Rhode Island Coastal and Estuary Habitat Restoration Fund
Full Proposal Form for Planning Projects 2023/2024

****for design or construction projects please use Full Proposal Form**

I. PROJECT SUMMARY

1. **Project Title:** Underwater Video Collection in Support of Eelgrass Restoration
2. **Project Location and coordinates** *(include map)*: South Shore Coastal Ponds and Narragansett Bay, Rhode Island
3. **Habitat type** *(River System, Salt Marsh, Seagrass, Shellfish Bed, other)*: Seagrass Bed
4. **If other, please specify**:
5. **Targeted restoration technique** *(e.g. re-vegetation, tidal restoration, etc.)***:** Re-vegetation
6. **Potential future benefits resulting from proposed planning project:** Increase in acreage of seagrass habitat
7. **Project partners** *(organizations providing financial or other support to the project)***:** RIDEM
8. **Is this is an ongoing project that has previously received funds from the CRMC Coastal and Estuarine Habitat Restoration Fund?** No **If yes, year(s) funding was awarded:**

II. PROJECT MANAGER CONTACT INFORMATION

1. **Name:** Michael Bradley, Jason Parent and Charles LaBash
2. **Organization**: University of Rhode Island
3. **Address:** 1 Greenhouse Road, Coastal Institute Kingston
4. **City:** Kingston **5. State:** RI **6. Zip:** 02881
7. **Phone:** 401-874-5054 **8. Email:** Michael_bradley@uri.edu
9. **Property Owner(s):** N/A

III. BUDGET SUMMARY

Amount Requested from Trust Fund		**$18,451.56**
Matching Funds	**Project Partner(s)**	**Amount of Match**
	RIDEM	$0
	TOTAL PROJECT COST	**$18,451.56**

The total cost of this project is $18,451.56 and covers 1.11 months of PI Bradley's salary, benefits and 0.03 person months of Dr. Jason Parent summer salary plus URI Environmental Data Center Geospatial lab service center costs associated with PI Bradley's effort on the project. Eelgrass mapping in Rhode Island has benefited greatly from the collaboration and partnerships established by the Rhode Island Eelgrass Mapping Taskforce: a consortium of estuarine scientists that work collectively to map and monitor eelgrass coastal Rhode Island waters. For the 2021 statewide mapping project for example, , RI Coastal Resources Management Council, and the Narragansett Bay Estuarine Research Reserve contributed personnel, boat time, expertise, and underwater video equipment. This project will again utilize RI Eelgrass Mapping Taskforce partners to complete the proposed work. The Taskforce, however, is an informal coalition and has a history of successful collaboration on eelgrass mapping. The bureaucracy of establishing official match accounts for Taskforce partners within the URI Controllers offices is daunting so we will not include formal match in the budget.

IV. PROPOSAL NARRATIVE

1. Justification and Purpose

Eelgrass is a critical marine habitat that provides a multitude of ecosystem services in estuaries and along coastlines throughout Rhode Island, yet it has been in steady decline throughout the State. Efforts to restore eelgrass populations would benefit from exploring approaches beyond the predominant practice of transplanting adult plants. Specifically, seed-based eelgrass restoration offers an alternative that has the potential to significantly increase the spatial and temporal scale of individual eelgrass restoration efforts. However, eelgrass seed production and reproductive phenology are not well described for the New England region. This information is key critical to the successful implementation of seed-based eelgrass restoration because collecting reproductive shoots too soon can risk missing pollination or otherwise stunting development. Collecting reproductive shoots too late can risk seeds releasing from the flowers prior to collection. This project will support this type of eelgrass restoration efforts by collection of underwater video several times during times during the growing season (June-September) in order to quantify how much of the eelgrass bed is in-flower and producing seeds. If funded, this work would supplement a larger project led by RI Department of Environmental Management (RIDEM) that is already funded through EPA (https://www.epa.gov/snep). The RIDEM project proposes to bring together eelgrass restoration practitioners and researchers in southern New England to build capacity for future seed-based eelgrass restoration efforts by documenting the timing of eelgrass seed maturation and density and identification of potential donor beds of mature eelgrass in the Rhode Island coastal ponds and Narraganset Bay.

2. Project Activities, Schedule and Work Plan

Underwater video will be collected at four to six beds in Rhode Island coastal ponds and Narragansett Bay (Figure 1). RIDEM will identify which eelgrass beds are in flower and producing seeds with bi-weekly diving surveys. The diver transects will only cover a small percentage of the aerial extent of the bed. Since the underwater video camera is deployed from a boat, more area can be surveyed than by using divers alone. Once eelgrass beds in flower are identified, underwater video surveys will occur concurrently with the diver surveys (every two weeks) until no flowering eelgrass shoots or seeds are observed. The goal is to quantify as a percent, how much of the bed is in flower or producing seeds by using both the diver and underwater video survey data. This is critical data to consider when identifying potential donor beds since successful restoration could potentially require a large quantity of seeds. Harvesting seeds would only be considered from eelgrass beds when most of the bed (by area) is producing seeds (by area), since the reverse (harvesting during times when there is little seed production throughout the bed) could cause undue stress.

Schedule and Work Plan

Spring 2024: GIS work to refine field site boundaries, field work logistics
Late Spring – Mid July 2024: Underwater video transect to identify eelgrass flowers and seeds (conducted every 2 weeks: 6-8 surveys in total)
Winter 2024 and 2025: Data management, analysis, and reporting

3. Coordination and Public Support

As the lead agency on the overall larger project, RIDEM will organize stakeholder groups with virtual and in-person meetings to leverage volunteers and field work. These introductory meetings will serve to educate stakeholders on the project so that they can mobilize outreach efforts for volunteers. Numerous stakeholders in Rhode Island (e.g. Salt Ponds Coalition, Save the Bay) have the expertise, skill, and resources to assist with field surveys utilizing volunteer divers and boat captains

4. Planning Consistency and Restoration Priority

It is a goal of RI CRMC to "preserve, protect, and where possible, restore SAV habitat." Activities within eelgrass habitats are regulated by the R.I. Coastal Resources Management Council's "Red Book" (CRMC 650-RICR-20-00-1.3.1(R))

5. Species of Concern

Seagrass beds are a well-known habitat for finfish and invertebrates of many kinds. For example, many species of threatened and vulnerable seahorses and sturgeons utilize seagrass beds (Hughes et al., 2009).

6. Climate Change and Coastal Resiliency

Seed-based eelgrass restoration has the potential to both significantly increase the spatial and temporal scale of individual restoration efforts, and the feasibility of incorporating a greater diversity of eelgrass phenotypes that have evolved in warmer sea water temperature like the mid-Atlantic. Further, the capacity to store seeds for multiple months, clean them of epibionts and parasites, and their small size and hardiness relative to adult plants allows greater flexibility in adjusting planting schedules, minimizes the risk of spreading unwanted organisms among locations, and makes transport of vast quantities of seeds between relatively disparate sites manageable – all characteristics which

make seeds an ideal choice for restoration projects hoping to incorporate climate resilient strategies such as phenotypic management and assisted gene-flow.

7. Environmental Justice

This project will occur entirely in Rhode Island's coastal waters including southern Narragansett Bay and the coastal ponds of southern Rhode Island. Thus none of our underwater sampling locations intersect the environmental justice priority areas as defined by the Narragansett Bay Estuary Program which are all on land. In addition, this project is not applicable to the USEPA's guidance on Environmental Justice and Equitable development since we not working in disenfranchised neighborhoods nor are we focused on urban planning or development.

8. Permitting

No permits are necessary for this project.

9. Capacity of Lead Organization

The work proposed here will be led by the University of Rhode Island Environmental Data Center (EDC) in the College of the Environment and Life Science. The EDC is a Geographic Information System (GIS) laboratory that has been operational for over 30 years. It developed the Rhode Island Geographic Information System (RIGIS) database, provides public access to the RIGIS database, and serves as the GIS Field Technical Support Center for the National Park Service. The EDC has a staff of 10 full-time scientists who have expertise in GIS, soil science, coastal ecology, coastal habitat assessment, geology, and conservation land protection and stewardship. The EDC has managed over $20 million dollars of extramurally-funded projects over the past two decades. It, and the URI grants office infrastructure are fully capable of administering this award.

The PI's for this project, collectively, have considerable experience in performing the technical and scientific work described here. PIs Bradley, Parent, and Labash have over 75 years of GIS experience among them. Bradley has been the lead and founding member of the RI Eelgrass Mapping Taskforce, a group of scientists who collaborate on methods, protocols, and the science necessary to map and monitor eelgrass in RI. In addition, he has been the lead on the previous four statewide efforts to map and delineate eelgrass and widgeon grass in coastal Rhode Island (Bradley et al. 2007, Bradley et al. 2013, Bradley et al. 2017).

10. External Factors and Climate Change

The presence and persistence of seagrass is an indication of resilient coastal ecosystems. Climate change has and will affect seagrass resilience in Rhode Island. Bradley et al (2021) found eelgrass acreage declined 53% in the enclosed coastal ponds of the south shore of RI from 2009 to 2021. Climate change impacts include an increase in turbidity due to flashier rain events especially the non-growing season as well warming water temperatures (Dunic and Cote, 2023). The coastal ponds of Rhode Island are especially vulnerable to both increases in turbidity and warming estuarine water temperatures. Furthermore, warming sea temperatures exceed the rate at which eelgrass populations can adapt, resulting in local eelgrass populations becoming ill-suited to survival at locations where they have historically thrived (King et la. 2018, Hughes et al. 2019, DuBois et al. 2022).

V. EVALUATING PROJECT SUCCESS (one page maximum)

1. Performance Measures and Deliverables

The project Team will develop a detailed field survey data collection plan and finalized detailed work plan and project timeline during first few weeks of the project (early Spring 2024). As part of this process, the project team will identify qualitative and quantitative metrics (i.e., targets) and project milestones to ensure work remains on schedule and the team is accountable to metrics and objective-related deliverables.

The deliverables for this project will include a short project report detailing our findings in terms of success of identifying flowering shoots and seeds in eelgrass with the survey area using underwater video equipment, correlations between diver surveys and the video surveys in terms of eelgrass phenology, and eelgrass maps for each survey area.

2. Monitoring Plan

This project involves monitoring four-six eelgrass beds in Rhode Island to determine the timing of flowering and seed production (Figure 1). We will use underwater video transects to conduct the monitoring. We will conduct three to four transects at each site that are between 75-100 meters long or enough to adequately cover the extent of the existing bed. Video monitoring will begin in early May and end in mid-July. The surveys will be bi-weekly during the monitoring period. PI Bradley will be responsible for collecting, analyzing, and managing underwater video data. Results of the monitoring will be made available with the project report.

VI. PROJECT BUDGET TEMPLATE

BUDGET ITEM	CRMC REQUEST	MATCH	MATCH PENDING OR SECURED? (select one)	SOURCE OF MATCH	TOTAL
Personnel Costs Dr. Jason Parent Mr. Michael Bradley	 $ 674.21 $8,299.23				$8,973.44
Fringe J. Parent M. Bradley	 $ 0.00 $3,951.73				$3,951.73
EDC service center	$1,836.08				$1,836.08
Indirect Costs (State of RI agency rate 25%)	$3,690.31				$3,690.31
TOTAL	**$18,451.56**			**TOTAL PROJECT COST**	**$18,451.56**

VII. BUDGET NARRATIVE (one page maximum)

Please provide a description and justification for each line item included in the project budget form (e.g. for personnel costs, provide hourly and fringe rates, for travel specify rate and estimated number of miles). Please specify any match requirements for each source of funding. Please include costs associated with required annual and final reports to CRMC. Be sure to detail how CRMC funds will be used.

Project Total - $18,451.56

Personnel

Principal Investigator: Dr. Jason Parent, Assistant Professor, will provide 0.03 month of summer salary effort in Years 1 and 2 (0.06 total) serving advising on research design and analysis.

Projected hourly wage rate is FY25 $70.68 and FY26 $72.80

Co-PI: Mr. Michael Bradley, Research Associate, URI Environmental Data Center, will serve as project manager of seagrass bed underwater video imagery data collection, post-processing and analysis at 1.11 person months of effort (0.36 month in Year 1 and 0.75 month in Year 2).

Projected hourly wage rate is FY25 $46.74 and FY26 $48.14

Fringe
The fringe benefit rate for full-time employees is set forth by contract and is not discretionary. Fringe benefits include retirement, health insurance, group life insurance and social security taxes. The rates are calculated individually and are actual amounts. Fringe benefits are not charged for faculty summer salary.

Bradley Fringe 47.62%

Environmental Data Center service center
The University of Rhode Island Environmental Data Center (EDC) Geospatial Technology Laboratory provides bench space for Michael Bradley's effort on this project. The EDC will contribute the geospatial IT infrastructure and maintenance for this project (GIS hardware, desktop geospatial and image processing software platform, networking, geospatial data storage, backups, security). These services are provided in return for a service charge that is calculated as a fixed percentage of the staff commitment to this project. Rates for EDC service center are reviewed and approved annually by the University of Rhode Island (URI) Service Center Committee under the direction of the URI Controller. EDC computing charges cover operation of the Environmental Data Center Geographic Information Laboratory, which has been an approved Service Center at URI for 23 years.

RI State FY24 EDC Service Center rates are approved at $1,600.07 /mo per 1 FTE and are subject to change in state FY25 based on annual review and are estimated at $1,632.07 per 1 FTE. FY26 rates are estimated at $1,664.71. Michael Bradley will contribute 1.11 person months (FY25 0.36 mo; FY26 0.75 mo) of service center effort toward this project.

IX. ADDITIONAL MATERIALS

Please include the following with your application:

_x_ Site and Locus Maps

_na_ Ground-level photographs of existing site conditions

_na_ Aerial photographs, if available

_na_ Preliminary design drawings, maps or engineering plans, if available

_na_ Pertinent physical, ecological, biological, and cultural / historical survey data

_x_ Letters of support

AUTHORIZED SIGNATURE

AUTHORIZED AGENT OF LEAD ORGANIZATION

Sara Clabby _____ 03/29/2024 _____

Signature **Date**

Return your completed proposal by 4:00 p.m. on **April 1, 2024** to:

Caitlin Chaffee
NBNERR
RI Dept. of Environmental Management
235 Promenade Street
Providence, RI 02908

caitlin.chaffee@dem.ri.gov

Applicants are required to submit one (1) signed hard copy of the proposal form and one (1) electronic copy in Adobe PDF format. **Please submit electronic copy as a **SINGLE PDF FILE** containing all application materials.**

Contact Caitlin Chaffee at **401-222-4700 xt. 277-4417** with any questions.

CRMC
COASTAL RESOURCES MANAGEMENT COUNCIL

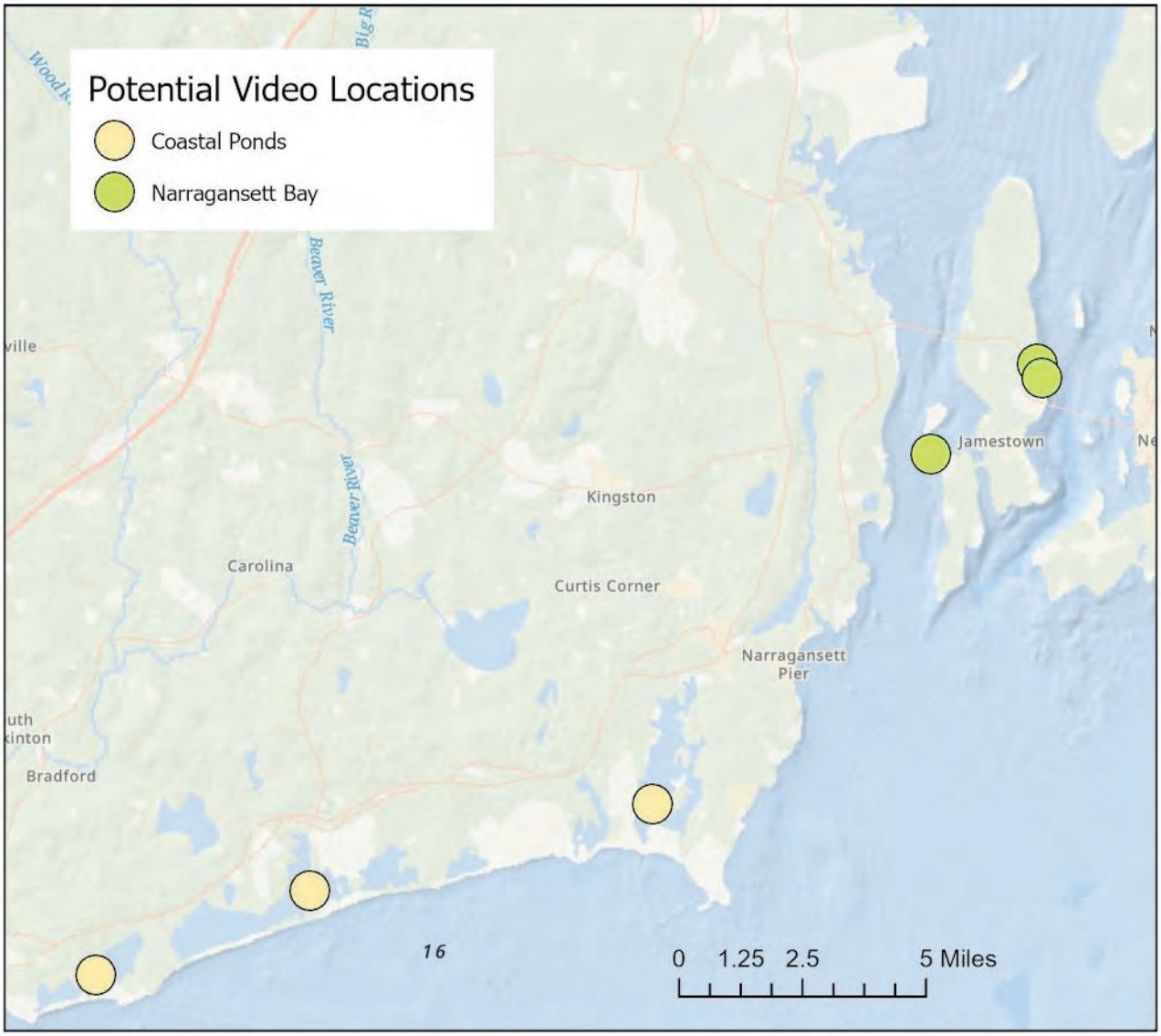

Figure 1. The map of potential underwater video locations to monitor eelgrass flowering and seed production includes three sites in Narragansett Bay and three in the coastal ponds.

References

Bradley, M., K. Raposa, and S. Tuxbury. 2007. Report on the Analysis of True-color Aerial Photography to Map and Inventory *Zostera marina* L. in Narragansett Bay and Block Island, Rhode Island. Page 1-16 and 9 Mapsheets. Rhode Island Natural History Survey

Bradley, M., R. Hudson, M. Cole-Ekberg, K Raposa, and A. MacLachlan. 2013. 2012 Mapping Submerged Aquatic Vegetation in Rhode Island Coastal Waters. Unpublished final report. http://www.savebay.org/eelgrass

Bradley, M., Chaffee, C., Raposa, K. 2017. 2016 Tier 1 Mapping of Submerged Aquatic Vegetation and 20-year Change Analysis. Final Report to the Coastal Resources Management Council, South Kingstown, RI. (http://www.crmc.ri.gov/sav.html)

Bradley, M., Boyd, J., Goetsh, B., Goulet, D., Mitchell, J., and LaBash, B. 2022. 2021 Tier 1 mapping of submerged aquatic vegetation (SAV) in Rhode Island and change analysis. Rhode Island Coastal Resources Management Council, Wakefield, RI. (http://www.crmc.ri.gov/sav.html)

DuBois, K., Pollard, K.N., Kauffman, B.J., Williams, S.L. and Stachowicz, J.J., 2022. Local adaptation in a marine foundation species: Implications for resilience to future global change. Global change biology, 28(8), pp.2596-2610

Dunic, Jillian C., and Isabelle M. Côté. "Management thresholds shift under the influence of multiple stressors: Eelgrass meadows as a case study." *Conservation Letters* 16.2 (2023): e12938.

Hughes, A. R., Williams, S. L., Duarte, C. M., Heck, K. L. and Waycott, M. 2009. Associations of concern: declining seagrasses and threatened dependent species. Frontiers in Ecology and the Environment, 7: 242–246.

Hughes, A.R., Hanley, T.C., Moore, A.F., Ramsay-Newton, C., Zerebecki, R.A. and Sotka, E.E., 2019. Predicting the sensitivity of marine populations to rising temperatures. Frontiers in Ecology and the Environment, 17(1), pp.17-24.

King, N.G., McKeown, N.J., Smale, D.A. and Moore, P.J., 2018. The importance of phenotypic plasticity and local adaptation in driving intraspecific variability in thermal niches of marine macrophytes. Ecography, 41(9), pp.1469-1484.

Rhode Island Department of Environmental Management
Division of Marine Fisheries

Office 401.423.1920 | Fax 401.423.1925 | dem.ri.gov/marine

Fort Wetherill Marine Laboratory
3 Fort Wetherill Road, Jamestown, RI 02835

Coastal Fisheries Laboratory
1231 Succotash Road, Wakefield, RI 02879

March 28, 2024

Caitlin Chaffee
Reserve Manager, Narragansett Bay National Estuarine Research Reserve
RI Dept. of Environmental Management, 235 Promenade St, Providence, RI 02908

Re: Letter of Support for the grant proposal "Underwater Video Collection in Support of Eelgrass Restoration"

Dear Ms. Chaffee,

On behalf of the Rhode Island (RI) Department of Environmental Management (DEM), Division of Marine Fisheries (DMF), I am writing to express our support for funding the project, "Underwater Video Collection in Support of Eelgrass Restoration" from the Rhode Island Coastal and Estuary Habitat Restoration Fund. RI DEM has statutory responsibility for the conservation and management of marine resources (RIGL § 20-1-2), including eelgrass (*Zostera marina*), and thus the proposed work aligns with our mission.

Eelgrass is a critical marine habitat that provides multiple ecosystem services in our coastal and estuarine waters. Despite its importance, this habitat is in steady decline along the Atlantic Coast, including portions of RI. In response, managers along the Atlantic coast are exploring seed-based restoration approaches to significantly increase the spatial and temporal scale of eelgrass restoration, as well as increase the resiliency of existing habitat. However, information related to eelgrass reproductive phenology and seed production are not well described for the New England region, including RI.

RI DEM DMF in partnership with the Massachusetts DMF was awarded funding from the EPA Southern New England Program (SNEP) to build capacity for future seed-based eelgrass restoration. The SNEP funded work focuses on determining the timing and density of eelgrass flowering shoots and seed maturation in shallow, wadable locations in targeted eelgrass beds in the SNEP region, including RI's coastal ponds and Narragansett Bay. The proposed work builds upon the SNEP funded activities by using underwear video to expand the spatial extent of the area surveyed and provide information on the portion of a bed that is flowering and how many potential seeds are present. The information collected by the proposed work is needed to guide future, spatially specific seed collection activities.

In closing, we strongly support the proposed project. Results from the proposed work, combined with information collected by RI DEM DMF and partners, will be used to restore and conserve eelgrass, benefiting local communities and users that depend on the ecosystem services provided by eelgrass.

Sincerely,

M. Conor McManus, Ph.D., Chief