



Bigelow | Laboratory for
Ocean Sciences

IMPACT REPORT

2020

At Bigelow Laboratory, we approach each day with urgency. Our oceans are reaching a tipping point, and this is a critical decade.

But as I look back on all the progress our scientists made this year, I can't help but be filled with optimism! We are making essential discoveries. We are creating solutions. We are sharing all we're learning with students, leaders, and the public to inspire the changes that are so desperately needed.

This report provides a glimpse of the work we've accomplished during the last year with the support of our visionary donors. During a time of great uncertainty and disruption, they maintained their focus on the ocean challenges and opportunities we're addressing together — for which I am immensely grateful.



DEBORAH BRONK, PhD, *President and CEO*

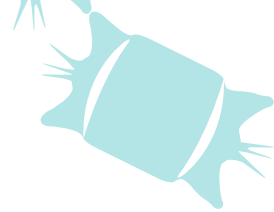


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**FROM THE ARCTIC
TO THE ANTARCTIC,
OUR SCIENCE MAKES AN**

IMPACT

OCEAN HEALTH & FUNCTION

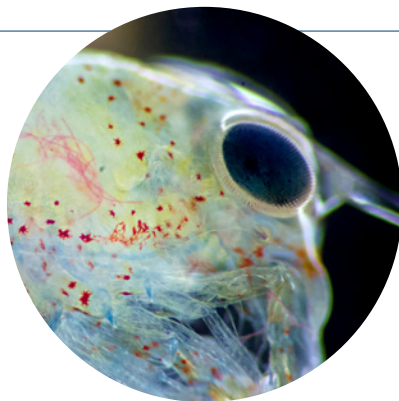


We reveal how the ocean works and how to better care for our planet.

As demand for rare metals used in electronics continues to increase, the world is eyeing deposits in the deep sea. Mining threatens these little-understood environments where microbes perform processes vital to planetary health. We led an international effort this year to assess the potential effects of mining on these microbes and their globally important roles.



Proliferation of toxic algae can be devastating to sea life and coastal economies. We launched a new study this year to investigate exactly what triggers these events — and what causes them to end. This work will untangle the complex relationships between viruses, bacteria, and the *Karenia brevis* algae that has ravaged Florida's coast in recent years.



Microplastic pollution is increasing in the ocean, but its effects on marine life are still largely unknown. Our scientists published new research this year that examined the impact of microplastic fibers on larval lobsters. Their experiments showed that fibers affected the lobsters at each stage of their early development, challenging the animals' feeding, respiration, and survival.



OUR CHANGING PLANET



We recently completed a year of Arctic fieldwork as part of the MOSAiC expedition. By collecting measurements throughout the annual sea ice cycle, our researchers developed new insights into how gases flow between the ice, ocean, and atmosphere. Their findings will help reveal the future of the Arctic.

Permafrost holds an enormous store of carbon — double that of the atmosphere. As climate change thaws this frozen soil, the trapped carbon becomes food for microbes that convert it into greenhouse gases. Our scientists are applying their expertise about these iron-oxidizing bacteria to understand how rising temperatures in the Arctic will reshape global cycles.



Human effects on the planet often compound. This year, we discovered that climate change and the loss of sea otters are combining to devastate living reefs that have defined Alaskan kelp forests for centuries. This research provided a sobering look at the future of this ecosystem, and a promising action plan for how local resource managers can slow this trend.

We focus on key species to predict, combat, and adapt to climate change.

THE OCEAN'S POTENTIAL

We develop the tools needed to unlock the opportunity of the ocean.

Maine is at the leading edge of sustainable aquaculture. This year, our scientists advanced research into fish feeds, oyster pathogens, water quality, kelp farming, and environmental monitoring. Through these and other diverse projects, we are making discoveries that support this growing Maine industry and generate solutions that can be applied around the globe.



The development of **CRISPR/Cas9** gene editing earned a Nobel Prize this year. Our scientists use this revolutionary technology to mine marine genomes for valuable properties and develop vaccines based on ocean microbes. We have also discovered it is a powerful way for us to engage students with science — from middle school through college.



Algae offer endless possibilities for environmentally friendly products — from food to fuels to medicines. To help companies actualize algae's potential, we launched the Center for Algal Innovation this year. As a core component of our new strategic plan, the center aims to be a comprehensive resource for the tools and capabilities needed to fully utilize algae.



Photos, left to right: Fritz Freudenberger, Brittney Honisch, Glenn Powers

Bigelow Laboratory is an independent, nonprofit institute. Our work is only possible with the help of a generous community of supporters. They share our passion for the ocean and our optimism about its boundless potential. They advise us, inspire us, and provide the philanthropic support that powers our work.

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Deceased donors are noted with a caret (^). Those who have named Bigelow Laboratory in their estate plans are noted with an asterisk ().*

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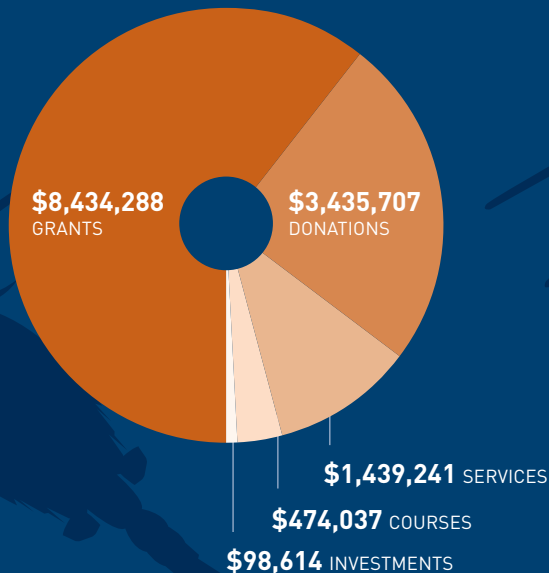
2020 FINANCIALS

JULY 1, 2019 – JUNE 30, 2020

View our audited financial report at bigelow.org/financials.

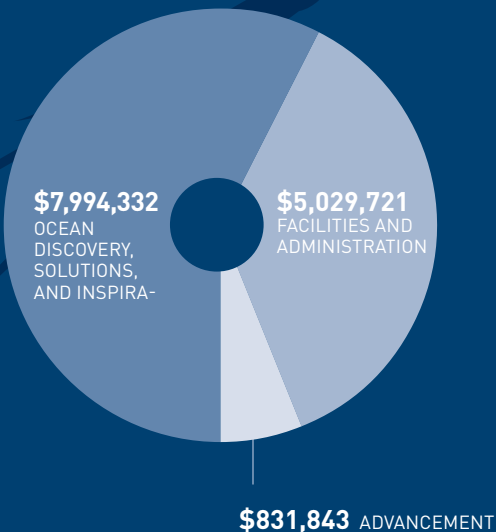
Revenue

\$13,881,887 TOTAL



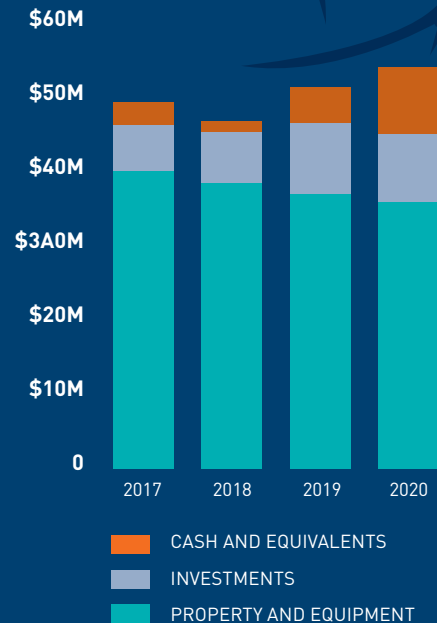
Expenses

\$13,855,896 TOTAL



Assets

2017–2020



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ON THE COVER This year, our scientists discovered that *Choanoflagellates* are one of two groups of microscopic organisms that may consume viruses as food. This was the first study to report this behavior outside of a laboratory, and the finding could transform the understanding of the role of viruses in the ocean.

Photo: Mark Dayel (mark@dayel.com)