Association to Preserve Cape Cod (APCC) Proposal
to Chatham Conservation Foundation (CCF)
Cockle Cove and Bucks Creek Salt Marsh Assessment

Project Purpose

The purpose of this project is to: 1) to complete an initial field assessment and report for the Cockle Cove and Bucks Creek salt marsh complex to document the condition and health of the wetlands resource areas, identify possible sources of impairment, and opportunities for improvement; and 2) to gather data to inform future restoration plans, feasibility studies and grant applications for the Cockle Cove/Bucks Creek complex. The proposed scope is divided into tasks that could be completed over the spring, summer and fall of 2021 according to APCC capacity and the ideal timing for monitoring during the field season. Task 6 includes more in-depth monitoring of the marsh vegetation which could be completed as part of this scope or removed to be completed at a later stage of site assessment and feasibility studies.

Proposed Scope

Task 1. Project Kick Off (April 2021)

APCC and the CCF salt marsh task force will initiate the project with a virtual meeting to review the project area, scope of work, timeline and existing knowledge and information about the site. This meeting will provide opportunity for the CCF to share concerns and knowledge about the site and for APCC to seek clarification on conditions, site access and scope of work. Following this meeting a joint site visit would be arranged to review the extent of the project area, key areas of concern and points of access to allow APCC to further refine field monitoring plans.

Deliverables:

- Revised project scope and timeline as needed (Word or PDF).
- Rough marked up of maps of draft monitoring locations and layout for review (PDF).

Estimated Cost: $500 (including staff time and travel charged at $0.56/mile)

Task 2. Desktop GIS Analysis (May 2021)

To expand upon and update the existing GIS Map Assessment and Analysis completed by APCC for CCF in early 2020, APCC proposes to complete additional desktop and GIS assessment and analysis of the site. This assessment will include review of current and historical maps of the project area to better understand changes in development and land use around the site that has influenced the condition and health of the system. APCC will review and provide updated information on overlap with key resource areas and ranking of the ecological value of this site

according to criteria developed by APCC and the Cape Cod Conservation District as part of a regional restoration planning effort. Ranking of the site in this desktop assessment will include: connection to impaired waterbodies (MA 2016 303d List of Impaired Waters, shellfish growing area designations), connection to sensitive resources (Biomap2, NHESP Priority Habitats, eelgrass, fish and shellfish habitat), human use benefits to the site (swimming, boating, fishing), connectivity to protected areas (open space), resilience to the impacts of climate change and natural process (erosion, storm surge, sea level rise), and potential for tidal restoration (low-lying properties and extent of restriction). Part of this ranking and review will focus on an updated look at the sites resilience to sea level rise and the potential for salt marsh migration using the Sea Level Affecting Marshes Model (SLAMM) developed by the Massachusetts Office of Coastal Zone Management. This assessment will provide a comparison and improvement upon the Cape Cod Commission Sea Level Rise viewer tool GIS assessment previously completed for this and other sites. APCC will also complete a desktop assessment of locations of potential or probable impairment of the site including but not limited to: historic or current cranberry farming impacts, stormwater impacts from roads and private property, and tidal restrictions. APCC will review this with local and state agencies (DER, NRCS) to further refine our understanding of the current and historic impacts on the site. This information will inform and further refine plans for field assessment.

Deliverables:

- Site ranking describing criteria and scoring for the site (Excel).
- Maps and summary of rankings for this site along with comparison to regional ranking for other sites across the Cape (Word).

Estimated Cost: $1,000 (staff time only)

Task 3: Field Assessment of Sources of Probable Resource Impairments (May to June for field assessment, June-September for water quality sampling)

The purpose of this task is to confirm on the ground the source and location of probable sources of impairment (invasive species dominance, poor water quality, impaired salt marsh) to the wetland resource. This will include a stormwater assessment identifying potential sources of runoff from roadways or private property including opportunities for possible installation of improved stormwater management. Assessment of culvert, road and stream crossings including documentation of the condition of the creek and structures crossing the creek, and where feasible measurement of the width and height of the restriction relative to the creek width. Assessment of impact of cranberry farming or other human activities upon the system. Spot sampling of water quality could be completed at these locations using a YSI probe to measure (pH, dissolved oxygen and temperature) and/or samples collected for lab analysis of cyanobacteria, nutrients, and/or bacteria levels. APCC proposes at minimum, one sample will be taken at each location with additional bi-weekly, monthly or storm event (1 inch or greater rainfall) sampling completed where relevant and feasible.

Deliverables:

- A geo-referenced map depicting locations of probable sources of impairment (JPEG/PDF).

- Photographs and written description of locations of concern with potential actions for intervention (JPEG and Word).
- Water quality monitoring data and written summary of results (Excel and Word).

Estimated Cost: $5,400 (including staff time and travel charged at $0.56/mile) includes $1600 for site assessment and $3,800 for sampling

Task 4: Time-Series Monitoring of Tidal Hydrology and Physical Parameters (July 2021)
The purpose is to collect data on existing conditions to determine if any remaining restrictions are negatively impacting the tidal hydrology and salinity in the salt marsh complex. Time-series monitoring of water level, temperature, and conductivity in the stream will be conducted using Solinst Levelogger LTC data loggers. A minimum of three dataloggers will be placed around the Ridgevale Road and Cranberry Lane culvert intersection of Cockle Cove Creek and Bucks Creek (two upstream and one downstream of these crossings) and 1-2 additional loggers if available could be placed further upstream or at other locations of concern. A reference logger (Solinst Barologger) to measure barometric pressure will also be deployed on site, which will be used to correct water level logger data for changes in atmospheric pressure. Loggers will be surveyed to get accurate elevation of the loggers to be able to provide water surface elevation data for each location.

Dataloggers will be set to record at 10-minute intervals and will be in place for a full lunar cycle (minimum of 28 days). The time-series water level data collected along with conductivity recordings will enable us to determine extent of restriction, impact on flow and salinity, and potential for restoration. This task includes equipment testing of dataloggers, completion of field survey to determine absolute logger elevation, mapping of logger deployment locations, setup on site and download of data for further analysis and reporting.

Deliverables
- Electronic copies of raw data for all parameters, field notes and survey data (Work, PDF and Excel)
- Final plots depicting tidal hydrology, including the restriction at the bridge (Excel)
- Final plots of temperature and salinity data (Excel)
- A geo-referenced map depicting locations of logger deployment (JPEG or PDF)

Estimated Cost: $3,000 (including staff time and travel charged at $0.56/mile)

Task 5. Wetland Assessment and Vegetation Mapping (July-August 2021)
Mapping of native and invasive vegetation along with soil assessment of the marsh is another valuable first step in assessment and data collection to determine extent of invasive, salt marsh and freshwater vegetation that could be improved or restored. For initial mapping APCC proposes to map the boundaries of Phragmites and any major unvegetated areas including sandy overwash, mudflats, pannes or ponding, and develop a final map with this data overlaid with existing GIS layers mapping resource areas. An initial soil assessment will be completed in tandem with vegetation mapping to document presence of sand and depth to peat layer in any formerly farmed salt marsh areas to better understand potential impact of historic land use on the system. As feasible and if warranted, some additional assessment could be done in the current

cranberry bogs if allowed by the owner. This work would entail digging holes in a few locations across the wetland surface to document the soil composition, measure depth of sand or depth to peat and map the locations of sampling. If feasible, a more in-depth soil survey will be also be completed in coordination with NRCS staff.

Deliverables

- Electronic copy of field notes (Word or PDF).
- Soil composition description and depth of sand/depth to peat layer (Word and Excel).
- A geo-reference map depicting areas of Phragmites and unvegetated marsh along with locations of soil sampling (JPEG or PDF).

Estimated Cost: $2,000 (including staff time and travel charged at $0.56/mile)

Task 6. Vegetation Monitoring (August 2021)
The purpose of this monitoring would be to get a more detailed understanding of the health and condition of the salt marsh within this complex system. This task would include establishment of monitoring transects and quadrats and collection of data on species present and percent cover within these one-meter square quadrats. The location and elevation of these quadrats would be mapped in tandem with monitoring. Analysis of this data can help inform our understanding of the health of the system including extent of low marsh relative to high marsh and invasive species in the upland edge, extent of unvegetated marsh, and current and future impact of sea level rise on this marsh. As proposed this task includes establishment and monitoring of 6 or 7 transects (three reference transects and 3-4 study transects further upstream).

Deliverables:

- Raw and analyzed data (Excel).
- A geo-reference map depicting location of transects and quadrats along with elevation of each quadrat (JPEG or PDF).

Estimated Cost: $2,800 (including staff time and travel charged at $0.56/mile)

Task 7. Final Report (September -November 2021)
The information and data collected in Tasks 1-5 will be provided in raw form according to the deliverables above but APCC proposes to combine the results of the approved tasks in a final comprehensive report that will include figures, captions and more descriptive language on methods, results and the interpretation of results. This report and interpreted results could provide the basis for future grant applications and be easily shared with other potential project partners (DER, DMF, DOT, town, etc.)

Deliverables

- Draft and Final summary report (PDF).

Estimated Cost: $2,500 (staff time only)

Total Cost not to Exceed for Tasks 1-7: $17,200