

QUAHOG BAY CONSERVANCY



2023 ANNUAL REPORT



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DIRECTOR'S STATEMENT

Each year we are inspired and further motivated to expand our reach, grow our programs, and work even harder to protect Quahog Bay. We'd like to share the results from our efforts and expand on potential future changes.

We continue to foster good stewards through our scholarship opportunities and Marine Science Award for college undergrads.

This year, QBC supported five dedicated interns and a post-doctoral student focused on pioneering projects. They assessed microplastic contamination in the marine environment, explored the relationship between fish species diversity and invasive green crab abundance, and conducted a comprehensive literature review on a parasite that poses a threat to Maine aquaculture. In collaboration with students from the Multiple Pathways Academy, we continued to explore sustainable food systems by establishing an aquaponics system stationed on Bethel Point.

We are continuously looking for opportunities to expand QBC and incorporate additional in-depth scientific work to our programs. To that point, we are excited about the plans for a new Marine Research Center at Waddles Wharf in Harpswell. This Center, while not owned by QBC, will be a pivotal hub of marine research excellence, benefiting the surrounding ecosystem, community, and working waterfront. QBC will lease space in the Center allowing us to expand our research and welcome local students, scientists, and community members to delve into the world of marine sciences.

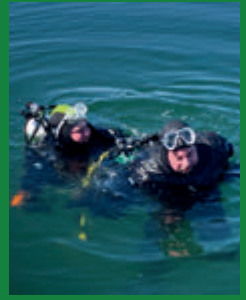
We will persevere with the important work of ensuring that Quahog Bay, and the surrounding areas, are protected and continue to thrive as a working waterfront.

With your assistance and support we can make a difference!

Thank you!

**PATRICK
SCANLAN**

Executive Director



NONPROFIT STATUS

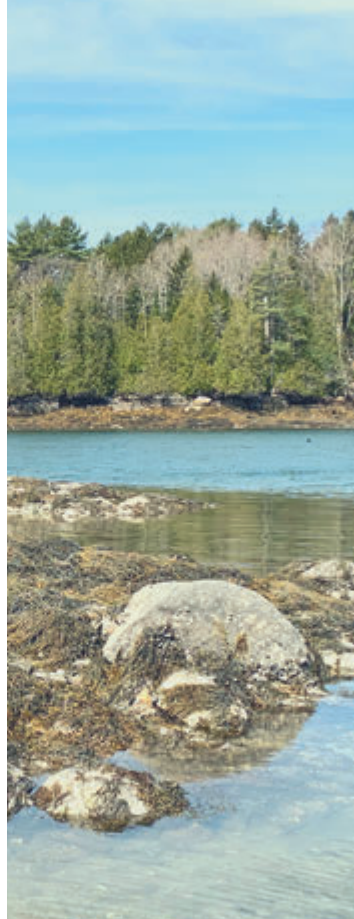
The Quahog Bay Conservancy (QBC) is a registered 501(c)(3) non-profit organization. All donations are 100% tax deductible. 100% of every dollar raised goes towards funding our programs and paying the staff who implement them. We are an extremely lean and efficient organization.

QBC is funded in part by generous individual donors, private foundations, and state grants. The balance of our revenue comes from QBC's sustainable oyster farm, which grows hundreds of thousands of oysters each year, selling them to restaurants and wholesale buyers.

The donated funds and 100% of the proceeds from the sale of Snow Island Oysters go to QBC's programs, ensuring that we protect the ecological integrity of the bay.

OUR BAY. OUR RESPONSIBILITY.

The mission of Quahog Bay Conservancy is to revitalize the ecosystem of Quahog Bay to a robust and resilient state for all communities that depend on it. Through sustainable aquaculture, ecosystem monitoring, and community education, we aim to conserve natural habitat, protect native wildlife, foster environmental stewards, and support Maine's working waterfront.



CONTACT INFORMATION

**QUAHOG BAY
CONSERVANCY**

**286 Bethel Point Road
Harpowell, Maine 04079**

Phone: (207) 522-1105

Email: office@quahogbay.org

LEARN WITH QBC

Education and outreach. Engaging and educating the community about the natural environment and marine ecosystem in such a way to promote good stewards of the land and sea.

Internship Program. Our summer internship is a comprehensive program for undergraduate students pursuing a career in marine biology, marine science, environmental science, fisheries science, oceanography, aquaculture, or a related field. In 2024 we will be offering a college credit for the internship.

Scholarships. Hoping to inspire future marine scientists, QBC supports undergraduate students attending a university in Maine with funds to support senior-level research projects. QBC also works with local high schools to create hands-on opportunities for the next generation. As well as offers support to local students planning to attend college with a Working Waterfront Science Scholarship.



NEW COLLABORATION

Katie Lankowicz, Stony Brook University 2016; B.S. in Marine Sciences and University of Maryland Center for Environmental Science 2022; Ph.D. in Ecological Systems; Postdoctoral Research Associate with the Gulf of Maine Research Institute 2023:

Katie is broadly interested in fisheries spatial and movement ecology, and so studies the factors that affect fish distribution. Her current research projects include modeling Atlantic cod spatial distribution in the Gulf of Maine and building a joint index of Western Bluefin tuna abundance from Canadian and American catch data. Katie also serves as a lead scientist for the Casco Bay Aquatic Systems Survey (CBASS), which seeks to evaluate the health and structure of the ecosystem in coastal Maine waters. This project includes a strong undergraduate science component, and so Katie has recently worked with QBC's summer interns as a scientific mentor collaborating the CBASS project.

Katie's doctoral research explored the spatial ecology and schooling characteristics of Atlantic menhaden using sonar imaging, statistical modeling, and individual-based simulation modeling.



INTERNSHIP & SCHOLARSHIP PROGRAM

Internship. QBC has established a formal, competitive summer internship program for undergraduate students and recent graduates. Interns support our staff on a portfolio of projects focused on fishery ecosystem research as well as community and education programs. The internship will provide an opportunity to gain valuable work experiences at sea and in our lab.

Scholarship Program. To encourage the development of Maine's future marine scientists, QBC supports senior-level research projects in marine science by students attending a university in New England. We allocate \$10,000 from our annual budget to support student marine science related projects.

For more information on internships and the scholarship program, visit our website (www.quahogbay.org) and download the requirements.



Hannah Orton, Bates College (Lewiston, ME); Environmental Science and Mathematics Major; **Summer Intern 2023:**

Hannah is from Littleton, MA but decided to spend a summer in Harpswell with QBC to learn more about aquaculture and what it takes to keep the bay clean. Going out on a boat daily didn't hurt!

During the summer Hannah conducted a literature review on the parasite *Haplosporidium costale* that causes the disease SSO in the eastern oyster, which is the species of oyster the QBC cultivates. QBC detected one of the first SSO outbreaks in Maine in both of their oyster leases this year, so she decided to do this project to find out more information to help reduce its spread.

Hannah enjoyed making connections at the Gulf of Maine Research Institute and other places she had the opportunity to visit through QBC. She also enjoyed getting involved in the multiple QBC projects.

"This summer taught me a lot about ocean conservation and grew my interest in pursuing a career in coastal ecology with an interest in disease pathology. My most valuable part was getting to work with the amazing QBC team and meeting scientists at research institutes such as GMRI. I also loved spending my summer in Maine!"



INTERNSHIP & SCHOLARSHIP PROGRAM

— CONTINUED



Dora Chaison-Lapine, Warren Wilson College (Swannanoa, NC) Conservation Biology Major and minor in Art; **Summer Intern 2023:**

Dora is passionate about the ocean, all of its creatures, and sustainable food systems, which is why this aquaculture internship was a perfect fit. She was initially drawn to the internship because of the oyster farming aspect and says: "All of the other projects were just a cherry on top. Learning about QBC's commitment to cleaning up and protecting the bay and helping with CBASS was so cool and everyday was exciting." She also highlights that making connections to different community organizations and learning about different research opportunities was a rewarding part of this internship.

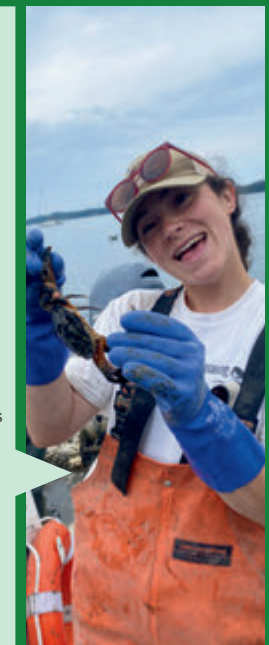
Looking forward, Dora hopes to continue working on the coast of Maine, farming or otherwise. "Working on the water everyday makes me happy and I am so grateful to QBC for all of the fun, connections and skills I have made this summer."

Lucy Medd, Bates College (Lewiston, ME); Biology Major and a minor in Hispanic Studies; **Summer Intern 2023:**

Lucy grew up in Portland, Maine spending her summers on the water. She is passionate about environmental conservation and education, and was inspired by her internship experience to engage in environmental outreach opportunities for the Maine community.

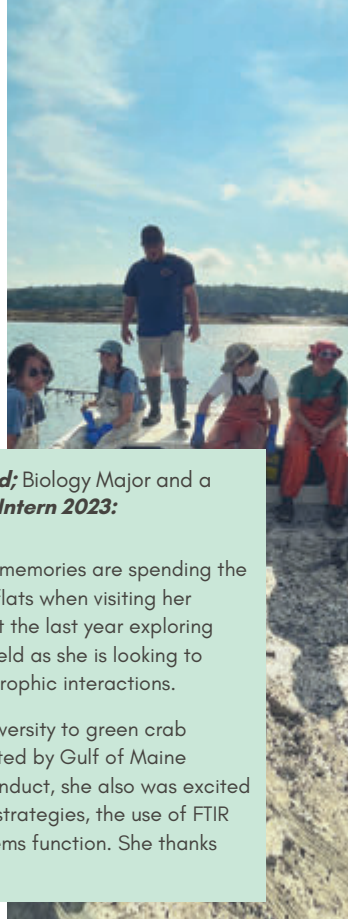
This summer, she conducted an assessment of microplastic contamination in Snow Island oysters using both optical and infrared spectroscopy. This assessment was the first of its kind in the area! In addition to her research project, Lucy most enjoyed trapping and crushing green crabs for use in the compost pile at Wolfe's Neck Farm. She was thankful for the QBC team and their positive attitudes and hard work ethics that made the summer so much fun.

"The most valuable part about an internship at QBC is that it will expose you to different career opportunities and give you the opportunity to network and engage with the marine science community in New England. Be excited to try something new, make connections, and spend lots of time on the ocean!"



INTERNSHIP & SCHOLARSHIP PROGRAM

— CONTINUED



Sasha Milsky, Union College 2022 grad; Biology Major and a minor in Classical Civilizations; **Summer Intern 2023:**

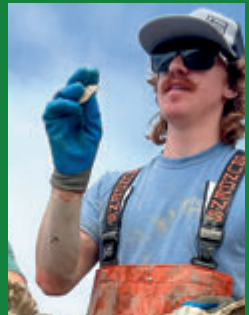
Sasha is from Chicago, IL, but her fondest memories are spending the summers kayaking and exploring the tidal flats when visiting her grandparents on Cape Cod. She has spent the last year exploring seasonal positions in the marine science field as she is looking to apply to graduate school to study marine trophic interactions.

This summer at QBC, Sasha worked on a project linking fish species diversity to green crab abundance using the Casco Bay Aquatics Systems Survey data collected by Gulf of Maine Research Institute (GMRI). Along with the research she was able to conduct, she also was excited to learn more about oyster harvesting, invasive green crab mitigation strategies, the use of FTIR and LDIR machines to detect microplastics, and how aquaponics systems function. She thanks everyone at QBC for all of these opportunities!

Nash Holley, Bates College (Lewiston, ME); Environmental Science Major; **Microplastic Research Technician 2023:**

As a summer intern at Quahog Bay in 2022, Nash developed a keen interest in microplastics, realizing the limited knowledge in this young field. Motivated by the global and local impact of microplastics on the Gulf of Maine ecology, Nash initiated a research project in spring 2023. Using a plankton net towed alongside a boat, he collected data at three chosen sites, employing a flowmeter and YSI instrument for water quality. In the lab, he digested samples to extract plastics and analyzed them with QBC's Agilent FTIR.

Results ranged from 100 to over 1000 plastics per slide, influenced by factors like water volume and storms. Recognizing weather's role, Nash recorded daily weather and tide data to support his hypothesis. Despite being his first research project, he overcame challenges through trial and error. Sample contamination, a prevalent issue, demanded a meticulous approach. By summer's end, Nash gathered 6 sets of 3 samples, revealing the presence of microplastics in Quahog Bay waters. While further research is needed, QBC is committed to ongoing exploration of microplastics' impact on local ecosystems.



MARINE SCIENCE CENTER

FACILITIES

We are actively seeking opportunities to enhance QBC's reach and integrate more extensive scientific endeavors into our programs. In this regard, we are enthusiastic about the upcoming establishment of a new Marine Research Center at Waddles Wharf in Harpswell. Although not under QBC ownership, this Center is poised to become a central hub for outstanding marine research, providing significant benefits to the surrounding ecosystem, community, and operational waterfront.

Through the generosity of individuals who, like you, share our commitment to fostering a flourishing environment, QBC will secure a lease for space within the Center. This will enable us to amplify our research initiatives and extend a warm welcome to local students, scientists, and community members, encouraging them to explore the fascinating realm of marine sciences.



MARINE SCIENCE CENTER

MICROPLASTICS

This year, Nash Holley, a microplastics research technician, launched a project to assess microplastic concentrations in Quahog Bay. Using a plankton net towed alongside a boat and a flowmeter, three sites were focused on to collect water quality data with a YSI instrument after 15 minutes of net towing at each location. In the lab, samples were digested in two solutions, preserving plastics while dissolving organic matter.

The filtered, digested samples were analyzed with QBC's Agilent LDIR, revealing variable plastic concentrations (100 to over 1000 plastics per slide) influenced by factors like water volume and storm activity. Despite challenges, six sets of three samples were successfully collected by summer's end, confirming microplastics' presence in Quahog Bay. Further research by the Quahog Bay Conservancy aims to extend this study to the Gulf of Maine to understand microplastics' local impact on ecosystems.



MARINE SCIENCE CENTER

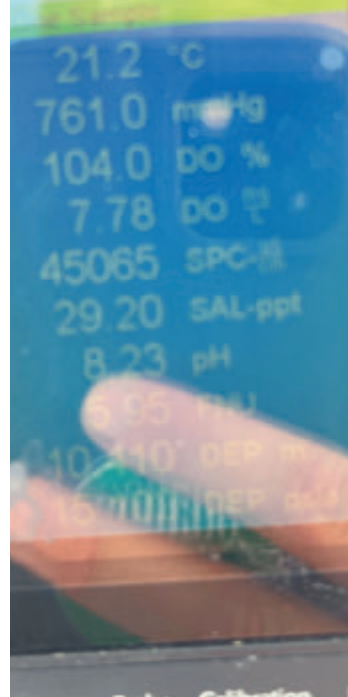
WATER QUALITY MONITORING

On a weekly basis the QBC team ventures out to nine different locations in Quahog Bay to collect water samples. The surface water at each site is collected and then processed and analyzed in our lab facility. Key measurements reported on include:

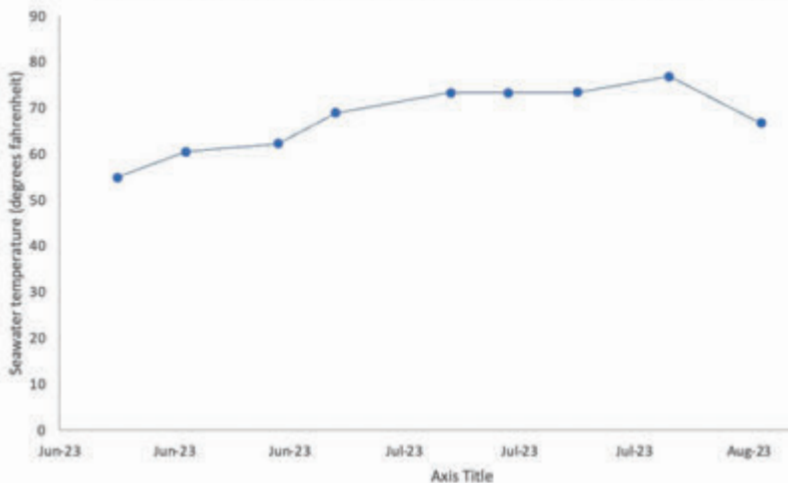
- water temperature
- salinity
- conductivity
- dissolved oxygen
- acidity
- turbidity

Other key components include monitoring the levels of bacteria and various species of phytoplankton to track harmful algal blooms, known as "red tide." Gulf of Maine red tide is caused by *Alexandrium catenella* algae, which produce a toxin that can accumulate in shellfish.

The combination of these key measurements and components inform us about the water quality and if the presence of disease-causing organisms has caused water contamination.



Summer 2023 Seawater Temperature (°F) in Quahog Bay, Harpswell, ME



MARINE SCIENCE CENTER

AQUAPONICS

Aquaponics, a highly efficient farming solution, addresses challenges by using less water than conventional farming, reducing the need for synthetic fertilizers, and minimizing waste. This sustainable farming method combines aquaculture (cultivation of aquatic organisms) with hydroponics (growing plants in nutrient-rich water without soil). This combination creates biological processes in both systems to establish a closed-loop environment where fish and plants thrive together.

In aquaponics, plants grow in the grow bed, and fish are placed in the fish tank. Nutrient-rich water containing fish waste from the fish tank is fed to the grow bed. Billions of naturally occurring bacteria in the grow bed break down ammonia into nitrites and then into nitrates. Plants absorb these nitrates and other nutrients for growth. The plant roots clean and filter the water before it flows back into the fish tank. The recirculating water, fresh, clean, and oxygenated, repeats the cycle in the fish tank.

QBC will utilize the aquaponics setup as an educational tool for students.



MARINE SCIENCE CENTER

CBASS

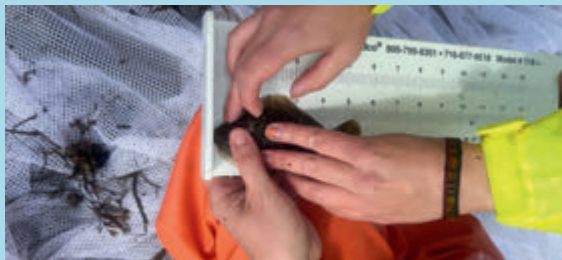
The Gulf of Maine Research Institute (GMRI) initiated the Casco Bay Aquatic Systems Survey (CBASS) in 2014 due to rising temperatures in the Gulf of Maine. CBASS examines the nearshore environment around Casco Bay, offering a comprehensive view of the ecosystem's functioning and shifts under climate change and changing land-use practices. Sampling includes various parameters such as temperature, salinity, oxygen, plankton, eDNA, and fish.

To enhance CBASS, an expanded survey is proposed, spanning an additional 10 years (2023-2033), covering Quahog Bay for increased spatial resolution, and expanding trophic level sampling. This expansion allows for greater engagement with researchers, students, institutions, and communities. A partnership with Quahog Bay Conservancy, GMRI, and the University of Maine aims to facilitate hands-on experiential learning for the next generation of ecosystem and marine scientists.



GMRI plans to leverage its Research Department's expertise for the expanded CBASS Survey and formalized partnership with Quahog Bay Conservancy. As part of this collaboration, scientists at GMRI will work with Quahog Bay Conservancy to design research protocols and study topics of interest, such as microplastics sampling and analysis.

The goal is to provide essential information for fisheries and coastal resource management by understanding the influence of physical and biological environments on coastal populations and communities.



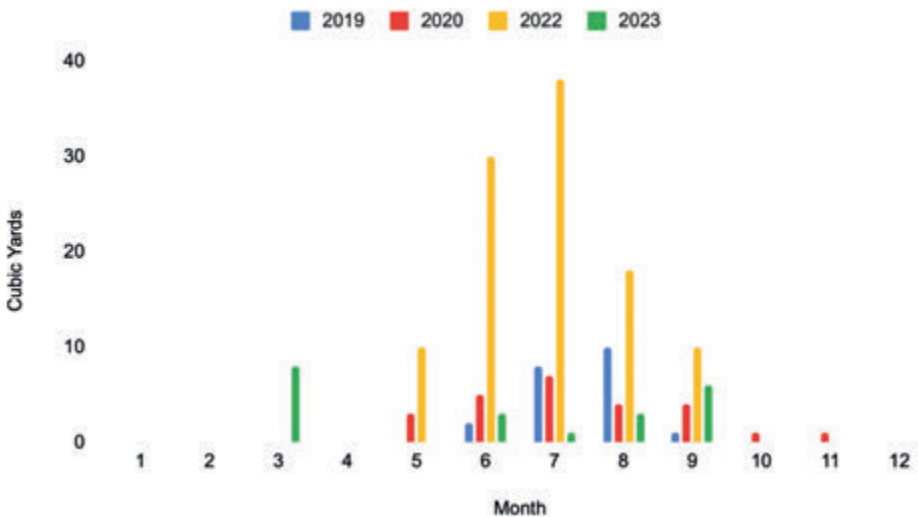
MARINE DEBRIS REMOVAL

Marine debris is a pollution problem that reaches throughout the oceans. Oceans and waterways are polluted with a variety of marine debris, ranging from tiny microplastics, smaller than 5 mm, to derelict fishing gear and abandoned vessels. Worldwide, hundreds of marine species have been negatively impacted by marine debris, which can harm or kill an animal when it is ingested or they become entangled, and can threaten habitats they depend on. Marine debris can also interfere with navigation safety and potentially pose a threat to human health.

Nearly all marine debris originates on land, entering the oceans through littering, poor waste management practices, storm water discharge, and extreme natural events: such as tsunamis and hurricanes. Some debris, such as derelict fishing gear, comes from ocean-based sources. Lost or abandoned gear is a major problem because it can continue to capture and kill wildlife, damage sensitive habitats, and even compete with and damage active fishing gear.



Cubic Yards of Trash Collected 2019–2023



MARINE DEBRIS REMOVAL

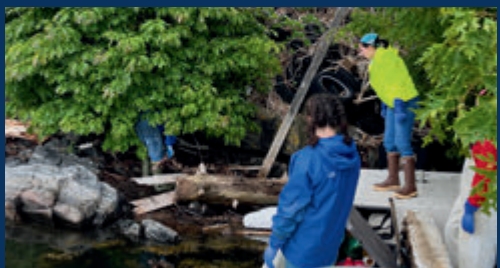
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QBC patrols and removes marine debris from the bay and along the shoreline year round. We also partner with other organizations and companies who have the same philosophy to maintain and protect the natural environment.

QBC partnered with Patagonia (Freeport) employees and participated in DMR's Maine Coastal Cleanup to remove marine debris.

Types of debris removed from the bay:

- fishing gear
- car batteries
- rope
- cigarette butts
- rubber gloves
- bottles & cans
- tires
- derelict docks & parts
- propane tanks! (so many this year)
- plastics
- styrofoam
- party balloons
- dock debris



OVERBOARD DISCHARGE

An overboard discharge (OBD) involves the release of domestic pollutants into Maine's surface waters, primarily stemming from residential and small commercial operations. Regulated by the Department of Environmental Protection (DEP) since the 1970s, these discharges release treated wastewater directly into rivers, streams, and the ocean. To preserve water quality for recreational, fishing, and aquaculture activities, the Department of Marine Resources (DMR) restricts shellfish harvesting near OBD outfall pipes. Maine, aligning its goals with the Federal Clean Water Act, seeks to eliminate OBDs, enhancing water quality and facilitating the reopening of shellfish growing areas.

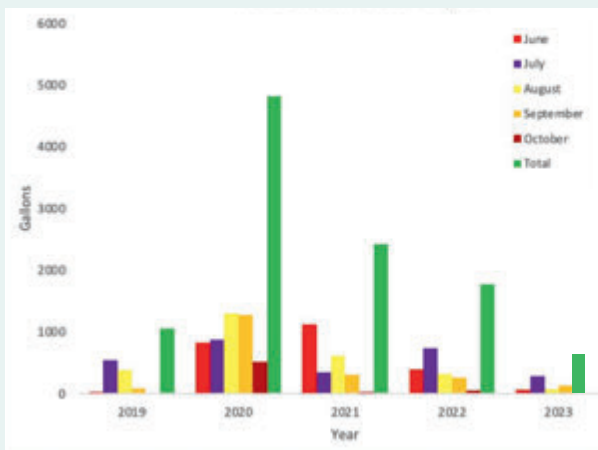
To combat OBDs, QBC operates a pumpout boat, providing boaters with a responsible alternative for wastewater disposal. These proactive measures champion water resource preservation, contributing significantly to Maine's commitment to sustainable marine practices and ensuring the long-term health of its coastal ecosystems.



Non Discharge Areas:

A "No Discharge Area" or "NDA" is a federally designated body of water where the discharge of both treated and untreated boat sewage is prohibited. Federal Law prohibits the discharge of untreated sewage from vessels within all navigable waters of the United States, which includes waters within three miles of shore. For more information on Maine's NDA's please visit: <https://www.maine.gov/dep/water/wd/vessel/nda/index.html>

Gallons Pumped Per Month Each Year



*In need of a
boat pumpout?*

Call (207)

522-1105

or reach us
by email

Office@quahog
bay.org



Available for
service mid-May
to October

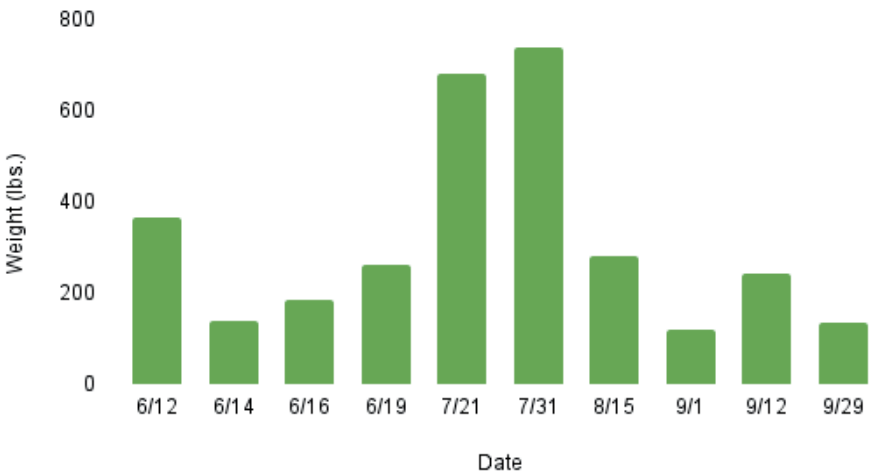
INVASIVE SPECIES

European green crabs (*Carcinus maenas*) are non-native, invasive and aggressive predators that were transported via human activities and introduced to new locations. Rising water temperature in the Gulf of Maine has seen an increase in green crab populations.

The dramatic increase of green crab population in recent years, and they have been feeding on shellfish resources such as blue mussels and soft-shell clams, threatening the state's third-largest wild fishery. DMR issues Green Crab Exemption permits to municipalities that wish to conduct trapping or other green crab removal programs. This allows QBC to participate in green crab removal activities without obtaining green crab permits or submitting landings reports. QBC is committed to maintaining the health of the bivalve shellfish resources and will continue to focus its resources and efforts on education, research, and reduction of green crabs.



3,149.75 lbs of Green Crab Removed in 2023



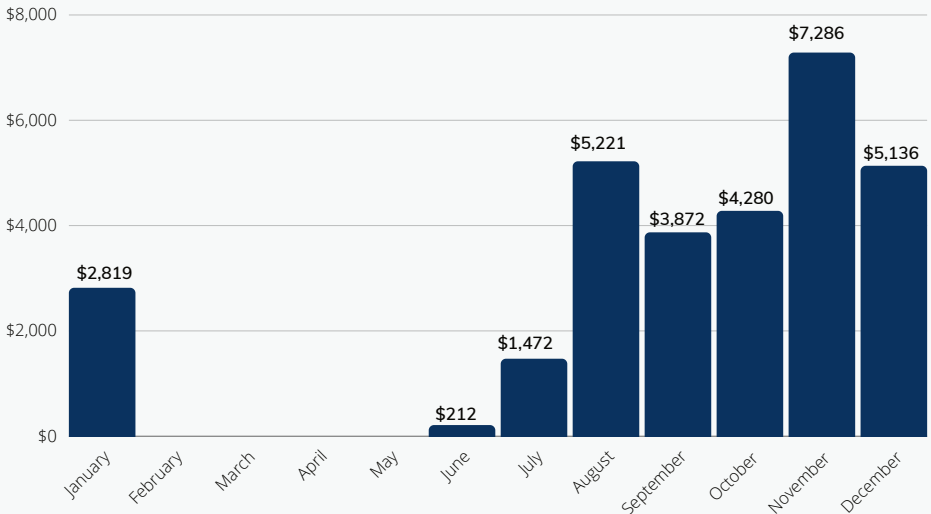
SNOW ISLAND OYSTERS



Oysters stand out as keystone species due to their outsized impact on ecosystems and other species. Their efficiency as filter feeders is noteworthy, with an adult oyster capable of filtering up to 50 gallons of water daily. This substantial reduction in nitrogen levels curtails the growth of harmful algal blooms, preventing detrimental effects on other aquatic life.

Shellfish aquaculture emerges as a cost-effective solution for water quality improvement. These organisms not only feed on phytoplankton but also accumulate marine biotoxins, chemical contaminants, and pathogenic microorganisms, effectively purifying the water column. Shellfish also play a pivotal role in controlling harmful algal blooms, such as red tide, and create an environment conducive to vegetation like eelgrass by enhancing water clarity. In essence, oyster farms contribute not only to economic vitality but also to the resilience and sustainability of coastal ecosystems.

2023 Oyster Income Breakdown



SNOW ISLAND OYSTERS

—CONTINUED



QBC not only uses oysters to filter the bay, but sells them and uses the proceeds to assist with other conservation efforts.

Snow Island Oysters are grown in floating cages. They increase in size by filtering the nutrient rich waters surrounding Snow Island and Dogs Head Island. It takes anywhere from 14 – 20 months for our oysters to reach a marketable size of 2.5 – 3 inches.

In 2022 we acquired 200,000 oysters seeds to raise.



QBC Yearly Oyster Income

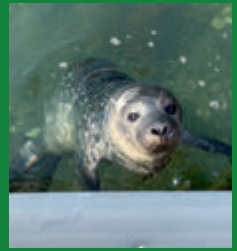
2016	\$6,460 & 9,900 oysters sold
2017	\$40,693 & 61,650 oysters sold
2018	\$45,203 & 55,705 oysters sold
2019	\$74,393 & 100,255 oysters sold
2020	\$9,483 & 12,286 oysters sold
2021	\$234,062 & 375,918 oysters sold
2022	\$53,231 & 64,775 oysters sold
2023	\$30,298 & 38,173 oysters sold



KELP

QBC's decision to integrate a kelp farm aligns with our commitment to community education and the preservation of coastal ecosystems. Functioning as an energy-efficient, multi-trophic aquaculture farm, the kelp project not only contributes to our non-profit's financial sustainability, but also addresses environmental challenges in our bay. By absorbing excessive nutrients like carbon dioxide, nitrogen, and phosphorus —commonly found in high quantities due to stormwater runoff and point-sources — kelp plays a crucial role in preventing harmful algal blooms. This nutrient reduction enhances oxygen availability, fostering an environment for diverse organisms to flourish. Additionally, cultivating kelp alongside our oysters provides a protective buffer against shell corrosion and diseases associated with ocean acidification.

Our envisioned farm will occupy currently unused QBC lease, anticipating the deployment of 20,000 feet of seed that is expected to yield 100,000 lbs of wet kelp in the inaugural year.



FINANCIAL OVERVIEW

The primary sources of income for Quahog Bay Conservancy (QBC) encompass contributions/grants, fundraising activities, and revenue generated from oyster sales.

QBC's existence is reliant on generous contributions and grants, which serve as essential pillars of support. The organization further sustains its financial needs through annual mailings, local events, and engaging social media campaigns. Oyster sales contribute significantly to funds acquired, providing vital resources for QBC's conservation initiatives.

As a 501(c)(3) nonprofit organization, QBC places a profound emphasis on accountability and transparency. To uphold this commitment, our IRS Form 990s for the preceding years are readily accessible on our website. This allows donors, partners, and the public to gain insights into our revenue, the allocation of funds to bay conservation, and the overall efficiency of QBC operations.



*For more financial information
please visit www.quahogbay.org*





Quahog Bay Conservancy Revenue and Expense Summary 2023 January – December

Revenue Total
\$516,877

Contributions — \$486,579

Oysters — \$30,298

Expense Total
\$255,364

Support Services Total
\$72,939

Overhead — \$51,570

Fundraising — \$21,369

Programs Total
\$182,425

Conservation — \$57,551

Oysters — \$55,228

Research and Development
— \$55,397

Education and Outreach —
\$14,249

NO EXECUTIVE COMPENSATION:

We are an extremely lean and efficient organization. Not a single penny goes to executive compensation because we don't have any executives to compensate. 100% of every dollar raised goes towards funding our programs and paying the staff who implement them.





OUR BAY. OUR RESPONSIBILITY.

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GIVE A SHUCK.