robbins, Director of the Humpback Whale Studies program, was part of a multi-national collaboration that generated 19 years of survey data from seven countries and territories in Oceania. She recently co-authored a paper (Derville et al. 2019) that found that the waters around American Samoa are already at the upper end of the known water temperature range for a humpback whale breeding ground.

Based on current climate change models, many breeding sites that are currently occupied are predicted to become too warm for this species by the end of the 21st century.

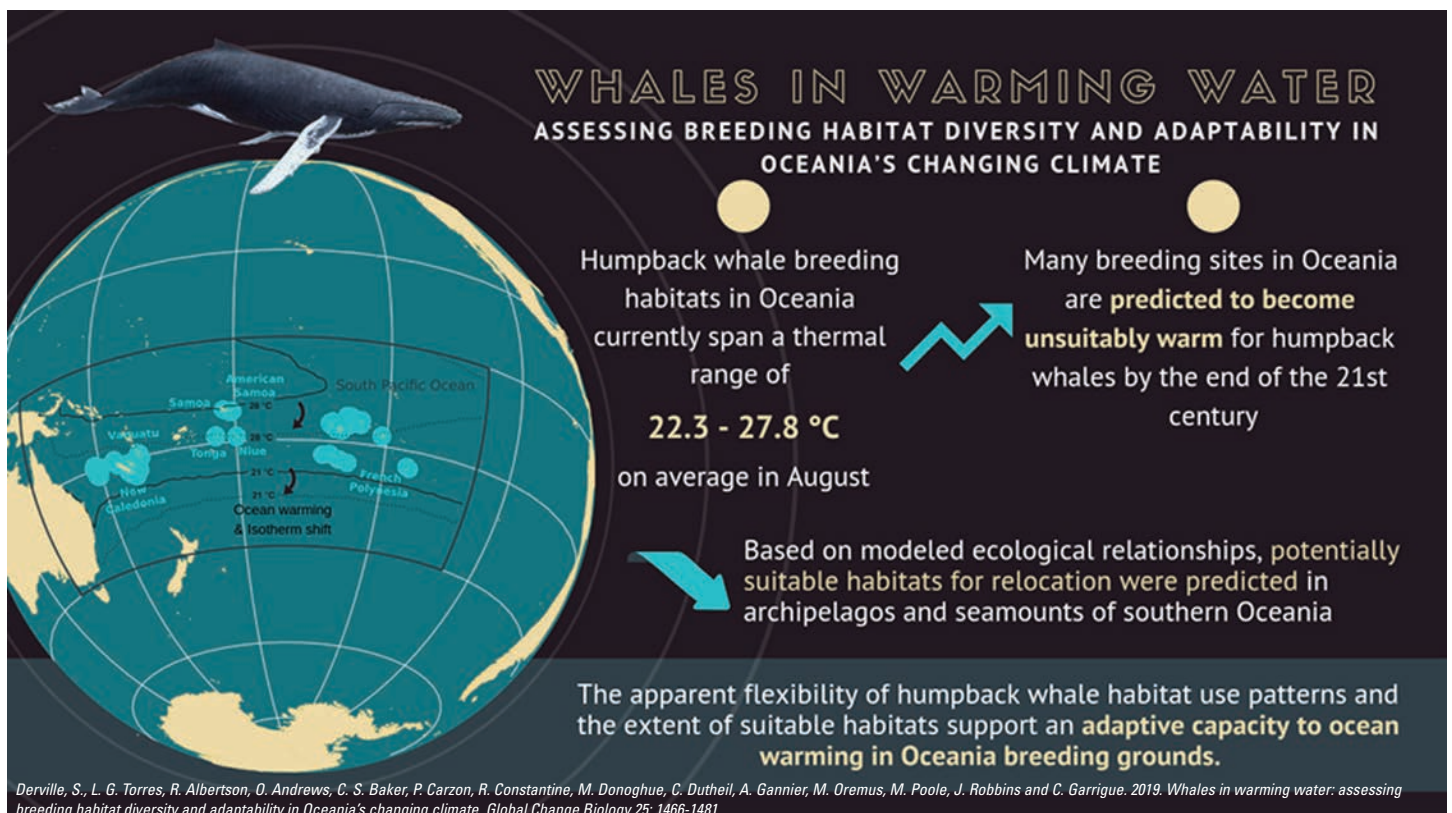
However, the study did identify suitable alternate habitats around island chains and seamounts in some parts of southern Oceania, so humpbacks may eventually shift into those cooler areas to breed.

CCS has performed collaborative research at American Samoa annually since 2003. The goal of the work is to define the local population, to clarify its relationship to other parts of Oceania and to identify its Antarctic feeding grounds. Field research is done in partnership with the American Samoa Department of Marine and Wildlife Resources.



CCS, NOAA permit #774-1714

Two whales studied by CCS at American Samoa once held a scientific record for the longest distance movement by a mammal, an 18,840 km round-trip, spanning 108 longitudinal degrees, from the breeding grounds to remote feeding grounds off the Antarctic Peninsula.





# Marine Fisheries Research

*The Marine Fisheries Research program fosters collaboration, trust, and community among local fishermen, researchers, managers and policy makers, whose common goal is to maintain sustainable fisheries and practices while addressing the impacts of conservation and management measures.*

With projects taking him from Maine to the Caribbean, Owen Nichols, Director of Marine Fisheries Research, is a tough guy to keep track of.

In Provincetown he is working with colleagues at the National Park Service and Antioch University to lead a multiagency study of shellfish/invertebrate habitat and population dynamics in the East Harbor tidal restoration area.

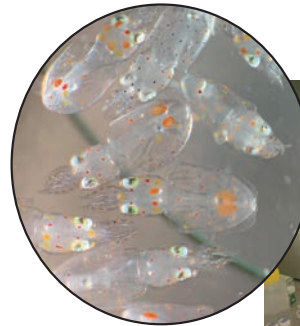
In Cape Cod Bay, he's working with the CCS Geology Department and Marine Debris and Plastics program to locate and recover derelict fishing gear in Cape Cod Bay and document the type, extent and mortality rates of marine life — including lobsters — captured in the abandoned traps, in collaboration with local lobstermen.

A study of bycatch and depredation in the northeastern US sink gillnet fishery is nearing completion in the waters east of Cape Cod, off Orleans and Chatham. Underwater footage recorded during the latest research phase captured video for the first time of active sink-gillnet fishing in the region.

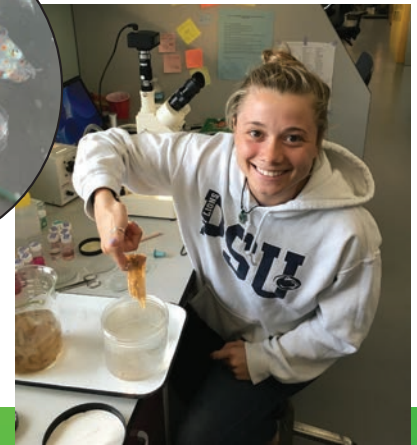
In Nantucket Sound, Owen partners with commercial weir fishermen from Chatham to investigate the effects of environmental factors on the distribution and catch of longfin inshore squid, and to understand how the environment influences the survival and development of squid embryos and drives the movement of the miniscule hatchlings.

In the Dominican Republic, Owen assisted colleagues at the state Autoridad Nacional de Asuntos Marítimos (ANAMAR) with a preliminary assessment of the diamondback squid fishery and continues to work with ANAMAR scientists, students and local small-scale fishermen to study the developing fishery.

Owen is also an Adjunct Professor at Shoals Marine Laboratory and the Massachusetts Maritime Academy, and a Guest Investigator at Woods Hole Oceanographic Institution, but somehow he still finds time to teach local kids about cool underwater technology and even cooler marine life, and demonstrate to college interns what the life of a marine fisheries researcher is *really* like — usually dirty and wet with moments of incredible discovery.



*Marine Fisheries intern Bailey Reigel from Washington College studied squid eggs, hatchlings and adults in the lab and on the water.*



*Screenshot from video of dozens of spiny dogfish swimming over a gillnet which has captured several winter skates (CCS/WHOI)*



# Policy

Providing CCS's scientific expertise and knowledge of ocean and coastal ecosystems to policy makers far and wide is a fundamental tenet of CCS. In just one year, CCS President & CEO Rich Delaney will have traveled around Cape Cod, Nantucket and Martha's Vineyard; to Boston, Washington, DC, and San Francisco; and to Katowice, Poland, and Madrid, Spain, to engage in policy discussions ranging from offshore wind and climate change to right whale conservation and water quality remediation.

In Spring 2019 Rich traveled to India as part of a three-person team to evaluate progress made by the Indian federal government and three coastal states in developing coastal management plans (CMPs) under a \$200 million credit from the World Bank, and to investigate how a second World Bank credit of \$600 million should be structured to ensure that the CMPs focus on climate change impacts along the coast.

India and Bangladesh each have 200 to 300 million people living in very low-lying areas of the coast that are already experiencing the devastating impacts of sea level rise on their communities. Even the most moderate sea level rise projections predict that these regions will be completely inundated, causing untold social, economic and political disruptions.

CCS scientists also provided detailed comments on proposed NOAA regulations to reduce mortality of North Atlantic right whales; status of humpback whales on the endangered species list; and other topics. Many CCS staff serve on policy and advisory committees that provide additional opportunities to directly engage government, corporate and other individual leaders in the development of solid, science-informed decision-making, with the overarching goal of more sustainable management of ocean and coastal resources and better stewardship by all individuals.

***Help propel us into the new year.***  
Please donate generously to  
our Annual Appeal. *Thank you!*



CCS Marine Animal Entanglement Response vessel IBIS



# Education and Outreach

The CCS water quality education program, now in its tenth year, reaches 600 school children in eight area public schools. In 2019 another 6,000+ learners of all ages and abilities participated in CCS programs on the beach, at SEASpace, our marine discovery center, in the Spinnaker Exhibition at the Hiebert Marine Lab and at Napi's restaurant, as well as at several local hotel resorts and organizations including the Wequassett Inn, Chatham Bars Inn, Pleasant Bay Community Boating, Cape Cod Sea Camps, the Family Equality Council, the Cape Cod National Seashore and others.

Among the ways we reach far beyond our local waters is through our scientific publications, which appear in peer-reviewed journals and contribute to the advancement of science and conservation. Thus far in 2019, CCS has authored or co-authored 20 new publications addressing a wide range of topics, including: microplastics, entanglement, marine debris, climate change, nature's cancer prevention mechanisms and many other aspects of marine species ecology and biology. You can find more on these and other studies at <https://coastalstudies.org/publications>.

April brought nearly 70 naturalists and marine educators from around New England to CCS for an annual Whale Watch Naturalist Workshop that we co-organize with Whale and Dolphin Conservation and the Dolphin Fleet. Here, we share new information and best practices for whale watch education, helping hundreds of thousands of passengers learn and get involved each year.

This year, the Center joined forces with businesses whose interests are deeply intertwined with the health and well being of the waters of Massachusetts Bay, and whose concerns about climate change are equally powerful. Together, we initiated the Massachusetts Bay Conservation and Climate Change Collaborative. The Center is excited to partner with Cape Air, Boston Harbor Cruises and the Bay State Cruise Company, whose fare add-ons and other donations help support our efforts to protect and preserve Cape Cod and Massachusetts Bays.

Dr. Agnes Mittermayr and Dr. Mark Borrelli both participated in TEDx Provincetown in September; videos of their presentations are now on the TEDx Talks YouTube channel, which has a global audience of more than 21 million viewers.

Thanks to the new, fully integrated A/V system in Larkin Hall, our staff can live-stream presentations to schools, colleges and conferences across the world. Now the only constraints to our education and outreach efforts are power outages and patchy connectivity.

Educating kids in our inflatable right whale, Delilah.



*CCS cultivates young scientists through internships in our right whale ecology, humpback whale studies, marine fisheries research and marine geology programs. Our interns learn on the job and experience life in the lab and in the field, and this helps many of them clarify their long term goals. One such individual is Lauri Leach, winner of the 2019 Ruth Hiebert Memorial Scholarship. Lauri interned with the CCS right whale survey team in 2018 and now, thanks in large part to the professional connections and skills she acquired here at CCS, she is pursuing a Master's degree in Marine Biology at the University of Maine.*

**It's hard to believe that our popular Winter Lecture Series, supported by Napi and Helen Van Dereck and held at Napi's Restaurant in Provincetown, is now in its ninth year. Time flies when you're having fun!**

# A whole new audience for Spinnaker



## SPINNAKER

This summer a short film produced by Red Thread Productions about the painful life and death of the humpback whale *Spinnaker* premiered in Provincetown to tremendous acclaim. This incredibly powerful and moving documentary has been selected for the inaugural Turks and Caicos Film Festival, the Block Island Film festival, the Oregon Documentary Film Festival and Wildlife Conservation Film festival in New York in October 2020, and has been submitted to several more festivals in the US and Europe.

Spinnaker, an 11 year-old humpback whale, was well known at CCS. Her life history, and that of her mother (Palette) and grandmother (Compass), was documented in great detail by CCS scientists as part of our Gulf of Maine humpback whale population research. During her short life Spinnaker was entangled in fishing gear at least four times; on three of those occasions she was freed by the CCS Marine Animal Entanglement Response team and colleagues from Campobello Whale Rescue and Maine Marine Patrol. In June 2015 Spinnaker died and her body washed ashore in Acadia National Park in Maine. A necropsy was performed, and samples from her kidney, eye, baleen, and tissue were collected for future scientific studies. During Spinnaker's preservation and articulation researchers found a tangle of rope and gillnet deeply embedded in roof of her mouth, almost splitting her upper jaw in two. Her skeleton, with the entanglement still lodged in her skull, is on permanent display here at the CCS Hiebert Marine Laboratory.

Follow our Instagram, Facebook and Twitter feeds to keep up with program updates, events, whale sightings and a whole lot more.



@coastalstudiesptown



@coastalstudies



@ccsptown  
#centerforcoastalstudies

## Volunteers

*Great volunteers like ours are hard to find, and we know how unbelievably fortunate we are to have these wonderful people on our team in 2019.*

Fran Adams, Lin Allgeier, Americorps, John Anderson, Jesse Angelo, Laurie Appleby, Arrana Ashton, Kristina Atsalis, Karen Back, Patty Bennett Walsh, Steve Brazil, Tom Bliss, Elizabeth Bradfield, Sherry Brec, Barbara Brennessel, Judy Bullard, Lee Burns, Kathy Burroughs, Pat Canavan, Michela Carew Murphy, Kevin Cassidy, Marina Chander, Jim Christopher, Carolyn Collins, Elise Cozzi, Laura Curran, Joshua Dalo, Bob Daniel, George Davis, Oharra Deschamps, Robert Dixon, Susan Downey, Pine duBois, Mark Dubois, Mary Beth Dyer, Melissa Falen, Ray Faulkner, Mary Feeley, Joann Figueras, Dennis Fitzkee, Brian Fitzpatrick, Sharon Fitzpatrick, Suzanne Fleming, Larry Franke, Cynthia Franklin, Kimberly Frary, Steven Furlong, D'Arcy George, Inez Giles, Carol Girard-Irwin, Sue Girard-Irwin, Alondra Gomez, Scott and Heather Grenon, Maria Grotz, Diana Haemer, Kathy Haltom, Lydia Hamnquist, John Hanle, Lindi Higgins, Christine Hight, Connie Hinds, George Hirst, Nan LeClaire Hirst, Maddie Kelly, Mary Ellen Kimball, Peter Kosewski, Herb and Shirley Kressel, Katie Ledoux, Sheri Lee, Hal Levine, Zoe Lewis, Jack Lloyd, Sandy Longley, Corrine Losch, Pippa Low, Pam McDonald, Garrett Maggio, Edward Maheigan, Dylan Marat, Genevieve Martin, Bruce Mason, Jody Melander, Ellen O'Connell, Emily O'Connell, Carolyn O'Connor, Brian O'Malley, Becca Miller, Jody O'Neil, John Parker, Stefanie Paventy, Barbara Penn, Anne Puzzo, Delta Rae Read, Bailey Reigel, Rob Ross, Garine Roubinian, Lucy Sandberg, Joan Shaffer, Patricia Shannon, Donna Smith, Jan Spence, Andrea Spence, Leslie Starr, Phil and Betty Suraci, Penny Sutter, Tracy Taylor, Sharon Topper, Denise Traver, Jeanne Washington, David Watson, Susan Whitman-Helfgot, Fran Widdick, Philip Wilson, Amy Wolff, Jim Woodworth, Don Yasi, Mary Zarba.

*Thank you for all that you do for the Center!*

We make every attempt at accuracy. If you discover an error, please contact us at 508-487-3622 x104.



# Staff Updates

A warm welcome to Robert Ware (Outreach Coordinator), Courtney Callahan (Research Assistant, Humpback Whale Studies program), Paulette Durazo (Rescue Assistant, MAER), and Troy Wood (Research Assistant, Water Quality Monitoring Program).

Thank you and farewell to Ev Sacrey (MAER), Theresa Kirchner (Humpback Whale Studies Program), Melissa Lowe (Outreach and Marketing Coordinator), and Angela McNerney (Kiosk Manager).

## MEMBERSHIP

On January 1, 2020 our annual membership rates will increase for the first time in more than ten years. If you currently donate to CCS but are not a member, please consider joining now so that you can take advantage of our member-only benefits, which include discounts at our store and on Dolphin Fleet whale watches and more. Contact us or visit our website for more information.

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Stephanie Richardson, HR Manager  
Kathy Shorr, Development Officer  
Robert Ware, Outreach Coordinator  
Jan Young, Volunteers & Outreach, Accounts Payable

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Alex Hill, Adjunct Scientist  
Per Palsbøll, PhD, Adjunct Scientist  
Jenn Tackaberry, Adjunct Scientist  
Mason Weinrich, Adjunct Scientist

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Theresa Smith, Researcher II, Quaternary Geologist  
Dan Solazzo, Marine Researcher  
Sean Terrill, Graduate Research Assistant  
Steve Mague, Adjunct Scientist, Cartographer

#### MARINE DEBRIS & PLASTICS PROGRAM

Laura Ludwig, Program Coordinator

#### MARINE FISHERIES RESEARCH

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#### MARINE OPERATIONS

Marc Costa, Captain  
Ted Lucas, Captain

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Charles "Stormy" Mayo, PhD, Director  
Christy Hudak, Associate Scientist  
Amy James, Aerial Observer & Flight Coordinator  
Brigid McKenna, Aerial Observer & Data/Photo Manager  
Alison Ogilvie, Aerial Observer

#### MARINE ANIMAL ENTANGLEMENT RESPONSE

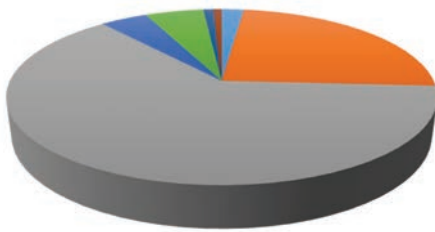
Scott Landry, Director  
Paulette Durazo, Rescue Assistant  
Maria Harvey, Rescue Assistant  
Bob Lynch, Rescue Assistant  
David Mattila, Coordinator, Global Whale Entanglement Response Network  
Lisa Sette, Seal Project Manager

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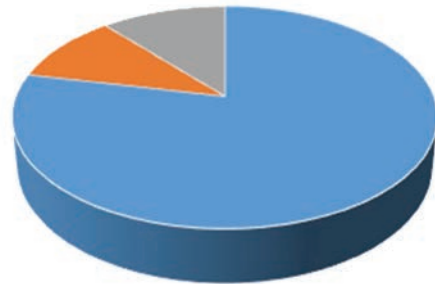
# Financial Report

## FY2018 Source and Use of Funds Summary\*



Revenue 2018

- Memberships
- Other income
- Contributions
- Events
- Other revenue
- Grants and contracts
- Merchandise and tool sales



Expenses 2018

- Program services
- General and administrative
- Fundraising

### REVENUE (restricted and unrestricted) 2018

Memberships	\$72,337
Contributions	\$875,479
Grants and contracts	\$2,301,674
Events	\$154,155
Merchandise/tool sales	\$191,825
Other income	\$7,986
<b>Total</b>	<b>\$3,603,456</b>

### EXPENSES 2018

Program Services	\$2,864,789
General and Administrative	\$374,876
Fundraising	\$415,443
<b>Total</b>	<b>\$3,655,108</b>
<b>Net</b>	<b>(\$51,652)</b>

\*A copy of our audited Financial Statements is available on our website.



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View of autumn sunset over Cape Cod from the International Space Station  
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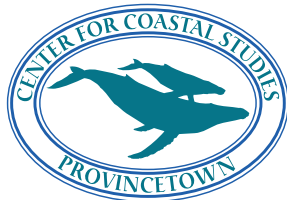
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*Napi and Helen Van Dereck with GWERN  
Coordinator David Mattila on a recent whale  
watch (Janet Young)*

With this issue of Coastwatch, we pay tribute to our longest standing supporters, Napi and Helen Van Dereck. Napi and Helen have championed the Center from our earliest days in 1976 over nearly 44 years of growth, development and success in protecting our ocean resources. We are extremely grateful for their devotion to the work of the Center, and wish to express our deep appreciation for their steadfast support.

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