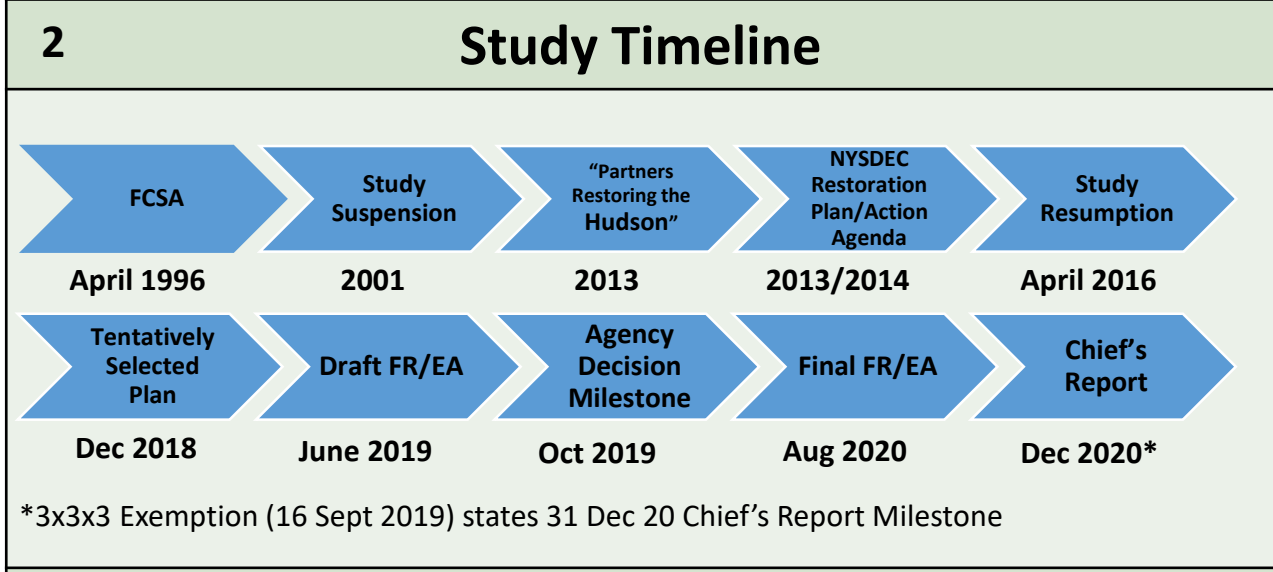


Hudson River Habitat Restoration (HRHR) Feasibility Study, New York

1 Non-Federal Sponsors



3 Purpose

Restore significant ecosystem function, structure, and dynamic processes that have been degraded in the Hudson River. Intent of restoration is to partially or fully reestablish the attributes of a naturalistic, functioning and self-regulating system.

- ## 5 Nationally Significant Hudson River
- Institutional Significance:** one of 28 Estuaries of National Importance (National Estuary Program); numerous national designations of importance; key location along the North American Atlantic Flyway.
 - Technical Significance:** regionally scarce freshwater tidal marsh, intertidal shore and tidal marsh; nationally unique large river habitat; lost river side channels due to USACE's historical navigation improvements; tributaries fragmented from barrier construction; presence of federally endangered and threatened species.
 - Public Recognition:** 94 federal and state agencies and NGOs establishing "Partners Restoring the Hudson"; 21 villages, 41 towns, 10 cities, 10 NY counties.

4 Study Area

125 miles from Troy Lock and Dam downstream to Mario M. Cuomo Bridge including Tributaries

6 Key Problems

Lost Side Channels

Filled/Hardened Shorelines

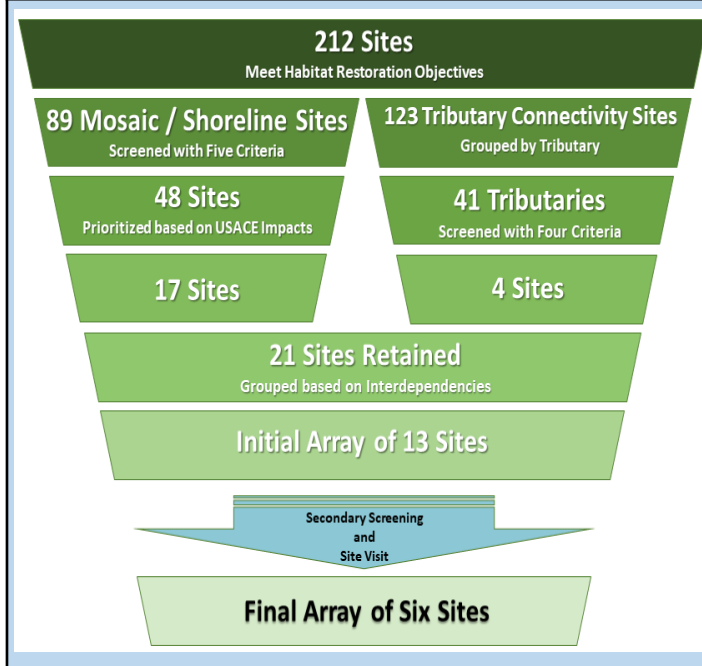
Fish Passage Barriers

Over the past 200 years, ~ 4,000 acres of aquatic habitat (shallow water, intertidal and wetland habitats) have been lost:

- ✓ River side channels and islands were lost from **construction, dredging, and filling from the Federal Navigation Channel** (3,300 acres of wetlands, 700 acres of shallow water habitat, 85% of islands and side channels in upper portion of river were filled with dredged material, more than 70 miles of shoreline lost)
- ✓ USACE constructed longitudinal dikes and dams along the Hudson. Bulkheads and rip-rap were used to harden over 10,100 acres of shorelines (53%)
- ✓ More than 1,600 dams were constructed in the watershed disconnecting the river from its tributaries

- ## 7 Objectives
- Restore a **mosaic of interconnected, large river habitats**, which together host a diversity of native taxa.
 - Increase the extent and quality of *subtidal, shallow water habitats* (e.g., side channels) and *intertidal habitats* (e.g., freshwater tidal marshes, mud/sand flats).
 - Promote shoreline, riparian and upland habitats contributing to aquatic ecosystem integrity and a balanced mosaic of habitat types.
 - Restore **lost ecological connectivity** within the Hudson River and its tributaries
 - Increase the connectivity of spawning, foraging, and resting habitats for *migratory fish* and stopover, nesting, and foraging habitat for *migratory and resident birds*.

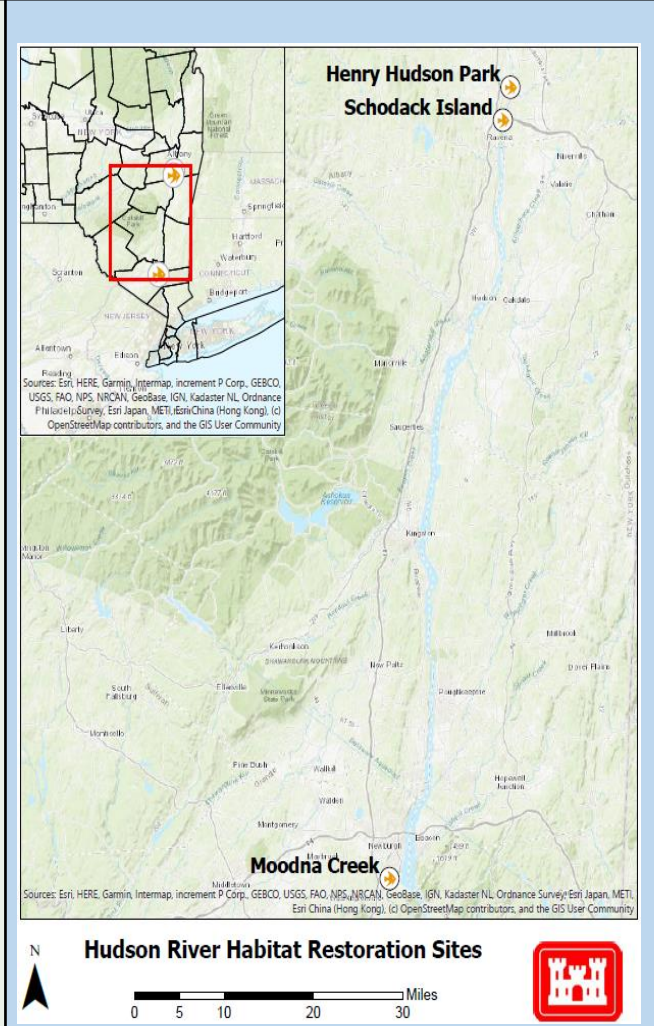
8 Plan Formulation



- 1665 habitat restoration opportunities identified
- 212 sites met objectives
- 3 restoration categories (mosaic, shoreline and tributary connectivity)
- Preliminary screening
- 13 sites – Recon and secondary screening
- Final Array of 6 sites with 23 Alternatives
- Field work (EPW, profiles, tide gauges, etc)

- Management measures: excavation, dredging, re-contouring, invasive vegetation removal, planting, bank stabilization, dam removal, culvert modification, fish ladder
- Cost estimated/benefits quantified with certified models- Evaluation of Planned Wetlands and Watershed Scale Upstream Connectivity Toolkit
- Plan Evaluation and Comparison: Site and Regional Cost Effectiveness/Incremental Cost Analysis, planning objectives
- Five sites included in Tentatively Selected Plan
- Two sites (Rondout Creek and Binnen Kill) removed due to public and landowner opposition and lack of sponsor support
- Three sites recommended as NER Plan

9 National Ecosystem Restoration (NER) Recommended Plan



Shoreline Restoration

Henry Hudson Park

- Tidal wetland restoration (3.7 acres)
- Replacement of the eroding hardened shoreline with a living shoreline (1,760 linear feet of shoreline with 0.6 acres of tidal wetlands)

Large Mosaic-Side Channel Restoration

Schodack Island Park

- Side channel and tidal wetland complex (8.5 acres)
- Tidal wetland restoration (19.1 acres)

Tributary Connectivity

Moodna Creek (collectively reconnect 7.8 miles of habitat)

1

Utility Pipe Removal

2

Firth Cliff Dam Removal

3

Orr's Mill Dam Partial Removal

- **NER Plan includes: 3 Projects restoring Tidal Wetlands (23 acres); 1 Side Channel/Wetlands (9 acres); and 3 Full/Partial Dam Removals on Moodna Creek reconnecting 7.8 miles of tributary habitats to the Hudson River**
- **Future spin-off feasibility studies to be carried out under the existing Study Authority.**

10 Environmental Compliance

- Environmental Assessment
- All coordination complete (Endangered Species Act, Fish and Wildlife Coordination Act Report, Essential Fish Habitat)
- National Historic Preservation Act compliance achieved through a Programmatic Agreement with the New York State Historic Preservation Office
- Preliminary Water Quality Certificates and Coastal Zone Consistency
- Supported by State and Federal Resource Agencies

11 Cost Summary (FY21)

Project total First Cost	\$44,638,000
Project Total Federal Share (75%)	\$33,478,500
Project Total Non-Federal Share (25%)	\$11,159,500
Lands and Damages	\$1,347,126
Cash Balance	\$9,812,374
Project Total Fully Funded Cost	\$64,810,000 (escalated to the mid-point of construction for each site)

12 Average Annual Costs & Benefits

Total Average Annual Cost	\$1,604,000
Average Annual OMRR&R Cost	\$9,600
Total OMRR&R Cost (100% Non-Fed)	\$428,000
Total Average Annual Benefits (Average Annual Functional Capacity Units)	59 AAFUCs
Cost/AAFUCU	\$27,000