# COMMUNITY PRESERVATION COMMITTEE (CPC)
# Chatham Community Preservation Act (CCPA)

**Application Number**: CPA-2020-17

**Application Date**: January 13, 2020

**Project Title**: Frost Fish Creek Salt Marsh Preservation

**Organization Name**: Chatham Conservation Foundation, Inc.

**Organization Address**: 540 Main Street, Chatham, MA 02633

**Email**: Gerry@GerryStahl.net

**Website**: https://ChathamConservationFoundation.org

**Names of Governing Board of Trustees:**

Robert Lear (President), Paul Chamberlin (Vice President), Gerry Stahl (Treasurer), Edyth Tuxbury (Clerk), Jeanne Branson, David Dougherty, Jack Farrell, Michael Franco, Jane Harris, Roy Meservey, Tony Murphy, Carol Odell, Peter O'Neill, Gary Toenniessen, Cathy Weston.

**Federal Tax ID Number (if non-profit):** 04-6047692

**Submitter or Project Director:** Gerry Stahl, Chair of the Salt Marsh Task Force

**Contact Phone:** (215) 260-7467

**Relevant Town Committee (if applicable)**: N/A

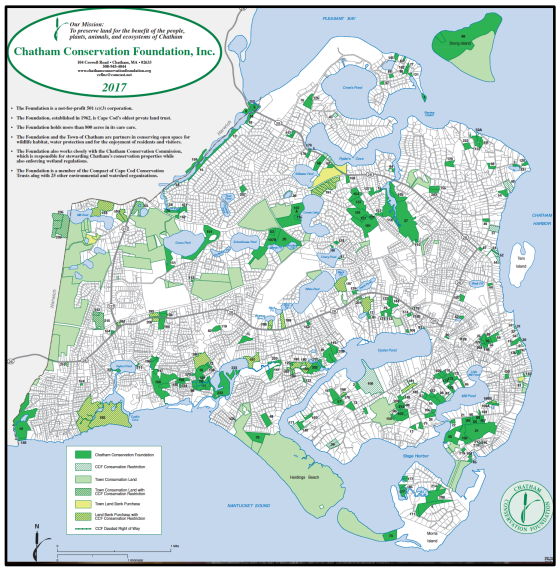
**Amount Requested from CPA Funds:** $75,000

**Project Description**:

This project will study how best to preserve an important Chatham salt marsh from ongoing injury, harm and destruction due to development and climate change. The salt marsh is on and surrounded by land owned by the Chatham Conservation Foundation, Inc. (CCF)—see maps below. A preliminary study conducted by APCC in 2018 indicated multiple tidal restrictions and recommended systematic further study to plan for preserving the health of the marsh under likely scenarios of restriction removal, sea-level rise and storm surge.

Recommended studies included: (A) a complete hydraulic and hydrologic modeling; (B) water quality modeling resulting from recommended tidal changes; (C) a ground penetrating radar survey of the bog area to determine sand depth, as needed; (D) a fish and shell fish survey to identify presence/absence of species; (E) expanded vegetation mapping; and (F) establishment of long-term vegetation monitoring transects. Using CPC grant funds, this project will undertake only the first two of these studies (A and B) of the existing marsh and adjacent land onto which the marsh might migrate. The results of the hydraulic and hydrologic study (A) will suggest specific strategies such as potential opening of the existing restrictions, particularly under Route 28 from Bassing Harbor to Frost Fish Creek, to increase flushing without impacting any private property. A water quality modeling study (B) will then consider whether removal of tidal restrictions would result in improved water quality parameters necessary for restoration of salt marsh habitat.

The results of these studies (A and B) may lead CCF to conduct baseline studies (C, D, E and F) as appropriate, using its own funds. *CCF will then be in a position to assess the feasibility of possible scenarios for the preservation of the Frost Fish Creek salt marsh, based on systematic analysis of existing conditions, with potential increased flushing and improved water quality*. The proposed studies will prepare the way for future design, permitting and construction within a comprehensive holistic approach. Preservation of Frost Fish Creek will then be able to encompass a desired combination of the following: improved water quality, salt marsh restoration, reestablishment of fish passage and potential for salt marsh migration—all measureable against baseline data.



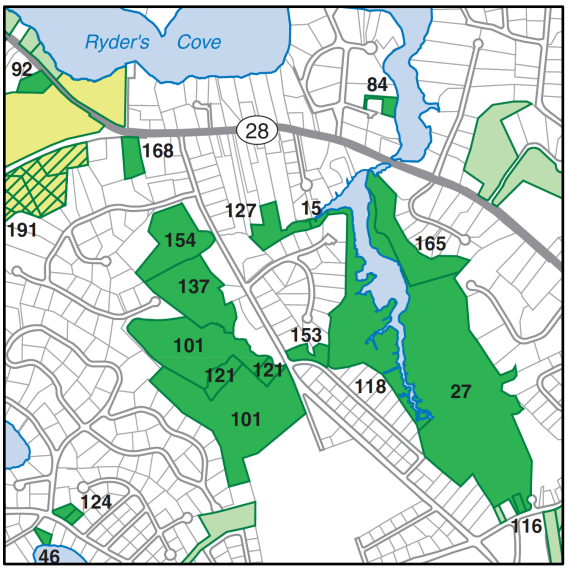




*Figure 1. Map of CCF properties (dark green) and CRs (light green).*

*Figure 2. Frost Fish Creek salt marsh: CCF properties #15, 27, 84, 101, 118, 121, 127, 137, 153,154, 165. This is a total of about 90 acres of land surrounding and encompassing the marsh, including land that formerly was part of the marsh or might become part in the future.*

CCF is the oldest land trust on Cape Cod, dating to 1962. It owns 620 acres of land in Chatham and manages conservation restrictions (CRs) on another 215 acres of land owned by the Town of Chatham. Of this land, approximately 163 acres of the owned land is salt marsh and 50 acres of the CRs is salt marsh, according to the map below. Additionally, this does not count CCF stewardship of dry land surrounding marsh or land where a salt marsh could migrate in the future with sea-level rise.

A major goal of CCF's 2019-2021 Strategic Plan is to "monitor and maintain health of salt marshes to prevent degradation and/or restore health." In 2019, CCF established a Salt Marsh Task Force to focus efforts on the preservation of the salt marshes in the Town of Chatham. Due to its position at the elbow of Cape Cod, adjoining Pleasant Bay, the Atlantic Ocean and Nantucket Sound, Chatham has a uniquely high percentage of its land covered by or adjoining salt marshes. The preservation of its salt marshes is essential to retaining the health and beauty of Chatham.

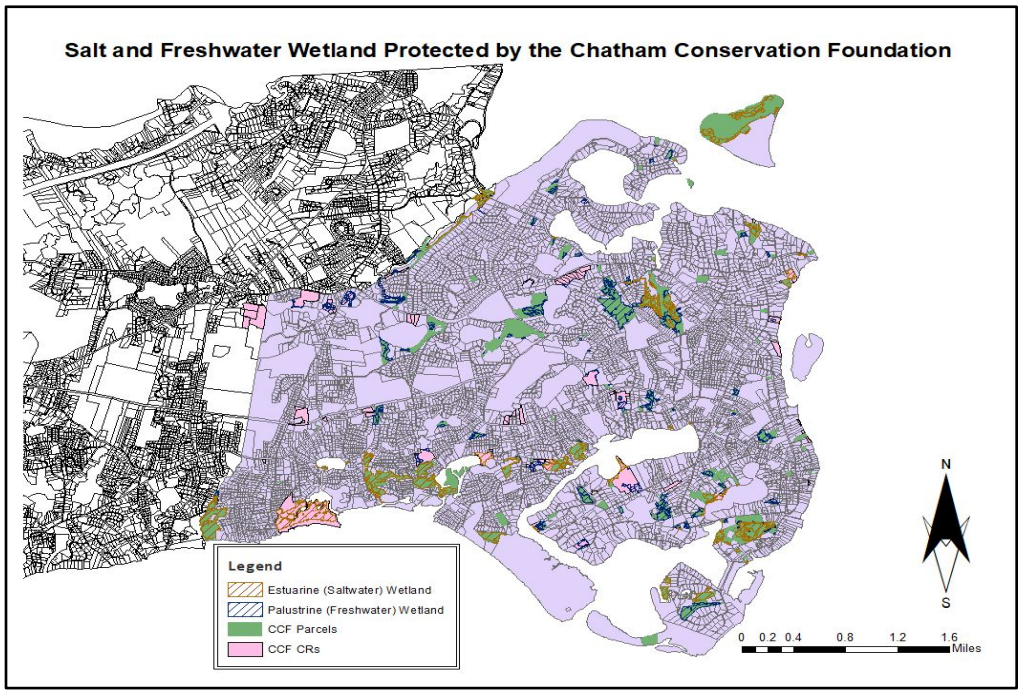



*Figure 3. Wetlands protected by CCF.*

The mission of CCF is "to preserve land for the benefit of the people, plants, animals and ecosystems of Chatham." Salt marshes have natural rhythms and mechanisms for preserving their ecosystems. These have long been threatened by development, such as roads restricting tidal flows and abutting residences polluting through septic systems and chemical runoffs. Preservation of salt marshes is now additionally threatened by climate change, with, for instance, sea-level rise, extreme storm surges and climate shifts that favor invasive species.

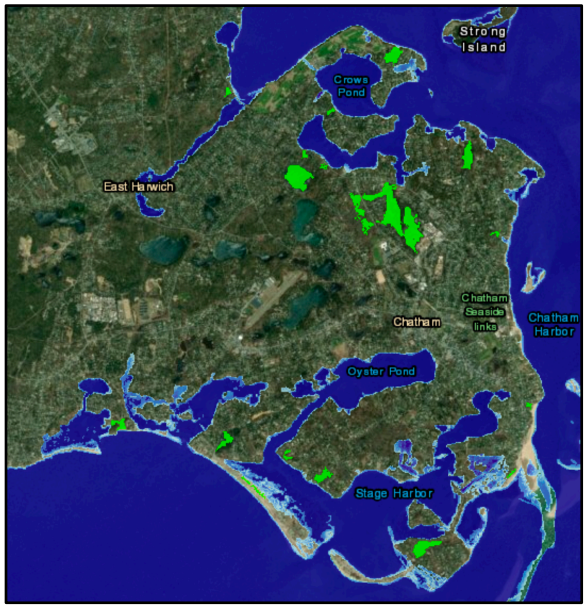
CCF was founded to preserve open space in Chatham in its historical, natural state. It has done this by acquiring about 200 parcels and protecting these and an additional 50 parcels of Town-owned land under perpetual Conservation Restrictions. However, it has become clear that *it is no longer sufficient to simply acquire land*. One must also protect it from the impacts of invasive species, disturbance from surrounding development and escalating climate change.

Protection of salt-marsh resiliency is a subtle matter, requiring careful study of existing conditions and detailed modeling of possible interventions. Salt-marsh preservation has become doubly important in the

era of climate change as salt marshes are particularly effective in sequestering carbon and thereby mitigating the *causes* of climate change, as well as mitigating its *effects*, such as sea-level rise and storm surges.

The Frost Fish Creek is CCF's initial salt-marsh preservation target. The following maps of Chatham show wetlands now and projected in a couple decades, with the large bright green area in Figure 4 indicating Frost Fish Creek salt marsh. Figure 5 indicates areas for potential salt marsh migration as tidal restrictions are removed to preserve the original extent of the marsh, and as sea-level rise takes place in the coming years. Note that CCF already owns the areas for probable migration as well as the area surrounding the current wetlands.

The CCF Salt Marsh Task Force is beginning to coordinate with relevant expertise on Cape Cod and in Massachusetts governmental agencies concerned with salt-marsh preservation. The Frost Fish Creek salt marsh has been identified by the Association for the Preservation of Cape Cod (APCC) and other agencies in Massachusetts as a priority for preservation action. In 1987, it was designated by the state as part of the Pleasant Bay Area of Critical Environmental Concern (ACEC). An ACEC is a place in Massachusetts that receives special recognition and protection because of the quality, uniqueness and significance of its natural and cultural resources. The ACEC Program's goal is to preserve, restore and enhance critical environmental resources and resource areas of the Commonwealth of Massachusetts through increased levels of protection, and to facilitate and support the stewardship of these areas. CCF will work closely with Town and state agencies to study and preserve the Frost Fish Creek area.



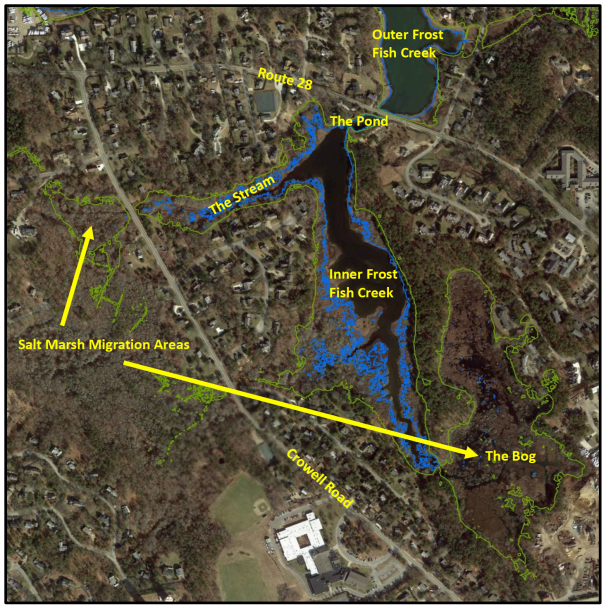




*Figure 4. Chatham with future flooding levels shown in light blue and bright green. Source: NOAA's Office for Coastal Management sea level rise viewer at 2 ft. level.*

*Figure 5. Migration paths of Frost Fish Creek. Blue lines show two-foot flooding and green lines indicate five-foot elevations. Yellow arrows point to areas that were formerly part of the marsh and could be preserved as such in the future.*

Frost Fish Creek is a salt marsh owned by CCF. One of CCF's most scenic and most popular trails for public access goes along Frost Fish Creek. In 2018, the CCF Board allocated funds from its operating budget to hire salt-marsh specialists from APCC to undertake an initial study of how to preserve Frost Fish Creek as a healthy salt marsh. (See report in Appendices.)

Since 1968, APCC efforts have led to landmark achievements in water resource protection, land preservation and smart growth, earning APCC the reputation as Cape Cod's most prominent and influential nonprofit environmental organization working to preserve, protect and enhance the natural resources of the Cape. It conducts advocacy, studies and interventions to restore and protect natural landscapes and preserve wildlife habitat.

Working with CCF in 2018, the APCC (i) deployed data loggers at six locations throughout Frost Fish Creek to collect data on water level, temperature and salinity every 10-minutes during a full lunar-driven tidal cycle in October 2018; (ii) conducted an elevation survey throughout the area; and (iii) collected soil samples in an abandoned cranberry bog section of the former marsh. The report made a series of recommendations for further study to determine an optimal plan for preservation of Frost Fish Creek salt marsh. The 2018 APCC study concluded that the traditional tidal access to the Creek was being significantly restricted by Route 28. A culvert under the road to permit tidal flow had deteriorated, restricting flow in both directions, so that too little salt water enters the marsh to maintain its health and too little flow after storms escapes to relieve flooding. The salt marsh is also restricted at other points and is consequently much smaller than it was prior to local development, and is substantially tidally restricted.

The current proposal to the CPC is to take the next set of steps as recommended by the APCC study of Frost Fish Creek to study the feasibility of salt marsh preservation. The purpose of this is to plan how best to preserve this important natural resource from continuing injury, harm or destruction in the next decade. The land owned by CCF surrounding and encompassing Frost Fish Creek is a prized aquifer and watershed land, including forest land, fresh and salt-water marshes and other wetlands, stream and lake frontage, scenic vistas, land for wildlife, nature preserve, and land for recreational use. The current proposal does not include actual implementation of changes to the environment, but provides for the two major studies needed in order to understand the feasibility of alternative implementation approaches. Subsequent implementation would be carried out based on the findings of these studies in close collaboration with Town and state agencies. The proposed studies are necessary preconditions for future statewide funding.

## Specific Objectives and Costs

The proposal is to undertake the two concrete studies listed below as project objectives A and B. This is a one-time effort, which will set the stage for a coherent, long-term preservation strategy. These proposed studies will be managed primarily by APCC. The studies will be done within a broader context of planning for Frost Fish Creek and other salt marshes on CCF land in consultation with relevant agencies at the Town of Chatham and the Commonwealth of Massachusetts, as well as other wetlands experts on Cape Cod. The long-term strategy will be implemented using other funding sources, under the direction of CCF, in collaboration with relevant agencies and accompanied by public outreach and education. Public access to trails will be guaranteed through appropriate Town agreements.

**Objective A**. *Complete hydraulic and hydrologic modeling (H&H)*. This objective will determine options for tidal restoration, culvert sizing/design and expected extent of flooding under different scenarios.

**Objective B**. *Complete water quality modeling, based on the H&H*. This objective will model changes to water quality (e.g., salinity, nutrients) as a result of changed tidal flows.

**Objective C**. *Submit a report to the CCF Board, the Town of Chatham and the public, summarizing results and recommendations.* This report shall convey the major findings of each of the studies conducted. It will also outline data-based strategies for preservation of the salt marsh based on these findings.

These proposed studies are largely in response to the findings of the 2018 study, which CCF funded from its own funds and which was conducted by APCC, namely:

- That tidal flow is significantly restricted by the deterioration of the culvert under Route 28. However, if Mass DOT were to suddenly replace the damaged culvert (as could be possible in the near future), the consequences for homes abutting the marsh and for the salt marsh itself would not be sufficiently carefully controlled.
- That a migration path has not yet been determined and prepared for the marsh as sea-level rise impacts the marsh. The upper regions of the wetlands were artificially dammed off for cranberry bogs in the past, and fish corridors were closed off by development.
- That it is important to model the consequences of changing the existing tidal restrictions and to plan for carefully stewarded gradual changes.
- That in order to monitor preservation and restoration, we need to document current conditions, including the current existence of fauna and flora. The marsh is named after a particular fish, but it is not known if the fish currently exists in the marsh. Similarly, we need to know the extent of rare vegetation and of invasive species, as well as the presence of animals.

Following are the budgeted costs of each of the Objectives proposed under this CPC application. Together, these Objectives define the scope of the proposed project and their costs define the proposed budget:

**Objective A**. *Complete hydraulic and hydrologic modeling (H&H)*. $40,000 for APCC to hire and manage consultant to complete modeling, including up to $35,000 for subcontractor expense.

**Objective B**. *Complete water-quality modeling based on the H&H*. $35,000 for APCC to hire and manage consultant to complete modeling, including up to $30,000 for subcontractor expense.

**Objective C**. *Submit a report to the CCF Board, the Town of Chatham and the public, summarizing results and recommendations.* $5,000 for APCC to compile data from the above work into a final report by December 31, 2022.

**Total Budget Proposal: $75,000 from CPC, $5,000 from CCF.**

* * *

**Which of the Following Goals of CPA does this project address?**

**X** The acquisition, creation and **preservation of Open Space**.

**How does this project impact Chatham's citizens and address a current need?**

Healthy salt marshes are important to the Town of Chatham; to protection of property and infrastructure; to the water quality; to the Town's scenic beauty; to local fauna, sea life and flora; to recreation; to many other eco-systems; and to the climate. Healthy salt marshes sequester greenhouse gases that would otherwise contribute to climate change. They can mitigate flooding and dissipate storm surges. They respond naturally to sea-level rise if not tidally restricted. Degraded and dying salt marshes release dangerous methane gases to the atmosphere, which is significantly more impactful than $CO_2$. The Frost Fish Creek salt marsh is perhaps the largest salt marsh in Chatham that is most in need of preservation. Preservation of this marsh will provide a working model to guide preservation of other marshes under CCF stewardship.

**What is the estimated or target number of people this project will benefit/affect?**

This project will benefit the residents of Chatham in general. A preserved marsh will provide recreational opportunities for hundreds of people each year. The proposed studies will allow CCF to make data-based decisions about how best to preserve the marsh.

**How will you measure the success of this project?**

The proposed studies will capture baseline data concerning the land, water and tidal flows, under different scenarios. As part of the project, in addition to the collection of new measurements, CCF will gather together baseline historic data from previous studies of Frost Fish Creek by various sources and agencies to show changes over time. This will permit future assessment of increased health of the marsh and associated ecology. In particular, potential future spread and migration of the marsh can be periodically measured and compared to the baseline and historic figures.

**Projected Action Plan and Timeline, including anticipated completion date. List steps needed to complete the project?**

It is anticipated that the studies and report funded as part of this CPC project will be completed within two and a half years from July 2020 through December 2022. Summer of 2020 will be used for project start-up. **Objective A**, the hydraulic and hydrologic modeling (H&H) will be conducted first. Findings from this will feed into **Objective B**, *the water quality modeling*. **Objective C**, *the final project report* detailing findings and recommendations will be completed by December 2022.

**Please provide a full budget including the following information:**

| **Full Project Budget** | |
|---|---|
| **Objective A - H&H modeling** | |
| APCC - Restoration Ecologist | $2,400.00 |
| APCC - Restoration Technician | $1,750.00 |
| APCC - Grant/Contract Administrator | $795.00 |
| Subcontractor | $35,000.00 |
| Travel (130 miles) for 2 meetings | $75.00 |
| ***Task 1 - Subtotal*** | ***$40,020.00*** |
| | |
| **Objective B - Water quality modeling** | |
| APCC - Restoration Ecologist | $2,400.00 |
| APCC - Restoration Technician | $1,750.00 |
| APCC - Grant/Contract Administrator | $795.00 |
| Subcontractor | $30,000.00 |
| Travel (65 miles) for 1 meeting | $35.00 |
| ***Task 2 - Subtotal*** | ***$34,980.00*** |
| | |
| **Objective C - Final Report** | |
| APCC - Restoration Ecologist | $2,100.00 |

| | |
|---|---|
| APCC - Restoration Technician | $1,070.00 |
| APCC - Grant/Contract Administrator | $795.00 |
| Subcontractor | $1,000.00 |
| Travel (65 miles) for 1 meeting | $35.00 |
| ***Task 3 - Subtotal*** | ***$5,000.00*** |
| | |
| **TOTAL** | **$80,000.00** |

**Total Amount of Project: $80,000.**

**Other revenue sources including private/public/in-kind:**

CCF paid APCC $5,000 in 2018 to conduct a first phase of this preservation study. These funds came from CCF's operating budget.

CCF will provide volunteer services to assist with this CPC project.

CCF will contribute $5,000 to pay for Objective C, the final report.

**Financial sustainability to secure project after the grant:**

The project will be complete at the end of the grant period. Possible future design, permitting and construction suggested by the findings of this project would involve state-wide funding with Town collaboration, proposed using data from this study, and would not be part of this grant. Until the studies are conducted and new decisions made based on the findings, there are no additional costs planned after the grant.

**Annual cost/expenditures once the project is operational, if any?**

There will be no special on-going costs, other than the normal maintenance of the land and trails, which is covered by CCF's staff, volunteers and operational budget.

**Annual cost to the Town once the project is operational, if any**: None.

**Potential revenue from project on an annual basis, if any:**

None. Access to the trail will be free and open to the public. CCF is prepared to enter into a restriction or agreement with the Town to guarantee permanent public access to the trail.

**What entity will collect and control future revenue?** N/A.

**What is the basis for your budget? What are the sources of information you used?**

The budget was prepared with the assistance of the APCC salt-marsh staff, based on their experience conducting similar studies. APCC staff conferred with both Horsley Witten and the Woods Hole Group concerning reasonable costs for the two major studies.

**Are there any legal ramifications/impediments to this project**? Not for the studies in this project. Any potential legal issues associated with future implementation steps will be identified and addressed as part of the planning process based on the findings of this project.

**Is the project compatible with the Town's Comprehensive Plan?** Yes.

**Cite specific sections if applicable:**

This CPC project is particularly in support of Chatham's Comprehensive Plan 3: Natural Resources. Specifically, it is compatible with Goal 3-1: Protecting the quality of our air and water resources. The preservation of salt marshes like Frost Fish Creek contributes to Water Quality Protection, the control of Storm Water and the natural protection of Coastal Resources. It is also supportive of Goal 3-2: Protection of Vegetation and Wildlife Habitat. In addition, the trail along Frost Fish Creek supports Chatham's Comprehensive Plan 4: Open Space and Recreation.

**Do you have the authorization of the property owner?**

**X Yes**

**Do you have a supporting letter from a Town Board, Commission, Committee?**

**X Yes**

We have supporting letters from Dr. Robert Duncanson of the Town of Chatham and from the Pleasant Bay Alliance.

**What is your assessment of the nature and level of community support for the project?**

The Chatham community is highly supportive of the work of CCF in preserving the land of Chatham, including the fresh-water ponds and salt-water marshes. CCF trails, kayak trips and guided tours are very popular. In addition, Chatham residents are increasingly concerned about climate change—especially sea-level rise and storm surges. They are looking for ways to mitigate these and are strongly supportive of CCF efforts to preserve healthy salt marshes. As CCF proceeds with exploring strategies to preserve healthy salt marshes in Chatham, public education about its importance will be a central component of the effort.

**Upload CPA Documents:**

2018 Report on Tidal Study of Frost Fish Creek by APCC.pdf