PROGRAMMATIC AGREEMENT
AMONG
THE U. S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT,
AND THE NEW YORK STATE HISTORIC PRESERVATION OFFICE,
REGARDING
THE HUDSON RIVER HABITAT RESTORATION PROJECT

WHEREAS, the U.S. Army Corps of Engineers, New York District, (New York District), has been authorized under the Section 551 of the Water Resources Development Act of 1996 to conduct a feasibility study to evaluate federal participation in ecosystem restoration along the Hudson River and its tributaries. The study's purpose is to determine the feasibility of carrying out ecosystem restoration measures that would restore a mosaic of large river habitats and connectivity within the Hudson River and connected ecosystems; and

WHEREAS, The Hudson River Habitat Restoration (HRHR) Study Area consists of the Hudson River and its tributaries from the Tappan Zee Bridge to the Troy Lock and Dam, a length of approximately 125 miles; and

WHEREAS, the New York District used a screening process to selected three sites out of 1,665 potential restoration sites included within the feasibility study to recommend for construction. These three sites are Schodack Island State Park, Henry Hudson Park, and Moodna Creek AOPs 1, 2, and 3 (Appendix A); and

WHEREAS, the New York District has defined the "Area of Potential Effect" (APE) for this Undertaking to include all areas within the three sites where restoration measures are planned as well as the associated staging areas that are yet to be determined; and

WHEREAS, the New York District conducted a historical and archaeological assessment for the three restoration sites (Appendix B). The assessment consisted of compiling existing information and a pedestrian survey. Data was gathered on historic sites and districts, archaeological sites and sensitivity areas, and National Register of Historic Places (NRHP) eligible and listed resources which are located within the restoration site boundaries and within a one-mile buffer surrounding each site; and

WHEREAS, the New York District has determined that properties listed and/or eligible for listing on the National Register of Historic Places (NRHP) may be adversely affected by implementation of the proposed restoration measures at the three sites recommended for construction; and

WHEREAS, for all three sites an additional survey will be required to determine the presence or absence of significant cultural resources and to make a final assessment of adverse effects; and

WHEREAS, the New York District, in consultation with the New York State Historic Preservation Office (NYSHPO) and other interested parties, plans to carry out additional work to identify cultural resources and develop treatment plans, if necessary, for the proposed undertaking to ensure that the project will avoid, minimize, or mitigate for adverse effects to significant historic properties and archaeological sites; and

WHEREAS, the New York District has notified the Advisory Council on Historic Preservation of the potential for the Undertaking to affect historic properties and that a programmatic agreement will be prepared; and

WHEREAS, the New York District has consulted and will continue to consult with the NYSHPO, the Stockbridge Munsee Band of Mohican Indians, the Saint Regis Mohawk Tribe, the Delaware Tribe of Indians, and the Delaware Nation (federally-recognized tribes); and

WHEREAS the New York District is coordinating, and shall continue to coordinate a public outreach program for this undertaking which in the past has consisted of a number of public meetings and the circulation of cultural resource and environmental documents related to the Section 106 review process; and

NOW, THEREFORE, the New York District and the NYSHPO agree that the project shall be administered in accordance with the following stipulations to satisfy the New York District's Section 106 responsibilities for all individual actions of the Undertaking.

Stipulations

The New York District shall ensure that the following measures are carried out:

I. IDENTIFICATION AND EVALUATION

A. The New York District shall carry out surveys for each restoration site that is advanced past the feasibility phase to identify significant cultural resources within the APE. Survey methodology shall be tailored to the unique environment of the restoration site to identify resources and will consider previous survey results and consultation comments when designing the surveys.

B. Prior to the initiation of construction-related activities which may affect historic properties, the New York District, in consultation with the NYSHPO and other interested parties, shall identify and evaluate:

1. Archaeological Sites

a. The New York District shall ensure that archaeological surveys within the uninvestigated portions of the APE are conducted in a manner consistent with the Secretary of the Interior's Standards and Guidelines for Identification (48 FR

44720-23) and guidelines set forth by the NYSHPO including the New York Archaeological Council's Standards for Cultural Resource Investigations and the Curation of Archaeological Collections in New York State (1994, adopted by NYSHPO in 1995), and take into account the National Park Service publication The Archaeological Survey: Methods and Uses (1978).

b. The scopes of work and survey reports shall be submitted to the NYSHPO via the CRIS program and to other consulting parties for review and comment.

2. Traditional Cultural Properties

a. The New York District shall ensure that surveys within the uninvestigated portions of the APE include procedures to identify traditional cultural properties and to consult with federally recognized tribes and other affected parties in accordance with the guidelines provided by National Park Service Bulletin 38, Guidelines for Evaluating and Documenting Traditional Cultural Properties.

b. In the event that a federally recognized tribe or affected group contacts the New York District regarding its recognition of a traditional cultural property, located within the APE, the New York District shall notify the NYSHPO to initiate discussions to consider whether the property is a traditional cultural property that meets the Criteria.

3. Buildings and Structures

a. The New York District shall ensure that surveys are conducted for buildings and structures in the APE in a manner consistent with the Secretary of the Interior's Standards and Guidelines for Identification (48 FR 44720-23). The Scope of Work and survey report will be consistent with the guidelines set forth by the NYSHPO and shall be submitted to the SHPO via the CRIS program and other consulting parties for review.

b. The New York District, in consultation with the NYSHPO and other consulting parties, shall identify and evaluate buildings and structures that are located adjacent to NRHP listed or eligible historic districts to determine whether such properties should be considered as part of the historic district or an expanded district.

4. Historic Landscapes and View Sheds

a. The New York District shall consult with the NYSHPO and other consulting parties, including local historical societies, to identify and evaluate historic landscapes and viewsheds located within the APE. The New York District shall consult National Park Service Bulletins 18, How to Evaluate and Nominate Designed Historic Landscapes, and 30 Guidelines for Evaluating and Documenting Rural Historic Landscapes, National Park Service Preservation

Brief 36, Protecting Cultural Landscapes, and other publications and materials made available by the NYSHPO to assist in defining the criteria that should be applied to such properties.

b. The objective in conducting the surveys is to identity NRHP-listed or eligible historic landscapes and affected viewsheds within the project area that may be adversely affected by the Undertaking, and to determine whether they meet the NRHP criteria set forth in 36 CFR Part 60.4.

C. The New York District shall ensure that qualified professionals meeting the National Park Service professional qualifications for the appropriate discipline [National Park Service Professional Qualification Standards, Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44738-39)] are used to complete all identification and evaluation plans related to this undertaking, to include geomorphological, palynological, and archaeological surveys and testing, and documentation.

D. The New York District, the NYSHPO, and all other consulting parties shall consider the views of the public and interested parties, including local historic preservation groups, in completing its identification and evaluation responsibilities.

E. The New York District shall maintain records of all decisions it makes related to the NRHP eligibility of properties.

F. Application of Criteria:

1. The New York District, in consultation with the NYSHPO and other consulting parties, shall evaluate historic properties using the Criteria established for the NRHP [36 CFR 800.4(c)(1)]:

a. If the New York District, the NYSHPO, and the other consulting parties agree that the Criteria apply or do not apply, in evaluating the NRHP eligibility of a property, the property shall be treated accordingly for purposes of this PA.

b. If the New York District, the NYSHPO, and other consulting parties disagree regarding NRHP eligibility, prior to the start of any project-related work at the site or in the vicinity of the property, the New York District shall obtain a formal Determination of Eligibility (DOE) from the Keeper of the National Register (Keeper), National Park Service, whose determination shall be final.

G. The New York District shall ensure that the identification and evaluation of historic properties that may be affected by each phase of the Undertaking is completed prior to the initiation of any formal action by the Corps including rehabilitation, relocation, demolition, etc.

II. TREATMENT OF HISTORIC PROPERTIES.

The New York District shall adhere to the following treatment strategies in order to avoid adverse effects to historic properties.

A. The New York District shall ensure that treatment plans are developed and implemented for all historic properties determined eligible for listing in the NRHP that may be affected by project activities. Unless the NYSHPO or other consulting parties object within 30 days of receipt of any plan, the New York District shall ensure that treatment plans are implemented by the New York District or its representative(s). The New York District shall revise plans to address comments and recommendations provided by the NYSHPO and the other consulting parties.

B. The New York District shall ensure that qualified professionals meeting the NPS professional qualifications for the appropriate discipline [NPS Professional Qualification Standards, Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44738-39)] are used to develop and implement all treatment plans.

C. Avoidance. The preferred treatment is avoidance of effects to prehistoric sites and historic properties. The New York District shall, to the extent feasible, avoid significant archaeological sites through design changes. The New York District, the NYSHPO, and consulting parties shall consult to develop plans for avoiding impacts to NRHP-eligible sites. The New York District shall incorporate feasible avoidance measures into study activities as part of the implementation of the restoration measures. If avoidance is determined to be infeasible, the New York District shall develop and implement treatment plans in consultation with the NYSHPO and other consulting parties.

D. Preservation in Place. When the New York District, the NYSHPO and the other consulting parties agree that complete avoidance of historic properties is infeasible, the New York District shall explore preservation in place, if appropriate. Preservation in place may entail partial avoidance or protection of historic properties against project-related activities in proximity to the historic property. The New York District shall preserve historic properties in place through project design, such as incorporating color, texture, scale, and materials, which are compatible with the architectural or historic character of the historic property, use of fencing, berms or barricades, preservation of vegetation including mature trees, landscaping and planting that would screen the property.

III. RESOLUTION OF ADVERSE EFFECTS

A. If the New York District, in consultation with the NYSHPO and other consulting parties, determines that the Undertaking will have an adverse effect on historic resources, the New York District shall:

1. Consult to develop alternatives to mitigate or minimize adverse effects. The analysis of alternatives shall consider program needs, cost, public benefit and values, and design feasibility.

2. Develop treatment plans to outline the process for implementation of mitigation measures.

B. Development of treatment plans.

1. The New York District, in consultation with the NYSHPO and consulting parties, shall develop treatment plans for historic properties that will be adversely affected by the Undertaking. The New York District shall submit all treatment plans to the NYSHPO and the other consulting parties for review and approval. The NYSHPO and other consulting parties shall have 30 days from receipt of adequate information in which to review and comment on the treatment plans. If the consulting parties fail to respond within 30 days, or if there is disagreement, the New York District shall initiate the dispute resolution process set forth in Stipulation XII.B. below.

2. Treatment plans developed between the New York District and the NYSHPO may include one or more of the following stipulations which address routine adverse effects that may occur to historic properties as a result of study implementation.

a. Recordation. The New York District shall consult with the NYSHPO to determine the appropriate level and type of recordation for affected resources. For historic properties with state and/or local significance, recordation shall be consistent with the requirements and standards of the Department of the Interior (October 1997). HABS/HAER documentation may also be required.

b. Salvage and Donation of Significant Structural Elements. Prior to removal, partial removal, or substantial alteration of historic properties, the New York District, in consultation with the NYSHPO, shall develop a salvage and donation plan to identify appropriate parties willing and capable of receiving and preserving the salvaged significant structural elements.

c. Archaeological Data Recovery. The New York District shall conduct data recovery on archaeological sites following agreement on the perspective data recovery and treatment plans between the New York District and the NYSHPO when the archaeological sites are eligible for National Register inclusion under additional Criteria than Criterion D (for the information which they contain) or when the full informational value of the site cannot be substantially preserved through the conduct of appropriate research to professional standards and guidelines. To the maximum extent feasible, data recovery and treatment plans shall be developed to take into account and mitigate for the fullest range of archaeological site values and significance.

IV. DISCOVERY

A. If previously unidentified and unanticipated historic resources are discovered during implementation of the Undertaking, the New York District shall cease all work in the vicinity of the discovered historic resource until it can be evaluated pursuant to the guidelines in Stipulations I and II of this PA. If the property is determined to be eligible, the New York District shall consult with the NYSHPO and other consulting parties to develop a treatment plan in accordance with Stipulation III of this PA.

B. The New York District shall implement the treatment plan once approved by the NYSHPO.

V. TREATMENT OF HUMAN REMAINS:

A. If any human remains and/or grave-associated artifacts are encountered, the New York District, the NYSHPO and Tribes shall consult to develop a treatment plan that is responsive to the ACHP's "Policy Statement Regarding Treatment of Burial Sites, Human Remains and Funerary Objects" (February 23, 2007), the Native American Grave Protection and Repatriation Act, As Amended (PL 101-601, 25 U.S.C. 3001 et seq.), and the U.S. Army Corps of Engineers, Tribal Consultation Policy (4 October 2012).

B. Human remains must be treated with the utmost respect and dignity. All work must stop in the vicinity of the find and the site will be secured.

C. The medical examiner/coroner, local law enforcement, the NYSHPO and Tribes will be notified. The coroner and local law enforcement will determine if the remains are forensic or archaeological in nature.

D. If the remains are determined to be archaeological in nature a forensic anthropologist will be employed to determine whether the remains are Native American or of other origin.

E. If the human remains are determined to be Native American they shall be left in place and protected from further disturbance until a treatment plan has been developed and approved by the New York District, NYSHPO and Tribes. Remains will be treated in accordance with the Stockbridge Munsee Band of Mohican Indians Policy for Treatment and Disposition of Human Remains and Cultural Items That May Be Discovered Inadvertently During Planned Activities (Appendix C).

F. If human remains are determined to be non-Native American, the remains will be left in place and protected from further disturbance until a plan for avoidance or removal is developed and approved by the New York District, NYSHPO, Tribes and other parties, as appropriate.

VI. COORDINATION OF REVIEWS FOR STUDY ACTIVITIES

A. All plans, documents, reports, and materials shall be submitted by the New York District (or its representative) to the NYSHPO via New York's CRIS program, and other consulting parties by mail, for a 30 day review period unless otherwise stipulated in this PA. If the NYSHPO and other consulting parties fail to comment within the specified time the New York District shall assume the agencies concurrence.

B. When interested parties are participating in the review of activities or actions outlined in this PA (i.e., consulting parties) the New York District shall ensure that all parties are provided documentation at the time it is forwarded to the NYSHPO, and afforded a 30 day review period. As appropriate, the New York District shall submit the comments of interested parties to the NYSHPO to facilitate further consultation.

C. If, after consulting with the NYSHPO and other consulting parties for a period of 90 days on any action or activity provided for in this PA, the New York District and the SHPO conclude there is no progress in developing treatment plans or other documents required by this PA, the District shall initiate the dispute resolution process set forth in Stipulation VII.B. below.

D. The New York District shall ensure that all submissions to the NYSHPO and all other consulting parties include all the relevant information required to facilitate their review. The New York District shall provide all additional information requested by the NYSHPO and other consulting parties within a timely manner unless the signatories to this PA agree otherwise.

E. The New York District shall ensure that all draft and final reports resulting from actions pursuant to the Stipulations of this PA will be provided to the NYSHPO and other consulting parties and will identify the Principal Investigator responsible for the report. All reports will be responsive to contemporary standards, and as appropriate to the Department of the Interior's Format Standards for Final Reports of Data Recovery Programs (42 FR 5377-79) and NYSHPO report standards. Precise locational data may be provided only in a separate appendix if it appears that its release could jeopardize archaeological sites consistent with National Register Bulletin Number 29, Guidelines for Restricting Information about Historic and Prehistoric Resources. All reports will be submitted in digital format via New York's CRIS program.

F. If the District proposes revisions or addenda to NYSHPO-approved treatment plans or other documents, the New York District and the NYSHPO shall meet to determine whether additional conditions or mitigation measures are appropriate. Any revisions to the treatment plans shall be provided to the NYSHPO and other consulting parties for review prior to implementation.

G. The New York District shall certify in writing that all requirements for identification and evaluation, and the implementation of treatment plans have been satisfactorily completed prior to the initiation of construction activities. The New York District shall submit a copy of this certification to the NYSHPO and other consulting parties via CRIS and by mail. The NYSHPO and other consulting parties shall have 30 days to object to the certification based a finding of incomplete compliance or inadequate compliance with the terms of this PA. If, after 30 days, no objections are received, the District may proceed with construction.

VII. ADMINISTRATIVE TERMS

A. Review Periods

The NYSHPO and other consulting parties shall have 30 days to review and /or object to determinations, evaluations, plans, reports, and other documents submitted to them by the New York District.

B. Dispute Resolution

The New York District and consulting parties shall attempt to resolve any disagreement arising from implementation of this PA. If there is a determination that the disagreement cannot be resolved, the New York District shall request the ACHP's recommendations or request the comments of the ACHP in accordance with 36 CFR Part 800.6(b).

Any ACHP recommendations or comments provided in response will be considered in accordance with 36 CFR Part 800.6(c)(2), with reference only to the subject of the dispute. The New York District shall respond to ACHP recommendations or comments indicating how the New York District has taken the ACHP's recommendations or comments into account and complied with same prior to proceeding with Undertaking activities that are subject to dispute. Responsibility to carry out all other actions under this PA that are not the subject of the dispute will remain unchanged.

C. Public Involvement

In consultation with the NYSHPO, the New York District shall develop a plan to inform the interested parties of the existence of this Agreement. Copies of this Agreement and relevant documentation prepared pursuant to the terms of this PA shall be made available for public inspection (information regarding the locations of archaeological sites will be withheld in accordance with the Freedom of Information Act and National Register Bulletin 29, if it appears that this information could jeopardize archaeological sites). Any comments received from the public under this Agreement shall be taken into account by the New York District.

Public Objections. The New York District shall review and resolve timely substantive public objections. Public objections shall be considered timely when they are provided

within the review periods specified in this PA. The New York District shall consult with the relevant consulting parties and as appropriate with the Council, to resolve objections. Study actions which are not the subject of the objection may proceed while the consultation is conducted.

D. Monitoring

The New York District shall prepare annual reports summarizing the status of compliance with the terms of this PA and a summary of the completed activities and the exempt activities for the past year and proposed activities for the next fiscal year. Reports shall be submitted by January 31 of every year. The Annual Reports shall be provided to the ACHP, the NYSHPO, all other signatories and interested parties until the Study-related activities are complete.

The ACHP and the NYSHPOs may request a site visit to follow up information in the annual report or to monitor activities carried out pursuant to this PA. The ACHP and the NYSHPO shall provide the New York District with 30 days written notice when requesting a site visit unless otherwise agreed. The New York District may also schedule a site visit with the NYSHPOs and the ACHP at its discretion.

E. Amendments

Any signatory to this PA may request that it be amended, whereupon all the parties will consult in accordance with 36 CFR Part 800.6(b)(7) to consider such amendment.

F. Termination

Any signatory to this PA may terminate it by providing thirty days' notice to the other parties, provided that the parties will consult during the period prior to termination by certified mail to seek agreement on amendments or other actions that would avoid termination. In the event of termination, the New York District will comply with 36 CFR Parts 800.4 through 800.6 with regard to individual undertakings covered by this Agreement.

G. Sunset Clause

This PA will continue in full force and effect for ten years or until the Undertaking is complete and all terms of this PA are met, unless the Undertaking is terminated or authorization is rescinded.

H. Anti-Deficiency Act

All requirements set forth in this PA requiring expenditure of funds by the New York District are expressly subject to the availability of appropriations and the requirements of the Anti-Deficiency Act (31 U.S.C. 1341). No obligation undertaken by the New York District under the terms of this PA shall require or be interpreted to require a commitment

to extend funds not appropriated for a particular purpose. If the New York District cannot perform any obligation set forth in this PA because of unavailability of funds, that obligation must be renegotiated among the New York District and the signatories as necessary.

Execution and implementation of this PA evidences that the New York District has satisfied its Section 106 responsibilities for all individual Undertakings of the Project, and that the New York District has afforded the ACHP an opportunity to comment on the Undertaking and its effects on historic properties.

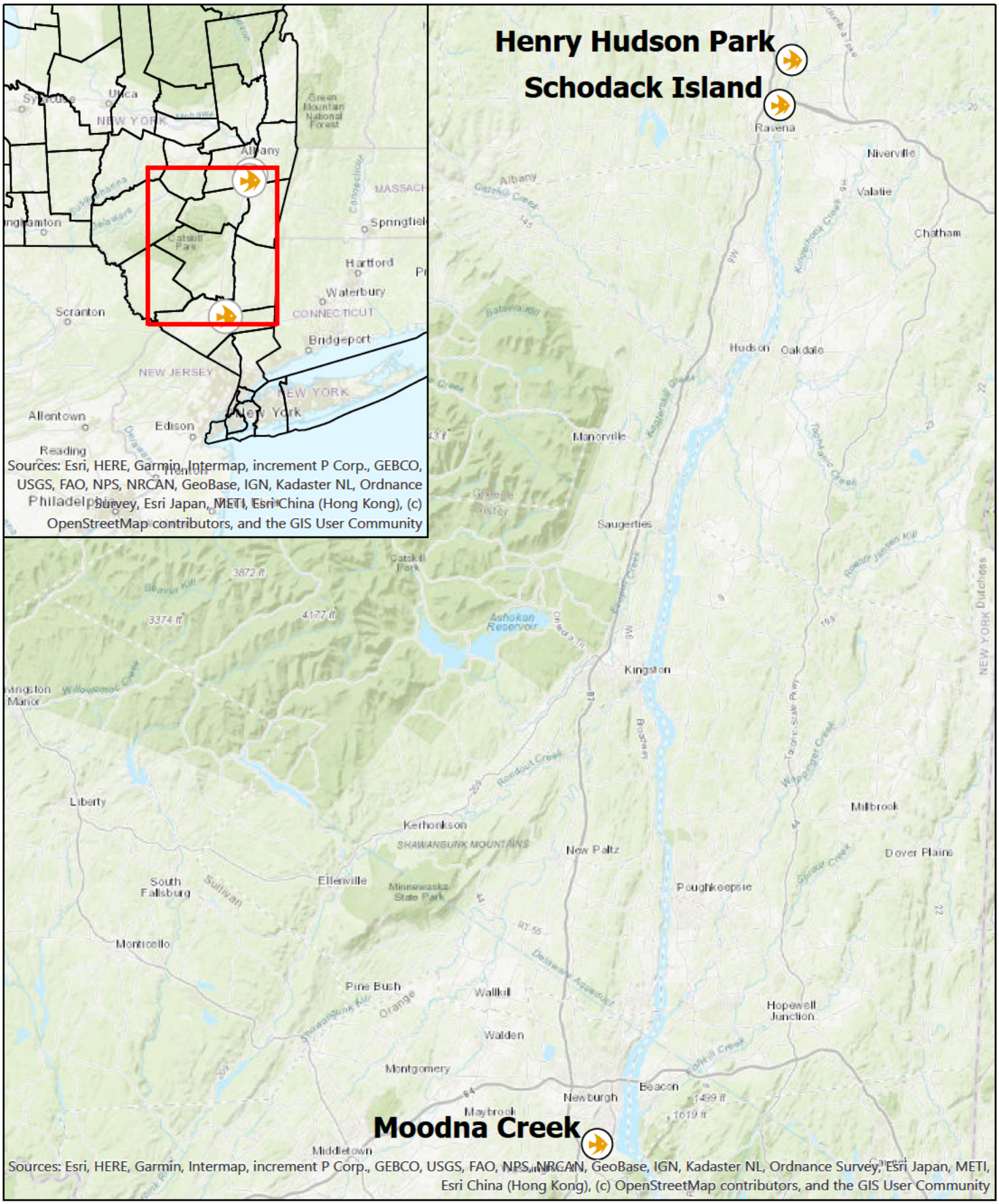
PROGRAMMATIC AGREEMENT
AMONG
THE U. S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT,
AND THE NEW YORK STATE HISTORIC PRESERVATION OFFICE,
REGARDING
THE HUDSON RIVER HABITAT RESTORATION PROJECT

U.S. ARMY CORPS OF ENGINEERS

By: _____ Date: 20200605
Col. Thomas D. Asbery, New York District Commander

NEW YORK STATE HISTORIC PRESERVATION OFFICE

By: _____ Date: July 6, 2020
R. Daniel Mackay, Deputy Commissioner for Historic Preservation/Deputy State Historic Preservation Officer



Hudson River Habitat Restoration Sites

N

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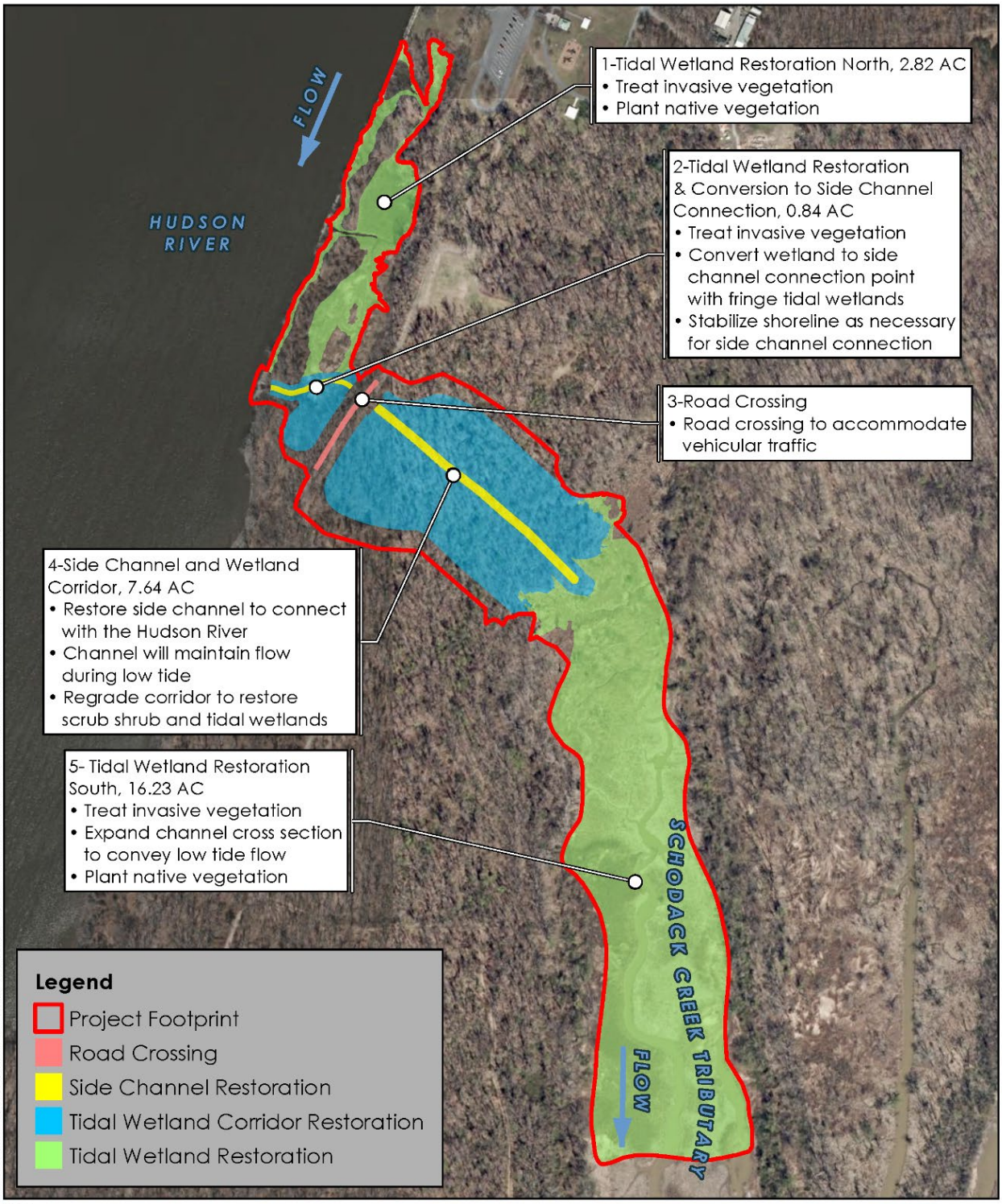

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NOTES:
1. 2017 orthoimagery obtained from the New York State GIS Clearinghouse: gis.ny.gov

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Map Projection: NAD 1983 State Plane New York East FIPS 3101 Feet

RECOMMENDED PLAN

HUDSON RIVER HABITAT RESTORATION
SCHODACK ISLAND
TOWN OF SCHODACK
RENSSELAER COUNTY, NEW YORK

US Army Corps of Engineers
New York District

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NOTES:
1. 2017 orthoimagery obtained from the New York State GIS Clearinghouse: gis.ny.gov

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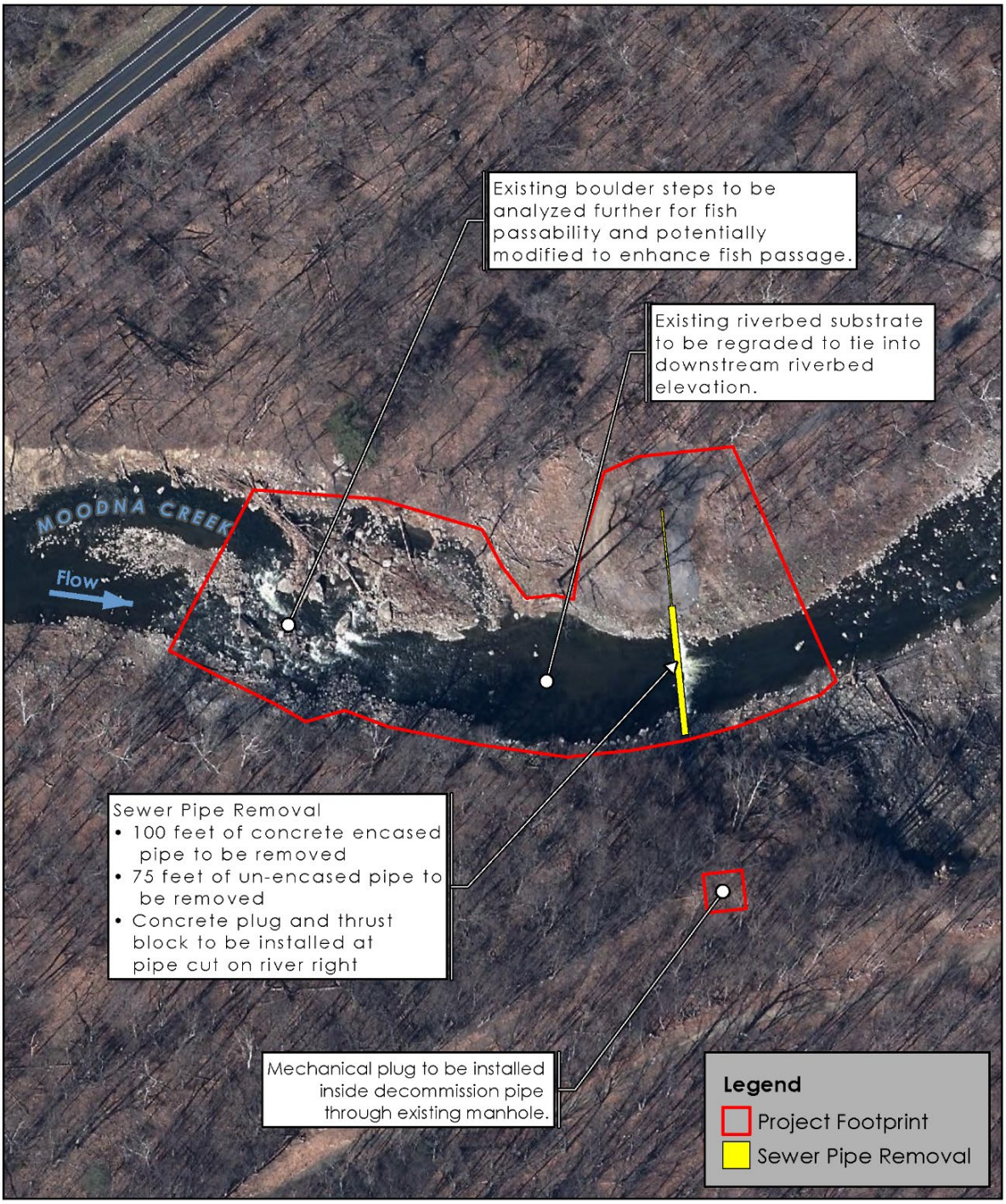
Map Projection: NAD 1983 State Plane New York East FIPS 3101 Feet

RECOMMENDED PLAN

HUDSON RIVER HABITAT RESTORATION
HENRY HUDSON PARK
TOWN OF BETHLEHEM
ALBANY COUNTY, NEW YORK

US Army Corps of Engineers®
New York District



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NOTES:
1. 2016 orthoimagery obtained from the New York State GIS Clearinghouse: gis.ny.gov

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Map Projection: NAD 1983 StatePlane New York East FIPS 3101 Feet

RECOMMENDED PLAN

HUDSON RIVER HABITAT RESTORATION
MOODNA CREEK - AOP 1: UTILITY CROSSING
TOWN OF NEW WINDSOR
ORANGE COUNTY, NEW YORK

US Army Corps of Engineers®
New York District

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NOTES:
1. 2016 orthoimagery obtained from the New York State GIS Clearinghouse: gis.ny.gov

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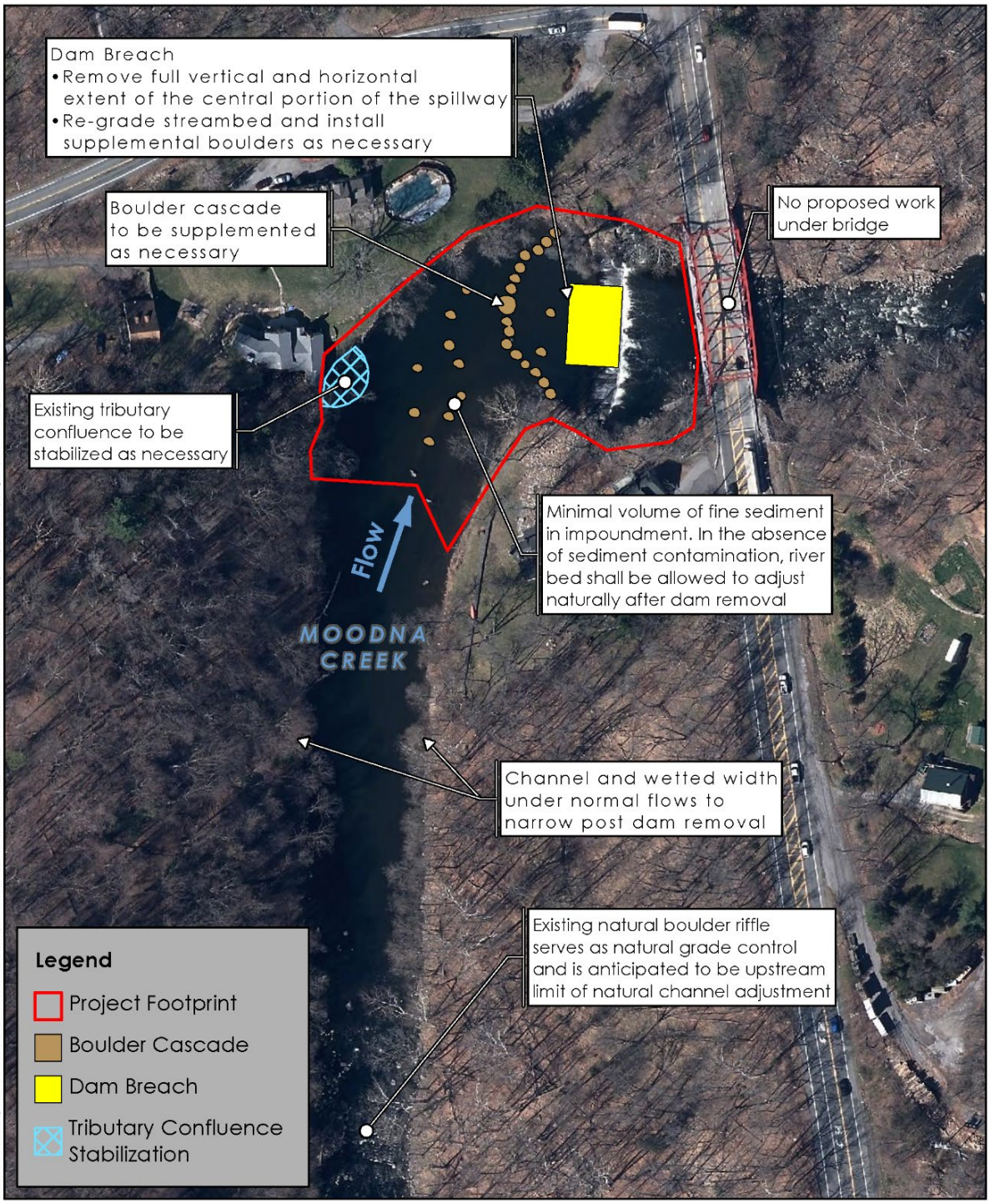
Map Projection: NAD 1983 StatePlane New York East FIPS 3101 Feet

RECOMMENDED PLAN

HUDSON RIVER HABITAT RESTORATION
MOODNA CREEK - AOP 2: FIRTH CLIFF DAM
TOWN OF CORNWALL
ORANGE COUNTY, NEW YORK

US Army Corps of Engineers®
New York District



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NOTES:
1. 2016 orthoimagery obtained from the New York State GIS Clearinghouse: gis.ny.gov

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Map Projection: NAD 1983 StatePlane New York East FIPS 3101 Feet

RECOMMENDED PLAN

HUDSON RIVER HABITAT RESTORATION
MOODNA CREEK - AOP 3: ORR'S MILL DAM
TOWN OF CORNWALL
ORANGE COUNTY, NEW YORK

US Army Corps of Engineers
New York District

Cultural Resources Summary

Schodack Island, Henry Hudson Park and Moodna Creek

Hudson River Habitat Restoration

Ecosystem Restoration Feasibility Study

By Carissa Scarpa, M.A., R.P.A.

U.S. Army Corps of Engineers

New York District

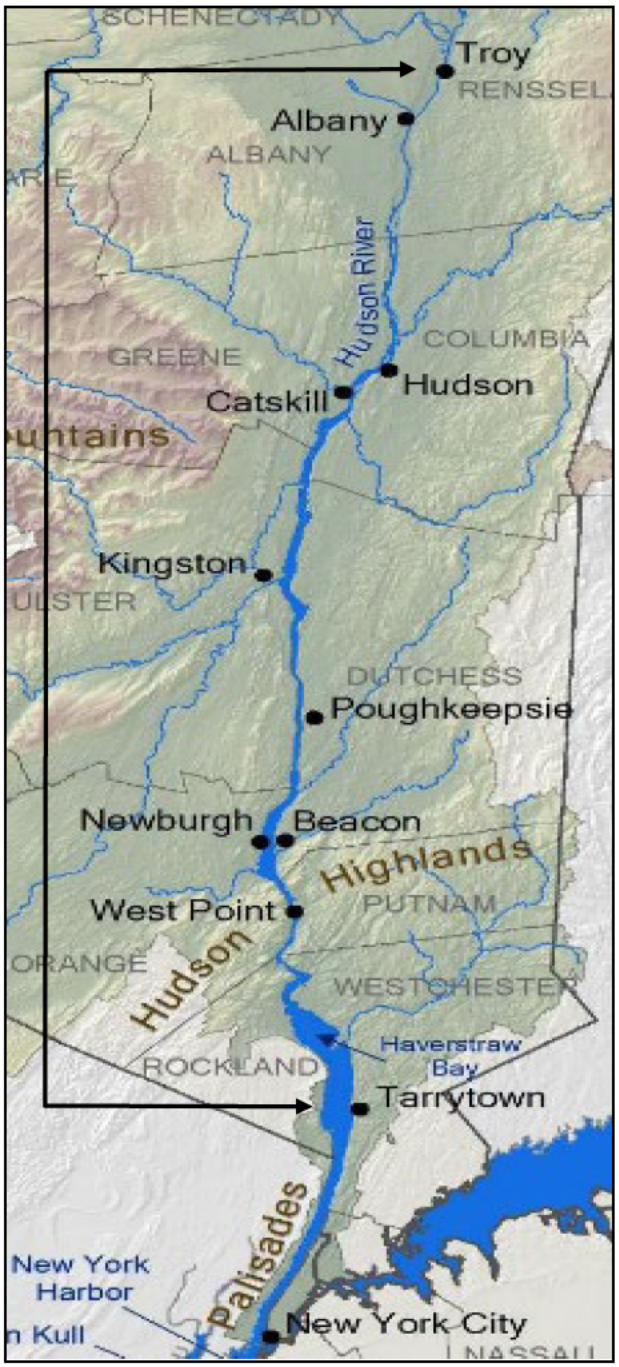
June 2020

Introduction

The U.S. Army Corps of Engineers, New York District (District) in partnership with the New York State Department of Environmental Conservation (NYSDEC) and New York State Department of State (NYSDOS), carried out a feasibility study to investigate potential opportunities for ecosystem restoration in the Hudson River. The study is authorized under Section 551 of the Water Resources Development Act of 1996 (P.L. 104-303). A Reconnaissance Study of the Hudson River Channel Federal Navigation Project was initiated in 1994 under Section 216 of the Harbors and Rivers Flood Control Act of 1970 which authorized a review of completed projects that cause significant change to physical and economic conditions. The reconnaissance study identified degradation of the ecosystems within the Hudson River and tributaries that have been partially caused by multiple U.S. Army Corps of Engineers navigation projects. Beginning in the late 18th Century, the U.S. Army Corps of Engineers built longitudinal dikes, a navigations channel, and placed dredge material in back channels between islands and in shallow marshes. The study recommendations led to the authorization of the current study in 1995.

As a federal undertaking the Hudson River Habitat Restoration (HRHR) Project is subject to review under the National Historic Preservation Act (NHPA) of 1966, as amended, and implementing regulations 36 CFR 800. The National Historic Preservation Act requires all federal agencies to take into account the effect of their undertakings on cultural resources listed or eligible for listing in the National Register of Historic Places (NRHP) (36 CFR 60). The agency must also afford the Advisory Council on Historic Preservation (ACHP) the opportunity to comment on the undertaking. The Section 106 process is coordinated at the state level by the State Historic Preservation Office (SHPO), which in New York operates within the office of the New York State Office of Parks, Recreation, and Historic Preservation (NYSOPRHP).

Figure 1: HRHR Study Area



Project Descriptions

The Hudson River Habitat Restoration Study Area encompasses the Hudson River and its tributaries from the Tappan Zee Bridge to the Troy Lock and Dam, a length of approximately 125 miles (Figure 1). Through a screening process and in coordination with partners and interested parties the study team selected three sites out of 1,665 potential restoration sites and projects to recommend for construction. These are Schodack Island, Henry Hudson Park, and tributary connectivity measures (AOPs 1, 2, and 3) along Moodna Creek (Figure 2).

Schodack Island

At Schodack Island on the eastern shore of the Hudson River in Schodack, New York, the plan consists of tidal wetland restoration and side channel restoration with a tidal wetland corridor (Figure 3).

Tidal Wetland Restoration North

Approximately 2.82 acres of existing tidal habitat, dominated by invasive species such as common reed, would be treated and planted with native plant species.

Tidal Wetland Restoration & Conversion to Side Channel Connection

Approximately 0.84 acres of existing tidal habitat, dominated by invasive species such as common reed, would be treated and planted with native plant species. Additionally, grading would occur to convert wetland to a side channel connection point which would facilitate the conveyance of flow. The shoreline would be stabilized as necessary to accommodate new flows.

Tidal Wetland Restoration South

Approximately 16.23 acres of existing tidal habitat, dominated by invasive species such as common reed, would be treated. Minor grading would expand the existing tidal channel to accommodate increased flows with the proposed side channel connection. Fringe wetlands would be graded as necessary to stabilize the wetland and native vegetation would be planted.

Figure 2: HRHR Recommended Sites

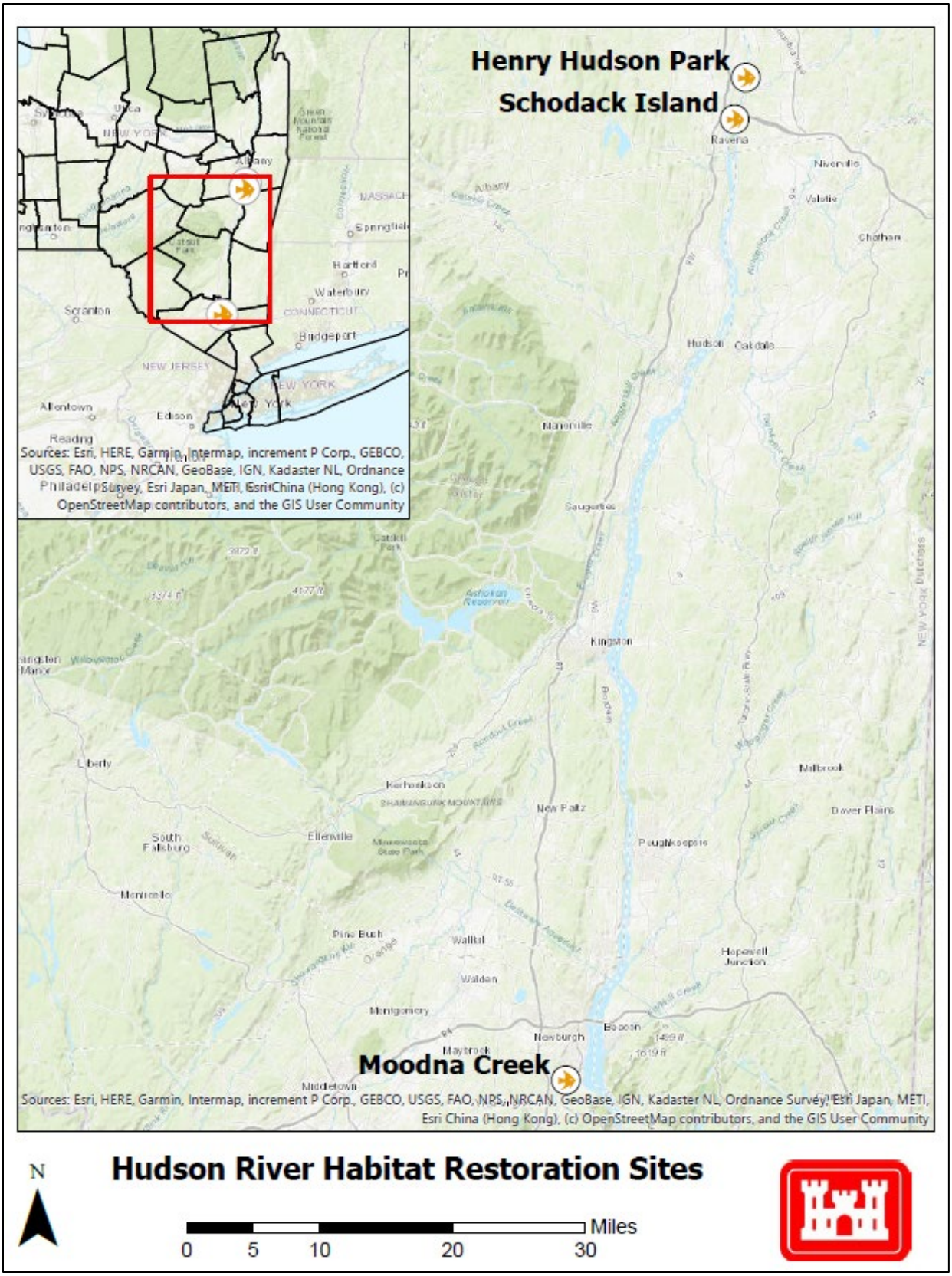
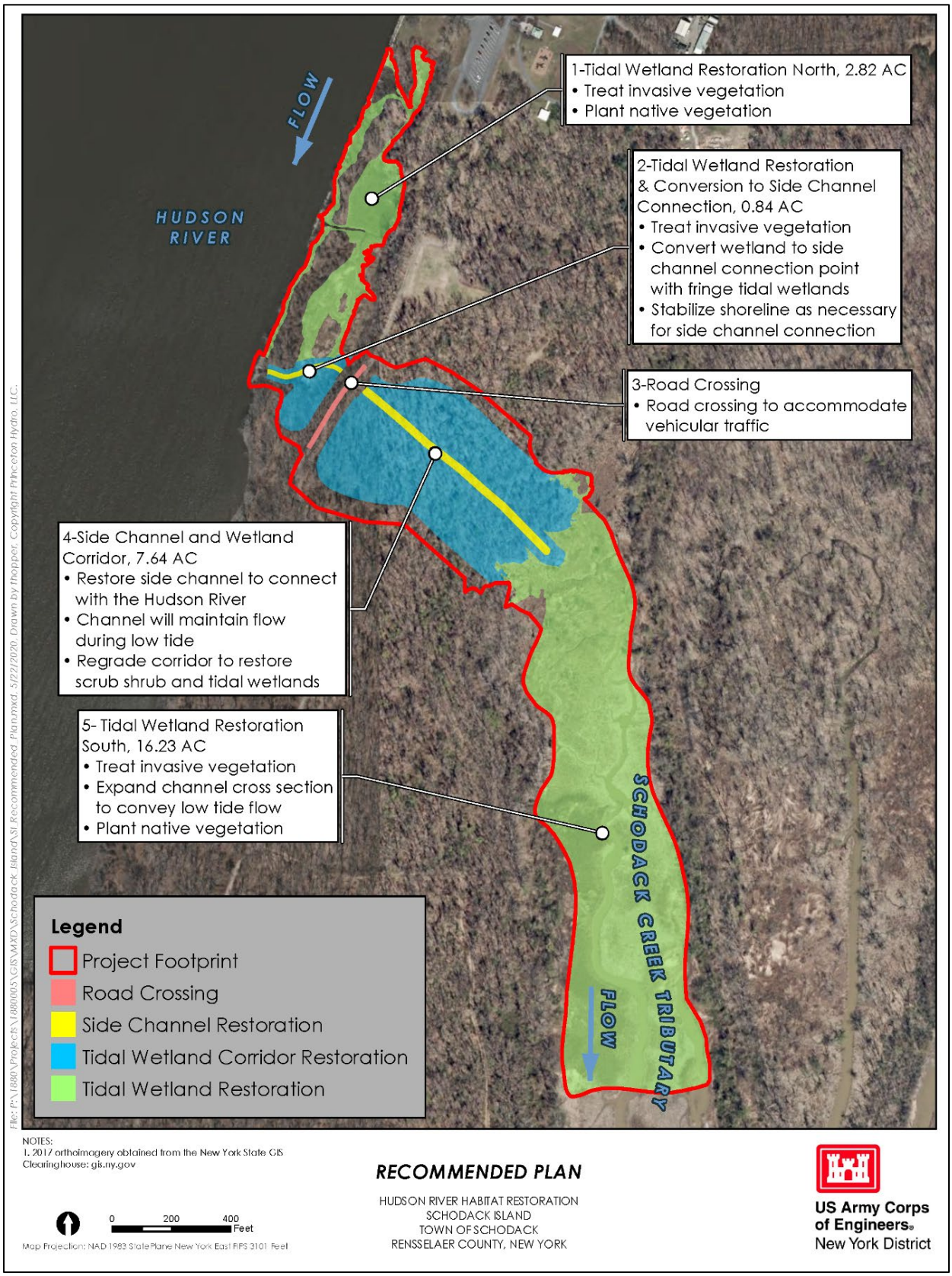


Figure 3: Schodack Island



NOTES:
1. 2017 orthoimagery obtained from the New York State GIS Clearinghouse: gis.ny.gov

0 200 400 Feet

Map Projection: NAD 1983 State Plane New York East FIPS 3101 Feet

RECOMMENDED PLAN

HUDSON RIVER HABITAT RESTORATION
SCHODACK ISLAND
TOWN OF SCHODACK
RENSSELAER COUNTY, NEW YORK

US Army Corps of Engineers®
New York District

Side Channel and Tidal Wetland Corridor

A side channel would be excavated in areas of historic fill placement to hydrologically connect Schodack Creek and the Hudson River with tidal waters. The channel would convey flow during low tide and higher water levels providing refuge to aquatic species during increased river velocities. A 400-foot tidal wetland corridor would be established adjacent to the channel. To accommodate local vehicular access to the southern portion of the island, the channel would be spanned by a road crossing with a rectangular reinforced box culvert. The existing ski trail would also be redirected to this road crossing. The channel would have a 20-foot width and an invert elevation of -2.00 feet and transition to tidal wetland, based on 2027 tide levels, which would range in elevation from elevation 1.5 to 4.00 feet and then transition to riparian vegetation. The tidal wetland would be dominated by a scrub/shrub wetland community. The riparian vegetation would transition to existing grade at a maximum slope of 3 feet horizontal to 1 foot vertical. Excavated soil from each restoration area would be disposed of at the dredged material placement site on Houghtaling Island, New Baltimore, NY.

Literature Review and Cultural Resources within the Schodack Island Study Area

Several cultural resources surveys have been conducted within the study area. Much of the historical background for Upper and Lower Schodack Island was compiled by Paul Huey of the New York State Office of Parks, Recreation and Historic Preservation (Huey 1997). In the 1990s Wendy Harris and Arnold Pickman of the U.S. Army Corps of Engineers conducted surveys to locate historic ice houses on the Schodack Islands as part of the Hudson River Habitat Restoration Study (Harris and Pickman 1997 and 2000) and Hartgen Archaeological Associates (HAA) was retained by the NYSOPRHP between 1997 and 2002 to conduct a series of archaeological investigations in areas of construction for park facilities and mitigation areas that were considered to be sensitive for prehistoric and historic resources (HAA 1999, 2000, 2001a, and 2002a). These studies have formed the basis for this preliminary cultural resources assessment.

The archaeological record of the area surrounding Schodack Island is similar to that of Binnen Kill. Of the 97 archaeological sites documented within 1 mile of the study area 28 are prehistoric and 20 of the prehistoric sites have been determined eligible for the NRHP. The Mahican Indian Village Site (08313.000238), is documented on historic maps within the Schodack Island study area however the village location has not been confirmed through archaeological investigations. In 1999 archaeological testing of a potential mitigation site on the eastern shore of Lower Schodack Island uncovered Native American pottery, chert flakes, cracked rock fragments and other items that likely date to the Middle Woodland Period (HAA 1999). Another notable site is the Schodack Landing Prehistoric Archaeological District (08313.000319) which is situated on the east side of the Muitzes Kill and consists of 20 contributing precontact archaeological sites situated on terraces between waterways draining into Schodack Creek and the Hudson River.

In 1609, when Henry Hudson explored the Hudson River he recorded the island of Schodack. One of the earliest settlements in the area was the Colonie of Rensselaerwyck to the north in 1630. Historic records document the presence of the Mahican people on the Schodack Islands in the seventeenth century and they are believed to have utilized the islands in precontact periods. In the seventeenth century ownership of the Islands passed into the hands of the Dutch, but Native Americans were still residing on Lower Schodack Island until the middle of the eighteenth century. Where the Muitzeskill enters Schodack Creek was the location of a large Indian settlement and a river landing owned and operated by

the Dutch in the seventeenth century called Schutters Island. The Schodack Islands possessed rich farmlands and a convenient location to store and raise cattle and as a result many farms were established in the seventeenth century on the Islands. Numerous ice harvesting companies established commercial storehouses on the Schodack Islands as well beginning in the late 1700s but by 1930 all the ice houses had closed (Harris and Pickman 1997 and 2000). Starting in 1863 the Federal Government began construction of dikes and a deep channel in the Hudson River and between 1920 and 1998 Hudson River dredge spoil was deposited on top of the islands and in the channels between the Lower and Upper Schodack Islands and between the Lower Schodack and Houghtailing Island, Mull Island, and Mull's Platt.

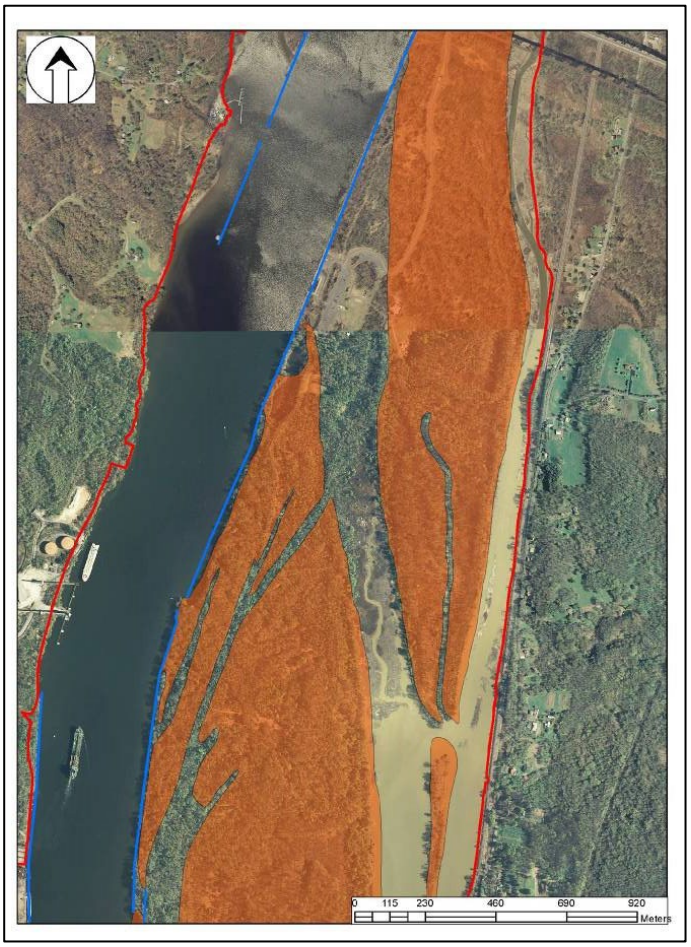
Four historic sites were identified within the boundaries of the study area during the preliminary investigations. These are the Miller and Witbeck Ice House (08313.000242), Ziegler's Ice House (08313.000237), the J.N. Briggs Ice House (08313.000243), and the Horton and Company Ice House (03912.000109). Several other archaeological sites have been identified on Upper and Lower Schodack Island, these are the P. McCabe & Co. Ice House (03912.000112), the Scott Brothers Ice House (03912.000111), the Vanderpoel, Van Orden & Sherman Ice House (03912.000113), the McCabe or Vanderpoel, VanOrden & Sherman Ice House (03912.000108), the Gardenier Ice House or National Ice Company Ice House (02117.000100), the Shermerhorn & Gardenier Ice House (02117.000101), the Johnson House Site (08313.000247), the Knickerbocker Ice House (08313.0000248), an unidentified Ice House Structure (08313.000236), the Van Buren Farm (08313.000246), a group of barge wrecks (08313.000245), the Witbeck/Schermerhorn Farm Site (08313.000234), the Douw/Gardenier Farm Site (08313.000235), the Calverway (08313.000254), the Ten Eyck House Site and Vicinity (08313.000255), Clifford's Ice House (08313.000256), Dodd & Maloney Ice Hosue Site (08313.000253), and the Montauk Ice House Site (08313.000252). The remaining sites within 1 mile of the study area are located outside the study area boundaries either to the east of Muitzes Kill on the mainland or across the River to the west. The NRHP-eligible Schodack Landing Historic Archaeological District (08313.000320) is comprised of 25 contributing historic sites distributed along portions of NY Route 9J and its connecting roads east of the Muitzes Kill. The sites represent occupations ranging from the late eighteenth century through the nineteenth century.

Background research using the CRIS online database identified 236 previously inventoried NRHP eligible or listed historic properties within 1-mile of the study area however none of those properties are located within the current study area. The majority of the recorded properties are concentrated on the west side of the Hudson River within the Coeymans Landing Historic District (17NR00042) and on the east side of the Hudson in Schodack and consist of various nineteenth century structures contributing to the Schodack Landing Historic District (90NR00967). The majority of these properties are listed on the NRHP. The NRHP-eligible Castleton-On-Hudson Bridge (08313.000338) and the Alfred H. Smith Memorial Bridge (08313.000358) and are located approximately 0.5 miles north of the study area.

Recommendations

The recommended plan for the Schodack Island State Park Site is focused in the northern half of the Island. No measures are recommended for the southern portion of the Island. In 2015 the New York State Department for Environmental Conservation prepared a document entitled *Program Statement for the Creation of Backwater Channel and Shallow Water Habitat Restoration at Schodack Island State Park* which evaluated the feasibility of re-creating backwater channels at three sites in the Park. The report included a cultural resources inventory and sensitivity assessment for the proposed measures.

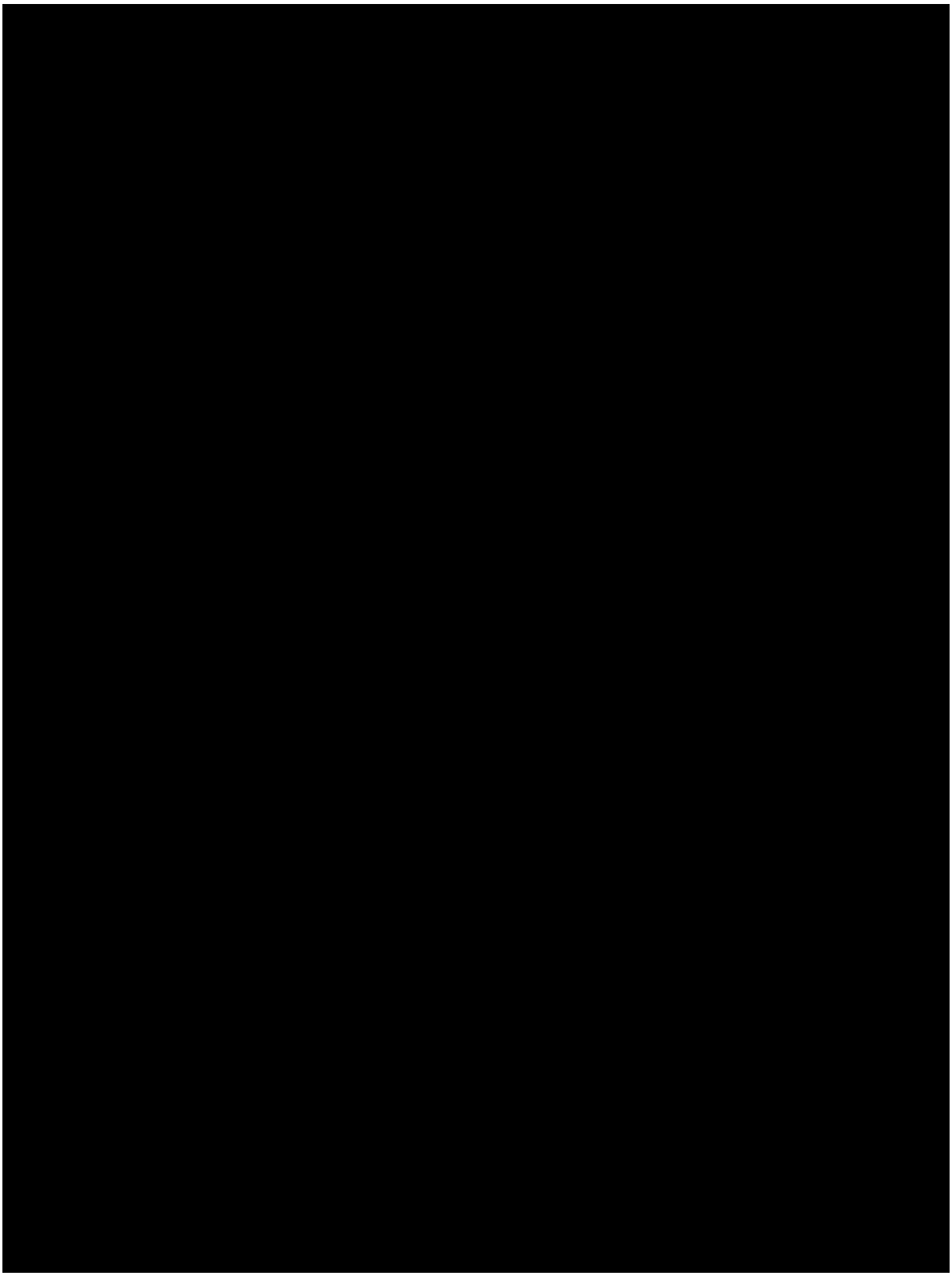
Figure 42: Historic Islands at Schodack



Combining data collected from previous surveys and the NYSOPRHP CRIS online service, a map was prepared depicting the location of documented resources and historic shorelines (Cheplowitz 2015) (Figures 4 and 5).

Of the five sites identified within the study area only one is located within the APE of the recommended plan, the Mahican Indian Village. The proposed measures are primarily located within the historic channel that once divided the Islands and archaeological testing within a portion of the APE in 1999 confirmed that the area contains fill deposits however the maximum depth of those deposits has not been determined (HAA 1999). A review of previous surveys and other background data indicates that the potential for prehistoric and historic archaeological sites to exist within most of the APE is low however, there is a portion of the APE that may not have been inundated historically according to historic maps and this portion of the APE has also been identified as the potential site of the Mahican village. Geotechnical surveys of the APE will be helpful in determining the potential for the proposed project to reach depths below dredge material deposits and additional surveys including limited subsurface testing is recommended once plans are further developed to determine the presence or absence of archaeological sites within the APE. Additional areas identified for staging and access should also be evaluated for impacts to cultural resources.

Figure 5: Map of Cultural Resources in the Schodack Island Study Area (Taken from Cheplowitz 2015)



Henry Hudson Park

At Henry Hudson Park on the western shore of the Hudson River in Bethlehem, New York, the recommended plan includes the restoration of tidal wetlands and providing a living shoreline with habitat and stability (Figure 6).

Western Tidal Wetland Restoration

Approximately 3.59 acres of existing upland would be converted to tidal wetland. Soils would be excavated to an average depth of five feet below existing grade to achieve tidal wetland hydrology. The soils within the wetland area would be amended as necessary and planted with native vegetation. The shoreline would also be stabilized with rock to dissipate erosive forces. Target ground elevations would be set to allow daily tidal flushing. Excavated soil would be disposed of off-site at a nearby disposal facility.

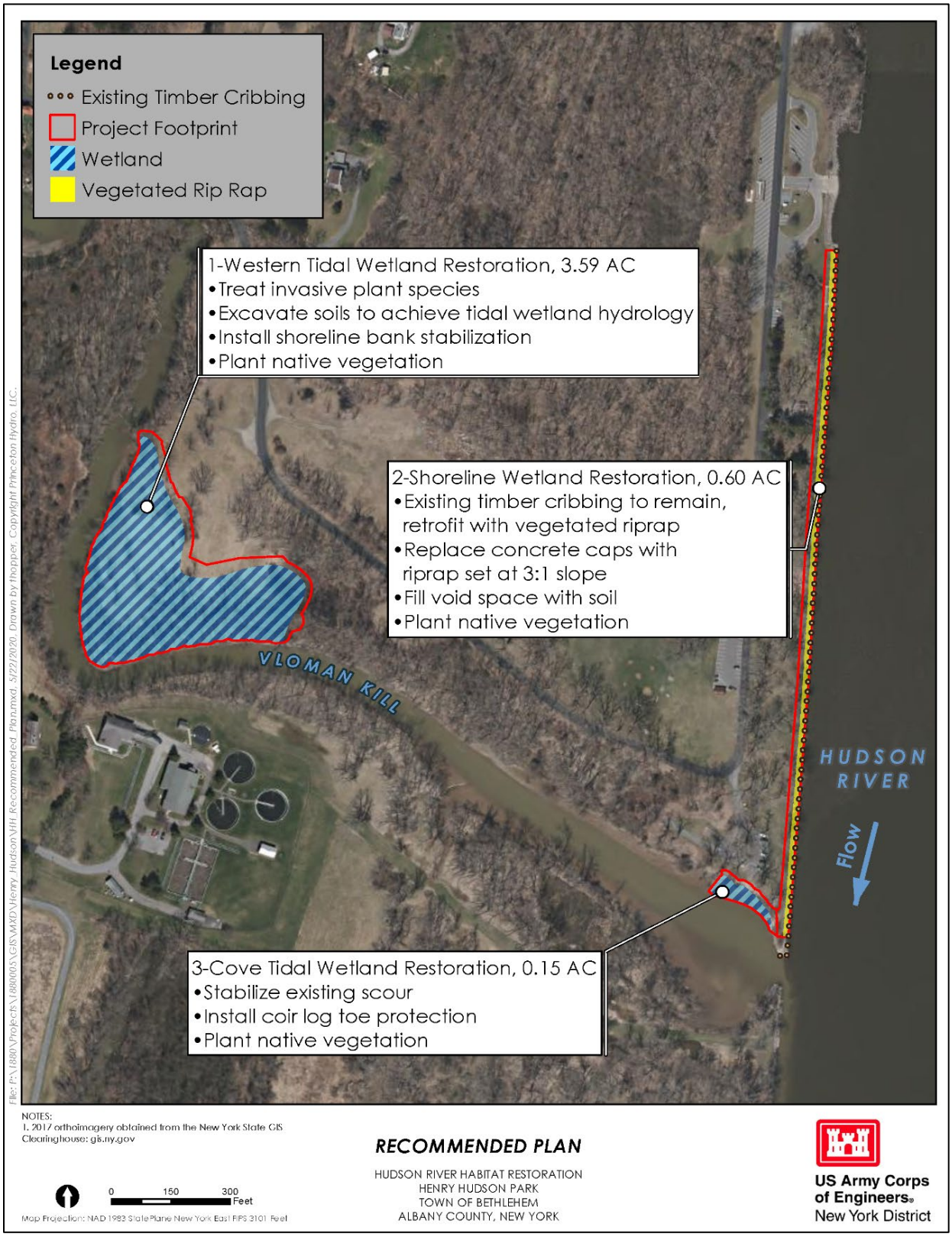
Shoreline Wetland Restoration

Approximately 0.60 acres of shoreline would be restored. The portion of land available for shoreline restoration at the Park is limited due to the adjacent park amenities, and the bank slopes are generally steep and require stabilization to transition from the shoreline edge to river channel bottom. Due to these conditions, it was necessary to provide a hard-armoring approach using vegetated riprap while balancing the goal to maximize ecological benefits. To breach the transition from the river channel bottom to shoreline edge, reinforcement of the existing timber cribbing toe protection is proposed. Along the Hudson River shoreline, the existing timber cribbing would remain. The cribbing would be reinforced with 12-inch riprap which was sized based on existing rock material located on-site. The concrete cap would be removed and replaced with riprap and graded to achieve a 1V:3H slope. The area of land landward of the reinforced cribbing would be backfilled with soil and planted with native vegetation. Additionally, stabilization boulders would be placed at the wetland-upland interface. The boulders would be approximately three to four-feet in diameter which is similar in size to boulders on-site that appear to be currently stabilizing the shoreline. These modifications to the structure would not significantly encroach upon the park's upland areas.

Cove Tidal Wetland Restoration

Approximately 0.15 acres of existing mudflat would be stabilized and restored to tidal wetland. Along the northern bank on the Vloman Kill, 20-inch coir log toe protection would be installed at the toe of the slope around the existing mudflat. This diameter coir log was selected to allow six inches to be embedded into the existing substrate and at least 12 inches above grade to retain the substrate, assuming that the coir log would flatten by approximately two inches during installation. Riprap consisting of 36-inch boulders would be installed at the top of slope to stabilize existing scour. These boulders would be embedded a minimum of six inches into the ground. This diameter rock was selected because it is consistent with the size of existing material in stable bank areas. Native wetland vegetation would be planted within the intertidal area.

Figure 6: Henry Hudson Park

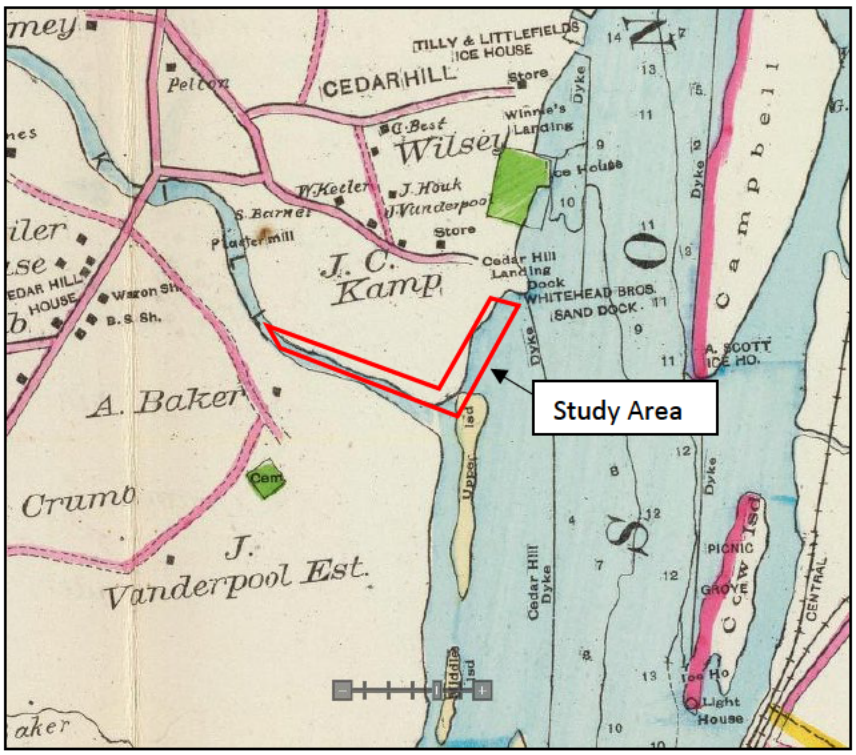


Literature Review and Cultural Resources within the Study Area

The historical and archaeological record for the Henry Hudson Park study area vicinity is similar to that of the Schodack Island site. Evidence has been found of a Paleoindian presence in the Hudson Valley as nearby as West Albany (Ritchie 1957). Although archaeological sites from the Early and Middle Archaic periods are rare in the region they do exist as evidenced by sites in Ulster County, Connecticut and the Upper Delaware Valley (Dent 1991; Funk 1991, 1993; Nicholas 1988). Sites from the Late Archaic and Woodland periods are more common in the northeast and regionally as populations increased and subsistence strategies diversified.

Henry Hudson Park is believed to be located very near the place where Henry Hudson landed his ship, the Half-Moon, on his historic journey up the Hudson River. Early settlers were encouraged by the reports from Hudson and other early explorers who noted the beauty and richness of the land in the Hudson Valley. One of the earliest settlements in the area was Normansville, named for its location along the Norman Kill. Later settlement centered around the Delaware and Hudson Railroad in the mid-nineteenth century which extended its service through the town of Adamsville, later renamed Delmar. The study area is located near the site of the small community of Cedar Hill which is located near the confluence of Vloman Kill. A historic map dating to 1891 depicts the community of Cedar Hill as a fairly dispersed settlement with several ice houses along the banks of the Hudson, docks and a plaster mill along the Vloman Kill (Figure 7) (Beers 1891). No map documented structures are depicted within the study area on the 1891 historic map. The area has remained rural in character for much of the twentieth century. Topographic surveys dating back to 1898 show that the shorefront has been built up over the years with dredge material by the U.S. Army Corps of Engineers. Prior to 1925 the shorefront portion of the study area was within the Hudson River.

Figure 73: 1891 Map of Henry Hudson Park (Beers)



Several cultural resources investigations have been carried out in the vicinity of the study area. From 2001 to 2003 Hartgen Archaeological Associates, Inc. conducted surveys in connection with improvements to the nearby Bethlehem Waste Water Treatment Plant located on the south side of the Vloman Kill. Archaeological testing was carried out for groundwater test wells in the vicinity of the proposed stabilization measures on the north side of the Vloman Kill and Hudson River confluence. Testing on both the north and south side of the Vloman Kill along the Hudson shoreline confirmed the existence of deep dredge material

deposits (Hartgen Archaeological Associates, Inc. 2002 and 2003).

A site file search on the CRIS database revealed 11 archaeological sites within 1 mile of the study area. Three of the eleven sites were identified as prehistoric. In addition fourteen eligible or NRHP-listed properties are located with 1 mile of the study area. One of the listed archaeological sites, the Cedar Hill site (NYSM Site 6013), is located within the study area at its northern boundary. No information is available on CRIS for this site, however, it likely corresponds to the Cedar Hill Landing and the northern extent of a dyke constructed prior to 1891 as depicted on historic maps. The Nicoll-Sill House Site (00102.000004; NYSM Site 5781) is listed on the NRHP and is located directly across the Vloman Kill from the western tidal wetland area on the south bank. Archaeological evidence of Native American occupation has been recovered from the Nicoll-Sill House grounds as well as artifacts originating from the 17th through 19th century. A 19th century cemetery is located west of the house and in 2003 Native American human remains were identified in the vicinity during the installation of a water line by the Bethlehem Waste Water Treatment Plant. Subsequent investigations revealed several potential burials in the area. This Bethlehem Ancestral Repatriation Site (00102.000892) marks the location of the repatriated Native American remains (CITY/SCAPE: Cultural Resources Consultants 2013).

Recommendations

There are no extant structures located within the APE that have the potential to be determined eligible for the NRHP, however, there is one New York State Museum Site 6013 “Cedar Hill” located directly adjacent to the study area at its northern limit, no details were available in the CRIS database however it is likely that this site corresponds to a historic dock labeled “Cedar Hill Landing” on historic maps (see Figure 7). The presence of several previously documented historic and prehistoric archaeological sites in the vicinity suggests that the area was utilized heavily both in precontact and contact periods. Considering that the shoreline portion of the study area contains deep dredge material deposits, the potential for historic archaeological remains to exist within the area of proposed shoreline stabilization measures is low. The 3.6 acre proposed wetland area along the bank of the Vloman Kill, however, is believed to have a moderate to high potential for historic and prehistoric remains due to its proximity to a river confluence and the discovery of several historic and prehistoric sites in the vicinity. A pedestrian survey and archaeological testing is recommended for the proposed wetland area to determine the presence or absence of archaeological sites and a geomorphological study is recommended to understand the depositional profile of the shoreline. Additionally, as plans are developed, additional areas including staging and access areas should be subject to a cultural resources assessment.

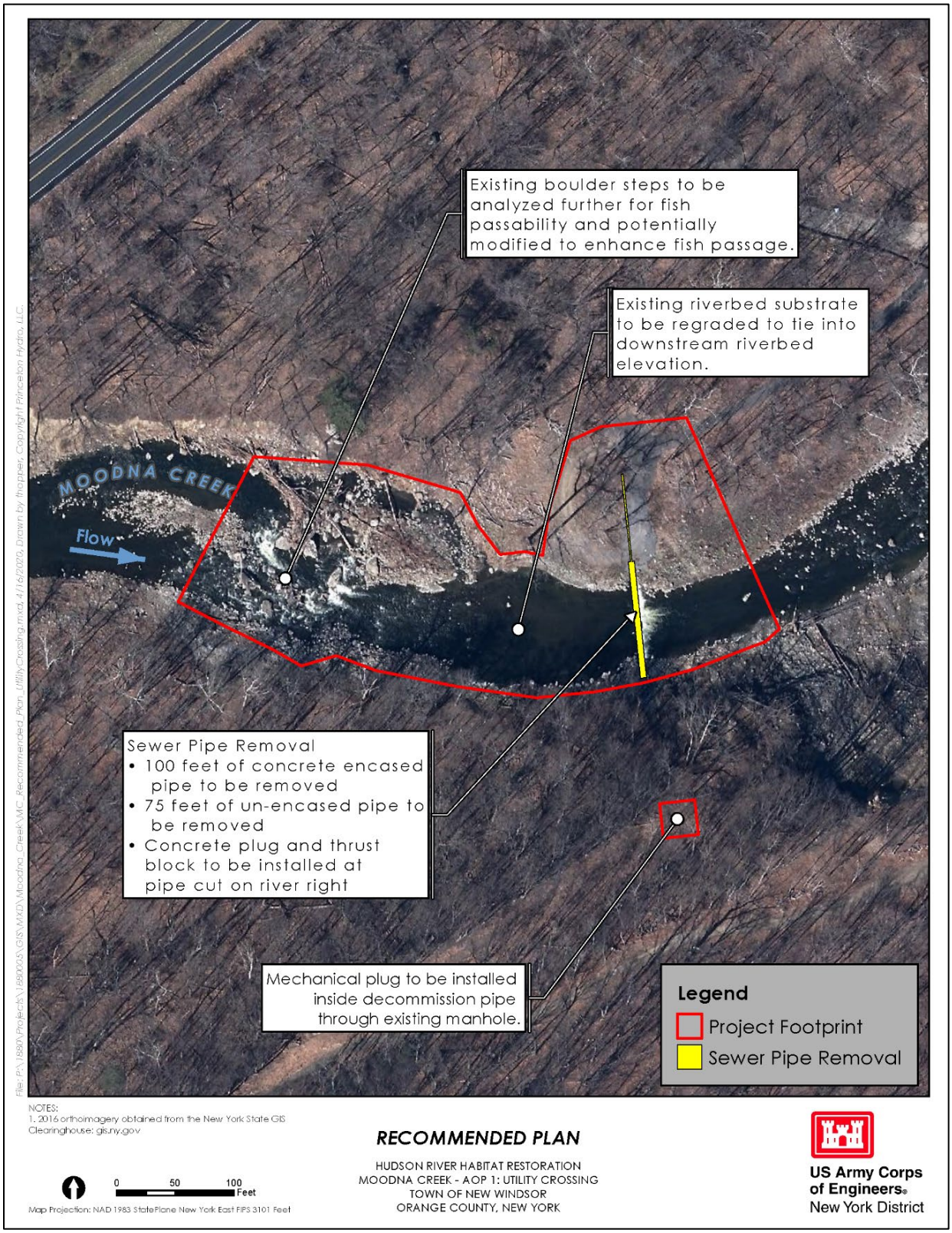
Moodna Creek

On Moodna Creek, a tributary of the Hudson River in Orange County, New York, the plan includes removal of a sewer utility line (Aquatic Organism Passage Site [AOP] 1), removal of Firth Cliff Dam (AOP 2), and breach of Orr’s Mill Dam (AOP 3). The removal of all three structures would, collectively, reconnect 7.8 miles of river habitat.

AOP 1 - Utility Removal

For AOP 1, the sewer utility line in New Windsor, the recommended plan entails decommissioning the dormant utility line and removing the section that crosses Moodna Creek (Figure 8). This removal would

Figure 8: Moodna AOP 1



result in the reconnection of 1.2 miles of river habitat. The sanitary sewer line is an 18-inch ductile iron pipe (DIP); an approximately 100-foot-long section spans the channel and is contained in a concrete encasement approximately five feet wide and five feet deep. The recommended approach to decommissioning the line includes accessing the existing manhole on the floodplain to the northwest (i.e. river left side), and sealing-off the incoming sanitary line with concrete or similar means. On the river right bank, where the utility descends steeply from the inactive railroad bed at the top of the slope, the recommended approach to decommissioning this sewer line is to break the existing line at the base of the slope and mechanically plug and cap the line with a concrete thrust block. The sewer line at the upslope manhole would be mechanically plugged.

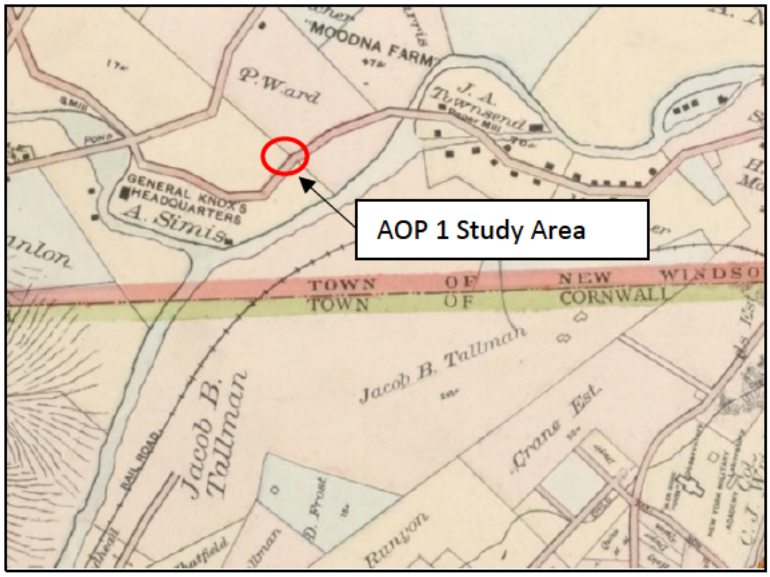
A total of 175 feet of sewer line (100-foot concrete encased section and the 75-foot section under floodplain soils leading to the existing manhole) would be excavated and disposed of offsite. Full removal of the utility line at the channel crossing is proposed as it is the alternative that most effectively restores fish passage through the site, and also eliminates the structure that is currently exposed, undermined by subsurface flow, and at risk for damage or rupture. Preliminary hydraulic modeling for the proposed conditions of the recommended plan indicates that removal of the sewer utility line lowers water surface elevations by 0.8 feet in the 1% Annual Chance Flood, 1.0 feet in the bankfull flow, and 1.6 feet in the median annual flow.

Literature Review and Cultural Resources within the AOP 1 Study Area

The site of the proposed work has not previously been subject to cultural resources survey however several surveys have been conducted in the vicinity. There are 14 archaeological sites listed within 1 mile of the AOP 1 study area. Five of the sites are prehistoric and several of the prehistoric sites (07115.000704; 07115.000705; and 07115.000028) are located within the Moodna Creek corridor on dry elevated ground overlooking the Creek. Most of the prehistoric sites within 1 mile of AOP 1 have not been associated with a particular period or cultural affiliation. The two nearest sites consist of a single flake at each location and were recovered during a cultural resources survey for the proposed Cornwall Commons Development project (Oberon 2006). The Nicoll Farm Site (07115.000018) was recorded by Funk (1976) and contained evidence of Paleoindian through Woodland period activity. Just over 1 mile from the APE is the site of a Woodland period village (NYSM 4381).

New York State CRIS lists six properties that are listed or eligible for listing on the NRHP within 1 mile of AOP 1. The nearest historic property is Knox's Headquarters/John Ellison House (90NR02311) which was built in 1754 and served as the headquarters for Major Generals John Knox, Nathanael Greene, Fredrich von Steuben, and Horatio Gates during various encampments of the Continental Army at New Windsor. The site consists of approximately 50 acres including the house and grounds and the boundaries of the property are adjacent to the boundaries of the current study area.

Figure 9: Historic Map of AOP 1 Study Area (Beers 1891)



Recommendations for AOP 1

The presence of historic properties and prehistoric occupation within the vicinity of the APE suggests that there is potential for archaeological resources in areas not recently disturbed. However, the installation of the sewer main in the APE would likely have destroyed any archaeological sites that may have existed there. The proposed work at AOP 1, therefore is not expected to have an adverse effect on cultural resources, however, as project plans are developed and access and staging areas are selected additional areas outside the boundaries of previous work would be sensitive for prehistoric and historic archaeological sites. As plans are developed and the APE is better defined additional cultural resources survey is recommended to determine the presence or absence of cultural resources within the project area.

Moodna Creek AOP 2 - Dam Removal

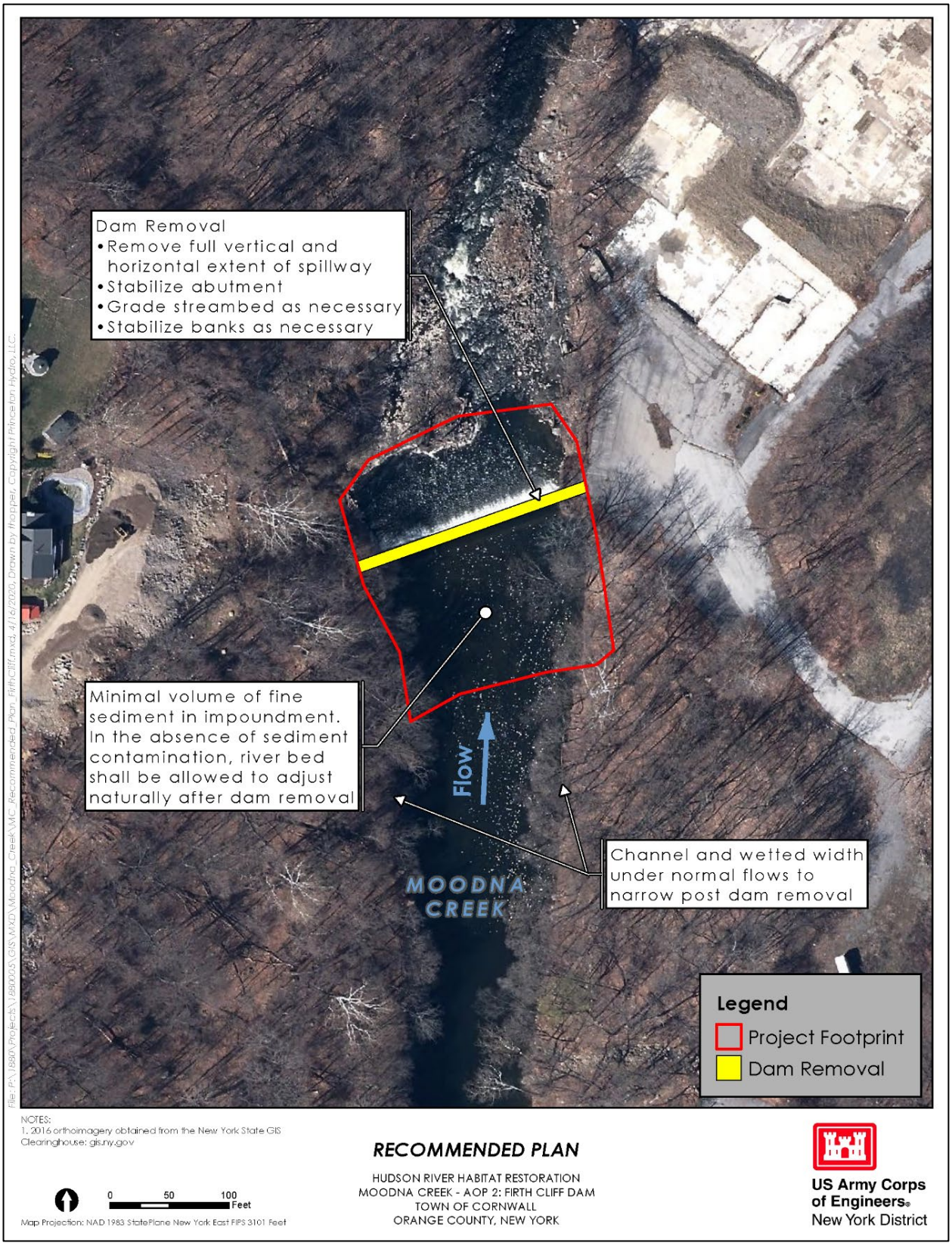
For AOP 2, Firth Cliff Dam, the recommended plan entails demolition and removal of the approximately 9-foot high, 180-foot wide, concrete spillway to the full vertical extent (Figure 10). This removal would result in the reconnection of 0.6 miles of river habitat. Concrete debris would be broken up and re-used on-site for channel and bank stabilization. The abutments attached to the valley wall on river left and the building foundations on river right may be left in place pending observations from a more detailed site investigation. Approximately 1,300 feet upstream of the dam, a pronounced boulder riffle indicates the upstream limit of the impoundment and would serve as a natural grade control that would limit the upstream extent of any channel adjustment in the event of dam removal. The well-vegetated banks and narrow valley walls indicate little potential for lateral channel adjustment or meandering.

In general, the geomorphic response to dam removal would follow a predictable trajectory: (i) initial water-lowering, (ii) impounded sediment evacuates from the impoundment as a head-cut moves upstream from the dam and then widens to the full span of the channel, and (iii) temporary deposition of coarse-grained sediment in the downstream reaches. By the end of the first growing season, herbaceous, annual plants would begin to occupy the newly-exposed upper banks; perennial species would begin to dominate by the end of the second growing season.

The assessment of the transport of impounded sediment, which included approximating equilibrium profile, impounded sediment volume, and watershed sediment yield, indicates that the impounded sediment volume is negligible (4-10%) relative to the annual watershed sediment yield. While sediment sampling and chemical analysis would be performed as part of PED, the passive release of this quantity of impounded sediment is not anticipated to have adverse impacts on downstream aquatic biota, habitats, structures, or properties based on a preliminary analysis.

This plan is anticipated to re-create a free-flowing reach of river with increased dissolved oxygen content and moderated water temperatures. Full fish passage conditions are very likely to re-form; removal of the dam would reconnect two previously disconnected river reaches and restore passage for some resident species and American Eel. In addition, this dam removal is anticipated to restore the natural transport of bedload sediment, which in turn could rejuvenate benthic habitat conditions for aquatic invertebrates downstream, and partially offset any vertical channel degradation that has occurred in the decades and centuries since dam construction. Preliminary hydraulic modeling for the proposed conditions of the recommended plan indicates that removal of the dam lowers water surface elevations by 3.8 feet in the 1% Annual Chance Flood, 3.4 feet in the bankfull flow, and 3.3 feet in the median annual flow.

Figure 10: Moodna Creek AOP 2

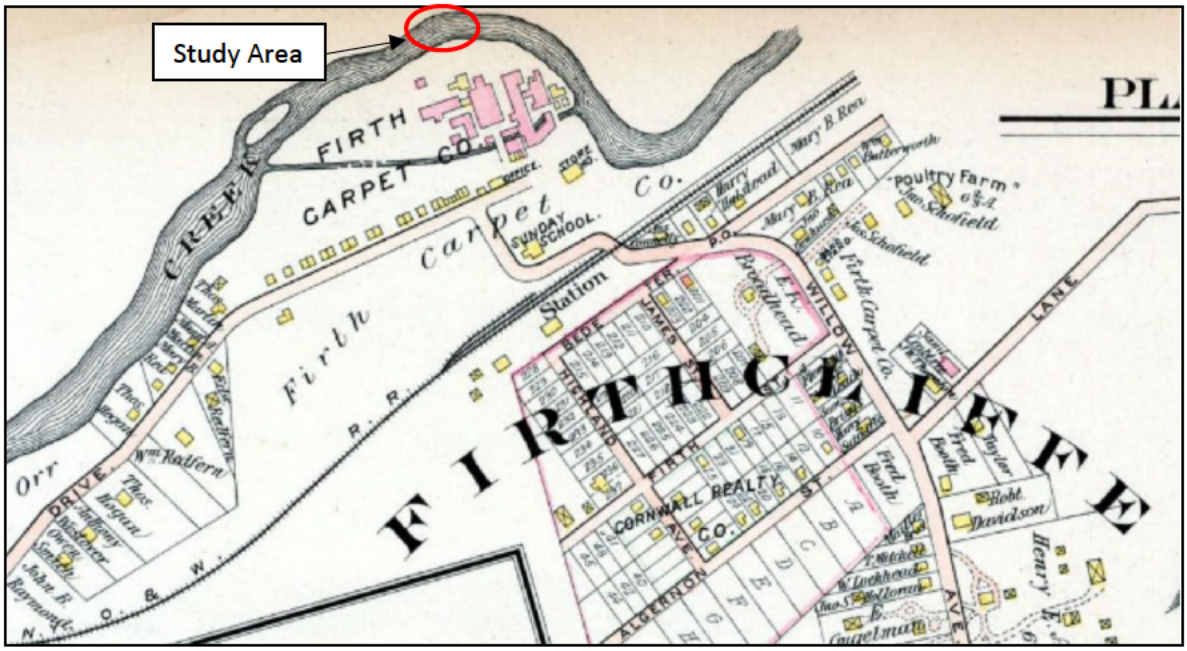


Literature Review and Cultural Resources within the AOP 2 Study Area

Several surveys have been conducted within the vicinity of the Firthcliff Dam however none have been carried out for the current AOP 2 study area. There are two archaeological sites in the CRIS system within 1 mile of AOP 2. These are the Woodward Historic Site (07103.000253) and the Cornwall Commons Stray #2 (07115.000705). There are thirteen sites that are eligible or listed on the NRHP within 1 mile of AOP 2. A notable site that is located only 0.13 miles north of study area is the Woodruff House Site (90NR03061). The Woodruff House is a stone vernacular farmhouse constructed in the early part of the nineteenth century along NYS Route 32. The house was originally part of a larger farm situated on a hill above the Moodna Creek.

A large factory complex associated with the dam was once situated directly east but was recently demolished (07149.000103). The factory was known as the Firth Carpet Company complex. The complex was located between the Moodna Creek and Mill Street. When the site was documented as a historic property in 1982 it contained a wood framed administration building, brick wool washing and storage building, two large factory buildings and several smaller buildings including a machine shop, dye house and pump house. The mill was situated on the site of the former Townsend Mill built in the 1840's and the Broadhead's woolen mill, built in the 1860's. In the 1880's Percy Firth adapted the existing mill structures to establish his carpet manufacturing company. The last phase of construction is believed to have been completed in 1928. In the early part of the twentieth century the Firth Co. began acquiring property off Willow Avenue to build duplexes for their employees. Many of those homes remain along Willow Avenue today. In 1960 the Firth operation was moved to North Carolina and the Majestic Weaving Company used the facility until 1982. A fire destroyed the complex in 2012 forcing the demolition of the buildings. The NYSHPO has determined the remaining portions of the factory complex not eligible.

Figure 11: Historic Map of the AOP 2 Study Area (Lathrop 1903)



Recommendations

The Firthcliff Dam is potentially eligible for the NRHP. Although the factory complex itself has been determined no eligible additional research and an assessment of the dam itself will be required to determine the eligibility of the structure individually and furthermore, there is a potential for elements of earlier dam structures to lie below the existing structure as there have been several mills at the site beginning in the 1840's. Future work should include additional background research, an evaluation of the structure and coordination with the NYSOPRHP to determine the need for archaeological monitoring at the site.

AOP 3 - Dam Breach

The plan for AOP 3 entails breaking through the approximately 10-foot high, 100-foot wide, concrete spillway crest, and underlying cobble/boulder-filled timber crib structure, removing the vertical extent of a central portion of the spillway, and leaving the side portions in place. This removal would result in the reconnection of 6 miles of river habitat. Concrete debris would be broken up and re-used on-site for channel and bank stabilization. The ends of the spillway could be stabilized at their base with placed boulders, while the upper portions could be left open for visibility of the spillway's interior construction. This plan effectively removes the dam, but retains a portion of the spillway in place as a physical marker of the former dam; however, similar to current conditions, the remaining spillway would be subject to slow deterioration due to weathering and river conditions (freeze/thaw, ice floes, scour, abrasion, debris impact, etc.)

The pronounced accumulation of boulders behind the dam, which may shift in position during construction and after dam breach, has the potential to form a steep (5% slope) boulder cascade or reveal natural bedrock falls (although no historic record of a natural waterfall has been identified). However, the more likely, and conservative, estimate for a potential post-dam breach equilibrium slope extends approximately 325 feet upstream of the spillway crest at 1.6 percent resulting in a cobble-boulder riffle. Approximately 900 feet upstream of the dam, a large boulder riffle exists that would likely serve as grade control if channel adjustment extends to that point.

The re-formation of a cobble-boulder riffle would likely restore passage to a range of fish and other aquatic organisms in Moodna Creek. However, the emergence of a bedrock falls or formation of a steep boulder cascade may not provide full passage for fish; and in this case, some active re-grading and re-positioning of boulders may be recommended to facilitate fish passage while maintaining grade control. If in situ boulders are insufficient to maintain a stable grade change and/or fish passage conditions, the recommended plan also includes supplementing this reach with large boulders. The small cobble dominated tributary which flows under a residence and joins Moodna Creek approximately 250 feet upstream of the dam, may require grade control to prevent undermining of the over-lying house.

The assessment of the transport of impounded sediment, which included approximating equilibrium profile, impounded sediment volume, and watershed sediment yield, indicates that the impounded sediment volume is negligible (4-10%) relative to the annual watershed sediment yield. While sediment sampling and chemical analysis is strongly recommended in a subsequent project phase to assess sediment quality, the passive release of this quantity of impounded sediment is not anticipated to have adverse impacts on downstream aquatic biota, habitats, structures, or properties. This plan is anticipated to remove the stagnant backwater conditions that occur during low flows and base flows, and re-create a free-flowing reach of river with increased dissolved oxygen content and

Figure 12: Moodna Creek AOP 3

NOTES:
1. 2016 orthoimagery obtained from the New York State GIS Clearinghouse: gis.ny.gov

0 60 120 Feet

Map Projection: NAD 1983 StatePlane New York East FIPS 3101 Feet

RECOMMENDED PLAN

HUDSON RIVER HABITAT RESTORATION
MOODNA CREEK - AOP 3: ORR'S MILL DAM
TOWN OF CORNWALL
ORANGE COUNTY, NEW YORK

US Army Corps of Engineers®
New York District

moderated water temperatures. In addition, this dam breach is anticipated to restore the natural transport of bedload sediment, which in turn could rejuvenate benthic habitat conditions for aquatic invertebrates downstream, and offset any vertical channel degradation that has occurred in the decades and centuries since dam construction. Preliminary hydraulic modeling for the proposed conditions of the recommended plan indicates that breach of the dam lowers water surface elevations by 3.5 feet in the 1% Annual Chance Flood, 7.3 feet in the bankfull flow, and 9.1 feet in the median annual flow.

Literature Review and Cultural Resources within the Study Area

There are no archaeological sites listed in the CRIS database within 1 mile of AOP 3. There are twenty-six previously documented NRHP eligible or listed sites within 1 mile. The Route 32 Bridge over Moodna Creek has been evaluated and determined not eligible for the NRHP. Several cultural resources investigations have documented the historic mill features along Moodna Creek. Surveys carried out in connection with the West Point Pipeline Project and the Catskill Aqueduct Connection Phase II Transmission Line Project along NYS Route 32 identified the historic structures in the vicinity of the Orrs Mills Road and Route 32 intersection including the Moodna Mansion/William Orr House, the Orr's Summer House and Orrs Mill as well as the historic dam, raceway, stone walls, and culverts (Sandy and Schneiderman 2017). Several Orr's Mills historic properties have been documented as historic properties starting in the 1970s. The Moodna Mansion (07103.000060), Orr's Summerhouse (07103.000059), Orr's Mill (07103.000063), and William Orr House (07103.000246) have individual listing in the CRIS database. A 1997 eligibility determination on file with the NYSOPRHP states the following:

> "Based on limited information provided for the project, the collection of residential, industrial, and engineering structures and sites associated with the former Orr's Mill are eligible for inclusion in New York State and National Registers of Historic Places. The district includes several features associated with the development and evolution of this site. These features include the home of William Orr (Moodna Mansion, 1870); the Orr "Summerhouse" (ca. 1750 core, enlarged ca. 1870); the ruin of the 40 by 80 foot, three story Orr's Mill (ca. 1866); a nineteenth century wood frame mill worker's cottage; a late nineteenth century outbuilding (formerly used as an industrial building); boathouse; mid-nineteenth century bridge remnants (abutments); early twentieth century stone foot bridge; and extant waterpower features including the impound area and dam. Collectively, the components of this district chronicle the evolution of this site from the earliest days of settlement in the area, through the initial industrial development of William Townsend, to the acquisition of the site by Englishman, William Orr. During his tenure on the property Orr established a prosperous Cornwall Mill complex on the site. The mill continued to operate into the twentieth century. Associated with the industrial aspect of the district are several houses that in their size and style recall the prosperous era of the mill. The significance of the complex is further enhanced by the rural setting and water features associated with the district."

A limited walkover survey of the area confirmed the existence of many of the structures and features previously documented, however, it was not possible to confirm the existence of all of the features.

Figure 13: Historic Map of the AOP 3 Study Area

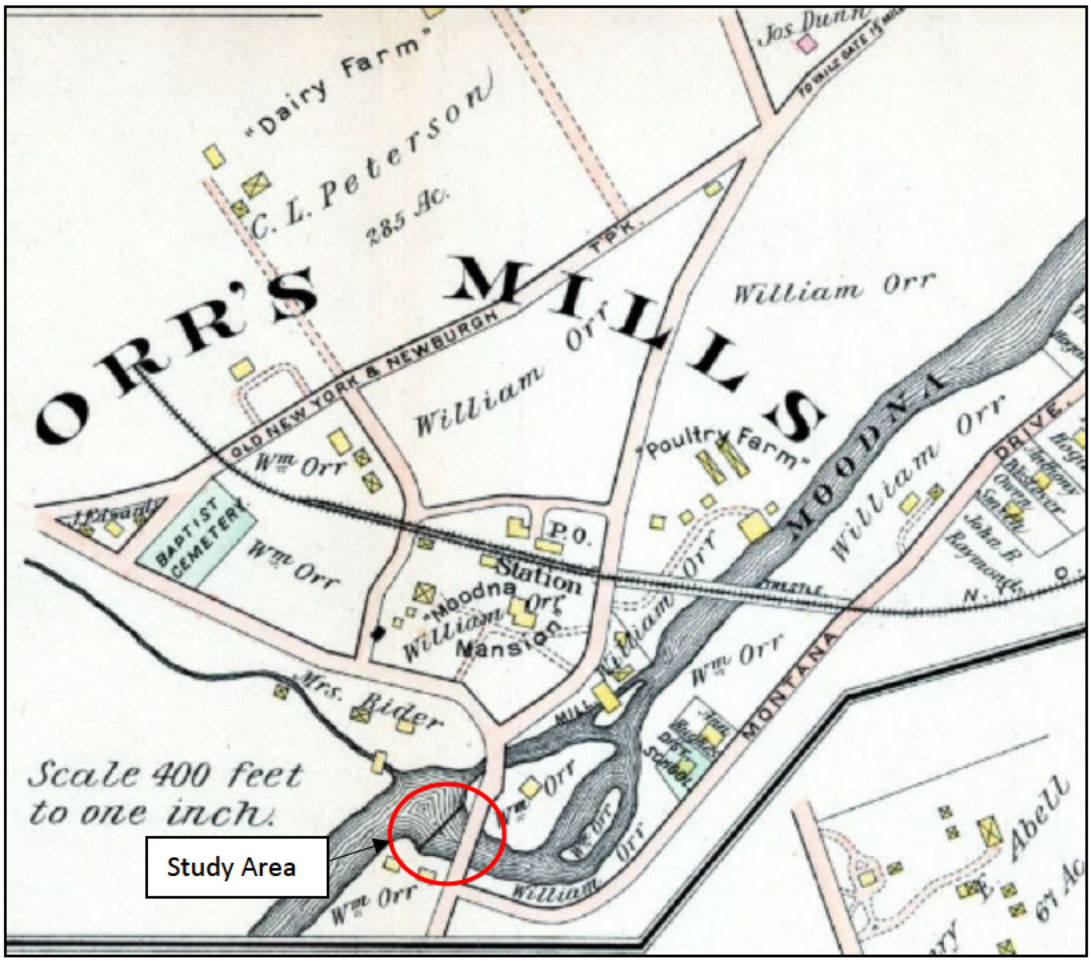
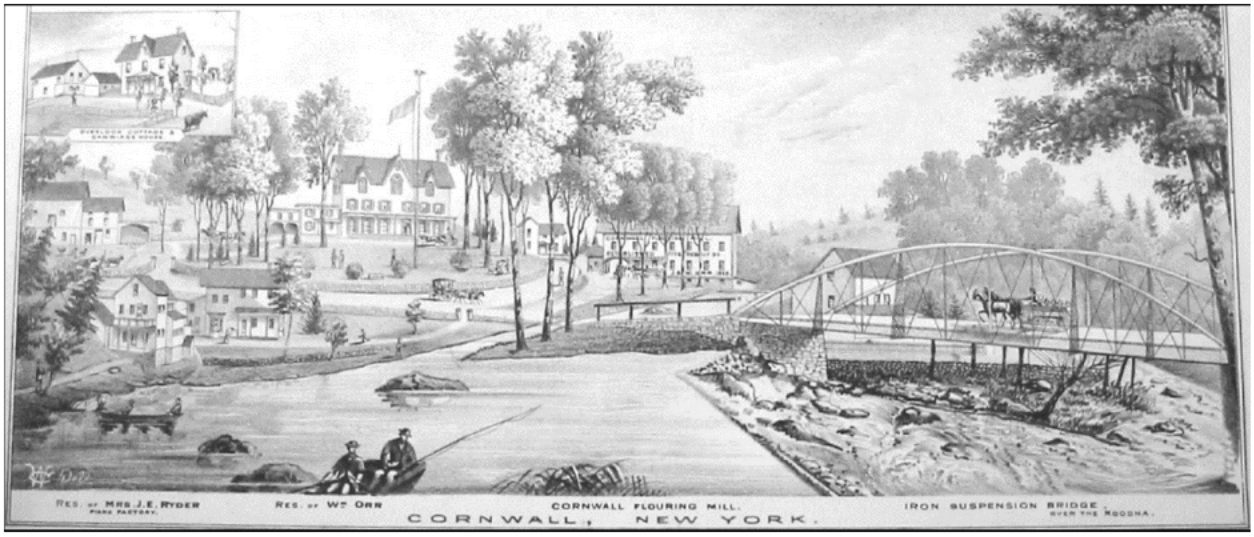


Figure 14: Artist's Rendering of Orr's Mills (Lathrop 1903)



Recommendation for AOP 3

The Orr's Mill Dam and the mill pond are potentially contributing elements to a historic district centering on the Orr's Mill at the intersection of Orr's Mill Road and NYS Route 32. Removal of the dam could potentially alter the character of the historic district and the structure itself has the potential to be determined eligible for the NRHP. Several surveys have been conducted in the area but a comprehensive survey of the dam and the historic district will be necessary to determine the eligibility status of the historic properties both individually and collectively and to determine the effect of the proposed notching of the dam.

References

Alden, Gregory, Thomas Cook, P.E., and Edward Taft
2006 Hudson River Shoreline Restoration Alternatives Analysis. Prepared for New York State Department of Environmental Conservation.

Alfieri, J., Berardis, A.; Smith, E.; Mackin, J.; Muller, W.; Lake, R.; Lehmkulh, P.
1999 The Lenapes: A study of Hudson Valley Indians. *Poughkeepsie, New York: Marist College.*

Baldwin, Geraldine E., Belinda Cox, Joel I. Klein, Lori Aument, Lee Cox, and Dan Leib
2011 Schodack-Houghtaling Island Cultural Resources Investigation, Town of Baltimore, Greene County, New York. National Historic Preservation Act Cultural Resources Investigation Report No. 5, (Volume I), American Recovery and Reinvestment Act 2009 Section 110 Compliance Report for the US Army Corps of Engineers, New York District. John Milner and Associates, Inc.

Beers, F.W.
1891 Portion of Albany County. Portion of Rensselaer County. From Atlas of the Hudson River Valley from New York City to Troy, including a section of about 8 miles in width. Watson & Co., New York.

Cheplowitz, Nicole
2015 Revised Initial Site Analysis Technical Memorandum for the Evaluation of Backwater Channel and Shallow Water Habitat Restoration at Schodack Island State Park. Ecology and Environment Engineering, P.C.

CITY/SCAPE: Cultural Resources Consultants
2013 Bethlehem Waste Water Treatment Plant Improvement, Supplemental Trenching Protocol. Dinmore Road, Town of Bethlehem, Albany County, New York.

De Simone, D.J., Wall, G.R., Miller, N.G., Rayburn, J.A., Kozlowski, A.L.
2008 Glacial Geology of the Northern Hudson through Southern Champlain Lowlands. Guidebook to Field Trips For the 71st Annual Reunion Northeastern Friends of the Pleistocene. http://www2.newpaltz.edu/fop/pdf/NEFOP2008.pdf

De Lisser, Richard Lionel
1984 Picturesque Ulster. The Hope Farm Press, Cornwallville, NY.

Diamond, Joseph E.
1990 Reconnaissance Level Survey of Archaeological Resources in the City of Kingston, NY.

Fried , Marc B.
1975 The Early History of Kingston & U;ster County, NY. U;ster County Historical Society, Marbletown, Kingston, NY.

Friends of Schodack Island State Park
2017 History of Schodack Island. http://friendsofschodackisland.org/history-of-the-schodack-islands/

Funk, Robert E.
1976 Recent Contributions to Hudson Valley Prehistory. New York state Museum and Science Service Memoir 22. The State Education Department of the University of the State of New York, Albany.
1991 The Middle Archaic in New York. Journal of Middle Atlantic Archaeology 7:7-18.

Harmon, Daniel E.
2004 The Hudson River. Chelsea House Publishers.

Harris, Wendy and Arnold Pickman
1997 Ice Industry Associated Remains on Portions of Schodack-Houghtaling Island Owned by the U.S. Army Corps of Engineers: A Preliminary Assessment. Town of New Baltimore, Greene County, NY.
2000 Cultural Resources Investigation Hudson River Habitat Restoration Study, Mill Creek Marsh, Town of Stuyvesant, Columbia County, NY. Schodack-Houghtaling Island, Town of New Baltimore, Greene County, New York.

Hartgen Archeological Associates, Inc. (HAA)
1998 Phase I Archaeological Investigation Castleton Island State Park, Town of Schodack, Rensselaer County, New York.
1999 Addendum Report, Phase 1 Archeological Field Investigation, Wetland Mitigation Areas 1 & 2, Schodack Island State Park, Town of Schodacl, Rensselaer County, New York.
2000 Phase II Archaeological Investigation Access Road, Schodack Island State Parkm Town of Schodack, Rensselaer County, New York.
2001a Monitoring Wetland Mitigation Area and Boat Launch Installation Schodack Island State Park, Town of Schodack, Rensselaer County, New York.
2001b Phase IA Report for Archaeological Potential Sensitivity Assessment and Phase IB Field Investigation, Eddyville Mine, Town of Ulster, Ulster County, New York.
2002a Phase IA Literature Review and Sensitivity Assessment of PIN 8757.10, Abeel Street Reconstruction Project, City of Kingston, Ulster County, New York.
2002b Phase IB Archaeological Field Reconnaissance of PIN 8757.10, Abeel Street Reconstruction Project, City of Kingston, Ulster County, New York.\

2002c Addendum Report, Archaeological Monitoring Investigation, Schodack Island State Park Comfort Station Building, Water Treatment Building and Water Line Excavations, Town of Schodack, Rensselaer County, New York.

2003 Phase IB Archaeological Field Reconnaissance, Bethlehem Water Supply Line, Town of Bethlehem, Albany, County, New York.

2016 Phase I Archaeological Investigations, Selkirk Industrial Park, State Route 144, Town of Bethlehem, Albany County, New York.

Huey, Paul R.

1997 Historical and Archaeological Resources of Castleton Island State Park, Towns of Stuyvesant, Columbia County, New Baltimore, Greene County, and Schodack, Rennselaer County, New York: A Preliminary Phase I Cultural Resources Assessment.

Hutchinson, Diane L.

2015 History of Schodack Islands. http://friendsofschodackisland.org/history-of-the-schodack-islands, Accessed on February 10, 2015.

Laberge Group

2011 Town of Schodack Comprehensive Plan. https://www.schodack.org

Lathrop, J.M.

1903 Atlas of Orange County, New York. A.H. Mueller & Company. Philadelphia, PA.

Lawrence, Dawn, and Gade, Susan (Landmark Archaeology, Inc.)

2013 Phase IB Archaeological Investigations of a Proposed New Campground Facility at Schodack Island State Park Town of Schodack, Rensselaer County, New York.

Mack, Karen and Jennifer Larlee

2017 Phase IA Archaeological Assessment of the Landau Solar, LLC Project, Town of Eddyville, Ulster County, New York.

2018 Phase I Archaeological Assessment of the Landau Solar, LLC Project, East of State Route 32 & West of State Route 213, Town of Ulster, Ulster County, New York.

Miller, Daniel E., Edward Samanns, and Erik Kiviat

2017 Natural Resource Inventory and Assessment of Conservation Priorities of the Binnen Kill and its Tidal Habitats, Towns of Bethlehem and Selkirk, NY. Prepared for the Department of Environmental Conservation and the New England Interstate Water Pollution Control Commission.

Miller, Daniel E.

2013 Hudson River Estuary Habitat Restoration Plan. New York State Department of Environmental Conservation, Hudson River Estuary Program.

Moyer, Rebecca, and David Moyer

2003 Phase IA/IB Cultural Resources Survey, Kingston Rhinecliff Bulkhead, Ramp and Access Road, Town of Kingston, Ulster County, New York. On file, NYSOPRHP.

National Audubon Society

2018 Important Bird Areas: New York [webpage]. Accessed 15 Aug. 2018. www.audubon.org/important-bird-areas/state/new-york

New York State Department of Environmental Conservation

2011 – 2012 New York State Department of Environmental Conservation (NYSDEC) LiDAR: Coastal New York (Long Island and along the Hudson River) [dataset]. NOAA Office for Coastal Management. https://inport.nmfs.noaa.gov/inport/item/49888.

New York State Department of State (NYSDOS)

1995 Town of Schodack and Village of Castleton-on-Hudson Local Waterfront Revitalization Program. Approved: March 17, 1995NYSDOS.

2012a Coastal Fish and Wildlife Rating Form, Shad and Schermerhorn Islands. Designated: November 15, 1987. Revised: August 15, 2012.

2012b Coastal Fish and Wildlife Rating Form, Rondout Creek. Designated: November 15, 1987. Revised: August 15, 2012.

2012c Coastal Fish and Wildlife Rating Form, Schodack and Houghtailing Islands and Schodack Creek. Designated: November 15, 1987. Revised: August 15, 2012.

2012d Coastal Fish and Wildlife Rating Form, The Flats. Designated: November 15, 1987. Revised: August 15, 2012.

New York State Department of Transportation

2013 Geology of New York State. Geotechnical Design Manual. 3-1-3-35.

New York State Museum

1991 Surficial Geologic Map of New York. http://www.nysm.nysed.gov/research-collections/geology/gis

1995 Geologic Map of New York. http://www.nysm.nysed.gov/research-collections/geology/gis

Oberon, Stephen J.

2006 Phase I Cultural Resources survey Site Assessment and site Identification Phase Proposed Cornwall Commons Development, Town of Cornwall, Orange County, New York. Columbia Heritage, Ltd.

Ocean and Coastal Consultants

2011 Henry Hudson Shoreline Stabilization Study: Research and Recommendations.

Office of Parks Recreation and Historic Preservation

2018 Various site files within 1.6-kilometer (1-mile) radius of project area. On file, Office of Parks Recreation and Historic Preservation, Peebles Island, Waterford, NY. Available at https://cris.parks.ny.gov. Accessed January 2018.

Panamerican Consultants, Inc.

2002 Cultural Resources Investigation and Remote Sensing Survey of the Hudson River at Athens Navigation Project, Athens, Greene County, New York. Prepared for the U.S. Army Corps of Engineers, New York District.

Rink, Oliver A.

1986 Holland on the Hudson: An Economic and Social History of Dutch New York. *Ithaca, New York: Cornell University Press. pp. 17–23, 264–266.*

Ritchie, William A.

1994 The Archaeology of New York State, revised edition. Purple Mountain Press, Fleischmanns, New York.

Sandy, William and Faline Schneiderman

2017 Phase IB Archaeological Investigation, Catskill Aqueduct Connection, Phase II Transmission Line, Towns of Cornwall and New Windsor, Orange County, New York. Historical Perspectives, Inc.

Schodack Scene

2015 Schodack Island to Host Winterfest [Webpage]. Accessed December 2018. https://thescene-thescene.blogspot.com/search?q=schodack+island.

Stanne, Stephen P.

1996 The Hudson: An Illustrated Guide to the Living River, p. 120. Rutgers University Press.

Stone and Stewart

1866 Map of Bethlehem from the New Topographical Atlas of Albany and Schenectady, New York. Philadelphia, PA.

U.S. Army Corps of Engineers, New York District

2014 U.S. Army Corps of Engineers awards $8.6 million maintenance dredging contract for work along Hudson River. https://www.nan.usace.army.mil/

2019 Aquatic Organisms Passage Barrier Literature Review for Moodna Creek and Rondout Creek. Hudson River Habitat Restoration Feasibility Study, Orange and Uster Counties, New York.

Stockbridge-Munsee Community
Band of Mohican Indians
Policy for
Treatment and Disposition of Human Remains and Cultural Items
That May be Discovered Inadvertently during Planned Activities

Purpose

The purpose of this policy is to describe the procedures that will be followed by all federal agencies, in the event there is an inadvertent discovery of human remains that are identified as potentially Stockbridge-Munsee (Mohican).

Treatment and Disposition of Human Remains and Cultural Items

1) The federal agency shall contact the Stockbridge-Munsee Community immediately, but no later than three days after the discovery of the remains, using the contact information below: *updated Jan. 2020*

Nathan Allison, Tribal Historic Preservation Officer (THPO)	Nathan.Allison@mohican-nsn.gov	518-244-6891 office

If unavailable, contact:

Bonney Hartley, Tribal Historic Preservation Manager	Bonney.Hartley@mohican-nsn.gov	518-244-3164 office
Heather Bruegl, Cultural Affairs Director	Heather.Bruegl@mohican-nsn.gov	715-793-4270 office
Linda Mohawk Katchenago, Administrator	Linda.Katchenago@mohican-nsn.gov	715-793-4355 office

2) Place tobacco with the remains and funeral objects.

3) Cover remains and funeral objects with a natural fiber cloth such as cotton or muslin when possible.

4) No photographs to be taken.

5) The preferred treatment of inadvertently discovered human remains and cultural items is to leave human remains and cultural items in-situ and protect them from further disturbance.

6) Non-destructive "in-field" documentation of the remains and cultural items will be carried out in consultation with the Tribe, who may stipulate the appropriateness of certain methods of documentation.

7) If the remains and cultural items are left in-situ, no disposition takes place and the requirements of 43 CFR 10 Section 10.4 – 10.6 will have been fulfilled.

8) The specific locations of discovery shall be withheld from disclosure (with the exception of local law officials and tribal officials as described above) and protected to the fullest extent by federal law.

9) If remains and funeral objects are to be removed from the site, consideration will begin between the Stockbridge-Munsee Tribe and the federal agency.