



## SYNOPSIS

1. **Project Title:** Upper Bass River Watershed Restoration Project
2. **Organization Name:** Friends of Bass River
3. **Amount Requested from CPA funds:** \$99,000
4. **Purpose (Open Space, Historic Preservation, Community Housing, Recreation):**  
  
Open Space
5. **Project site(s)/location. As applicable, include tax map, parcel with site highlighted, acreage, and zoning district.**

The project is located within the Bass River estuarine system, which is approximately seven (7) river miles long, winding through the towns of Yarmouth and Dennis from Nantucket Sound into Mill Pond. The area west of Mill Pond is called Hamblin's Brook. It extends from the levee in Mill Pond west to the first fish ladder at Miss Thacher's Pond.

The Upper Bass River Watershed Restoration Project is focused on the Upper Bass River System extending from Miss Thatcher's Pond—which is the true-spring-fed headwaters, downstream to Follin's Pond, passing through two impaired culverts—North Dennis Road/Crab Creek Culvert and Weir Road Culvert—and through 57 of acres of abandoned cranberry bogs. Both culverts and study areas are fully within the Town of Yarmouth, Massachusetts, and owned by the town.

The focus of this request is the North Dennis Road culvert. Project Property Map attached.

## 6. Synopsis of Project.

The Upper Bass River Watershed Restoration Project seeks to address four critical threats to Southeast New England's coastal and watershed ecosystems: water quality impairments, restricted habitat from fish passage barriers, berms disconnecting floodplains, and restricted stream and tidal flows from undersized stream crossings. Bass River is one of the largest estuaries on Cape Cod and is an important waterway for recreation, fish, aquatic organisms, and community resiliency to storms and storm surges.

The Crab Creek Culvert at North Dennis Road crosses Bass River in a north-south alignment. Mill Pond to the west of the Crab Creek Culvert experiences significantly reduced tidal exchange due to its undersized culvert. This results in high levels of nitrogen and dissolved oxygen among other challenges. The 6'x6' structure was deemed appropriate by an engineering study in 2010, replacing the original 1700's structure "in-kind". This report pointed to an existing pinch point 1.7 miles south on Bass River as the source of the problem (former railroad bridge built 1857). Recent changes to hydrodynamic conditions, however, suggest this is incorrect.

In 2018, the railroad bridge was replaced with a wider span (85 feet at high tide – 65 feet at low tide), which has restored the tidal flow to this area. This increase in water volume has now created a restricted, high-velocity flow through the culvert in both directions depending upon the tide cycle. Erosion has caused failure of an adjacent recreational trail structure, boardwalk overlook, and the bottom of an access stairwell.

This undersized culvert causes degradation in the vicinity of the culvert due to scour from the tidal waters rushing through the culvert. Mill Pond water quality has been impaired as a result of being cut off from tidal exchange for over 150 years and receiving nutrient inputs from cranberry farming and increased residential development throughout the watershed.

Reduced flow through the undersized culvert results in a buildup of nitrogen in the system. This increased nitrogen loading in turn causes algal blooms. The algal blooms deplete the oxygen within the river and pond system, harming other aquatic species, causing unpleasant odors, and reducing recreational value of the water body.

To date, we have completed Phase I: Modeling and Preliminary Design. We are currently in Phase II: Permitting and Final Design. The Mass Department of Transportation Study has been completed. Preliminary Design is imminent with funding secured from the Natural Resources Conservation Service (NRCS). Preliminary Engineering Design is for the new bridge at North Dennis Road, which will replace the significantly undersized 6 feet wide culvert with a 60 ft wide bridge.

This funding request to the Dennis CPC is for Permitting for North Dennis Road, which is expected to take a total of 18 months and includes:

- Massachusetts Environmental Policy Act (MEPA)
- Wetlands Protection Act Notice of Intent & Division of Marine Fisheries
- Chapter 91 Waterways License
- Section 401 Water Quality Certification
- Section 404/10 Army Corps Pre-Construction Notification & CZM Federal Consistency
- Massachusetts Historic Commission

**APPLICANT INFORMATION**

7. **Project Title:** Upper Bass River Watershed Restoration Project – North Dennis Road - Permitting

8. **Organization Name:** Friends of Bass River (FOBR)

9. **Address (street and post office box), Telephone, Fax, E-mail, Website**

P.O. Box 303  
West Dennis, MA 02670

Friends of Bass River Inc  
C/O Rick Bishop  
17 Point of Rocks Rd  
Yarmouth Port, MA 02675

rbishop@friendsofbassriver.org

617-407-9503

<https://www.friendsofbassriver.org/>

10. **Federal Tax Identification Number:** 88-1972334

11. **Primary Contact Person(s) & Secondary Person (titles, telephone numbers, and e-mail addresses)**

Rick Bishop, Executive Director  
rbishop@friendsofbassriver.org  
617-407-9503

Robert Harrison, Board Chair  
rharrison.pcc@gmail.com  
508-776-4146

12. **Primary Contact Person & Secondary Person who can approve and receive the funds (titles, telephone numbers, and e-mail addresses)**

Rick Bishop, Executive Director  
rbishop@friendsofbassriver.org  
617-407-9503

Robert Harrison, Board Chair  
rharrison.pcc@gmail.com  
508-776-4146

## **APPLICANT BACKGROUND**

### **12. Brief applicant history**

Our mission, through monitoring, vigilance and direct management, is to help preserve and protect Bass River's delicate ecosystem. As one of the largest and most beautiful waterways on Cape Cod, the Bass River is under an increased danger from elevated nitrogen levels that, if allowed to continue unabated, will further damage and may even permanently alter coastal life as we now know it. Public education, awareness and involvement are critical to saving our river. With proper management, current nitrogen trends can be reversed. It is our duty to protect and preserve the invaluable Bass River Estuarine System.

Organized six years ago to give a voice to Bass River, we are dedicated to protecting and preserving the ponds, coves, and sub-basins of the Bass River Estuarine System. Through our ongoing Water Quality Monitoring Program, Upper Bass River Watershed Restoration Project, our annual State of the River Symposium, and regular engagement by our growing membership and volunteer base, Friends of Bass River is determined to improve the quality of the watershed to restore river herring and shellfish habitats, improve coastal resiliency, and to become a local leader in holistic watershed improvements from which neighboring towns with similar water quality threats can learn. Through public education, raising awareness, and increasing involvement we are taking critical steps to protect Bass River. With proper management, current nitrogen trends can be reversed.

In April of 2022, after several years of fiscal sponsorship through the Cape Cod Foundation, we received our 501 (c)(3) designation. As of January 1, 2023, we are an independent nonprofit no longer under the fiscal sponsorship of the Cape Cod Foundation.

Protecting Bass River means preserving Cape Cod's wildlife and improving coastal resiliency. All coastal communities rely on clean waterways for tourism, recreational activities, and fishing. Bass River is no exception. Unfortunately, pollution is already a part of life on Bass River. Excessive nitrogen fuels the growth of algae, which makes the water cloudy and lines boats and beaches with slimy green algae. If the water is cloudy, eelgrass can't grow at the bottom. Without eelgrass, fish and shellfish have a hard time surviving. If fish and shellfish habitat continue to decline, the birds that rely on them for food are also negatively impacted. In short, nitrogen pollution is destroying the river ecosystem.

The good news is that this is not a foregone conclusion. With careful management and by adopting some best practices, the current increase in nitrogen trends can be reversed and our waterway can be cleaned and protected for future generations.

Friends of Bass River is actively working and educating to monitor and improve the quality of the Bass River to protect this delicate ecosystem.

### **Current Programming**

FOBR runs a Water Quality Monitoring Program, holds an Annual State of the River Symposium, and is in the process of implementing a multi-year restoration project of the Upper Bass River Watershed. The project is supported federally through EPA funding, at the state level through the Department of Ecological Restoration (DER), and locally through the Yarmouth Community Preservation Fund. Water Quality Monitoring Program FOBR is currently the only organization involved in monitoring and improving water quality in the Bass River.

Monitoring nitrogen levels and other data points is vital to our work and our goals for restoring the Bass River. To conduct monitoring, FOBR launched the Bass River Water Testing Team in July 2020- a volunteer-based program with several partners, including local youth, where we conduct comprehensive measurement and assessment of water quality weekly, May through October.

In May 2019, FOBR held its inaugural State of the River Symposium. The symposium provides the community living on and near Bass River and its 10,500-acre watershed an update on the state of the river along with a snapshot of current and upcoming projects that will impact the region. In 2022, we hosted the 3rd annual in-person symposium (we were unable to hold the event in 2020 due to the pandemic), welcoming more than 150 community members. The symposium content is filmed by the Cape Cod Media Center to run on public access and to be available on our website for those who cannot attend in person.

### **Accomplishments**

Our Water Quality Monitoring Program is necessary in order to restore the river to safe and healthy levels. Comprehensive water testing data includes tide, weather, water temperature, precipitation, water turbidity, depth at each station, nitrogen, dissolved oxygen, phosphorus, and salinity. This data confirms current and changing conditions in Bass River.

In 2022, our now 19-member water testing team, trained by experts from the Center for Coastal Studies, analyzed testing data and prepared a comparison with the 2021 findings. We expanded our water testing sites from 6 sites to 7 with the addition of the Dennis Yacht Club.

FOBR's 3rd State of the River 2022 Symposium took place on October 21<sup>st</sup>. Cape Cod Media Center filmed the Symposium for public access and to stream on our website. Over 150 in-person participants gathered to hear from experts on the following topics:

- Nitrogen Bloom on Bass River
- Water Testing Team Results (Year 3)
- Oyster Aquaculture - Is it a solution?
- Bass River Bridge Conditions
- Erosion and Shoaling on the River
- Upper Bass River Headwaters
- Culvert Replacements

Speakers included: Eric Karplus, of Sciencewares, based in Falmouth, specializing in electronic and mechanical design and prototyping.

Nick Nelson and Sondra Shah of Inter-Fluve, a company committed to freshwater ecosystem restoration.

Eric O'Hanian, Jamie Fitzpatrick of lighe & Bond, providing engineering, environmental consulting, planning, and landscape architecture.

Tim Kelley, well-known meteorologist and our newest Water Testing Team member, speaking on the results of water testing.

On January 10, 2023, we hosted an on-site Municipal Vulnerability Preparedness (MVP) Public Presentation event with 36 in-person attendees. Meaningful public engagement is a key component to an MVP program.

**13. Names of governing board, trustees, or directors**

Chairman: Robert S. Harrison  
Vice Chair: Joseph E. Tierney  
Treasurer: Erinn McCarty  
Robert R. Churchill Jr.  
Kenneth H. Foster

**14. Summary of comparable projects completed**

In August of 2020, FOBR began Phase I of the Upper Bass River Watershed Restoration Project with a grant award of \$253,779 by the Southeast New England Watershed Grant Program (SNEP) (funded through the EPA). FOBR contributed matching funds (including in-kind staff time from FOBR and the Town of Yarmouth) in the amount of \$102,599—totaling \$356,378. FOBR delivered the Final Report for Phase I in February 2022 (Included with this proposal).

Phase I included:

Friends of Bass River Water Quality Testing  
Field Data and Modeling at North Dennis Road and Weir Road Culverts  
Restoration Design at 60%  
Recommendations for Next Steps, including Projected Costs

In Phase II, FOBR has completed:

Bog Restoration Design and Permitting – Funded – Completion Status

Initial Permitting - \$30,000 - Funded

- Section 106 Initiation – Completed
- MEPA EENG (no EIR) – Submitted
- DEO 401/91 – Partially Completed
- Corps 404 – Spring 2023
- CWA NOI – Spring 2023

Secondary Permitting - \$70,000 - Funded

- Project Management – 2023
- Ch 91 License Support – Spring/Summer 2023
- Historical Archaeological – Spring 2023
- Property Line Survey – Spring 2023

Weir Road - \$241,600 - Funded

- Inundation Mapping – Currently Underway
- Phase 2 Mass DOT Type Study – Currently Underway
- Phase 3 Preliminary Design – Currently Underway

North Dennis Road

- MassDOT Type Study - \$62,000 – Funded - Completed
- Initial Inundation Mapping - \$28,000 – Funded - Completed

## PROJECT INFORMATION

### 15. Project Concept

The Upper Bass River Watershed Restoration Project will provide for the final design and permitting elements of an overarching three-phase effort to restore 160+ acres of Bass River's estuary/coastal stream habitat by improving natural processes.

The completion of the project will result in replacing two significantly impaired and undersized culverts in the Upper Bass River System, and 57 acres of abandoned cranberry bogs.

The Upper Bass River Watershed Restoration Project will restore over 100 acres of estuary/coastal stream habitat by improving natural processes (restoring tidal exchange, fish passage, and wetland function/nutrient processing). We will remove obstructed water control structures, replacing them with bridges, and revert an abandoned cranberry bog to natural wetland.

Phase I of the project, which was funded and completed at the end 2021 (Final Report February 2022), included data gathering, engineering studies, and a preliminary design. This design work revealed that the replacement structures could not remain as culverts as originally thought, but instead would have to be designed as bridges (each extremely undersized culvert to be replaced by a new bridge—a bridge approximately 12 feet wide at Weir Road and a bridge 60 feet wide at North Dennis Road). This assessment required a new preliminary design for each bridge.

We are now implementing Phase II of the project, in which we'll apply the results gleaned from Phase I to finalize designs and complete the permitting process. **This proposal is specifically for funding to complete Permitting for the North Dennis Road bridge replacement.**

**While we have accessed federal funding for components of the overall restoration project, it should be noted federal dollars are not available to fund permitting.**

Upon completion of Phase II, we will have the project shovel-ready to enter Phase III - Construction.

## 16. Project Goals / Objectives

The specific goals under this request is to complete the following permitting for North Dennis Road:

- Massachusetts Environmental Policy Act (MEPA)  
It is anticipated that the preferred alternative will exceed wetlands review thresholds defined under 301 CMR 11.03, and that the preparation and submittal of an Environmental Notification Form (ENF) will be required for the proposed work, as the proposed activities will require an Agency Action (i.e., Chapter 91 License and/or Section 401 Water Quality Certification at a minimum). At present, it is assumed that the preferred alternative will require MEPA review in the form of an ENF and will not require review through an Environmental Impact Report nor will it be subject to the MEPA Environmental Justice (EJ) Protocols as the project area is 1.25 miles away from the nearest EJ population. While the EJ Protocols also regulate a five mile radius between a project area and EJ populations, the five mile radius only applies to projects triggering greenhouse gas thresholds. This project will not exceed greenhouse gas thresholds. This process is anticipated to take up to two months, from the date of application submittal.

- Wetlands Protection Act Notice of Intent & Division of Marine Fisheries  
The proposed culvert replacement is anticipated to involve work within a combination of the following resources: Land Under the Ocean (LUO), the 200-foot Riverfront Area, Coastal Bank, Bordering Vegetated Wetland, and Land Subject to Coastal Storm Flowage (LSCSF), and the 100-foot Buffer Zone. These are all jurisdictional resource areas regulated by the Massachusetts Wetlands Protection Act (WPA; *M.G.L. c. 131, § 40*) and implementing regulations (310 CMR 10.00). Accordingly, we have assumed that a Notice of Intent (NOI) filing will be required with the Yarmouth Conservation Commission (Commission) and MassDEP to authorize the project under the WPA. This process generally takes two months from the date of submittal, including public notice timelines, public hearings, and permit issuance.

As this is a coastal project that will occur below the mean high water line, coordination with and review by the Massachusetts Division of Marine Fisheries (MassDMF) will be required. A copy of the WPA Notice of Intent will be provided to MassDMF and they will complete their file review concurrent with the NOI process.

- Chapter 91 Waterways License  
Based upon a review of Chapter 91 Jurisdictional Tidelands provided by MassGIS, the project area falls within jurisdictional tidelands. Replacement of the culvert will require a Chapter 91 License, which involves preparation of a Chapter 91 license application and project plans in the required License format for submittal to MassDEP, and public notice requirements. Based upon experience with similar projects, the proposed project may be considered a water-dependent use. MassDEP's review process takes on average nine to 12 months for issuance of a License upon receipt of a complete application.
- Section 401 Water Quality Certification  
We anticipated a Section 401 Water Quality Certification (WQC) will be required. A WQC is required when the project results in either in a loss of 5,000 square feet cumulatively of Bordering or Isolated Vegetated Wetlands and Land Under Water, the amount of any proposed dredging is greater than 100 cubic yards, or if any of the other thresholds listed in 314 CMR

9.04 are met such as temporary or permanent impacts to salt marsh. Sediment sampling will be required for this submittal and will need to be screened for analyses listed under 314 CMR 9.07(2)(b)(4). To evaluate the upland reuse of any dredged sediment, the samples will also be analyzed for the parameters listed in the MassDEP Interim Policy COMM 94-01: Dredged Sediment Reuse or Disposal and MassDEP Interim Policy COMM-15-01: Re-Use of Soil for Large Reclamation Projects. This permitting process generally takes seven or eight months upon application submittal.

- Section 404/10 Army Corps Pre-Construction Notification & CZM Federal Consistency  
The proposed project is subject to jurisdiction under Section 10 of the Rivers and Harbors Act due to work beneath waters subject to the ebb and flow of the tide. Possible discharge of fill may also occur within Waters of the U.S. under Section 404. The Corps' General Permits (GP) for Massachusetts cover specific activities within the limits of Corps' jurisdiction as stated in each of the activity General Permits. The total temporary and permanent impact area is used to determine if a project is eligible for Self-Verification, Pre-Construction Notification, or Individual Permit coverage. The project appears to qualify for authorization as a Pre-Construction Notification under multiple GP categories, including GP 1: Maintenance and GP 14: Temporary Construction, Access, and Dewatering.

The Pre-Construction Notification will be submitted to the Corps, and will be concurrently reviewed by other federal agencies, including the U.S. Environmental Protection Agency (EPA), the National Oceanic and Atmospheric Administration (NOAA)/ National Marine Fisheries Service (NMFS), the Massachusetts Office of Coastal Zone Management (CZM), the Federal Emergency Management Agency (FEMA), and the U.S. Fish & Wildlife Service (USFWS). The PCN process generally takes four months, following the Corps' receipt of a complete application.

In addition to environmental factors, the MA General Permit requires notification of the State Historic Preservation Officer (SHPO), Tribal Historic Preservation Officers (THPOs), and the Massachusetts Board of Underwater Archaeological Resources (MABUAR) per Section 106 of the National Historic Preservation Act.

The project is subject to Federal Consistency Review (MA Federal Consistency Rules, 301 CMR 20.00 and Coastal Zone Management Act, 16 U.S.C. § 14560) because it is being conducted by a non-Federal entity within the Coastal Zone and requires a permit from a Federal Agency (Corps). CZM Federal Consistency Review (FCR) through the Corps' review process is anticipated, and an Individual FCR process is not anticipated. The Corps will initiate coordination with CZM upon receipt of the Pre-Construction Notification application.

- Massachusetts Historic Commission  
Any new construction projects or renovations to existing structures that require funding, licenses, or permits from any state or federal governmental agencies must be reviewed by the State Historic Preservation Officers, including MHC, MABUAR, and pertinent THPOs for impacts to historic and archaeological properties in accordance with Section 106 of the National Historic Preservation Act of 1966 and 950 CMR 71. The purpose of this review is to ensure that projects minimize or mitigate adverse effects to properties listed in the National and/or State Register of Historic Places. A Project Notification Form (PNF) will be completed and submitted to relevant parties. As review under the Massachusetts Environmental Policy

Act (MEPA) is assumed to be required, a copy of the MEPA Environmental Notification Form (ENF) will be provided to these agencies to initiate historical review and will preclude the need to file a PNF. It is anticipated that historic review will be required for all four project alternatives, and will be submitted regardless of the alternative that is selected. A basic historic review generally takes one month from the date of receipt of a complete application, provided a finding of no effect is issued and no additional studies or submittals are required.

The long-term goals of the Upper Bass River Watershed Restoration Project are:

- Restoration of the identified abandoned cranberry bogs-returning them to their original state as wetlands-a vital nutrient sink for the surrounding community.
- The removal of culverts and manmade water controls on the abandoned cranberry bogs will restore hydrologic connectivity and improve fish passage.
- Improved tidal flushing, which will result in a net improvement in nitrogen levels and dissolved oxygen.
- Improved community and infrastructure resiliency to climate change, improved water quality, and ecological resources.
- Improved habitat for historically endemic species: herring and other anadromous fish, shellfish, birds and reptiles as well as eelgrass - the indicator of a healthy estuary
- Improved pathways will provide access for recreational users including fisherpersons, birdwatchers, walkers, and members of the ADA community.
- The Culvert replacement component of this project will help improve water quality through increased water exchange in Mill Pond, reduce erosion of Crab Creek through velocity reduction, provide improved fish passage, and enhance recreation opportunities.

**17. Describe any legal issues, ramifications, impediments about this project, if any.**

The Massachusetts Natural Heritage and Endangered Species Program (NHESP) Atlas (14th edition; August 1, 2017) and MassGIS online (August 2017) were consulted during the planning phase for this project. According to these sources, the project area does not fall within Priority Habitats of Rare Species or Estimated Habitats of Rare Wildlife. Accordingly, the proposed project is assumed to not require review under the Massachusetts Endangered Species Act (MESA).

Completing the MEPA study prior to submitting other permits will allow for potential regulatory feedback during the MEPA public comments so FOBR can account for those in remaining applications. This strategy should address and identify any legal issues, ramifications, impediments about this project in advance of the permitting process and keep the project on track.

On January 10, 2023, we hosted an on-site Municipal Vulnerability Preparedness (MVP) Public Presentation event with 36 in-person attendees. Meaningful public engagement is a key component to an MVP program.

*“The Massachusetts Environmental Policy Act (MEPA) requires that state agencies study the environmental consequences of their actions, including permitting and financial assistance. It also requires them to take all feasible measures to avoid, minimize, and mitigate damage to the environment.*

*MEPA further requires that state agencies "use all practicable means and measures to minimize damage to the environment," by studying alternatives to the proposed project, and developing enforceable mitigation commitments, which will become conditions for the project if and when they are permitted.*

*MEPA applies to projects that exceed MEPA review thresholds and that require a state agency action, specifically that they are either proposed by a state agency or are proposed by municipal, nonprofit or private parties and require a permit, financial assistance, or land transfer from state agencies.*

*MEPA review is not a permitting process. MEPA requires public study, disclosure, and development of feasible mitigation for a proposed project. It does not pass judgement on whether a project is environmentally beneficial, or whether a project can or should receive a particular permit. Those decisions are left to the permitting agencies. MEPA review occurs before permitting agencies act, to ensure that they are fully cognizant of environmental consequences of their actions.*

*MEPA review provides the mechanism through which this information collection and mitigation mandate is executed. MEPA empowers the Secretary of Energy & Environmental Affairs to oversee the review process. The process is public and encourages comments from citizens and from state, regional and local agencies.”*

Once MEPA concludes, we plan to prep the Ch. 91 and 401 WQC applications and submit them to start the clock running. Once those are submitted we will prep and file the NOI and PCN so the remaining agency review periods can overlap. The ENF can serve as the MHC PNF so a standalone PNF should not be required.

## **18. Describe how this project accomplishes the goals and objectives of the CPA**

### **OPEN SPACE**

Falling under the Open Space objective of the CPA, the Upper Bass River Watershed Restoration Project will achieve improved water quality through removal of barriers, increased water exchange, and the reintroduction of 57 acres of wetlands (abandoned cranberry bogs) to the riparian ecosystem.

The project is protecting and restoring the Upper Bass River watershed; protecting and restoring 57 acres of abandoned cranberry bogs by reintroducing them as wetlands. As stated above, the

project will Improved habitat for historically endemic species: herring and other anadromous fish, shellfish, birds and reptiles as well as eelgrass - the indicator of a healthy estuary.

The Upper Bass River Watershed Restoration Project is addressing four critical threats to our watershed ecosystem: water quality impairments, restricted habitat from fish passage barriers, berms disconnecting floodplains, and restricted stream and tidal flows from undersized stream crossings. Bass River is one of the largest estuaries on Cape Cod and is an important waterway for recreation, fish, aquatic organisms, and community resiliency to storms and storm surges.

#### **19. Describe how this project is relevant to the current and future needs of Dennis**

Bass River is a 7-mile essential estuary that winds through Yarmouth and Dennis.

The Bass River watershed covers:

- 10,835 acres
- 12,070 individual land parcels (85% which are residential)
- 21 freshwater ponds
- Three significant freshwater streams
- Involves three towns (Yarmouth, Dennis and part of Brewster)
- Two separate water districts

In 50 years, residential density has grown by over 60% causing nitrogen levels to increase significantly. Ten years ago, the Mass Estuaries Project estimated nitrogen in Bass River at 338 kg/day. Five years ago, Mass DEP recommended it be lowered to 206 kg/day. Reduction of nitrogen entering the watershed by installing sewers around the upper part of the river is decades away, but increasing tidal exchange and improving water flow to these areas can be done in the next five years with FOBR's Upper Bass River Watershed Restoration project.

Due to impaired water flow, the upper reaches of the system are more subject to the effects of nitrogen overload including the disappearance of eelgrass on which aquatic life feed and lives within. Additionally, all Cape towns are required to reduce nitrogen in coastal waters in compliance with the federal Clean Water Act (Barnstable County 208 Plan).

The coastal resiliency benefits of this project are far reaching and have immediate positive implications for the town of Dennis.

Opening the North Dennis Road culvert eliminates the bottleneck in place stopping storm flowage and accumulated sea level rise. Storm flowage is held back into Follin's Pond and Kelley's Bay flooding shoreline properties.

Opening the culvert allows this flowage to enter nearly 100 acres of existing wetlands that will absorb this water, thus eliminating flooding down river. Combined with predicted sea-level Rise, these issues will become a common event if the project is not completed.

**20. Describe how this project relates to the Dennis Local Comprehensive Plan**

<https://www.town.dennis.ma.us/planning-department/pages/comprehensive-plan>

The coastal community of Dennis needs a clean waterway for tourism, recreation, & fishing. Allowing nitrogen overload affects the whole ecosystem & decreases the health of people & wildlife living within it. Friends of Bass River's Watershed Restoration project also serves the residents of and visitors to the rest of the cape who will enjoy increased access to the watershed and its improved health.

This project empowers Cape communities by documenting how we can better protect ecosystems and support our local economy sustainably. This new infrastructure we are designing will be resilient to storm surges and flooding as the community adapts to the effects of climate change. Implementing these improvements along the largest river in Cape Cod will be an example across the region to smaller watersheds that hold critical aquatic and estuarine ecosystems.

Improvements to water quality will also result in improved recreational values including fishing and boating, shell fishing, hiking and other types of passive recreation. There is a major component to the project that is designing ADA accessible trails and walkways. Increased and appropriate pedestrian access will serve recreational users including fisherpersons, birdwatchers, walkers, and members of the ADA community. We want this area to be open to all who wish to enjoy it.

**PROJECT IMPLEMENTATION & BUDGET**

**21. Total CPA Funding Request: \$99,000**

**22. A Financial Plan, which must include a line-item project budget**

FOBR Executive Director Oversight and Coordination	\$9,000	10%
Massachusetts Environmental Policy Act (MEPA)	\$23,000	4 Months
Wetlands Protection Act Notice of Intent & Division of Marine Fisheries	\$13,500	2-3 Months
Chapter 91 Waterways License	\$17,500	12 Months
Section 401 Water Quality Certification	\$18,000	12 Months
Section 404/10 Army Corps Pre-Construction Notification & CZM Federal Consistency Review	\$12,500	4 Months
Massachusetts Historic Commission	\$5,500	1.5 Months
<b>TOTAL</b>	<b>\$99,000</b>	

**23. Evidence of interest from potential lenders, if applicable**

N/A

**24. List of other funding source(s), include private/public/in-kind**

Funded				
Funder	Date	Amount	For	Notes
Kelley Foundation	2/4/2021	\$10,000	Restoration	Status
Mass DER	2021-2022	\$36,000	Restoration	Funded
Cape Cod 5	2020	\$2,500	Water Testing	Funded
SNEP	2020-2021	\$253,779	Restoration	Funded
In-Kind SNEP Match	2020-2021	\$39,395	Restoration	In-Kind Staff Hours
<b>Yarmouth CPC</b>	<b>2020-21</b>	<b>\$94,616</b>	<b>Restoration</b>	<b>Funded</b>
Pond	Feb-22	\$10,000	Water Testing	Funded
Pond Report	Feb-23	\$17,000	Restoration	Funded
Cape Cod 5	2021	\$4,500	Water Testing	Funded
<b>Yarmouth CPC</b>	<b>2021-22</b>	<b>\$102,500</b>	<b>Restoration</b>	<b>Funded</b>
Eastern Bank	2022	\$3,000	Restoration	Funded
Mass DER	Nov-22	\$165,000	Restoration	Funded
Dennis Local Cultural Council	Oct-22	\$150	State of the River	Funded
Mass Cultural Council	Nov-22	\$2,500	State of the River	Funded
NRCS	2022	\$365,000	Restoration	Funded
<b>Yarmouth CPC</b>	<b>2022-23</b>	<b>\$150,000</b>	<b>Restoration</b>	<b>Funded (but 4 Town Mtg)</b>
		<b>\$1,255,940</b>		

**25. A five-year income and expenses plan for this project, if applicable**

N/A

**SUPPORT DOCUMENTS**

- 26. Letters of support from community organizations or other such sources (no more than five)
- 27. References (no more than three)
- 28. Other relevant materials specific to the project
- 29. Copy of most recent US Income Tax Form 990, where appropriate
- 30. Certificate of Non-Collusion (provided herein)

## ***CERTIFICATE OF NON-COLLUSION***

*The undersigned certifies under penalties of perjury that this proposal has been made and submitted in good faith and without collusion or fraud with any other person. As used in this certification, the word “person” shall mean any natural person, business, partnership, corporation, union, committee, club, or other organization, entity, or group of individuals.*

*Chief Executive Officer(s):*

*Rick Bishop*

*Name (print)*

*Name (print)*

*Signature*



*Signature*

*Title*

ED

*Title*

*Date*

5/1/23

*Date*

***APPLICATION SUBMITTED BY:***

Name of Organization: Friends of Bass River

Address: P.O. Box 303, West Dennis, MA 02670

Phone Number: 617-407-9503

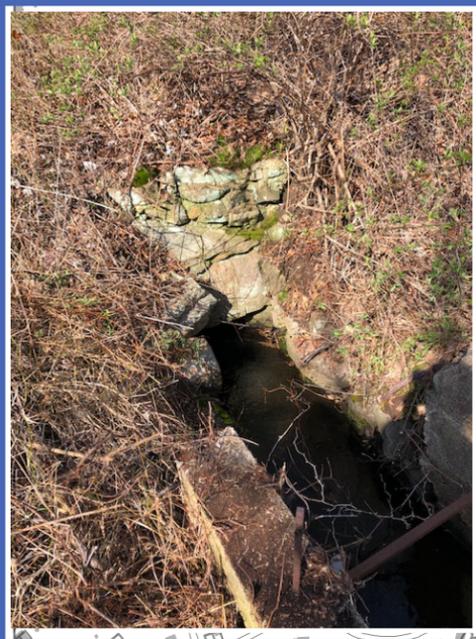
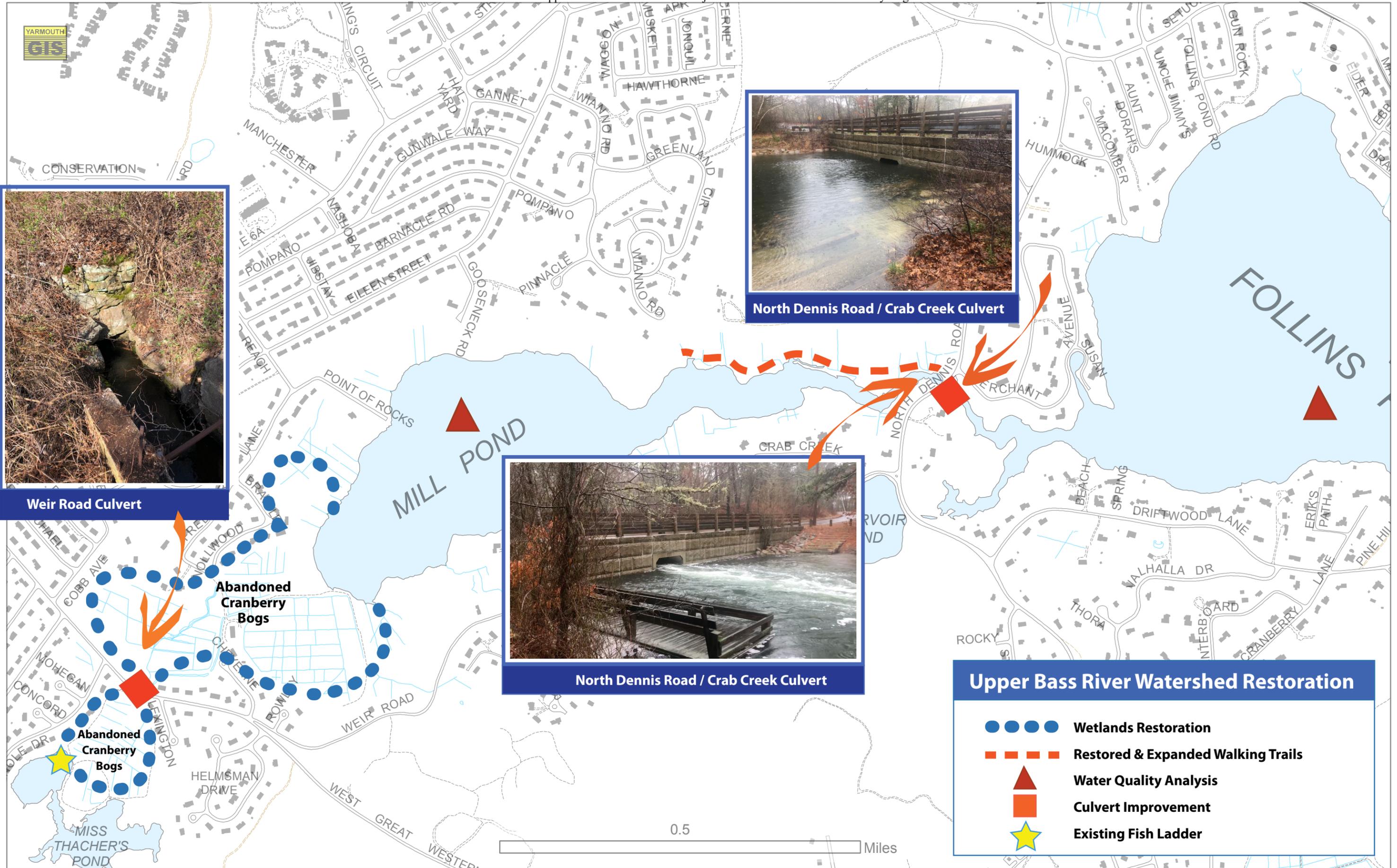
Email: rbishop@friendsofbassriver.org

Chief Executive Officer: Rick Bishop

Signature: 

Name: (if more than one) \_\_\_\_\_

Signature: \_\_\_\_\_



Weir Road Culvert



North Dennis Road / Crab Creek Culvert



North Dennis Road / Crab Creek Culvert

**Upper Bass River Watershed Restoration**

- ● ● ● Wetlands Restoration
- Restored & Expanded Walking Trails
- ▲ Water Quality Analysis
- Culvert Improvement
- ★ Existing Fish Ladder

Department of the Treasury  
Internal Revenue Service

for Tax-Exempt Organization not Required to File Form 990 or 990-EZ

2022

Open to Public Inspection

**A** For the **2022** Calendar year, or tax year beginning **2022-01-01** and ending **2022-12-31****B** Check if available Terminated for Business Gross receipts are normally \$50,000 or less**C** Name of Organization: **FRIENDS OF BASS RIVER INC****17 Point of Rocks Road,  
Yarmouth Port, MA, US,  
02675****D** Employee IdentificationNumber **88-1972334****E** Website:**[www.friendsofbassriver.org](http://www.friendsofbassriver.org)****F** Name of Principal Officer: **Robert Churchill****44 River Street, South  
Yarmouth, MA, US, 02664**

**Privacy Act and Paperwork Reduction Act Notice:** We ask for the information on this form to carry out the Internal Revenue laws of the United States. You are required to give us the information. We need it to ensure that you are complying with these laws.

The organization is not required to provide information requested on a form that is subject to the Paperwork Reduction Act unless the form displays a valid OMB control number. Books or records relating to a form or its instructions must be retained as long as their contents may become material in the administration of any Internal Revenue law. The rules governing the confidentiality of the Form 990-N is covered in code section 6104.

The time needed to complete and file this form and related schedules will vary depending on the individual circumstances. The estimated average times is 15 minutes.

**Note: This image is provided for your records only. Do Not mail this page to the IRS. The IRS will not accept this filing via paper. You must file your Form 990-N (e-Postcard) electronically.**

THE  
DENNIS  
CONSERVATION  
LAND TRUST



April 7, 2023

Dennis Community Preservation Committee (CPC)  
Town of Dennis  
685 Route 134  
South Dennis, MA 02660

Dennis CPC,

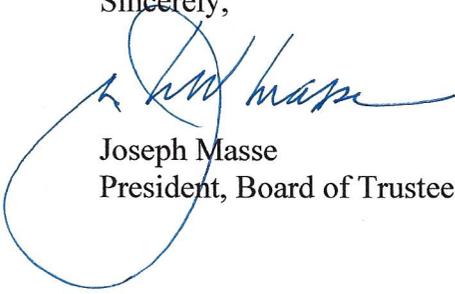
The Dennis Conservation Land Trust enthusiastically supports the mission on the Friends of Bass River (FoBR). A healthy and vibrant Bass River and its estuary benefits the citizens of our Town.

Unfortunately, according to a report completed by the Association to Preserve Cape Cod, the Bass River is not healthy. Mill Pond, Follins Pond, Dinahs Pond, Kelleys Bay, and the remainder of the river from top to bottom is rated either as moderately or significantly impaired. There are many reasons this river is not well, from infrastructure to pollution.

We should not be surprised by the results of the water quality work done by the FoBR and APCC. We also can't turn our backs on the problem. It is indeed within our power to return this river to a healthy state, and FoBR has been hard at work doing so.

The FoBR has a plan to begin the process of restoration. FoBR's proposal to fix infrastructure and restore tidal flow will improve water quality and reduce flood risk along the River. We believe their project to be well worth consideration by the Dennis CPC and the communities of Dennis and Yarmouth.

Sincerely,

  
Joseph Masse  
President, Board of Trustees

  
David Fryxell, Ph.D.  
Executive Director & Ecologist

TO: Chris Foley Chairman and Jeff Treiber Member at Large  
Town of Dennis Community Preservation Committee

FROM: Town of Dennis Climate and Coastal Resiliency Advisory Committee

Recently we invited Rick Bishop, Executive Director of Friends of Bass River, to make a presentation to our committee. He shared details of their comprehensive Upper Bass River Restoration project.

Phase one of the project calls for replacement of the significantly undersized 6' culvert on North Dennis road. By replacing this undersized structure with a 60' wide bridge, storm surge will flow from Bass River and specifically Kelley's Bay and Follins Pond through Crab Creek and into wetlands at the end of Mill Pond. This absorption will directly reduce the effects of storm related surge on Dennis residents' properties.

Understanding storm related and sea level rise issues is our direct charge. We see this proposal as an excellent solution to resiliency issues impacting our community in the very near future.

The Town of Dennis Climate and Coastal Resiliency Advisory Committee voted unanimously to support the Friends of Bass River project. We recommend the Dennis Community Preservation Committee support their application for funding.

Thank you very much,

A handwritten signature in black ink, appearing to read 'Spencer Stone', written in a cursive style.

Spencer Stone, acting Chair

# A River Runs Through Cape Cod

*Bass River, beset by pollution and collapsed infrastructure, finally finds a friend in a new nonprofit organization dedicated to bringing the river back to health.*



JAMES KINSELLA/CAPE COD REVIEW

By RICH HOLMES of the CAPE COD REVIEW

**D**ipnet in hand, a woman stood in shallow water on the south side of the North Dennis Road bridge over Crab Creek in Yarmouth Port, eyeing the water flowing out of the bridge's square concrete culvert for blue crabs.

"Any luck?" I yelled down to her from a gravel patch by the east end of the bridge.

"Just small ones," she replied.

"You'll get bigger ones later in the season," said Rick Bishop, standing beside me. She nodded her reply.

Bishop is executive director of the Friends of Bass River, a non-profit organization working toward environment improvement of Cape Cod's biggest tidal stream. The section of the river near North Dennis Road goes by the name "Crab Creek"

The scene before us seemed a slice of bucolic beauty, as sunlight illuminated the creek run-

ning through the forested conservation area.

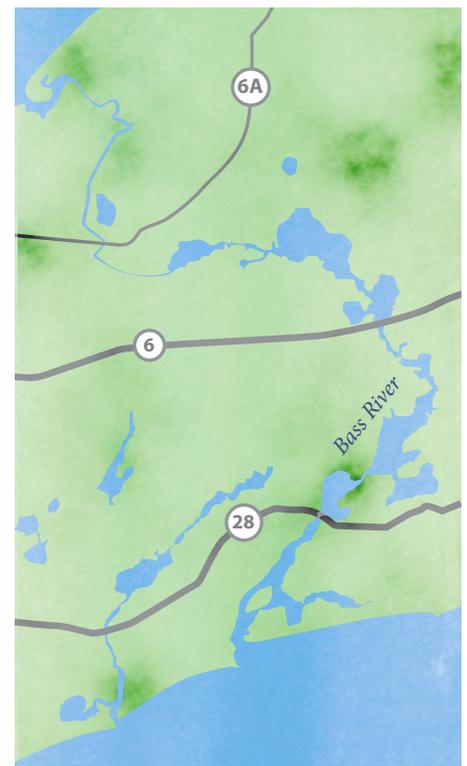
But to Bishop, the same scene displayed damage done to the upper part of Bass River.

He pointed to the creek's wide banks. Erosion, he said, had washed away soil and toppled trees so the once 18-foot-wide streambed is now 58 feet across.

In 2018, the railroad bridge built in the 1800s, which crossed Bass River a short distance south of the four-lane Mid-Cape Highway, Route 6, was replaced with a bike and pedestrian bridge. That allowed stronger tidal surges to come up the river.

At North Dennis Road, these watery forces met the precast 6-foot-square culvert, a pinch point, causing erosion on both sides of the bridge.

Installed in 2010, the culvert is one of several physical barriers the Friends of Bass River hope to rectify in its attempt to restore the upper reaches of the river to a more natural state.





JAMES KINSELLA/CAPE COD REVIEW

**A young Yarmouth family crabs for fun, not food, at Crab Creek just downstream from the North Dennis Road bridge.**

The battle is personal for Bishop, a Cape native who grew up swimming at Windmill Beach in the Bass River section of Yarmouth, and used to harvest scallops as far up the river as Follins Pond, northwest of where Route 6 passes by Kelleys Bay.

Those scallops disappeared along with the eelgrass that grew on the river's bottom, he said, killed off by rising levels of nitrogen, primarily from septic systems around the river. Eelgrass is vital to the scallops, which find their first home on the slender blades of grass and can hide amongst them as they begin to grow to maturity.

Too much nitrogen in coastal waters causes algae blooms and oxygen-starved dead zones, along with fish kills and smelly, slimy areas.

"It was loaded (with scallops) when I was a kid – loaded," he said.

By the mid-1980s, scallops could still be had between the Bass River bridge (Route 28) and High Bank Road bridge, Bishop said, but no longer.

"I'm so passionate about the river – it's part of my life," he said.

**Taking on the problem**

In 2017, a handful of residents concerned about the river's degradation formed the Friends of Bass River.

In 2020, they hired Bishop, a member and former chair of the Yarmouth Conservation Commission, as executive director.

"I immediately started a testing program in six locations," he said.

Water samples taken weekly during the summer by a team of 12 volunteers go to the Center for Coastal Studies in Provincetown for nitrogen analysis.

Ten years ago, the Massachusetts Estuaries Project estimated the total amount of nitrogen in Bass River estuarine system at 338 kilograms a day.

Five years ago, the state Department of Environmental Protection recommended levels be lowered to 206 kilograms a day.

With all the development that's occurred in the past decade, imagine what the total nitrogen load is now, Bishop said. Because of the impaired water flow, the upper reaches of the system are more subject to the harmful effects of nitrogen loading.

The sampling now being done by the Friends will provide the first new data on nitrogen levels in a decade or more. Bishop said results should be known in a few weeks.

The Friends of Bass River want to increase tidal flushing and recreate historic wetlands to lower nitrogen levels in the river and improve the habitat for fish, shellfish and other native wildlife.

Revising the culverts at Crab Creek and Weir Road would help accomplish this.

**The upper estuary, west of Follins Pond**

The North Dennis Road bridge traverses Crab Creek upstream from Follins Pond. Going further up, the creek flows west to become Mill Pond. Continuing on from Mill Pond, Hamblins Brook heads toward Weir Road.

There, another crossing forms another bottleneck, caused by a collapsed culvert. It hampers passage of fish and limits water flow in and out of the surrounding 57 acres of wetlands and old cranberry bogs, which are crisscrossed with drainage ditches, berms and water controls.

Bishop's organization wants to replace the Crab Creek culvert with a single-span bridge or add more precast culverts to increase flow while lowering the pressure that's scouring the banks.

It also seeks to remove the collapsed Weir Road culvert and create a meandering stream through the old bogs, now owed by the Town of Yarmouth, and connect to Miss Thatcher's Pond, which he identified as the historical spawning grounds for herring, and the true spring-fed headwaters of Bass River.

The pond and surrounding wetlands lie between Weir Road and Union Street in Yarmouth Port.

The Crab Creek culvert might even be reused if replaced, as it's "nearly a perfect fit" to replace the fallen Weir Road culvert, according to the Friends' website.

Hamblins Brook, as a natural stream, "no longer exists," Bishop said, but "in the 1870s, it was the second-largest herring run in all of Massachusetts."

The Friends of Bass River are starting by focusing on the upper part of the estuarine system because changes there could be done relatively quickly with great effectiveness, Bishop said.

Attempts to reduce nitrogen entering the watershed by installing sewers in the residential areas around the upper part of the river is "decades away," he said. "This could be done in five years."

A \$253,779 grant from the U.S. Environmental Protection Agency's Southeast New England Program, awarded last year to the organization, has helped the Friends of Bass River sample, study and plan the restoration effort.

Bishop said the organization recently applied for the another SNEP grant to complete the second phase of the project.

The group paid for all the engineering work, he said.

Once the project design and plans are complete, the group will raise funds to do the restoration.

“We like holistic projects—projects that have a broad impact,” said Tom Ardito, administrator of the Southeast New England Program’s watershed grant program.

He said the Bass River project received a grant because it seeks to improve conditions for both habitat and wildlife, and ameliorate the effects of flooding. Plus, it’s backed by the Town of Yarmouth.

Yarmouth voters placed about \$95,000 in community preservation funds toward the project, Bishop said, and the town’s conservation commission been involved “since the beginning.”

Yarmouth conservation administrator Kelly Grant said town staff from conservation, natural resources and public works departments regularly attend meetings on the project’s progress.

The grant program looks for commitment from all involved parties, Ardito said.

“You had very strong support from the municipality,” he said.

Ardito said the grant requires a 33 percent match in non-federal funds. The grant funds are being administered for the Friends by Cape Cod Foundation, a larger organization better suited to handle the accounting responsibilities, Ardito said.

Despite the pandemic, the Friends managed to keep to its project schedule, Bishop said. Ardito praised the group as “one of more timely grantees” in accomplishing the work set forth its grant application.

He said he couldn’t speak about the merits of the Friends’ second grant request, but its fate will be decided in mid-August and this year’s grants will be announced in September.

Other local organizations that have received SNEP grants include the Association for the Preservation of Cape Cod, Buzzards Bay Coalition, Pleasant Bay Alliance and the Falmouth Rod and Gun Club, which is restoring old cranberry bogs on the Childs River to natural wetlands, and improving the waterway to allow fish to travel upstream.

## A shared problem for Dennis and Yarmouth

While the initial project lies within Yarmouth, the Friends’ interests extend to the entire river. The eastern half of the waterway from the middle of Follins Pond to the river’s mouth on Nantucket Sound falls within the town of Dennis.



JAMES KINSELLA/CAPE COD REVIEW

**This view of the North Dennis Road bridge over Crab Creek may look bucolic, but the reconstruction of a bridge just south of the Mid-Cape Highway to carry a westward extension of the Cape Cod Rail Trail inadvertently changed the tidal flow of the river, damaging its Crab Creek branch.**

Erinn McCarty, the group’s vice chair, said she would like to see a similar project in the area of Weir Creek in West Dennis where she lives.

Lower County Road and Loring Avenue both cross the creek, which widens near the West Dennis Yacht Club to pass by “The Fingers,” a neighborhood of homes on short canals, and then empties into the river just north of its mouth.

The Weir Creek area suffers from the same issues as the upper river, she said.

Improvement of the river’s nitrogen levels isn’t just a nice thing to do for the environment. All Cape towns are under legal pressure to reduce nitrogen pollution of their coastal waters to become compliant with the federal Clean Water Act, as laid out under the county’s 208 Plan.

An effort to create a regional plant in Dennis that would treat wastewater from Yarmouth, Dennis and Harwich foundered last month when Harwich officials decided to pull out. McCarty said Dennis residents should know that the town still has to clean up its nitrogen problem, whether or not a regional plant is built.

“Dennis has to have a comprehensive wastewater plan,” she said.

The 208 plan places the responsibility for nitrogen reduction on towns, but looks at the problem by watershed. Of the 53 watersheds identified in the plan, 32 lie within two or more

towns, so cooperation would seem to be the name of the game. Dennis officials are aware of the Friends’ project, McCarty said, adding she has discussed it with members of the select board.

She said the Friends of Bass River has quickly grown to about 1,300 members, with many from Dennis. The group plans a “state of the river” meeting in October at which it will try to get representation from all levels of government.

George Macdonald, chairman of the Dennis Conservation Commission, said that he has not been involved with the Friends’ project, but supports the goals of restoring wetlands, clearing waterways and lowering nitrogen water levels.

“In a general way, I certainly would be in favor of all of them,” he said, noting he had worked on a similar project on Sesuit Creek back when he was the town natural resources officer.

Both Bishop and McCarty stressed the need for more public education on threats to the river and what local residents, summer visitors and businesses can do to help out.

The Friends’ website encourages maintenance of septic systems, organic lawn care, use of boat pumpout facilities, and proper disposal of hazardous wastes. The group’s newsletters have discussed Styrofoam pollution from boating, and how low tidal flushing encourages the growth of invasive plants into salt marshes.



ROBERT SCOTT BUTTON

An aerial view of Bass River, the largest estuary on the Cape and, like the rest of the Cape's estuaries, suffering from pollution.

## Why restoring Bass River matters

Bass River may be the Cape's largest tidal stream, but it's far from the only one, and those other estuaries shares its flow and pollution problems.

Work has begun on some of those waterways, including the Herring River in Wellfleet and the Coonamessett River in Falmouth.

"Cape Cod's small estuaries, like the Bass River, are incredibly important for residents and visitors—for swimming, boating, fishing, birding and aesthetic enjoyment," Ardito said.

"By restoring cleaner water to the Bass River," the program director said, "this project will ensure that present and future generations can continue to enjoy the unique beauty of Cape Cod's coastal environment."

### Alternative septic systems may help address the pollution

All of 15 of Barnstable County's towns have been on notice to reduce nitrogen pollution of coastal waters since 2011, when the Conservation Law Foundation sued the Environmental Protection Agency over the matter. In response, the Cape Cod Commission created the 208 Area Wide Water Quality Management Plan.

Horsley worked as a water resources consultant on that plan and is now working with the Friends of Bass River and other like-minded groups, including the Barnstable Clean Water

Coalition, as well as the Town of Wellfleet.

Horsley said while it's taken years, Cape towns and local organizations are making steps to cut nitrogen pollution.

"There's been way too many plans developed and not enough action," he said. But now, "it's happening," he continued, citing sewer projects moving forward in Mashpee and Barnstable.

Big sewer projects typically serve downtowns and other densely developed areas, such as along Route 28 on the Cape's south side. Alternatives to traditional septic systems could provide relief for less densely settled areas, like those around the upper section of the Bass River system, Horsley said. The technology is simple, less expensive than sewers and natural.

After leaving the first tank in a traditional

septic system, where solids settle out, the effluent would then be aerated and sent into a tank of wood chips, where bacteria (using carbon from the wood chips) remove nitrogen before the treated wastewater is dispersed through a leaching field. The technology has improved to the point where it gets rid of 80-90 percent of the nitrogen, he said, and it can be scaled up to serve several buildings.

The technology may become part of the state's Title V septic regulations. Horsley said he sits on an advisory committee to the Department of Environmental Protection that's considering adopting the technology as part of an update of the existing rules. It's already being tried on Cape Cod in projects in Wellfleet and Barnstable, he said.



[friendsofbassriver.org](http://friendsofbassriver.org)

*Please consider supporting the Friends of the Bass River and the Cape Cod Foundation.*

# Battling a threat lurking beneath the surface, group working to clean up Bass River

**Sarah Carlon**

Cape Cod Times 9/3/2022

YARMOUTH PORT — In late August, Mill Pond in Yarmouth Port is surrounded by the lush signs of summer.

The trees reach above and over the trails to the pond, which wind through former paths of cranberry bogs now long abandoned. Morning sunlight that promises another warm and muggy Cape Cod August day pushes through the leaf canopy, dappling the sometimes wild overgrowth all along the path.

The pond itself appears as a picture-perfect freshwater gem, idyllic and calm. Its waters, however, hide one of Cape Cod's dirtiest secrets.

"It's the nitrogen," Rick Bishop, executive director of Friends of Bass River, said. "Its damage is irrefutable."



Friends of Bass River Executive Director Rick Bishop talks about the water quality project for the Bass River Estuary System at the Crab Creek Conservation Area in Yarmouth Port Wednesday. *Merrily Cassidy/Cape Cod Times*

Friends of Bass River, formed in 2017, is a nonprofit dedicated to protecting and preserving the water of the Bass River Estuary System, which includes ponds, coves and sub-basins in Dennis, Yarmouth and even a small part of Brewster.

Bishop, a Yarmouth native, joined Friends of Bass River as executive director in 2020.

He previously spent 11 years on the Yarmouth Conservation Commission — most recently serving as chair — where water quality was a primary concern.

“Bass River, like many estuaries on Cape Cod, is ill,” Bishop said, “And we are looking for ways to improve water quality.”

Bishop's first project with Friends of Bass River is a comprehensive water quality analysis of the entire system.

The organization partnered with the Provincetown Center for Coastal Studies and tests water twice weekly at seven locations all along the estuarine system for nitrogen, dissolved oxygen, salinity, turbidity and phosphates.

Although they haven't been at it long, the results confirm what many have suspected for a long time: nitrogen contamination is a major problem in Bass River.

Mill Pond, for all its natural beauty, is a prime example of this.



Mill Pond in Yarmouth Port is part of the Bass River Estuary System that runs through Yarmouth and Dennis. The pond appears pristine but below the surface nutrient pollution, such as nitrogen, has significantly reduce the water quality. *Merrily Cassidy/Cape Cod Times*

In 2017, the Massachusetts Department of Environmental Protection, alongside the Office of Energy and Environmental Affairs and the Bureau of Water Resources, studied the amount of nitrogen the many ponds and streams along the system contributed to the Bass River watershed each day.

They found that Mill Pond contributed approximately 27 kilograms (almost 60 pounds) of nitrogen to the watershed per day, about 71% more than acceptable levels.

The Bass River Estuarine System overall needed to reduce its nitrogen load by 47%, the report concluded, a difficult undertaking for a system spanning Yarmouth and Dennis.

### **What does nitrogen do in ponds and waterways?**

The impact of nitrogen contamination isn't always obvious.

To the untrained eye, ponds and streams along the system such as Mill Pond, Crab Creek Bridge, Hamblin Brook or Miss Thatchers Pond look normal.

Dive beneath the surface, however, and a different story emerges.

Nitrogen acts like a fertilizer, Bishop said, and contributes to the rapid growth of algae and shoreline plants that deprive the rest of the water of oxygen, killing native fish populations.



This pond adjacent to Miss Thachers Pond in Yarmouth Port shows the impact of the septic systems from homes abutting the pond. *Merrily Cassidy/Cape Cod Times*

In the 1870s, Hamblin Brook was the second largest herring run in Massachusetts, Bishop said. Now, there are barely any.

A small unnamed pond next to Miss Thatchers Pond, surrounded by houses, is choked by shoreline overgrowth accelerated by nitrogen in the water, he added.

Nitrogen contamination is mainly the result of septic systems, which retain solids very well but leach nitrogen into the groundwater supply, Bishop said.

Over the decades as Cape Cod began to develop, and more and more homes popped up along Bass River, the amount of nitrogen leaking from septic systems into the water supply has increased exponentially. But it's not just a problem reserved for waterfront properties.

Water from the Bass River watershed, which extends throughout the towns of Dennis, Yarmouth and a small part of Brewster, is deposited into the estuary through two surface water discharge points, Fresh Pond Brook and Hamblin Brook, according to the Friends of Bass River website.

"It's all kind of connected," Bishop said. "That's why it's so critical we clean it up."



More than 30 water controllers that were used for a former cranberry bog will be removed as part of the Bass River Estuary System restoration project. This one is off Weir Road in Yarmouth Port. *Merrily Cassidy/Cape Cod Times*

In 2018, at the Massachusetts Conservation Commission's annual meeting, Bishop learned about the Tidmarsh Restoration Project in Plymouth, where the owners of a retired cranberry bog restored the area to its previous state as natural wetlands.

He immediately thought of the 57 acres of unused former cranberry bogs surrounding the upper headwaters of the Bass River Estuarine System, which had been abandoned since the 1970s.

"I got excited and thought, you know, we could definitely do that here," Bishop said.

He presented his idea to the Friends of Bass River, and they put together their team of consultants, Inter-fluve, Tighe & Bond and the Woods Hole Group, to help the organization apply for a Southeast New England Program Grant.



Bass River flows under Route 28 between Dennis and Yarmouth, shown here in West Dennis on Wednesday. The Bass River Estuary System is undergoing a restoration project. *Merrily Cassidy/Cape Cod Times*

In early 2021, they were awarded a \$272,000 grant, and with additional funding from Yarmouth's Community Preservation Committee, have about 60% of the project designs finished.

Their focus is on the upper headwaters of the river simply because they are the sickest, Bishop said, and need to be helped first.

"I heard someone say once that a fish rots from the head down," he said. "I'm not a scientist, but it seems to me that if we don't start here we may never catch up. We have to start in the neediest part of the river."

**What will the Bass River restoration project do?**

First on the list is addressing the culvert at the Crab Creek Bridge on North Dennis Road.

Currently 6-by-6-feet, the small opening in the bridge simply doesn't let enough water pass through, Bishop said.



Friends of Bass River Executive Director Rick Bishop stands on the banks of the Crab Creek in Yarmouth Port where eight feet of the bank has eroded away. *Merrily Cassidy/Cape Cod Times*

Erosion has affected the shoreline as well, widening it from 57 to 64 feet in just one year. By replacing the culvert to 60-by-60 feet, more water will flow to Mill Pond, helping overall water quality and hopefully bringing back some of the natural species, like herring, to the river, Bishop said.

The second part of the project is filling in the secondary ditches of the former cranberry bogs, creating one major channel from Mill Pond to Miss Thatchers Pond, improving water flow.

The former bogs will be restored, like the Tidmarsh project, to their natural wetlands state, which acts as a natural filter for carbon and nitrogen, Bishop added

Eventually, accessible walking trails will be put in place along the former cranberry bogs as well, with a parking lot on Weir Road.

### **Cross-town collaboration to help Bass River**

The Friends of Bass River have been working closely with the town of Yarmouth on the project.

Once the design phase is complete, the Friends of Bass River will hand the project off to Yarmouth's Department of Public Works, which hopefully will begin work on the Crab Creek culvert in 2023.

"The town of Yarmouth has been so helpful with this project. I feel very fortunate to be working with them," Bishop said.

He has been working with the Dennis Select Board as well, which has supported the project too.

Bishop hopes the Friends of Bass River's project is the first of many on the Cape and is excited for the future of the historic wetlands.

"We are getting very close to finishing the designs," he said. "I'm looking forward to handing it off to the town."

*Sarah Carlon can be reached at: [scarlon@capecodonline.com](mailto:scarlon@capecodonline.com) or on Twitter: [@sarcarlon](https://twitter.com/sarcarlon)*







