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CAPE COD  
COMMISSION

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## **STAFF REPORT**

**JOINT REVIEW  
HERRING RIVER RESTORATION IN WELFLEET AND TRURO  
FINAL ENVIRONMENTAL IMPACT REPORT  
(CCC #08009/ EOE # 14272)**

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### **DATE**

July 30, 2016

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## **INTRODUCTION**

The Cape Cod Commission (Commission) has received a Final Environmental Impact Report (FEIR)<sup>1</sup> for the proposed Herring River Restoration Project from the Herring River Restoration Committee (proponent). The project is located in the towns of Wellfleet and Truro within the herring River estuary system, in and adjacent to the Cape Cod national Seashore. The Herring River Restoration Committee includes representatives from the Towns of Wellfleet and Truro, the National Park Service, and other state and federal agencies.

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<sup>1</sup> The FEIR is also styled as a Final Environmental Impact Statement (FEIS) to satisfy review requirements under the National Environmental Policy Act (NEPA)

The project is currently undergoing Joint Review by and between the Commission and under Massachusetts Environmental Policy Act (MEPA), pursuant to a Memorandum of Understanding between the Commission and the Secretary of the Massachusetts Executive Office of Energy and Environmental Affairs (Secretary). After the project completes review under MEPA, the Commission will undertake Development of Regional Impact (DRI) review of the project. It is anticipated that the proponent will file for Project of Community Benefit status as part of its DRI application. The project requires DRI review because it was required to prepare an Environmental Impact Report under MEPA.

A public hearing will be held on Thursday, June 30, 2016 at the Wellfleet Senior Center/Council on Aging, 715 Old Kings Highway, Wellfleet, MA, beginning at 5:30 PM for the purposes of hearing comments and other information on the FEIR, which will inform the Commission's comment letter on the FEIR to the MEPA office, and the Commission's subsequent Development of Regional Impact review of the project. The FEIR was published in the *Environmental Monitor* on June 8, 2016. Comments on the FEIR are due to the Massachusetts Environmental Policy Act (MEPA) office by July 8, 2016.

The Commission previously: held a joint review hearing on the project's Environmental Notification Form (ENF) under MEPA in summer 2008, and submitted a comment letter on the ENF to the MEPA office dated October 23, 2008; and held a joint review hearing on the project's Draft EIR under MEPA in November 2012, and submitted a comment letter on the draft EIR to the MEPA office December 2012. On June 20, 2008, the Secretary issued a Certificate establishing a Special Review Procedure under MEPA for the project. On November 7, 2008, the Secretary issued a Certificate on the ENF that set out the Draft EIR scope. On December 21, 2012, the Secretary issued a Certificate on the Draft EIR.

## **PROJECT DESCRIPTION**

As described in the *Purpose* section of the FEIR/FEIS, "*the project is to restore self-sustaining coastal habitats on a large portion of the 1,100-acre Herring River estuary in Wellfleet and Truro,*" and has similarly developed objectives and proposed actions intended to meet this purpose. The FEIR further describes project alternatives discussed in light of meeting the purpose and objectives of the project, including the proponent's Preferred Alternative (Alternative D), the primary components of which are construction and installation of a new tidal control structure at Chequessett Neck Road and a new dike at the mouth of Mill Creek. Other project components include:

- Adaptive Management approach to long-term management of the new structure,
- Replacement of culverts at road crossings upstream of Chequessett Neck Road,
- Raising or relocating approximately low lying roadway located within the Herring River floodplain,
- Management of woody vegetation within the Herring River floodplain to promote recolonization of salt marsh vegetation,
- Restoration of natural tidal channels and marsh surfaces, and
- Management of flooding impacts to private properties.

## **RPP ISSUE AREA COMMENTS**

Commission staff reviewed the FEIR/FEIS in light of the Barnstable County Regional Policy Plan and offers the following issue area comments relevant and material to the project. Such comments are intended to inform the Secretary's decision to issue a Certificate on the FEIR, and guide the Commission's subsequent DRI review of the project and the proponent's preparation of a DRI application.

Commission staff suggests that the FEIR adequately and properly complies with MEPA, addresses the broad scope of concerns under MEPA, and supports the issuance of a Certificate on the FEIR, subject to proposed Section 61 Findings and mitigation. Among other more specific information anticipated for submission to the Commission, the development of a sufficiently detailed Adaptive Management Plan, based on the framework in the FEIR, will be a critical feature of DRI review, and central to successful implementation of the project, given its stated objectives. The AMP should ultimately contain clear and certain decision points and phasing plan, and conditions to determine whether or not certain actions or components of the project may proceed at certain times, or at all. Decision-making under the AMP should also consider and balance the natural resource impacts that might be created by addressing flooding on low-lying properties in the project area.

#### **NATURAL RESOURCES: COASTAL, WILDLIFE/PLANT HABITAT & WETLANDS**

This large-scale ecological restoration project does not fit neatly into the Cape Cod Commission's regulatory framework. The project's outcomes anticipated and desired by the proponents will bring broad ecological benefits to the Herring River system in Wellfleet and Truro, and as a result will likely benefit human health and the local and regional economy. However, the proposed changes associated with the project, including to the existing man-made structures within the estuary such as the Chequessett Neck Road dike, and upstream dikes, culverts and roadways, are not without impacts to natural resources.

The purpose of these staff comments on the Herring River Restoration Project is to identify where proposed actions described in the final EIS/EIR may be inconsistent with the RPP, and to offer some perspective as to how any of those inconsistencies may be balanced against the anticipated gains, or benefits, of the project. Under a typical DRI review, inconsistencies with MPSs deemed acceptable by the Commission may be addressed, among other mechanisms, through mitigation to impacted resources; in the context of this ecological restoration project, "mitigation" may take several forms, depending on the nature of the impact.

The National Park Service, together with the Towns of Wellfleet and Truro, have invested years of research and analysis, engaging technical experts and concerned residents, and consulting regulatory agencies, into the development of this project and the parameters of possible alternatives. One of the roles the Commission may serve through the review of this project is to receive and filter public comments on the various options presented in the final EIS/EIR, and make recommendations on options that will best serve the residents of Wellfleet, Truro, and the region. While staff comments focus on the benefits and impacts of the preferred Alternative D, staff comments also include evaluation of Alternative C, the "smaller build" alternative that would largely eliminate impacts to the CYCC and other low-lying properties within the Mill Creek sub-basin, and the resource areas associated with these properties.

#### **Project Purpose and Potential Outcomes**

The National Park Service (NPS) and the Herring River Restoration Committee (HRRC) have identified several objectives in pursuing this project:

1. Reestablishment, to extent practical, the natural tidal range within the 1,100 acre Herring River estuary,
2. Improve estuarine water quality for resident and migratory animals,
3. Protect and enhance harvestable shellfish resources,
4. Restore the estuary's functions as a nursery and source of organic matter,
5. Improve migratory fish and eel runs,
6. Re-establish the salinity gradient within the floodplain to improve estuarine habitats,
7. Restore normal sedimentation processes within the floodplain to counter marsh subsidence,
8. Restore ecological balance to improve mosquito control,
9. Cultural and socio-economic benefits, including restoration of expansive salt marshes within the floodplain for esthetic and recreational benefits.

The following staff comments are structured around the *Impact Topics* presented in the final EIS/EIR:

- Wetlands Habitats and Vegetation
- Aquatic Species
- Federal and State-listed Rare, Threatened and Endangered Species
- Terrestrial Wildlife

Remaining comments in this section then address *Elements Common to All Alternatives* presented in the final EIS/EIR.

- Incremental Tidal Restoration and Adaptive Management
- Vegetation management
- Restoration of Tidal Channel and Marsh Surface Elevation
- Low-Lying Road Crossings and Culverts
  - High Toss Road
  - Pole Dike, Bound Brook, and Old County Roads
- Low-Lying Properties

- Public Access and Recreation Opportunities
- Project Alternatives (Alternative A, the ‘no-action’ alternative, is not discussed below as it is not recommended by Commission staff or desired by the proponents).
  - Alternative B
  - Alternative C
  - Alternative D

### **Wetlands Habitat and Vegetation**

The restoration effort will require ‘development’ activity within resource areas protected by the RPP. Direct impacts common to Alternatives C and D include:

- the temporary alteration of 2.4 acres of wetlands resource areas to replace the dike and culverts at Chequessett Neck Road;
- permanent alteration of 12,500 sf feet of wetland and 2.4 acres of temporary alteration of wetlands at Mill Creek to install the dike;
- 4,000 sf of permanent wetland alteration to elevate Pole Dike and Bound Brook Island Roads, and possible additional wetland impacts due to the need to elevate other road sections;
- vegetation management and/or removal within areas of the 900+ acre restoration area;
- dredging to create channels and salt pannes; and
- application of sediment to the marsh surface

Indirect impacts will result due to changes within the restoration area that result from the change in salinity, tidal exchange, and flood levels including: changes from freshwater and brackish wetlands to salt and estuarine habitats, impacts to dunes, impacts to rare species habitat, changes in aquatic species, impacts to terrestrial species, and impacts to low-lying properties, including the Chequessett Yacht and Country Club (CYCC) (see discussions, below).

### **Aquatic Species**

The project anticipates significant improvement to shellfish and finfish populations. Adverse impacts that may be observed through monitoring may be addressed through the Adaptive Management Process, and implementing either primary or secondary management actions. See comments below on Adaptive Management.

### **Federal and State listed Rare, Threatened and Endangered Species**

The project will result in indirect impacts to habitat of the Northern Harrier, Diamondback Terrapin, Eastern Box Turtle, American Bittern, Least Bittern, and Water Willow Stem Borer, all state-listed species. Additionally, there may be impacts to the habitat of the federally-listed Red Knot and Northern Long-eared Bat. The project will likely result in some positive habitat changes for some of these species (e.g. increased estuarine habitat for Diamondback Terrapin and Red Knot), and in the loss of habitat for others (loss of freshwater marsh habitat for American and Least Bitterns, forested upland for the Northern Long-eared Bat). The

Commission will seek guidance from the Natural Heritage and Endangered Species Program in determining whether the project complies with the RPP performance standard for rare species, and whether impacts to rare species should be mitigated by means other than those planned for the restoration project generally, as articulated in the FEIS/FEIR (e.g. creation or preservation of specialized habitat within the project area, or elsewhere within the seashore).

### **Terrestrial Wildlife**

Changes to habitats and natural communities will result from the project, requiring relocation of many of the amphibians, reptiles, birds, and mammals that currently utilize the floodplain. The changes will be gradual, however, presumably allowing time for terrestrial wildlife to shift their dens, nests, and foraging ranges. These changes are not inconsistent with RPP requirements. Additionally, the project will potentially require clearing of woody vegetation by mechanical means. The process for vegetation management identified in the Adaptive Management Process allows for incremental changes that by their nature will help to minimize the need for physical clearing of the floodplain.

### **Incremental Tidal Restoration and Adaptive Management**

The project will allow for the gradual re-introduction of tidal exchange to the Herring River system over a period of several years. The Adaptive Management Process (AMP) addresses the need to monitor the progress of the restoration effort over time, and to make management decisions that respond to the conditions-of-the-moment consistent with the objectives and limitations of the project. Actions contemplated in the *Overview of the Adaptive Management Process*, found in Appendix C of the final EIS/EIR, include primary and secondary management actions. Primary actions involve the opening or closing of the tide gates incrementally and in varying combinations. Secondary actions include:

- vegetation management including removal of woody vegetation and for invasive species,
- sediment management, including the application of layers of sediment to subsided areas to promote reestablishment of salt marsh habitats, and
- restoration of tidal channels, creation of salt pannes and pools to promote fish habitat

The Adaptive Management Process sets up a framework for making decisions that appears to have adequate checks and balances; three separate committees will review management decisions, including a regulatory oversight group, and stakeholders will be engaged prior to decisions being made.

The AMP also sets up appropriate objectives that structure the decision making process, and which take critical impact-related issues and weave them into a series of decision trees (influence diagrams). The structure appears to support a methodical approach to managing the restoration effort. One notable exception, however, is the apparent lack of consideration for impacts to cultural or archaeological resources. The 5 to 30 acres of upland that could be cleared to mitigate flooding impacts from Alternatives B or D have high archaeological sensitivity and should be taken into account in the Adaptive Management Process. If the Mill

Creek portion of the project were to move forward, archaeological survey work required by the Programmatic Agreement with Massachusetts Historical Commission would begin. Any significant archaeological findings from this survey work could argue against altering these areas and instead pursuing Alternative C.

### **Vegetation Management**

The project anticipates the need to remove existing vegetation within the restoration area prior to, and/or during the course of the restoration. The removal of vegetation would be governed by protocols within the AMP. The removal of vegetation from wetlands and/or their buffers is inconsistent with some performance standards in the RPP, but supported by others. As a change in wetland type and vegetation is an objective of the project and contributes toward the many anticipated benefits of the project, staff suggests that vegetation management is a necessary and appropriate project element.

### **Restoration of Tidal Channel and Marsh Surface Elevation**

This project element involves several potential secondary management actions to reverse the effects of diking, drainage, and subsidence of the marsh surface. These actions could include dredging of sediment within the Herring River channel, creation of small channels and ditches, restoring stream sinuosity, removing berms, and applying dredged materials to the marsh surface. These actions are regulated by performance standards in the RPP. However, the Adaptive Management Process lays out a system of checks and balances that would minimize these actions to those necessary to achieve the project objectives, while avoiding adverse impacts to other sensitive resources.

### **Low-Lying Road Crossings and Culverts**

#### **High Toss Road**

High Toss Road forms another upstream barrier to tidal restoration within the Herring River system in the form of a 1,000 ft earthen berm and culvert. The final EIS/EIR explores feasibility of options for restoring tidal flow upstream, including abandoning and removing the road, or closing the road during flood events. In the time since the EIS/EIR was published, the Wellfleet Board of Selectmen have voted to discontinue use and maintenance of the road, allowing the removal of the earthen berm, but maintain the legal right-of-way. Removing the road would result in the restoration of 12,000 sf of wetlands (salt marsh).

#### **Other Low-Lying Roads**

Segments of paved and sand or fire roads within the floodplain, totaling approximately 20,124 linear ft, would be subject to flooding following restoration. The final EIS/EIR indicates that these segments would need to be elevated, relocated, or closed during storm events to mitigate the effects of flooding, and that there is the possibility that culverts within these road segments would have to be replaced. As mitigating the effects of flooding on these roads is necessary to achieve the objectives of the project, staff suggests that the proposed alterations are necessary and appropriate project elements.

### **Low-Lying Private Properties**

The impacts on low-lying properties are in areas located mostly outside of the Seashore

boundary, and which areas contain between 145 and 179 privately owned parcels within the historic floodplain. Approximately 125 acres of degraded wetlands could be restored with the reintroduction of tidal flow within the Upper Pole Dike Creek sub-basin, and 53 acres within the Mill Creek sub-basin. The HRRC would address impacts to low-lying properties within these areas on a site-by-site basis. Flood protection measures could include acquisition and undevelopment of properties with structures, elevating driveways, relocating structures, constructing berms or rip-rap walls, and moving drinking water wells. The project might require the proponent to relocate/ reconstruct CYCC's low-lying golf course onto higher ground, requiring excavation and fill. The smallest number of impacted properties of the alternatives evaluated is Alternative C, and the greatest is Alternative D.

### **Public Access and Recreation Opportunities**

The HRRC intends to improve public recreational access opportunities as part of the restoration project, and through the design of specific project elements (such as the new Chequessett Neck Road tide-control structure).

### **Project Alternatives**

The previous sections address the elements which are common to all of the potential alternatives. The following comments address only those elements which are unique to a project alternative.

1. **Alternative B**

This alternative would achieve the lowest high tide elevation to achieve the project objectives through the construction of a tide control structure at Chequessett Neck Road. This alternative would not include a new dike structure at Mill Creek, and thus some action would be necessary to mitigate flooding to the Chequessett Yacht and Country Club (CYCC). Options include 1. relocating or 2. elevating the flooded portions of the course.

2. **Alternative C**

This alternative would achieve the highest possible high tide elevation given the current constraints within the floodplain, while excluding tidal restoration to the Mill Creek sub-basin through the construction of a dike. This second dike would allow for out-flow of fresh water, but would eliminate any tidal influence into this portion of the floodplain. The CYCC and other low-lying properties in the Mill Creek sub-basin would be unaffected by the restoration project, and thus no mitigation of these properties would be required.

3. **Alternative D**

This alternative would achieve the highest possible high tide elevation given the current constraints within the floodplain, and would include a dike at Mill Creek with a tidal control structure to allow for management of tidal influence within the Mill Creek sub-basin. Because flooding would be re-introduced to this portion of the floodplain, some action would be necessary to mitigate flooding to the CYCC, and other low-lying properties. Options include 1. relocating or 2.

elevating the flooded portions of the course. The project differences between Alternatives C&D are largely operational, driving the differences in the anticipated results and impacts of these respective alternatives.

Each of these alternatives will result in impacts to coastal resources, freshwater wetlands, wildlife and plant habitat, and rare species habitat, as previously discussed. Through an alternatives analysis workshop, the HRRC identified the “full build” Alternative D as the preferred alternative for the project.

Alternative D will require mitigating actions to protect the CYCC that will have impacts on resources protected under the CCC Act. Option 1, relocating the affected portions of the CYCC course, would result in 12 acres of course reverting to salt marsh, and 30 acres of upland (presently providing box turtle habitat) being converted to new fairways. Option 2, elevating the affected portions of the CYCC course, would result in 10 acres of fill within low-lying, wet areas of the course, 7 acres of the course reverting to salt marsh, and the clearing and excavation of 5 acres of upland (presently providing box turtle habitat) to supply the fill. See also the discussion of impacts to Low-Lying Properties in Mill Creek, above.

Regardless of whether Alternative C or D is selected, a dike at Mill Creek must be constructed in order to protect the CYCC and other Mill Creek low-lying properties. In terms of wetlands and wildlife resource impacts within Mill Creek, the tradeoffs between Alternatives C and D (essentially the difference between restoring the Mill Creek sub-basin (Alt D) and not restoring it (Alt C)), include the potential gain of 53 acres of restored salt marsh from existing mixed freshwater wetland and vegetated upland, and the loss of between 5 and 30 acres of upland rare species habitat for conversion to golf course fairways or practice area. The impacts to upland at the CYCC would also impact an area that has been identified as having a good likelihood of archaeological sensitivity (see Historic Preservation comments). The possible gains from Alternative D are substantial, but the potential losses, or impacts to sensitive resources, are not trivial.

### **Floodplain Management**

As the project Alternatives relate to the management of the Herring River floodplain, there is a delicate balance between commercial benefits, flood control measures and environmental impacts; especially at the present time when anticipated changes in climate which will likely bring significant alteration of existing coastal areas and flood regimes.

With this large scale restoration project, certain areas of the Herring River will likely be impacted by tidal flooding. Historically, the Herring River functioned as a natural floodplain with about 1,100 acres of salt marsh, intertidal flats and open water habitats. This area has been impacted by more than 150 years of human manipulation; the most substantial impact was the construction of the Chequessett Neck Road Dike at the mouth of the river in 1909. The dike functions both as a tide control structure, restricting tides in the River system from approximately 10 feet on the downstream harbor side to about 2 feet upstream of the dike. Beginning in 1929, houses were built in low lying areas that may not have been permissible under current regulations and a nine-hole golf course was built directly on drained former salt marsh within the floodplain.

Increased tidal flooding will substantially affect Mill Creek, a sub-basin of the Herring River system. The effect of tidal influence on Mill Creek is of particular concern because it has the highest number of privately owned structures that could be vulnerable to flooding without protective measures in place. Alternatives B, C, and D include the installation of a new tide control structure at Chequessett Neck Road, but all three alternatives differ in their treatment at Mill Creek (see descriptions below).

Under Alternative B, the Mill Creek sub-basin would be left open to the Herring River and the tide regime in the creek would be controlled at the new Chequessett Neck Road Dike. As a result, Alternative B does not require the construction or cost of a dike at Mill Creek because essentially, tidal flow would be controlled by the Chequessett Neck Road Dike. However, flood proofing measures for the Chequessett Yacht and Country Club golf course and other low-lying properties would be required including elevating property or relocating structures out of the floodplain.

Alternative C provides the highest practicable high tide water surface elevations possible through modifications to the Chequessett Neck Road Dike, but a tidal exclusion dike would be constructed at the mouth of Mill Creek. The Mill Creek dike would eliminate tidal influence to the sub-basin and serve as a flood protection measure to avoid flooding to low-lying properties. With the dike at Mill Creek, no additional flood protection measures would be required at the Yacht Club or other Mill Creek properties.

Under Alternative D, a new dike will be constructed at Mill Creek and would allow tidal flow to the sub-basin. This alternative would require the same flood protection measures in Alternative B (i.e. property elevation and/or relocation).

Each alternative uses a dike to restore tidal flow and control flood water. Dikes are used to confine a waterway to a predefined size, flow and capacity and often this control structure maximizes the extent of developable land and keeps flood water away from people and property. A benefit is that one dike can protect many low-lying properties. However, dikes are expensive to install, they are fixed to the land and cannot adapt to rising water from sea level rise or storm surge.

This project offers important ecological benefits to the Herring River floodplain. As the tidal regime in the Herring River is restored in each of the alternatives, the floodplain will return to a more natural state and function. One benefit of a natural floodplain is floodwater storage capacity. Depending on the topography, soil composition and ecology of the area, expansive floodplains provide a broad area to spread out and temporarily store floodwaters. As tidal regime is restored to the Herring River system, water levels will increase in the estuary's wetlands, leading to varied and increased sediment transport and deposition on the wetland surface. With changes in tidal regime and sediment deposition, the flood storage capacity will likely increase in the Herring River floodplain.

Another benefit to the sedimentation of the marshes in the Herring River is protection from sea level rise. Upstream of the Chequessett Neck Road Dike, the tidal marsh plain of the Herring River has subsided up to 3 feet below its pre-dike elevation; this is below the surface of the

existing salt marsh seaward of the dike. As tidal range increases within the new Chequessett Neck Road Dike, the subsided wetland will likely increase in elevation as more sediment moves into the system. With higher sediment transport and deposition, the marsh would become less water logged throughout tidal cycles and encourage the re-establishment of tidal marsh plants, both will allow the marshes to keep up with rising sea levels.

## **WATER RESOURCES**

Restoring tidal flow to the Herring River system will result in improvements to water and sediment quality within the river and provide benefits to its ecology.

Staff comments provided on the DEIR suggested that the proponent identify private wells that could be impacted by the project. The FEIR identifies private drinking water wells that could be impacted by the project, and discusses measures to address such impacts, such as relocating such wells. The Adaptive Management Plan to be developed according to the framework in the FEIR should specifically include such measures.

The AMP will require sufficient detail (certainly more than is contained in the FEIR) about the plans to establish pre- and post-groundwater monitoring points and analysis in the basin, including modeling and monitoring. Commission staff was asked in 2015 by the Friends of the Herring River (FOHR) to make a groundwater presentation and then review information relative to changes in anticipated groundwater at the CCYC occasioned by the project. Since then the FOHR have used a consultant to review the same work and they recommended a more detailed plan for a monitoring program and the establishment of a new groundwater model. Commission staff has recently been requested to attend a kick-off meeting with the USGS, which was recently contracted by the FOHR, to review and come up with a more detailed monitoring plan and potentially a groundwater model. The Commission will participate in the AMP, and water resources staff will be involved in reviewing and decision-making for appropriate and detailed groundwater modeling and monitoring plans.

## **HERITAGE PRESERVATION AND COMMUNITY CHARACTER**

The preferred Alternative D involves potential upland disturbance of 5 to 30 acres in an area that is highly sensitive for archaeological resources. While the extent of archaeological resources and their significance will not be known until an archaeological survey is performed as required by the Programmatic Agreement with Massachusetts Historical Commission (MHC), it is fair to assume that significant archaeological sites may be found that need to be avoided or mitigated. Alternative C would avoid these potential cultural resource impacts and thus appears to be more desirable from a cultural resource standpoint. The preferred alternative would have the greatest potential impact on archaeological resources because it includes altering a large area for relocating the Chequessett Yacht and Country Club golf course.

This project has the potential to uncover or disturb archaeological resources either during construction of the dikes, during relocation/elevation of impacted low-lying development, or when tidal waters are increased. There are numerous known archaeological sites in the project area, representing both pre-contract and post-contact periods. The project proponent hired an archaeological consultant (PAL Inc.) who has identified areas of high and moderate archaeological sensitivity where survey work should occur once the final project design is confirmed. They have also prepared a Programmatic Agreement to comply with Section 106 of the National Historic Preservation Act. The Programmatic Agreement spells out how survey

work will proceed in areas of archaeological sensitivity, with oversight by Massachusetts Historical Commission and consulting parties. If resources are identified, they will apply National Register criteria to determine their level of significance, and MHC and Tribal Historic Preservation Officers will be consulted to develop a plan to minimize adverse effects to these resources. The PA also defines the process for protecting unanticipated discoveries during construction activities. This process allows for consideration of archaeological resources, and appears to satisfy requirements for protection of archaeological sites in Cape Cod's Regional Policy Plan, but staff has concerns that waiting until late in the planning process will make it more difficult to mitigate impacts on any resources that are found.

The FEIR states that exact quantification of impacts from the Mill Creek dike will depend on the dike siting and design, so they will be presented in detail once the design is finalized. To understand the full cultural resource impacts of Alternative D, the applicant will also need to present the results of the archaeological survey of potentially impacted areas. The Programmatic Agreement with MHC appears to allow this archaeological survey work to wait until ground disturbance is imminent, but it would be more appropriate to conduct the survey work prior to making a final decision about the preferred alternative so that the extent of impacts to the historic Mill Creek dike and other archaeological sites are fully understood.

The Adaptive Management Process (AMP) sets up appropriate objectives that structure the decision making process, and which take critical impact-related issues and weave them into a series of decision trees (influence diagrams). The structure appears to support a methodical approach to managing the restoration effort. One notable exception, however, is the apparent lack of consideration for impacts to cultural or archaeological resources, and a detailed discussion of predicting and monitoring adverse impacts on such resources in the Adaptive Management Process. The 5 to 30 acres of upland that could be cleared to mitigate flooding impacts from Alternatives B or D have high archaeological sensitivity and should be taken into account in the AMP. The AMP should address the Programmatic Agreement and its basic elements. If the Mill Creek portion of the project were to move forward, archaeological survey work required by the Programmatic Agreement with MHC would begin. Archaeological resources found during the survey would be evaluated for National Register eligibility. Any significant archaeological findings from this survey work could argue against altering these areas and instead pursuing Alternative C. Because of the possibility of finding archaeological sites that cannot be avoided or mitigated, Alternative D may not be viable and Alternative C will need to be kept as a valid alternative.

No historic structures are expected to be impacted by the proposed project. The Massachusetts Cultural Resource Inventory (MACRIS) does not identify any historic structures in the area of project impact, though the remains of many structures that existed in the past may be found. These resources are being addressed as part of the archaeological resource agreement.

The proposed work will impact some low lying roadways and landscapes in the project area. In general, it does not appear to have a negative effect on the cultural landscape as it will re-introduce natural elements of the landscape that were there in the past.

## **TRANSPORTATION**

Staff comments are similar to those provided on the DEIR. The Final Environmental Impact Statement/Environmental Impact Report (Final EIS/EIR) for Herring River Restoration project presents the preferred alternative for tidal restoration of the Herring River flood plain.

As detailed in the Final EIS/EIR, the increase in tidal flow from the preferred alternative would result in the flooding of a number of local paved and unpaved roads. The effected roads, including High Toss Road, Pole Dike Road, Bound Brook Road, Old County Road, and numerous fire roads, would need to be elevated, relocated, closed during high tides, or abandoned. The impacts of this project on the roadway network should continue to be detailed in subsequent work and submissions to the Commission under DRI review. Where paved roadways are significantly altered, accommodations for non-motorist should be maintained and, to the extent feasible, improved.

In addition to permanent impacts, temporary construction impacts on the roadway network should be addressed in subsequent analyses and submissions to the Commission.

## **ECONOMIC DEVELOPMENT**

The FEIR accurately identifies tourism as the major sector of Wellfleet's economy, as well as that of the broader Cape Cod economy. The National Park Service estimates that the roughly 4.5 million visitors to the Cape Cod National Seashore in 2015 spent nearly \$200 million in the local economy, creating almost 2500 jobs. The restoration of the Herring River will increase recreation areas, thus further enhancing the attractiveness of the Cape Cod National Seashore as a destination.

The FEIR also identifies the importance of shellfish aquaculture to the local economy. In recent years, shellfish aquaculture in Massachusetts has been one of the fastest growing maritime industries. The industry employs over 900 people and adds \$45 million to the state's economy, with 58% of state-wide oyster production occurring on Cape Cod. While the applicant does not anticipate any impacts to existing shellfish propagation areas, there is significant monitoring proposed as part of the project. Additionally, the restoration may open additional areas to shellfish propagation currently closed due to water quality issues.

Commercial fishing also remains an important sector of the economy on Cape Cod. Outer Cape ports landed 20 million pounds of seafood in 2014 valued at \$29 million. Further, recreational fishing in Massachusetts has grown into a \$1 billion industry state-wide supporting over 14,000 jobs. Groups such as the Cape Cod Commercial Fishermen's Alliance have embraced NOAA's Ecosystem-Based Fisheries Management as a means to ensure the continued success of Cape Cod's fishing industry. One opportunity identified as part of this approach is to protect the supply of forage fish available to larger, higher-value fish species. While likely not a significant impact, the increased breeding habitat for finfish such as Atlantic herring created as part of the project should have a net beneficial impact on the overall health of the region's fishing industry.

Any impacts to individual property owners, including the Chequessett Yacht and Country Club, will be mitigated through actions included in the plan as a condition to actions or development that could create impacts on these properties proceeding. Additionally, Commission staff suggests these changes are primarily local in nature and are unlikely to have an effect on the regional economy.