

Shellfish and Habitat Restoration in Support of Water Quality Improvement: *Expansion of Shellfish and Habitat Restoration in Shelter Island Town Waters*

Budget Justification Key Points:

- The multitude of species to be cultivated and propagated in support of water quality and habitat restoration goals calls for a wide scope of expertise, infrastructure and technical implementation of proven methodology. The budget reflects the personnel, equipment and material expenses needed to conduct this project, which will cost over \$300,000 in total, with \$200,000 being requested from the Town of Shelter Island Community Preservation Fund.
- CCE Marine Program is continually seeking funding from various agencies, foundations, and donors in order to continue and expand operations at all of its locations, including Shelter Island, and will continue to do so after the life of the current proposed project to ensure ample funds continue to be directed towards these efforts. The initial influx of funding from the Town CPF will enable the project to get off the ground and be better positioned for expansion and continuation on a long term basis. Without support from the Town it is unlikely efforts will be able to continue in 2023, as work and personnel will have to be directed to sites with commitments of funding in place.
- CCE has leveraged over \$50,000 in grant funds and additional in-kind contributions to invest in the pilot project that was conducted in 2022, with hopes to expand in 2023. The funding being requested would enable CCE to devote more time, staff, and resources to expanding efforts at the Shelter Island restoration location, paving the way for an even more successful future and partnership with Shelter Island Town in support of clean water and community stewardship.
- The highest restoration success - and in turn water quality benefits - will be achieved when a long-term commitment is made towards the expansion, maintenance, and monitoring of restoration efforts. In order to plan for a long term effort, adequate time and funds must be devoted to site selection and permitting process, test plantings, and monitoring of the success of the oyster, clam, bay scallop and eelgrass plantings.
- By conducting the project as proposed, this effort will yield substantial results in water quality improvement through shellfish population enhancement, habitat restoration, and effective public education and outreach. Residents and visitors will be able to become educated on water quality issues and how land based practices may impact the health of our environment and quality of our ground and surface waters.

Salary Related Cost Breakdown:**Aquaculture Team**

- **Total Annual Operational Salary Costs: \$350,000**
- **Total Proposed Project Expense: \$145,000**
- **Matching Funds: \$51,000**
- **Budget Request: \$94,000**
 - **Algae Technician:** cultivation of algae to feed the millions of shellfish to be produced for project.
 - **Shellfish Technicians (3):** assistance with spawning and care for shellfish for the 3 month duration they live in our shellfish hatchery system, transport to nursery systems, and weekly cleaning and care of juvenile shellfish until ready for seeding/deployment at stewardship site(s).
 - **Hatchery Manager:** Planning and oversight of algae and shellfish cultivation, maintenance and care and related staff to accomplish production goals.
 - **Aquaculture Coordinator:** Finalization of stewardship site/receiving area plans, coordination with regulators for permitting and permissions, coordination of stewardship activities and public involvement in the care and planting of shellfish produced for project.
 - **Aquaculture Specialist:** Guidance in restoration project design, final site selection, and oversight of all stewardship and restoration planting activities to ensure greatest water quality impacts.

Habitat Team

- **Total Annual Operational Salary Costs: \$222,000**
- **Project Expense: \$60,000**
- **Matching Funds: \$36,000**
- **Budget Request: \$24,000**
 - **Marine Botany Specialist:** Oversight and direction in design of eelgrass restoration element of project. Coordination of regulatory permissions and permitting affiliated with activities.
 - **Marine Meadows Program Manager:** Integration of community members into eelgrass planting activities to further the understanding of the importance of marine habitat, and increase extent of restoration plantings and seeding in support of water quality goals.
 - **Habitat Restoration Field Coordinator:** Coordination of field activities and dives to collect necessary information pertaining to site suitability assessment, final restoration site selection, and subsequent eelgrass planting and monitoring activities.

Education + Outreach Team

- **Total Annual Operational Salary Costs: \$214,000**
- **Project Expense: \$95,000**
- **Matching Funds: \$52,000**
- **Budget Request: \$43,000**
 - **Senior Resource Educator/Project Manager:** Oversight of all elements of project to ensure restoration, community involvement, and water quality goals are met and reported.
 - **Volunteer Coordinator:** Integration of community engagement opportunities into proposed tasks, recruitment of volunteers, delivery of stewardship sessions and workshops.
 - **Marine Education and Outreach Assistant:** Assistance in design and delivery of stewardship sessions and workshops.

Total Project Salary Costs: \$300,000**Total Project Salary Request: \$161,000****Total Project Matching Salary Funds: \$139,000**

Supply Cost Breakdown:

- **Total Supply Project Expense: \$5,488**
- **Matching Funds: \$2,988**
- **Budget Request: \$2,500**

Item	Unit Cost	Units	Cost
Burlap	\$ 150 per roll	\$ 1.00	\$ 150.00
Scissors	\$ 10.00	\$ 20.00	\$ 200.00
Template for discs	\$ 40.00	\$ 20.00	\$ 800.00
1" PVC Pipe	\$ 1.15 per ft	\$ 100.00	\$ 115.00
8" PVC Pipe	\$ 20 per ft	\$ 10.00	\$ 200.00
Clip weights	\$ 18.00	\$ 12.00	\$ 216.00
Folding Tables	\$ 70.00	\$ 12.00	\$ 840.00
Canopy Tent	\$ 170.00	\$ 4.00	\$ 680.00
Stainless Steel Skewers	\$ 3.00	\$ 12.00	\$ 36.00
Earth Anchor	\$ 10.00	\$ 4.00	\$ 40.00
Nylon line (15ft)	\$ 20.00	\$ 2.00	\$ 40.00
Buoy	\$ 10.00	\$ 20.00	\$ 200.00
Coolers	\$ 279.00	\$ 3.00	\$ 837.00
Tortilla Manufacturing	\$ 26/hour/volunteer	\$ 30.00	\$ 780.00
Tank Air Fill	\$ 12.00	\$ 32.00	\$ 384.00
Total			\$ 5,488.00

Equipment Cost Breakdown:

- **Total Proposed Equipment Project Expense:**
- **Matching Funds: \$14,798**
- **Budget Request: \$10,000**

Item	Unit Cost	Units	Cost
Boat	\$ 650/day	\$ 12.00	\$ 7,800.00
Truck and Trailer	\$ 150/day	\$ 12.00	\$ 1,800.00
Remote Setting Tank	\$ 1,478.00	\$ 1.00	\$ 1,478.00
CCE Facility Use Fee	\$ 100/day	\$ 30.00	\$ 3,000.00
Dive Gear	\$ 200 per diver/day	\$ 32.00	\$ 6,400.00
Greenhouse	\$ 720 per month	\$ 6.00	\$ 4,320.00
Total			\$24,798.00

Travel Cost Breakdown:

- **Total Proposed Supply Project Expense:**
- **Matching Funds: \$0**
- **Budget Request: \$1,950**
 - Travel funds will be utilized to cover costs affiliated with vehicle mileage and ferry trips.

Indirect Cost Breakdown:

- **Budget Request: \$25,050.26**
 - Indirect Negotiated Federal Rate (NICRA) of 14.28% on Association costs for both Federal and Non-Federal grant proposals.

Water Quality Improvement Key Points:

- Our proposal offers a long-term investment in the water quality improvement of Shelter Island's harbors. As shellfish grow from juvenile to adult, their filtration rates greatly increase; as eelgrass seeds and shoots grow into meadows, they sequester more nitrogen and carbon.
- The proposed habitat restoration and shellfish enhancement actions offer an ecosystem approach to water quality improvement. It has been observed that multi-species restoration collectively improves the successful establishment of each species, and in turn increases the efficiency of each species' nutrient uptake, therefore increasing the total water quality improvement potential.
- Eelgrass has been found to benefit the successful establishment of oysters, clams, and scallops through improved habitat and water quality. Many studies have found that species diversity is higher within seagrass meadows than outside of them.
- The following offers a breakdown of the filtration rates of the shellfish species in our proposal to get a broader picture of their water quality improvement potential. While nitrogen and carbon removal is important, shellfish also help balance levels of chlorophyll and microalgae, limiting harmful algal blooms.

Breakdown of WQI Potential by Species:**Spat-on-Shell Oyster Reef**

- Proposed action: 10 million oyster larvae to create 160 cubic feet of reef (assume 50% set success rate)
- A single adult oyster can filter up to 50 gallons of baywater per day, therefore:
$$5 \text{ million oysters} \times 50 \text{ gallons/day} = \mathbf{250 \text{ million gallons of baywater filtered per day}}$$
- Additional WQI includes nitrogen and carbon sequestration, habitat and substrate for other filter-feeding species, and enhancement of the wild oyster population through spawning which exponentially increases total water filtration

Hard Clams

- Proposed action: 250,000 seed (~13mm)
- A harvest-size littleneck clam filters approximately 5 gallons of baywater per day, therefore:
$$250,000 \text{ clams} \times 5 \text{ gallons/day} = \mathbf{1.25 \text{ million gallons of baywater filtered per day}}$$
- Additional WQI includes nitrogen and carbon removal upon harvest and enhancement of the wild hard clam population through spawning which exponentially increases total water filtration

Bay Scallops

- Proposed action: 100,000 seed (~15mm)
- A harvest-size scallop (12-14 months) filters on average 90 gallons of baywater per day, therefore:
$$100,000 \text{ scallops} \times 90 \text{ gallons/day} = \mathbf{9 \text{ million gallons of baywater filtered per day}}$$
- Additional WQI includes nitrogen and carbon removal upon harvest and enhancement of the wild bay scallop population through spawning which exponentially increases total water filtration

Eelgrass

- Proposed action: 10,000 shoots
- Conversion of carbon dioxide into oxygen in the water and sediment is crucial for supporting bay ecosystems
- Nitrogen and phosphorus sequestration by growing eelgrass shoots limits harmful algal blooms
- Sediment stabilization of meadows improves light penetration through the water column

Supporting Resources:

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Chipman, W.A. and J.G. Hopkins, 1954. Water filtration by the bay scallop, *Pecten irradians*, as observed with the use of radioactive plankton. *Biological Bulletin*, 107, 1: 80-91.

Dvorskas, A., S.B. Bricker, G.H. Wikfors, J.J. Bohorquez, M.S. Dixon and J.M. Rose, 2020. Quantification and valuation of nitrogen removal services provided by commercial shellfish aquaculture at the subwatershed scale. *Environ. Sci. Technol.*, 54, 24: 16156–16165.

Hilla, T.D., N.R. Sommerb, C.R. Kanaskiec, E.A. Santosd, and A.J. Oczkowski, 2018. Nitrogen uptake and allocation estimates for *Spartina alterniflora* and *Distichlis spicate*. *Journal of Experimental Marine Biology and Ecology* 507: 53-57.

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Zarnoch, C.B., T.J. Hoelleinb, B.T. Furmanc, and B.J. Peterson, 2017. Eelgrass meadows, *Zostera marina* (L.), facilitate the ecosystem service of nitrogen removal during simulated nutrient pulses in Shinnecock Bay, New York, USA. *Marine Pollution Bulletin*, 124, 17: 376-387.