

# **Stewart B. McKinney NWR: Salt Meadow Unit, Marsh Restoration and Tidal Flow Improvement Feasibility Assessment**

## **Narrative – Site Description**

Stewart B. McKinney National Wildlife Refuge (SBM) is composed of ten units distributed across Connecticut's southern coastline. The Salt Meadow Unit is located in Westbrook, CT and is comprised of both forest and salt marsh habitat. Salt marsh is dominant in the southern portion of the unit and spreads generally northward and inland encompassing a vast area. The salt marsh abuts large swaths of forested areas on the western, northern, and eastern sides with increasing elevation that peaks at approximately 110ft NAVD88. The 13.75-mile Menunketesuck River flows generally from north to south through the salt marsh and extends 11.43 miles past the northern end of the study area passing through 10 upstream dams, with the closest being 2 miles from the Amtrak structure. The river is hydrologically significant in the marsh system, is quite deep, and has significant scouring around bends. The salt marsh also contains two smaller, meandering branches of the Menunketesuck River flowing from a pool in the west and from the northeast. Like many salt marshes in the northeast, the marsh has a vast network of ditches which were created in the 1930s to drain standing water for salt marsh hay production and / or to prevent mosquito abundance. The Salt Meadow unit is bisected by the Amtrak Northeast Connector which connects 750,000 daily riders with Boston, New York City, Philadelphia, Baltimore, and Washington D.C., contributing \$50 billion to the economy annually (NEC Commission 2014). There is also a road bridge (Rt 1/Boston Post Rd.) that crosses the marsh at the downstream extent of the refuges' western boundary.

Extensive data collection has been conducted within the marsh over the past 5 years by Service staff, including topographic, bathymetric, hydrological, and biological data. The data was used to build a digital elevation model (DEM) of the salt marsh, which informed a numerical model and engineering analysis recently completed by coastal modelers from Louisiana State University and the University of Georgia.

This project will build on existing data and will fund a contractor to complete an initial review and refinement of baseline data, attend project team meetings and site visits to become familiar with all existing data. The contractor would then complete an assessment of the marshes of the southern New England – Long Island geography to assess marsh hydrology and develop a System Based Tools (SBT's) for the region. This assessment will inform marsh restoration design criteria for hydrological restoration (i.e.

recommended marsh channel to platform ratios) through remediation of historic alterations.

The feasibility study will encompass an area of 316 acres (See figure), including 180 acres of salt marsh, while the SBT development will encompass four states.

With all of this data, the contractors will develop an alternatives analysis for salt marsh restoration at the site to include 1) potential alterations to the road and railway crossings where they impact current and future tidal flow and 2) potential alterations to the marsh through a variety of within marsh restoration techniques (e.g. hydrological, elevation enhancements). With input from the project team the alternatives will be narrowed down to three for further design development. As the contractor refines the concepts and alternative analysis additional data maybe required. If possible (based upon the findings of the analysis and input from partners), the final preferred alternative will be refined into a 30% design plan set. All tasks are detailed below with associated deliverables in the Scope of Work.

### **Period of Performance**

09/01/2026 to 8/31/2028

### **Scope of Work (SOW)**

Tasks 1, 2, 3, 4, 5, and 6 are included in this request for Architectural and Engineering Services; including feasibility, assessment and conceptual design.

#### ***Task 1: Assessment of Existing Data***

- Attend a kick-off meeting (virtual) with the client and stakeholders to gather background information on the project site and timeline and establish site plan goals and objectives
- Attend 2 follow-up meetings (virtual) to discuss and clarify existing data questions.
- Request, obtain and review site data and any information obtained from partners or the state.
  - List of existing data and links provided as Appendix A.

#### ***Task 2: Assessment of Existing Modeling***

- Attend a modeling meeting with LSU team and Service to discuss the model results and get better understanding of what additional modeling scenarios will be necessary in the future tasks.
- Assess inputs, calibrations, and results of LSU Modeling efforts.

***Task 3: Site Visit and Preliminary Site Assessment***

- Conduct a site visit (2-day) to assess site conditions with Service.
- Visit tidal restrictions, upstream and downstream limits, marina, and surrounding marsh areas

***Task 4: Develop Standardized System-Based Tools (SBT) Approach for Hydrology Restoration Design in Tidal Marshes***

- Identifying and evaluating marshes and marsh cells with limited anthropogenic ditching or farming (NY to MA) to develop morphological and hydrodynamic framework for tidal marsh hydrology
  - Regional desktop search for relatively healthy marshes or marsh segments
  - Site visits to the marshes.
  - Evaluation of historical aerial imagery while developing the tools.
- Culmination of the findings of the SBTs hydrology evaluations and the other noted supporting elements will be used to develop the SBT set for Southern New England & New York which address marsh health for high marsh, mixed/transitioning marsh, and low marsh systems. It will be compiled into a findings document and applied to the design process. A draft findings document will be submitted for review to the Service prior to finalization.
- The revised document will then be submitted to the Service for the use in future projects.
- This task will include periodic updates during project meetings to highlight progress and findings to date.

***Task 5: Alternative Analysis Development***

- Host meeting with Service and key partners to brainstorm concepts and ideas for inclusion in restoration planning
- Develop list of 6 major options or concepts. These will be discussed in workshop setting with Service, with concerns and comments integrated to aid in developing final alternatives.

- Meet with partners and cooperating agencies to gain interest, support, concerns, and/or logistical issues for potential alternatives.
- Refine concepts to best three options for project area. All options and concepts will be summarized in alternative analysis document.

***Task 6: Concept Refinement and Development***

- Refinement of top 3 concepts into defined options with integration of additional modeling results.
- Develop preliminary design concept into plans for visualization and sharing with partners.
- Conduct additional hydrodynamic and/or sediment transport modeling to inform concept refinement
- Develop preliminary grading plans and volume estimates

## Site Overview Map:



**Figure 1:** Study area overview, showing the Menunketesuck River, bisecting the salt marsh. Key locations are labeled. The locations of the water level loggers are depicted.



## Appendix # A: Existing Data, Documents, Imagery

### Topobathymetry Survey & Tidal Monitoring:

- Survey Report: <https://iris.fws.gov/APPS/ServCat/Reference/Profile/181728>
- Digital Elevation Model (Created using 2022-2023 Survey Data combined with the 2016 Compiled CONED Topobathymetry from NOAA): <https://iris.fws.gov/APPS/ServCat/Reference/Profile/181734>
- Topobathymetric RTK Survey Data (Including over 11400 RTK Survey Points): <https://iris.fws.gov/APPS/ServCat/Reference/Profile/181722>
- Echo Sounded Bathymetry: <https://iris.fws.gov/APPS/ServCat/Reference/Profile/181750>
- Tidal Monitoring Data (Over 1 year of data): <https://iris.fws.gov/APPS/ServCat/Reference/Profile/181756>
- 2023 NOAA Topobathy LiDAR: <https://www.fisheries.noaa.gov/inport/item/74870>
- Bathymetric Data from the Rt 1 Crossing (*Pending Collection in June 2026*)

### Marsh Health Assessment and Vegetation Monitoring

- 2025 RTK Vegetation Survey and Assessment (Including over 5600 RTK Vegetation Survey Points): <https://iris.fws.gov/APPS/ServCat/Reference/Profile/192367>
- 2025 MarshRAM Cover Type Assessment: <https://iris.fws.gov/APPS/ServCat/Reference/Profile/185088>
- S.E.T. Data: Data from three Surface Elevation Table's (S.E.T.) at the Salt Meadow marsh have been collected since 2015, they've been analyzed and will be provided to the contractor once a contract is in place

### 2026 Louisiana State University Hydrodynamic Modeling Products

- Report: <https://iris.fws.gov/APPS/ServCat/Reference/Profile/193081>
- Animations: <https://iris.fws.gov/APPS/ServCat/Reference/Profile/193082>
- Online Results Viewer: <https://proteus.cee.lsu.edu/usfws/>
- Model file repository: <https://doi.org/10.5281/zenodo.19445848>
  - Including both the Finite Mesh Elements and the working input files for the hydrodynamic (ADCIRC) simulations

### Menunketesuck River Fishery Data

- Chapman Mill Pond Fishway Design and Construction information: [https://www.nfwf.org/sites/default/files/finalreports1/1401.13.039410-final\\_report.pdf](https://www.nfwf.org/sites/default/files/finalreports1/1401.13.039410-final_report.pdf)
- Additional Fishery data from CT D.E.E.P. fishery biologists will be provided about the species and productivity of the system.
- Migratory Fish Runs of CT: (Known species using the Menunketesuck River) [https://portal.ct.gov/-/media/deep/fishing/fisheries\\_management/migratory-fish-runs.pdf?rev=83aee5c5927e4c8fbb79cddeb28803ee&hash=59A02EE8AEFCDF689335E3521A85F173](https://portal.ct.gov/-/media/deep/fishing/fisheries_management/migratory-fish-runs.pdf?rev=83aee5c5927e4c8fbb79cddeb28803ee&hash=59A02EE8AEFCDF689335E3521A85F173)

## Historical Imagery

- T-Sheets (shows re-alignment of the river): <https://fws-files.sharebox.com/s/1n77ydchgiaf99vtk4zm5dcu6trqb4hh>
  - o 1880
  - o 1933
- Imagery: <https://fws-files.sharebox.com/s/dgwft4jgdmxsadduljo8yg3u5v0t1n8>
  - o 1934
  - o 1957
  - o 1970
  - o 1986
  - o 1990
  - o 2025: High Resolution Satellite Imagery is available once a contractor is selected

## Land Ownership Map

- Land ownership map compiled using parcel data from the Town of Westbrook, CT in May 2026. USFWS will conduct outreach to owners of non-service owned parcels as a part of this project. The marsh design will take a whole marsh approach while recognizing implementation on non-USFWS owned land may be more complicated. USFWS will conduct further reconciliation of internal landownership data with the public parcel layer to verify the correct land ownership boundaries.  
<https://fws-files.sharebox.com/s/k2ynqttellbeejzcg2q39516dmsrfgw>

## U.S. Army Corp of Engineers Potential Sediment Source Location Surveys

- Patchogue River (3/3/2026 Condition Survey)  
[https://ehydroprod.blob.core.usgovcloudapi.net/ehydro-surveys-pdf/CENAE/CENAE\\_DIS\\_CT\\_14\\_PAT\\_20260303\\_CS\\_010.PDF](https://ehydroprod.blob.core.usgovcloudapi.net/ehydro-surveys-pdf/CENAE/CENAE_DIS_CT_14_PAT_20260303_CS_010.PDF)
- Duck Island Harbor (6/20/2024 Condition Survey)  
[https://ehydroprod.blob.core.usgovcloudapi.net/ehydro-surveys-pdf/CENAE/CENAE\\_DIS\\_CT\\_13\\_DUC\\_20240620\\_CS\\_047.PDF](https://ehydroprod.blob.core.usgovcloudapi.net/ehydro-surveys-pdf/CENAE/CENAE_DIS_CT_13_DUC_20240620_CS_047.PDF)