

GULF OF MAINE RESEARCH INSTITUTE

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# 2018 Annual Report



**Gulf of Maine  
Research Institute**

Science. Education. Community.

# Ocean Warming and Climate Leadership



2018 was another warm year for the Gulf of Maine. Our scientists contributed to the foremost national conversation about warming and how it affects our country, and also exhibited local leadership in following an ocean heatwave.

In November, the federal government published the Fourth National Climate Assessment (NCA). Mandated by Congress starting in 1990, the NCA assesses climate change impacts across the U.S., now and throughout the century.

The report included significant contributions from GMRI scientists. Chief Scientific Officer Dr. Andrew Pershing was the lead author for the report's Oceans and Marine Resources Chapter and Research Scientist Dr. Kathy Mills was the oceans representative on the Northeast Chapter. Their role was to review the scientific literature since the previous NCA (published in 2014) and to state what we know about present and future impacts of climate change in the U.S. Here are some of the highlights from their work on the report:

**Heatwaves:** Dr. Mills and Dr. Pershing observed and later published a paper on an extreme warming event in 2012. This was one of the first times the term “heatwave” was used in the ocean context. Since then, the U.S. experienced heatwaves in the Caribbean, North Pacific, Alaska, and twice again in the Northeast — most recently this year. These events affected ecosystems, species, and people along the coast.

**Fisheries:** The report describes the economic importance of fisheries and their vulnerability to rising temperatures. Stories from the Northeast about lobster and cod illustrate these risks, and the report goes on to highlight potential ways to make fisheries more resilient to climate change.

**Ecosystem Disruption:** Rising temperatures, increasing acidity, and deoxygenation are disrupting marine ecosystems. These disruptions are especially acute in coral reefs and sea-ice ecosystems. While it is possible to build some resiliency in ecosystems, the report finds many disruptions are inevitable, unless carbon dioxide emissions are severely curtailed.

# Ocean Warming and Climate Leadership (continued)

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## Following an Ocean Heatwave

Last summer, our scientists provided a real-time update on an ocean heatwave in the Gulf of Maine.

As many are now aware, the Gulf of Maine is one of the fastest-warming ocean ecosystems on the planet, according to scientists in our lab. Over the last 30 years, the Gulf of Maine warmed at a rate of 0.06°C per year (0.11°F per year) — more than three times the global average. Over the last 15 years, this region has warmed at more than seven times the global average rate. At both time scales, the Gulf of Maine warmed faster than 99% of the global ocean.

2018 was especially warm and, this summer, scientists at GMRI observed that **the Gulf of Maine officially experienced its second warmest-ever day on August 8**. On that day, the average sea surface temperature in the Gulf of Maine reached 20.52°C (68.93°F), as measured by satellites operated by NOAA and NASA. This is only 0.03°C (0.05°F) shy of the record set in 2012.

Moreover, this period of 2018 officially crossed the threshold for what scientists call a **“marine heatwave.”** This phrase describes an area of the ocean that experiences temperatures above the 90th percentile for more than five consecutive days. According to this definition, this Gulf of Maine heatwave started on July 20 and lasted more than a month. However, this statistic downplays what happened throughout the year; only 40 days in 2018 did not reach heatwave levels, and you have to go back to September 2017 to find a sustained period below heatwave levels.

“We’ve set 10 daily temperature records this summer, after setting 18 this winter,” said GMRI Chief Scientist Dr. Andrew Pershing at the time. “We’ve had to add new colors to our temperature illustrations to reflect just how warm the Gulf of Maine has been this year.”

The idea of a heatwave in the ocean is a relatively new concept. GMRI scientist Dr. Kathy Mills and Dr. Alan Pearce from Australia independently applied the term “heatwave” to describe extreme temperature events in the North Atlantic in 2012 and off Western Australia in 2011. Since then, a group of scientists, led by Dr. Alistair Hobday of Australia’s CSIRO, developed the previously referenced heatwave definition.

Although the concept of a marine heatwave has only recently been defined, the Gulf of Maine is already pushing its boundaries. In 2012, only six days fell below the 90th percentile. In every year since 2012, the Gulf of Maine has experienced more than 150 of these heatwave-level days. In every year since 2010, the Gulf of Maine experienced more than 80 such days. At the time of this reporting, the Gulf of Maine had already spent 180 days above the 90th percentile, and that preceded the fall period, which has been especially prone to heatwaves.

**Why is the Gulf of Maine warming so rapidly?** The Gulf of Maine sits in a special corner of the ocean where cold waters from Canada (and ultimately, the Arctic) meet with warm waters from the south. A slight change in these currents can mean a big difference in temperatures, and this region is experiencing more than a slight change. Global warming is causing the glaciers in Greenland to melt. As this relatively fresh water dumps into the North Atlantic, it disrupts the entire circulation of the North Atlantic, pushing more warm water into the Gulf of Maine. It also pushes more warm water into the Barents Sea, north of Norway, another region that has been very warm this year.

“This year (2018) really brings home the connection between Atlantic circulation and the temperatures in the Gulf of Maine,” said Pershing. “The satellite images from this year show a persistent mushroom-shaped blob of very warm water at the mouth of the Northeast Channel — a deep gully that leads into the Gulf of Maine. Essentially, shifting ocean currents are functioning like a hot water tap that dumps directly into the Gulf of Maine.”

# New Study: Warming, Conservation, and Lobsters



A 2018 study, led by scientists at the Gulf of Maine Research Institute and colleagues at the University of Maine and NOAA, demonstrates how conservation practices championed by Maine lobstermen help make the lobster fishery resilient to climate change.

For generations, lobstermen in Maine have returned large lobsters to the sea and have designed a special way of marking egg-bearing lobsters to give them further protection. This conservation culture distinguishes the Gulf of Maine fishery from southern New England, where fishermen have not historically taken the same steps to preserve large, reproductive lobsters.

The study, funded by the National Science Foundation and published in *Proceedings of the National Academy of Sciences* (PNAS), shows how **warming waters and contrasting conservation practices contributed to simultaneous record landings in the Gulf of Maine fishery and population collapse in southern New England.**

Led by Dr. Arnault Le Bris, the research team used advanced computer models to simulate the ecosystem under varying conditions, allowing them to understand the relative impacts of warming waters, conservation efforts, and other variables. Their results show that, while temperature change was the primary contributor to population changes, conservation efforts made a key difference in population resiliency.

## Impacts of Warming

Over 30 years (1984-2014), ocean temperatures increased rapidly in both regions. **Warming in both regions shifted optimal summer ocean temperatures northeast, causing the southern New England lobster population to decline and the Gulf of Maine population boom.** The researchers estimate that, during this 30-year period, the Gulf of Maine population increased by 515%, while the southern New England population declined by 78%. Challenges associated with warmer temperatures include decreased survival of larval lobsters, increased incidence of shell disease, and increased predation.

# New Study: Warming, Conservation, and Lobsters (continued)

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## Impacts of Conservation

The study shows how conservation efforts prepared the Gulf of Maine population for temperature changes. **Researchers estimate that lobster population growth in the Gulf of Maine was more than double what it would have been without conservation measures.** Model simulations revealed that, without conservation measures to protect large lobsters and reproductive females, lobster abundance in the Gulf of Maine would have increased by 242% instead of 515%.

Temperature changes were disastrous for the southern New England fishery, which was already near the southern range of American lobster. Additionally, the region's lack of protections on larger reproductive lobsters made the population less resilient to warmer waters. **The model estimates that, even in the face of warming waters, more restrictive conservation methods would have limited the population decline from 78% to 57% over the 30-year period.**

## In the Future

In the Gulf of Maine, the lobster fishery is vulnerable to future temperature increases. The researchers' population projections suggest that lobster productivity will decrease as temperatures continue to warm, but continued conservation efforts can mitigate the impacts of future warming.

**While scientists expect lobster populations to decline from recent highs, the 30-year outlook for the Gulf of Maine fishery looks positive if conservation practices continue.** In their 30-year projection, the researchers anticipate average populations similar to those in the early 2000s.

## Implications

The results of this study demonstrate how widely-adopted fishery conservation measures can help fishing communities mitigate the effects of changing ocean conditions. American lobster is the most valuable fishery in both the U.S. and Canada, with a combined landed value of more than \$1.5 Billion USD in 2016.

Lead author Arnault Le Bris, a Gulf of Maine Research Institute postdoctoral research associate at the time of the study, is now a Research Scientist at the Fisheries and Marine Institute of Memorial University in Newfoundland.

“This paper shows how climate and fisheries management are connected,” says Dr. Le Bris. “Communities that embrace anticipatory conservation methods can continue to thrive in a warming ocean.”

Dr. Le Bris' work builds on the lab's prior research on the impacts of warming on Atlantic cod, another key Gulf of Maine species. Dr. Andrew Pershing, Chief Scientific Officer at the Gulf of Maine Research Institute and co-author of this study, led a 2015 study that showed, like lobsters in southern New England, cod in the Gulf of Maine suffered a steep decline in the face of warming waters and inadequate conservation measures.

“The older generation of lobstermen who championed the current protections in the Gulf of Maine gave a tremendous gift to today's lobstermen,” says Dr. Pershing. “As waters continue to warm, continued commitment to conservation is the key to the future of this fishery.”

# Understanding Bluefin Tuna

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**Bluefin tuna in the Gulf of Maine are a critically important species, both biologically and commercially.**

Dr. Walt Golet is an Assistant Professor at the University of Maine's School of Marine Sciences and serves as a Research Scientist at the Gulf of Maine Research Institute.

Walt's current research focuses on understanding how bluefin tuna and other highly migratory species use habitats across the North Atlantic and how they feed and grow.

He works with a network of commercial and recreational fishermen in the U.S. and Canada. These fishermen, who include sport fishermen and commercial fishermen on small and large boats, voluntarily provide information on the fish that they catch (where, when, and how big), and many of them return samples to Walt and his team of students.

For each fish that is provided to us, his crew extracts its otoliths (small bones in the head) which record information about the fish's life, much like growth rings record information about the life of a tree. Otoliths, together with other tissue samples, provide information on where the fish was born, its health, and what it has been eating.

In addition to his research, Dr. Golet has also led outreach efforts to share his passion and knowledge about tuna. Most recently, that includes this short explainer on Bluefin in the Gulf of Maine (see video at [ar.gmri.org](http://ar.gmri.org)).

If you ask Dr. Golet, he'll tell you bluefin tuna are special. Their large size and unique physiology (these fish are warm-blooded!) are part of what makes them so interesting, but on top of that, bluefin tuna also have a relatively mysterious life history. It's these mysteries that drive Dr. Golet's fascination.

## Understanding Bluefin Tuna (continued)

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Bluefin can be a source of confusion for the public, especially as contradictory information swirls in the news media and NGO community. In the video above, Dr. Golet shares some of what we know about bluefin here in the Gulf of Maine. For example, did you know that the term bluefin can actually refer to three separate species? Pacific, Southern, and Atlantic bluefin live in different parts of the ocean and have different population dynamics and life histories — yet they all are simply referred to as bluefin. No wonder people get confused!

Even when we focus only on Atlantic bluefin in the Gulf of Maine, we still observe two separate stocks — referred to as Eastern and Western — both of which journey to our local waters in search of food. Much of Walt's work, which includes tagging and biological sampling, is an effort to learn more about which fish are here and where they come from.

Dr. Golet also touches on some of the research tools and relationships that make our research possible. The samples he relies on for his research are only available thanks to long-standing partnerships with the fishing industry. Likewise, relationships with the fisheries management community connect the real needs and observations of fishermen, scientific findings, and the management necessary to protect the resource for years to come.

# Relaunching LabVenture



Three years ago, a team of GMRI staff, project partners, vendors, and advisors began building an unparalleled learning experience for Maine’s middle school students, thanks to breakthrough funding from NASA.

In the following years, the team worked tirelessly to create a state-of-the-art learning environment. In September, with nearly 200 guests in attendance, we celebrated the relaunch of LabVenture, a hands-on science education program which operated for 13 years and served over 120,000 students previously.

As part of LabVenture, GMRI transports roughly 10,000 Maine middle schoolers to our Commercial St. lab each year, free of charge, for a day of interactive science learning. The organization also extends this experience back into the classroom by providing professional development opportunities and curriculum resources for Maine teachers.

LabVenture exposes young Mainers to authentic science tools and methods of inquiry that are far beyond the reach of most Maine classrooms. Students work in teams to gather evidence about the Gulf of Maine through hands-on and high-tech research.

## The new experience

The thousands of students who visit LabVenture each year will now use real NASA satellite data, as well as local fishery data, to explore many of the same questions about the Gulf of Maine that professional research scientists at GMRI are tackling. They’ll do so in a fully renovated Cohen Center for Interactive Learning — a one-of-a-kind lab space housed within the larger GMRI Commercial St. facility. In the Cohen Center, students measure live lobsters, examine plankton under a microscope, and analyze data displayed on a cutting-edge digital technology platform.



# Relaunching LabVenture (continued)

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LabVenture is our largest education program, but the project involved experts across the entire organization. Our scientists, seafood experts, and external project partners all contributed their knowledge and skills to develop the content of the new program.

Additionally, a newly developed set of classroom resources and professional development experiences for teachers will help extend LabVenture back into the classroom.

“Our goal is to give the next generation the science and data skills they will need to manage the challenges and opportunities that come with a changing climate,” said Leigh Peake, Chief Education Officer of the Gulf of Maine Research Institute. “The new LabVenture is a totally unique science learning experience that places students in the middle of some of the most important questions scientists explore every day.”

## The new space

Separate from NASA funding, GMRI also completed a multi-million dollar rebuild of the Cohen Center for Interactive Learning, where LabVenture takes place.

“When we reimagined the LabVenture experience, we recognized we needed a renovation of the physical and technical infrastructure of equal scope and ambition,” said Peake.

The design of the new Cohen Center combined lessons-learned from thirteen years of experience working with students with best-practices from across the nation, provided by partners and advisors.

Updates to the space included:

- New “multi-touch” tables enable richer student collaboration by ensuring every student can engage actively with the experience.
- 4K (High Definition) videos featuring scientists and lobstermen are projected using state-of-the-art technology. These videos introduce the mystery of a new species showing up in the Gulf of Maine, connecting students to a wide variety of people who study the Gulf of Maine.
- Behind the scenes, a completely renovated technical back-end allows the LabVenture team to project NASA satellite data onto both the tables and the projection wall. Students use NASA sea surface temperature data to consider how changing ocean temperatures are driving other changes in our ecosystem.
- The biodiversity tank has been renovated inside and out to showcase the species students are studying in LabVenture, as well as others common in the Gulf of Maine.
- The guiding image for the physical renovation was a bathymetric map of the Gulf of Maine, which is reflected in a dimensional wall map, as well as a multi-level floor.
- Removing bleacher seating optimizes the entire space for interactive learning.

# Relaunching LabVenture (continued)

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In addition to GMRI experts, the project engaged a network of external partners and vendors around the country:

- **Upswell (Portland, OR):** Upswell is an experience design firm that specializes in creating interactive environments with a combination of digital and physical components. The firm worked closely with GMRI to design and develop both the content of the new experience and the technology platform on which it is implemented.
- **Education Development Center (Waltham, MA):** EDC helped produce the classroom activity development and project evaluation portions of the new LabVenture experience.
- **Stanford University (Palo Alto, CA):** Stanford's AAALab is a learning research group focused on game-based learning assessments. This group is developing new technology that will help better assess how students learn about and use data.
- **Partner Scientists:** In addition to the contributions of GMRI scientists, external scientists Dr. Marissa McMahan of Manomet, and Curt Brown of Ready Seafood added pieces of their black sea bass and lobster research to the experience design. Each has a central role in the video narrative as well.
- **Science Centers:** In coming months, the Maine Discovery Museum (Bangor, ME), Montshire Museum (Norwich, VT) and a network of regional science centers will work with GMRI to design locally relevant content and resources for communities beyond Maine middle schoolers.

Additional partners helped execute the physical design changes, including Open Studio Collective, Lassel Architects, Tenji Aquariums, ArtGuild Fabrication, and Ouellet Construction.

## Celebrating

On a Friday morning in September, GMRI CEO and President Don Perkins addressed the attendees of the celebration, who also toured the facility and cheered on one of the first groups of students to experience the new LabVenture.

“Our world is changing rapidly,” said Perkins. “Never before has there been instant access to so much information, and never before has it been so important to have the skills to critically evaluate what we read and hear.”

“Scientific literacy influences our success in so many ways,” Perkins continued, “from job performance to environmental stewardship to personal health and well-being. A scientifically literate public is critical to engaging in meaningful public policy debates and informed decisions for the 21st century. We want students to understand that pursuing a career in science can mean anything from working in a lab, to being out on a boat, to crafting computer-based ecosystem models.”

# Supporting Maine Teachers



## Teacher Tales

For over a decade, 5th and 6th graders from all corners of Maine have come to the Gulf of Maine Research Institute for our LabVenture education program. During their visits, the students take on the role of scientists and conduct their own hands-on research in the Cohen Center for Interactive Learning, our state-of-the-art learning laboratory.

But the LabVenture experience lasts far beyond one day in the lab. We work with teachers across the state to help them incorporate the lessons of LabVenture in their classrooms. Many teachers participate in our workshops and work with curriculum we've developed — but some go even further. Here's a story of how one teacher is doing just that.

### Meet Ms. Flick

Before and after their visit to LabVenture, the kids from Greene Central School are immersed in learning about the Gulf of Maine. Although the school is just one hour away from our lab — and around 45 minutes away from the nearest slice of beach — many of Nancy Flick's students have never been to the ocean.

“We live so close to the coast, but it never ceases to amaze me: so many of our students have never been to the ocean,” Flick says. “I think that art and technology add interest and commitment to their learning and research. I have always felt that if a student can see it, touch it, smell it, taste it, and build it, then they have learned it for life.”

That perspective has driven Ms. Flick to craft a complete interdisciplinary experience for her students to fully understand the complexity of this great ecosystem.

# Supporting Maine Teachers (continued)

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## Writing, Communicating, and Presenting

First, Ms. Flick puts the name of Gulf of Maine animals and plants in a fishbowl. Each student picks a unique species to learn about over the course of the unit. Students write a research paper on their species, in collaboration with their English teacher. As they conduct their research, they are expected to write down ten facts that are “knock-your-socks-off interesting” to use in a slide show. They add pictures to illustrate the facts in PowerPoint, which they use to share what they learned from their research. They present to all the other classrooms, and to their families and friends at a family night. Even during spelling lessons, they learn about the Gulf of Maine as they practice important words about this ecosystem.

## Hands-on Learning: Dissections, Art, and Cooking!

Later in the unit, each student gets a squid to dissect. They examine the skin under microscopes to look at the chromatophores and see how a squid changes colors. After the dissection, Ms. Flick invites parents to come and help prepare and cook calamari for the class. Together, they create a display of the many kinds of food the Gulf of Maine produces. Ms. Flick even brings in kelp products for them to taste. The students also paint murals throughout the room, including all their species to scale, the zones of the ocean, and other animals in their home habitats. They also paint the Portland Headlight and sometimes a beach scene, lobster boats, and scallop draggers. After they finish painting, each student makes a colorful paper 3D model of their species to hang from the classroom ceiling.

## Considering Community

Ms. Flick’s students learn about the many ways that humans use and interact with the Gulf of Maine. Her class discusses fisheries management concepts, such as legal limits and closed seasons. They talk about the motivation for closures and all the people who feel the associated economic impacts. The class talks about all the students and people who live in Maine’s island communities, and what travel to work and school means to them. They learn about jobs that are available along the coast and learn more about the economic opportunities provided by fishing, clamming, scallop dragging, and sea farms.

The watershed is also a big part of what makes the Gulf of Maine special. A local well-water testing business speaks to Ms. Flick’s class about clean water, and how the watershed affects the health of our rivers and, eventually, the ocean. In the past, her class has taken the ferry out of Portland to Peaks Island to drop “letters in a bottle” in the outgoing tide. Later, they looked at the ocean currents and try to guess where their bottles would end up. Of course, they learned how these currents affect weather and climate around the world.

## Earning Praise

Ms. Flick has created an incredible moment in her students’ education. They dive deep into the Gulf of Maine through their classrooms, with their families, at our lab, and in the community. It’s no surprise that Ms. Flick gets a lot of praise around the school.

“The entire project is such a favorite of students, that even our kindergarteners tell me that they can’t wait to learn more about the Gulf when they get to sixth grade,” said a fellow teacher. “When the students visit the lab, it brings all they learned to life. They get to see how everything is interrelated and how we are so connected to our Gulf.”

# Supporting Maine Teachers (continued)

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## Honoring Excellence

In April, we honored Buckfield Junior/Senior High School teacher Gretchen Kimball with the fifth annual McCarthy Education Innovation Award. GMRI education staff presented the award during a ceremony at the Maine Science Teachers Association conference.

Each year, GMRI presents the McCarthy award to the Maine teacher who best embodies GMRI's education principles. These teachers provide students authentic science experiences and promote students' interest in, understanding of, and connection to scientific studies. The McCarthy Award is named after retired Unum CEO Kevin McCarthy, a longtime supporter of science education in Maine.

Kimball was recognized by her nominator as a true innovator in the classroom, and she's known for creating authentic learning experiences for her students. This year, she took on the challenge of adapting her physical and chemical science units to be less "by-the-book" and more relevant to questions that her students and their families deal with (efficient home heating, more biodegradable plastics, etc.).

"Gretchen is a leader," says GMRI's Molly Auclair, who works closely with Kimball and other Maine teachers. "She's always enthusiastically sharing what she is trying out, how it goes, and her reflections. She communicates freely with other teachers in a collaborative and constructive way."

GMRI staff also noted Kimball's commitment to professional development, and support of other teachers. In the last two years, she has utilized GMRI's citizen science education platform, Vital Signs, and made valuable contributions to the Western Maine Teacher Community — a partner effort between GMRI and local teachers to connect rural and under-resourced teachers of STEM (science, technology, engineering, and math) subjects.

"Teachers like Gretchen Kimball are a huge part of what makes GMRI education programs scale to serve statewide needs," said Chief Education Officer Leigh Peake. "We're so glad to present her with this award, and we're excited to continue our shared efforts."

# Students Publish Findings

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For professional scientists and academics, scientific journals are a key tool for sharing knowledge and advancing research. Throughout their careers, scientists spend endless hours reading and contributing to articles published in these journals.

Now, we're inviting Maine students to take part in this tradition by contributing to *Findings from the Field* — a new journal of original scientific research by Maine middle schoolers. **The goal of *Findings*, launched in 2017, is to provide an opportunity for students to experience the full scope of the scientific process.** After conducting their research, students can now submit for peer review and publication, just as professional scientists do when they seek to publish their work.

With *Findings*, students engage in three strands of work designed to help them understand the nature of science:

## Conducting an Authentic Investigation

Many students begin their investigations through our Vital Signs program, collecting data in and sharing data about Maine's forests, fields, lakes, streams, wetlands, saltmarshes, and intertidal ecosystems. Students may choose to design their own authentic investigations or engage with ecological and environmental investigations supported by other programs.

## Crafting Their Submissions

As they conduct their investigations, students use *Findings* lessons to outline, craft, review and refine their submissions. Just like scientists writing for a professional journal, the students cite background research and identify their contribution to the field, explain their methods, describe their results, and articulate their findings along with the implications of those findings.

# Students Publish Findings (continued)

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## Peer Review

After submission, students from across participating schools engage in peer review. This has proven to be one of the most powerful elements of the project. **Last year, 76% of students reported putting forth greater effort because they knew others would review their work.** Knowing that their work would be peer-reviewed inspired them to take extra care and gave them confidence that they could contribute.

One teacher reported, “This is one of the best exercises I have done this year to engage all my students. It was amazing to see how each student pulled apart the rubric/submission guidelines, and went through the peer’s article with a fine-toothed comb... this is clearly going to elevate their writing..”

Based on their peer review, students refer submissions to the Editorial Board (composed of 3-4 science teachers and GMRI staff). Based on Editorial Board review, final articles are selected for publication. The first issue of *Findings* was published last spring, and we are poised to engage additional schools across Maine.

## Year One Results

In the first year, roughly **200 students** from **eight schools** participated in *Findings*. In total, the students submitted **67 articles** and completed more than **100 peer reviews**. In June, we published six articles in Volume 1 of *Findings from the Field*, and we are currently accepting submissions for Volume 2.

In addition to publishing the journal, our education team is focused on supporting teachers as they embed scientific investigations into their classrooms. **More than 20 Maine teachers participated in workshops or professional development centered on *Findings from the Field*.**

Our goal is for this kind of scientific learning to become a regular feature of classroom work for all students. Throughout this work, students are meeting learning standards across disciplines, from the Next Generation Science Standards to the Common Core standards in Math and English Language Arts.

“A student mentioned that I am always talking about ‘peer-reviewed’ sources for their research, but they had no idea what peer reviewed really meant,” one teacher told us. “They could now see that a scientist would submit to other scientists (their ‘peers’) and be put through rigorous paces in order to be published.”

# Our Impact: Gulf of Maine Seafood



Our Sustainable Seafood Program advances economic and ecologic sustainability. We work with industry leaders across the supply chain to build market demand and empower consumers to find and buy Gulf of Maine seafood. Here's a snapshot of what we have accomplished in the past year.

## Partnering with the Supply Chain

### TRAWL TO TABLE

**103** **People who attended** Trawl to Table workshops in the past year, bringing the total to nearly 400 since 2012. Half of attendees reported that they planned to follow up on a new business connection post-event.

**5** **Participants** from major distributors **outside New England** received travel scholarships to attend Trawl to Table in 2018.

### GULF OF MAINE RESPONSIBLY HARVESTED PARTNERS

**8** **Seafood processors** providing regional seafood to:

<b>3</b>	<b>24</b>	<b>2</b>
large foodservice companies	universities, schools, and hospitals	major retailers



# Our Impact: Gulf of Maine Seafood (continued)

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## Partnering with the Supply Chain

### CULINARY PARTNERS

**24** **Area restaurants** committed to always having *Gulf of Maine Responsibly Harvested* seafood on their menus.

### SUPPORTING RETAILERS

**NEARLY 2,000** **Stores belonging to the U.S. grocery chains owned by Ahold Delhaize**, all of whom we are assisting with sustainable seafood sourcing after expanding our partnership with the parent company.

### HANNAFORD'S LOCAL SEAFOOD PROGRAM (ESTABLISHED IN 2017)

**26** **Regional companies** are committed to supplying Hannaford's Local seafood program.

**20-25** **Local seafood items** consistently carried by Hannaford.

# Our Impact: Gulf of Maine Seafood (continued)

## Increasing Market Demand

16%

**Increase in Gulf of Maine Responsibly Harvested seafood sold by Sysco** Northern New England to their 3,000+ customers in ME, NH, and VT in 2018.

82%

**of the fresh white fish served by Sodexo** on 11 campuses in Maine is now *Gulf of Maine Responsibly Harvested*, an increase from almost zero in 2015.

7%

**The increase in Gulf of Maine Responsibly Harvested landings volume** since the program began. In particular, landings of underharvested species like dogfish, redfish, and whiting have grown an average of 103%.

78%

**The increase in Gulf of Maine Responsibly Harvested landings value** since the program began. Additionally, the value of dogfish, redfish, and whiting has increased an average of 159%.

Midway through this fiscal year, **Hannaford's Local seafood sales were up**

15%

>\$93M

**Gulf of Maine Responsibly Harvested seafood sold** by partners since 2011.

## Consumer Awareness

36

**Seafood team speaking engagements** and events in 2018.

79

**Number of attendees at the Future of Seafood: Nourishing the World** conference co-hosted by GMRI and the Museum of Science in Boston.

200+

**People who attended** the 2018 **Seafood Celebration** at GMRI.

273

**Mentions or features of GMRI in seafood-related news articles** over the course of a year. Our seafood program continues to shape the local, state, regional, and national media conversation around Gulf of Maine seafood.

# Our Impact: Gulf of Maine Seafood (continued)

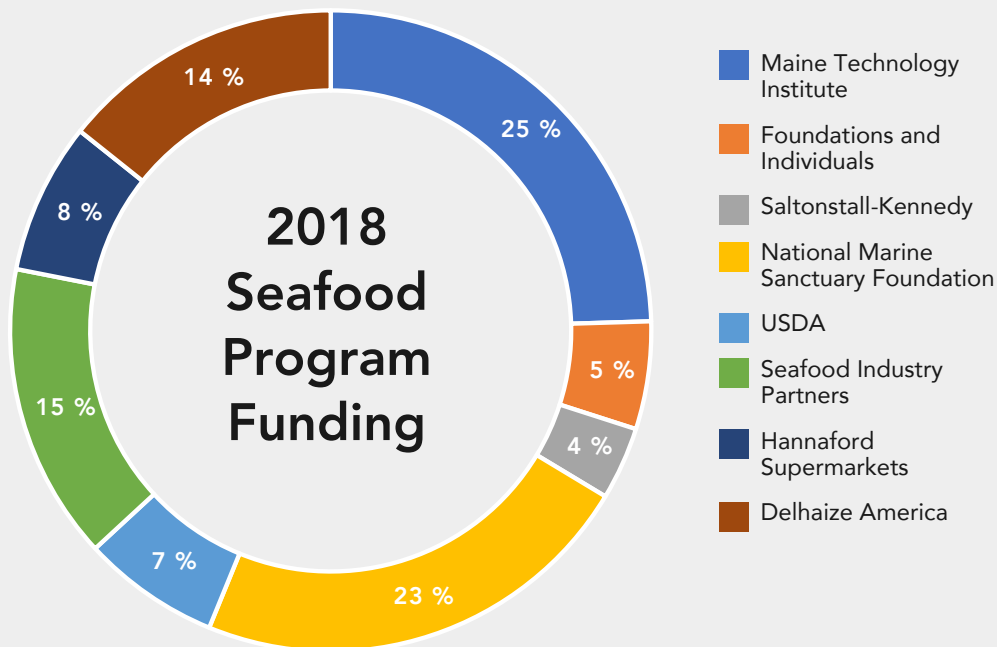
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## A Call to Action

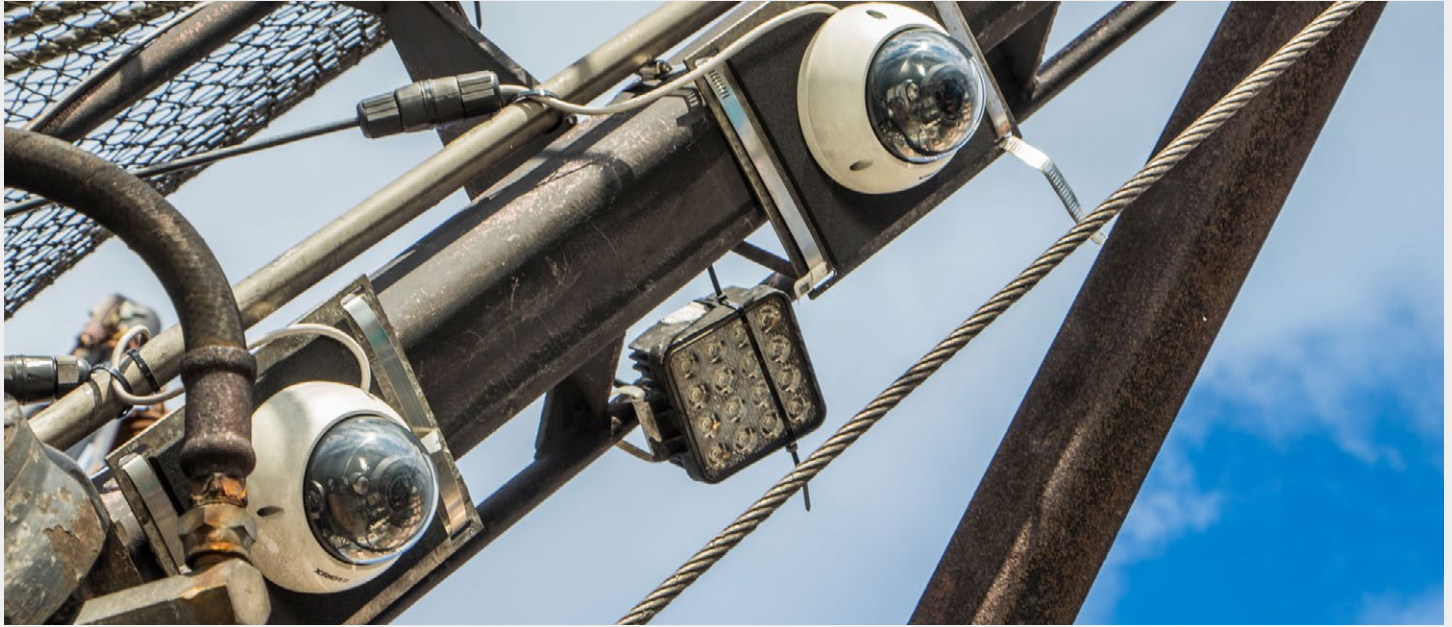
The success of our work depends on the cumulative action of our partners. Please consider supporting these efforts in the following ways:

- 1. Make a Commitment to Gulf of Maine Seafood.** Whether it's a commitment to sourcing more, adding new species, or ramping up promotions, your public commitment makes a difference.
- 2. Seek Collaborations.** Collaboration throughout the supply chain – from fishermen to processors to buyers – creates opportunity to harness available quotas, find efficiencies, and meet the market's needs.
- 3. Contribute to GMRI's Sustainable Seafood Program.** Our work aims to benefit the Gulf of Maine seafood industry as a whole, and we rely on financial contributions of our industry partners to fund 15% of our annual budget.

The Sustainable Seafood program relies on a diversity of funding from federal, state, foundation, and industry partners.



## Electronic Monitoring Expansion



To comply with federal regulations, fishermen in the Gulf of Maine are monitored by fisheries observers — people who ride along with fishermen to collect catch data. There are several challenges associated with human observers, including safety and cost.

In recent years, GMRI and fishermen partners have pioneered a new technology called electronic monitoring (EM) — a system of cameras and computers mounted onboard fishing vessels. The EM program at GMRI has grown tremendously in recent years. The **30 vessels** participating in the program this year have contributed data from **1,401 hauls** over **451 trips**, collecting data on over **77,000 individual fish**.

Increased participation from fishermen means more video data to process. That's why we're working with machine learning experts to make the program scalable. Instead of relying on humans to watch the video generated onboard, we're exploring how computers could identify fish species directly from video footage — the same way Facebook recommends tags for photos of your friends and family.

This is just one of many examples of how new technologies can improve outcomes for both fishermen and managers. Stay tuned for more updates as the work evolves.

*Thanks to our partners Ecotrust Canada, Integrated Monitoring, SNAPIT HD, Cvision LLC, The Nature Conservancy, Cape Cod Commercial Fishermen's Association, Maine Coast Fishermen's Association and participating captains and crews.*

*Funders include The National Fish and Wildlife Foundation and the Gordon and Betty Moore Foundation.*

# Electronic Monitoring Expansion (continued)

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## Updates on recent projects

### The Audit Model

GMRI, with its partners Ecotrust Canada, The Nature Conservancy, the Maine Coast Fishermen's Association, and the Cape Cod Fishermen's Alliance, is currently testing an audit EM model in an effort to reduce monitoring costs, and promote accountability and overall economic viability in the New England Groundfish Fishery. Vessels operating under the Audit Model carry a suite of cameras and sensors to collect datasets similar to those produced in the National Marine Fisheries Service's At-Sea Monitoring program.

The goal is to use this data to verify discards reported by captains in electronic vessel trip reports (EVTRs). While at sea, captains and crew measure allocated groundfish species prior to discarding them, and report all kept and discarded catch on a haul-by-haul basis via an EVTR. Video is reviewed by an on-shore analyst to calculate lengths and weights of discarded fish for catch accounting and quota management. In the near future, the program plans to shift into the audit phase, in which the data collected from video will be used to ensure the accuracy of the captains reports.

The Audit Model is in its 6th year of implementation. From its origin in 2013, the project has increased to include over 25 vessels, fishing with trawl, gillnet, longline and jig gear and operating in ports from Port Clyde, ME to Point Judith, RI.

### The Maximized Retention Model

The Maximized Retention EM Model is designed to improve accountability and decrease monitoring costs for vessels in the New England Multispecies Groundfish Fishery. In this model, vessels are exempt from minimum size requirements for allocated groundfish species and instead must retain fish that they would otherwise be required to discard (dead) at-sea. EM is used as a compliance tool to ensure all groundfish are landed and, rather than recording discards at-sea, all allocated fish are accounted for on shore by a dockside monitor. GMRI is pioneering novel technology solutions to reduce the cost, logistic and catch handling burdens of EM, improve data transmission time, and build EM system and data utility for participants in the Maximized Retention project.



By documenting catch on shore and streamlining video analysis, the project team is testing the potential for this model to:

- Decrease catch handling burdens at sea
- Reduce the time and cost of video review
- Improve landings data critical to management and stock assessment
- Open new markets for fish that would otherwise become waste at sea
- Increase the accuracy and decrease the uncertainty of fisheries dependent data

GMRI, working in conjunction with the Sustainable Harvest Sector, is in the first year of a 2-year pilot Maximized Retention project.

## Updates on Aquaculture

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2018 was a year of partnerships, progress, and growth for our aquaculture team. We took on local infrastructure projects, state-level growth initiatives, and workforce development efforts that will grow opportunities to work on the water in Maine.

### The South Portland Pier Aquaculture & Fishing Industry Needs Assessment

We continued our partnership with the City of South Portland and GEI Consultants in developing a “Master Plan” or long-term vision for the underutilized Portland Street Pier as a commercial fishing and aquaculture hub. Our specific role was to help the city understand who the most likely users of the pier are and how they might use the pier (at present and into the future) by conducting the South Portland Pier Aquaculture & Fishing Industry Needs Assessment. City leadership used our Needs Assessment to select pier design alternatives that would be most beneficial to aquaculture and commercial fishing industries.

Through a combination of data set analysis, surveying, interviews, stakeholder meetings, and informal conversations, the South Portland Pier Aquaculture & Fishing Industry Needs Assessment details the most likely user groups and their operational infrastructure needs in relation to the pier. The report also includes a comprehensive map and description of Portland Harbor’s working waterfront support infrastructure to help city officials understand what services are abundant or lacking. It concludes with a finding that the pier holds potential to support both aquaculture and commercial fishing businesses who share many of the same infrastructure needs.

### Commercial Oyster Demonstration Farm Partnership

In May, we partnered with the Quahog Bay Conservancy (QBC) on a commercial oyster demonstration farm to generate and outsource the real-world financial data of growing an oyster farm to commercial scale.

Though an abundance of oyster farming support resources are available to Maine sea farmers, detailed financial information about the real-world costs, revenues, profits, and losses of a commercial-scale oyster farm don’t exist. This is critical business planning information for pre-revenue and startup oyster farms, which comprise approximately 40% or more of Maine’s industry. Scaling up and increasing production from tens-of-thousands to hundreds-of-thousands presents significant challenges; these farms are vulnerable to business failure in the coming years. We hope to support these small businesses by open-sourcing financial and operational knowledge generated by the demonstration farm.

CONTINUES ON NEXT PAGE

# Updates on Aquaculture (continued)

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In 2015, QBC waded into oyster farming by starting a pre-commercial scale oyster farm in Quahog Bay. Like many of Maine's startup farms, they had success with oyster farming at a small scale and want to grow to commercial size.

Our efforts in 2018 focused on expanding the existing sea farm from square feet to acres, which gives more room to grow oysters. It was step #1 for us because the size of a sea farm dictates the operational and business plans. Through a collaborative process that included council from Jeff Auger of Mook Sea Farms, the team developed an application for a commercial lease off of Snow Island that was submitted in December. Our 2019 focus will be on developing the operational and business plans, site buildout, tracking growth and production, and documenting the process.

## FocusMaine Partnership

GMRI is one of two “backbone” organizations for the FocusMaine aquaculture job creation initiative, which uses a fact-based, disciplined approach to industry development. 2018 marked the first year of full-steam-ahead implementation of growth strategies for GMRI and its partners — the Maine Aquaculture Association and FocusMaine.

## Aquaculture Accelerator

Through the FocusMaine partnership, we partnered with the Maine Center for Entrepreneurs (MCE), and Maine Aquaculture Association (MAA) to develop and administer an intensive 15-week aquaculture-themed entrepreneur development program to further our shared goal of creating aquaculture jobs in Maine.

The prototype program – titled Aquaculture Top Gun 2018 – was modeled after MCE's established Top Gun entrepreneur development program that teaches business fundamentals and provides one-on-one mentoring to early-phase businesses. The focus on early-phase and startup businesses — which represent 40 – 50% of Maine's sector by number — offered the highest potential for job creation (and preventing business failure).

In fall 2017, the development team met regularly to tailor the Top Gun core curriculum to the unique challenges faced by aquaculture businesses and leverage networks to recruit aquaculture business experts as presenters and mentors. Twelve businesses were selected through a competitive application process and the program ran from February–May 2018. The program culminated with a Shark Tank style “pitch-off” with the two most outstanding presenters — Matt Moretti of Bangs Island Mussels and Jonathan Turcotte of Glidden Point Oyster Farms — each receiving a \$5,000 cash prize to invest in business growth.

## Aquaculture Workforce Development Strategy

Through the FocusMaine partnership, GMRI is leading development of the Maine Aquaculture Workforce Development Strategy. The project involves partnering with a team of consultants from Scotland, Educate Maine, MAA, and a Steering Committee representing 22 of Maine's education and training institutions to understand how the state's existing programs can be leveraged to create a comprehensive training pipeline that meets the labor needs of Maine's growing and evolving industry. The work, slated to begin in late-January 2019 will involve surveying the aquaculture industry to understand their workforce needs, challenges, and experiences; gap analysis of existing training programs; and, drawing from the experiences of countries with developed aquaculture industries through the Scottish consultants, synthesis into the workforce development strategy.

## Communities Face Rising Seas



Our sea level rise program Coastal Resiliency Informed by Science and Experience (CRISE) brings local relevancy to global scientific data through local history, maps, and case studies. Each interactive experience guides participants as they explore the impacts of sea level rise and weather events on community resources and examine potential resiliency measures.

Since 2017, CRISE has engaged **1,265 citizens** in an interactive, locally-focused, and fact-based program illuminating the coming impacts of sea level rise on coastal communities. Those who participated in the program learned about a range of topics related to sea level rise, with over 80% of participants reporting *some* or a *great deal of knowledge* related to the science of sea level rise, associated impacts on the Greater Portland area, and local community resources. Participants also substantially improved their ability to access and interpret data about sea level rise and adaptation efforts, both locally and globally.

**848**

people reached in  
2018

**23**

workshops held (12 in  
house, 11 offsite)

**93%**

kept the conversation  
going with family / friends /  
neighbors

**78%**

took action to reduce  
their carbon footprint

While participants represented an older and already somewhat engaged group, this experience prompted many to **seek more information, change their behaviors, and talk with others** about the issue of sea level rise. In surveys administered two-to-six months after their C-RISE participation, respondents showed a significant increase in their knowledge about sea level rise and climate topics — especially impacts of coastal storms/sea level rise and accessing local data. Ninety-three percent had talked with family, friends, and neighbors about sea level rise, and 78% had already taken steps to reduce their own carbon footprint. Most (65%) have since or plan to **contact their elected officials** about climate change or sea level rise issues.

CONTINUES ON NEXT PAGE



## Communities Face Rising Seas (continued)

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Participants appreciated that information was presented by **focusing on facts**, instead of debating the causes and politics behind the change in sea levels. Additionally, because each presentation of the program was tailored to the specific location, participants found the data and stories more meaningful. **Localizing the presentation** to a specific municipality or island community provided common context for everyone present and made the exploration of flooding impacts particularly pertinent.

The program also created community around the issue of sea level rise. Not only were participants surprised by the level of engagement of other attendees, they also formed important high-level partnerships. Our staff engaged local scientific experts, municipal planners, sustainability managers, and others in creating, refining, and implementing the program through our Leadership Team. This provided a fact-based, locally focused message. It also engaged other local leaders in the content of the program.

“Good to hear facts without blaming someone or anyone. Just what we know now, and what it portends.” – CRISE Participant

“[CRISE was] getting people from the most general understanding of ‘O.K., we may need to adapt because of climate change’ to the more scientific understanding of what is happening and what we can expect to happen...they distilled it down to be accessible and relevant in Casco Bay.” – South Portland Sustainability Director

Given the older demographic that attended our events, the CRISE team decided to create a student-specific curriculum to engage the next generation in these important discussions. Together with teachers from South Portland High School, Casco Bay High School, Morse High School, and Mount Desert Island High School, we are creating a high school curriculum that gives students the knowledge and skills needed to engage their communities in better understanding local sea level rise impacts. A pilot version is currently being tested in several Maine classrooms, and has already produced exciting results. Most notably, the curriculum helped students at Mount Desert Island present their concerns about sea level rise to then-gubernatorial candidate Janet Mills before the election.

Looking forward, the program will work further with the Leadership Team and other partners to plan the next steps regarding supporting coastal communities to build resiliency and adaptation to sea level rise. Due to many of the formal and informal relationships formed through this project, the Casco Bay region will now have a consistent, fact-focused message in a format that has shown to be successful in engaging and educating a public audience. CRISE will continue to support coastal communities and working waterfronts in moving from awareness to planning and action that builds resiliency against sea level rise and storm surge.

# Building Demand for Local Seafood



The ability of coastal communities to thrive in the coming years will depend in large part on our ability to grow a diverse seafood economy. That includes promotion of wild-caught and farmed fish from the Gulf of Maine.

As part of that effort, we published our top five reasons to eat Gulf of Maine Seafood:



## 1. Gulf of Maine fisheries are highly regulated.

Our commercial fisheries are among the most well-managed in the world. You can feel confident choosing seafood from the Gulf of Maine, knowing the fishery is carefully managed through a rigorous scientific process.

Fishermen in our region live with a lot of restrictions, including when and where they can fish, as well as the species, size, and amount of fish they can land.



## 2. Eating local seafood supports our coastal economy.

Buying local seafood supports fishermen and their families, and it keeps our coastal communities thriving. In order to run their businesses, fishermen purchase fuel, bait, and other marine supplies, which supports local businesses big and small.

Seafood is at the core of our region's economy and an important part of our cultural identity.

## Building Demand for Local Seafood (continued)

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### 3. There are plenty of other fish in the sea.

Did you know we import 91% of the seafood we consume here in the U.S.? Meanwhile, local fishermen leave hundreds of thousands of pounds of abundant Gulf of Maine species unharvested each year, due to lack of demand. Lesser known fish such as redfish, pollock, dogfish, and whiting are bountiful (and equally as tasty) as more popular species like cod and haddock.

With so many delicious fish available right here in the Gulf of Maine, why look elsewhere?



### 4. Seafood has a low carbon footprint.

When it comes to environmental impact, seafood has a smaller carbon footprint than other animal proteins, like beef and pork, which require large amounts of land, water, and feed to produce.

For an even greener option, choose seafood harvested locally and cut down the miles your meal traveled to get to your plate.



### 5. It's good for you.

Seafood is packed with healthy omega-3s that are hard to find in other foods. These essential fats are critical for your heart and brain health. Eating the recommended two servings of seafood per week can improve a range of health outcomes, including reducing your risk of death from heart disease by 36%! That's something you can feel good about.

These are just a few of the many reasons to choose local seafood, whether you're at the grocery store, or at your favorite restaurant. Looking for more local seafood tips? Check out our three strategies for eating sustainably.

# Building Demand for Local Seafood (continued)

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## Verified: Monkfish and Winter Skate

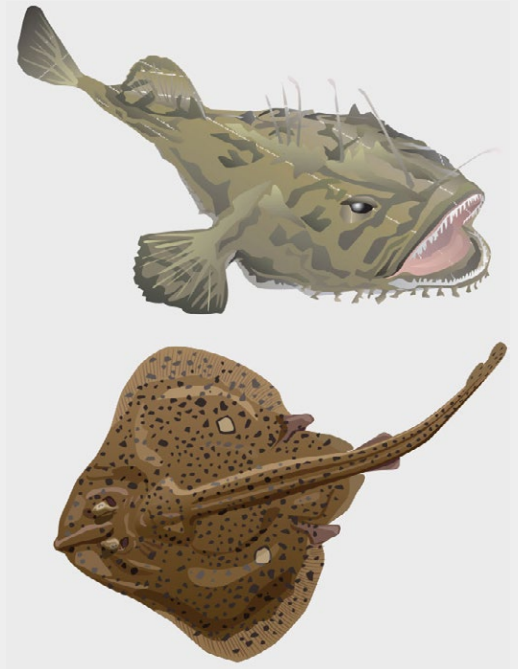
In 2011, we created our Gulf of Maine Responsibly Harvested® brand to help people buy seafood they can feel good about. Part of the brand process includes assessing and verifying which species from the Gulf of Maine region are responsibly harvested. This summer, we added two new species to our verified list: monkfish and winter skate.

“New England has some of the most well-managed fisheries in the world,” says sustainable seafood program manager Kyle Foley. “These two species are both delicious and responsibly harvested, so don’t be afraid to give them a try!”

Monkfish, which live on sandy areas of the ocean floor, are caught mostly by trawl nets in the Gulf of Maine. Fishermen targeting monkfish face strict regulations, including mesh size restrictions for their nets, limits on how much they can catch annually, and minimum legal sizes. Monkfish tails have been compared to lobster in texture and taste, and their livers are highly sought after in international markets.

Winter skate is a beautifully mild and flaky fish, yet fishermen historically have not pursued them (except for bait), due to lack of consumer demand. Now, as traditionally important species like cod are less available to fishermen, many are turning to fish like winter skate as a source of income.

Visit [gmri.org/verified](http://gmri.org/verified) to see our full list of responsibly harvested species.



# Building Demand for Local Seafood (continued)

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## Blue Mussels, Golden Opportunity

Blue mussels from Maine are both a special part of the ecosystem and an iconic seafood dish. People from here and away have enjoyed them for centuries and they have only increased in popularity over the last decade.

However, despite their importance, managers and buyers struggle to make decisions about blue mussels due to a lack of data. To address this need, we're working with industry partners to collect better data through a process called a Fishery Improvement Project (FIP).



“The goal of the FIP is to ensure the long-term health of the mussel fishery in Maine and the economic sustainability of the mussel industry,” said Kyle Foley, Sustainable Seafood Program Manager. “It’s encouraging to see the variety of businesses up and down the supply chain that are committed to this goal.”

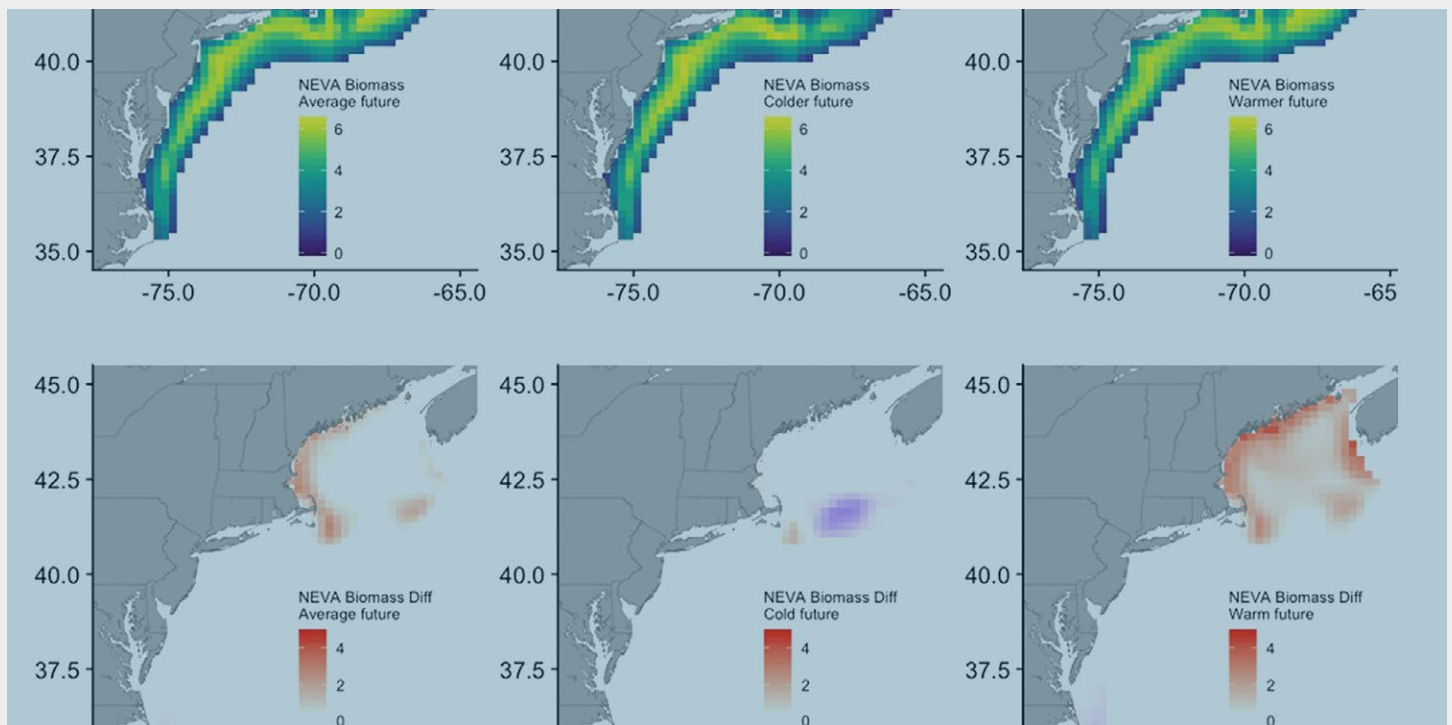
The collaboration includes eight companies — Acadia Aqua Farms, Bristol Seafood, Cape Cod Shellfish Company, Euclid Fish Company, Hannaford Supermarkets, J.P.’s Shellfish, Maine Shellfish Company, and Moosabec Mussels — which represent each step of the mussel supply chain from boat to plate. The project provides digital measurement tools to help these businesses quickly and accurately record crucial data while on the water. Their data will help us ask and answer questions about mussel distribution, population size, climate change resiliency, and more.

In the coming months, the group of collaborators will gather more data, network with scientific and fishing communities, and pursue additional funding to learn more about this keystone species and important fishery.

## Updates on Aquaculture

We’re also collaborating with Maine’s industry leaders, business community, research institutions, community organizations, and regulatory agencies to support the growth of cultured seafood production and profitability.

## Following Fish on the Move



As marine waters off the Northeast Shelf have warmed over the past 30 years, with particularly rapid warming occurring in the past decade, fisheries in the region are feeling the impacts of climate variability and change.

Dr. Kathy Mills is leading a multifaceted project that will help coastal communities address these coming changes by assessing their social-ecological vulnerability to climate impacts.

Early in the project, Dr. Mills and her team assessed the vulnerability of regional fishing communities to climate-related changes in marine resources. Combining social and economic risks with likely climate scenarios, the group developed a model to project future distributions and ranges of commercially targeted species. Using this information in combination with convening workshops and trainings, the team hopes to help communities understand and adapt profitably to the changes coming their way.

To demonstrate the potential for this work at the community level, Dr. Mills identified four key fishing ports to act as case studies for more in-depth assessments: Point Judith, RI; New Bedford, MA; Portland, ME; and Stonington, ME. Her team worked closely with fishermen and other stakeholders in these communities to provide a detailed assessment of the economic and social impacts of projected changes, and to evaluate a range of adaptation strategies that may buffer these impacts.

These results will provide a way of comparing the future costs and benefits of different operational, investment, and management strategies. The implementation of these strategies, however, will vary from community to community. Interviews with fishermen in each port helped the team identify a range of factors that facilitate or constrain adaptation.

Final results of these assessments will be shared back with the four ports in spring of 2019, and Dr. Mills aims to continue working with these communities to help them gather the information needed to make sound and forward-looking adaptation decisions.

# Following Fish on the Move (continued)

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## National Recognition

In 2018, Dr. Mills presented the results of her climate adaptation and forecasting projects at multiple scientific, industry, community, and management meetings. This included at the American Fisheries Society, the International Symposium on the Effects of Climate Change on the World's Oceans, and others.

Dr. Mills has also been selected as a Pew Marine Fellow to continue this work. This prestigious fellowship will support her research to understand how warming waters are affecting distribution shifts in fish and invertebrates, and to evaluate how fish populations will respond under various harvesting and climate scenarios. This information will help identify adaptation strategies that can both sustain fish populations and afford new fishing opportunities in the future.

“The most exciting part of this work is the opportunity to support climate adaptation efforts by fishermen, fisheries, and communities in the region,” said Dr. Mills. “It’s a great honor to have been awarded this fellowship, which will help us provide information to help fishermen and their communities.”

# Fiscal Year 2018 Financial Overview

Effective January 1, 2018, the Gulf of Maine Research Institute (GMRI) changed its fiscal year end reporting period to June 30. Therefore, what follows reflects the fiscal year January 1, 2018 – June 30, 2018.

Due to the seasonality of our income, the short fiscal year, and the lack of a fourth quarter when most of our individual charitable contributions are received, we anticipated that there would be a deficit for this short or ‘stub’ year.

GMRI had a loss of \$265,000, which was better than our budgeted \$325,000 deficit. This better-than-anticipated outcome reflects continued success in our operations, sustained delivery of core programs and 4% growth in total expenses, when compared to the same timeframe in 2017.

Science, Education, and Community programs are funded primarily by federal grants, foundation grants, and individual contributions. Revenue was up \$90,000 when compared to the same timeframe in 2017, primarily arising from increases in federal and foundation grants.

Fundraising and community relations activities are funded by unrestricted contributions. Most administrative costs are allocated as overhead to program and development costs, in compliance with federal cost guidelines. The balance of administrative expense is funded by income from administrative services contracted to our subsidiary.

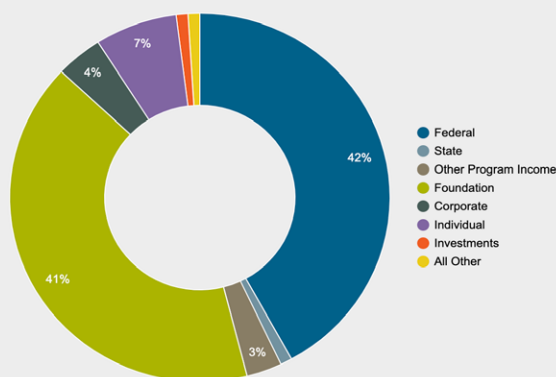
GMRI's wholly-owned subsidiary, Gulf of Maine Properties Inc. (GMPInc), owns and operates GMRI's facilities. GMRI rents 85% of the total space in the building and the remaining space is rented to other tenants.

GMRI has always received unqualified opinions from external auditors in our financial and federal compliance audits. Our 2018 external audit was no exception.

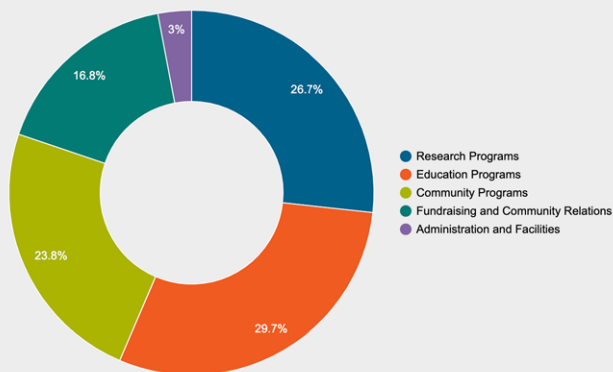
Most of the growth in our net assets over time has been in endowments and investment in property and facilities. We maintain our 2005 laboratory facilities in A-class shape. In 2018, we completed a major renovation to our Cohen Center for Interactive Learning, home to our LabVenture program. The Science Literacy Fund for Maine and other GMRI-held endowment funds reflect a new phase of asset growth, starting in 2013. As anticipated, our net assets decreased slightly in 2018, reflecting the impact of the six month fiscal year.

Meanwhile, GMRI continues to grow its national and international reputation as a marine research institute, a leader in science education, and a resource for marine and seafood businesses from boat-to-plate.

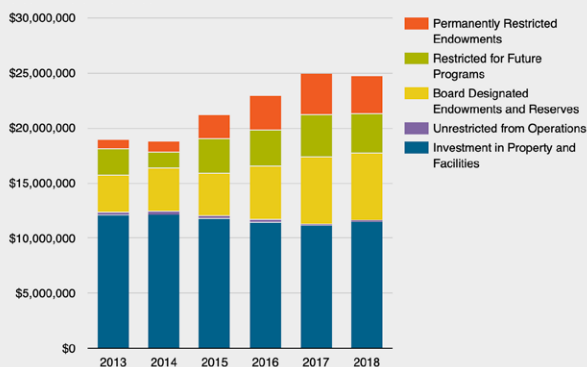
Revenue: \$4,558,907



Expenses: \$5,040,825



Total Net Assets





The success of our organization depends on our strong community of donors. In this video, they share why they support the Gulf of Maine Research Institute. Thank you to each and every one of you who contributed between July 1, 2017 and June 30, 2018.

## Wind Rose Society Gifts



We are grateful to the following members of the Wind Rose Society for their gifts between July 1, 2017 and June 30, 2018. Wind Rose Society members lead the way in helping GMRI protect our ocean, sustain vibrant coastal communities, and prepare the next generation for active citizenship.

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#### **Anonymous (2)**

**Andrew P. Barowsky Foundation, Inc.**

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#### **Maine Community Foundation at the recommendation of Steven A. Hammond**

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Susan & David Lawrence  
Jane & Don Leeber  
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The Morse Hill Trust at the recommendation of Ellie Linen Low & David Low  
Peggy & Bob MacArthur  
Machias Savings Bank  
Joshua Madore  
Marr-Anderson Family Foundation  
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