Wetland Mitigation

Ducks Unlimited – New York In-Lieu Fee Program
Hudson River Service Area – Non-tidal Wetlands

11-16-2020

Ducks Unlimited

Great Lakes / Atlantic Regional Office
7322 Newman Boulevard, Building 1
Dexter, Michigan 48130

&

North Atlantic Office
159 Dwight Park Cir.
Syracuse, New York 13209

Submitted to: U.S. Army Corps of Engineers and the Inter-Agency Review Team

Contents

1. Introduction

Ducks Unlimited Inc. (DU), is a 501(c)3 non-profit organization dedicated to conserving and restoring wetlands and other aquatic resource features to sustain North America's waterfowl. The Ducks Unlimited New York In Lieu Fee Program (DU-NY-ILF) was approved in January of 2012 to provide compensatory mitigation for impacts to aquatic resources in New York State and operates as an umbrella ILF program. The DU-NY-ILF provides a third-party compensatory mitigation option for unavoidable impacts to waters of the United States (including wetlands and streams) approved by the Army Corps of Engineers (Corps) under Section 404 of the Clean Water Act ("CWA") and Section 10 of the Rivers and Harbors Act. The DU-NY-ILF program also provides third party compensatory mitigation option for the New York State Department of Environmental Conservation (NYSDEC) permit programs under the Environmental Conservation Law, including the Fresh Water Wetland Act, Article 24; the Stream Protection Act, Article 15; and the Water Pollution Control Act, Article 17 and the Adirondack Park Agency (APA). Additionally, the DU-NY-ILF program may be used to satisfy other federal, state, and local regulatory program requirements related to impacts to aquatic resources including enforcement actions. This instrument addresses the required elements for operating an ILF program under the federal 2008 mitigation rule (33 CFR Part 332).

Demand for wetland mitigation in the Hudson River Basin has been high in recent years (Brett and Bliss 2019). Through this amendment DU proposes to incorporate the ability to mitigate for impacts to non-tidal wetlands in the Hudson-Hoosic 8-digit HUC (02020003), and portions of the Middle Hudson 8-digit HUC (02020006) into the DU-NY-ILF (Figures 1, 2). Within the Hudson River Watershed, tidal influence extends to the Federal Dam in Troy, NY where the dam prevents tidal influence further inland. By definition, non-tidal wetlands have neither water-levels nor flows that affected by the tides. Given the scarcity of areas suitable for tidal wetland restoration free of due-diligence concerns (e.g., invasive species, pollution, title encumbrances), DU is restricting resource compensation to non-tidal wetlands.

By offering a compensatory mitigation option for non-tidal wetlands in these watersheds, DU will be able to offer larger more sustainable mitigation options to permittees. Preservation of larger blocks of undeveloped land provide greater benefits to wildlife, aquatic resource function, and provide for more effective mitigation than do small-isolated mitigation projects (*sensu:* MacArthur and Wilson 1963; Zedler 2003; Hunter et al 2012). To summarize need, development pressure is high and few options exist outside of permitee responsible mitigation in this biologically important River Basin.

The Hudson River Service Areas will follow the same procedures (*e.g., credit transaction, credit release, performance standards, monitoring reporting, adaptive management, long-term protection, accounting, default, and closure provisions*) identified in the DU-NY-ILF Program Instrument. DU will restrict sales to wetland credits in these watersheds.

Table 1 – NY ILF Service Areas. Proposed additions are Bolded.

Service area	**Hydrologic Unit Codes (HUC)**
1. Black River	HUC 04150101
2. Buffalo-Eighteen Mile Creek	HUC 04120103
3. Conewango Creek	HUC 05010002
4. Irondequoit-Ninemile Creek	HUC 04140101
5. Lower Genesee	HUC 04140101
6. Niagara River	HUC 04120104
7. Oneida Lake	HUC 04140202
8. Oswego River	HUC 04140203
9. Seneca Lakes	HUC 04140201
10. St. Lawrence River (E, W)	HUCs 04150305-8 (E); 04150301-4 (W)
11. Hudson-Hoosic	**HUC 02020003**
12. Middle Hudson	**HUC 02020006**

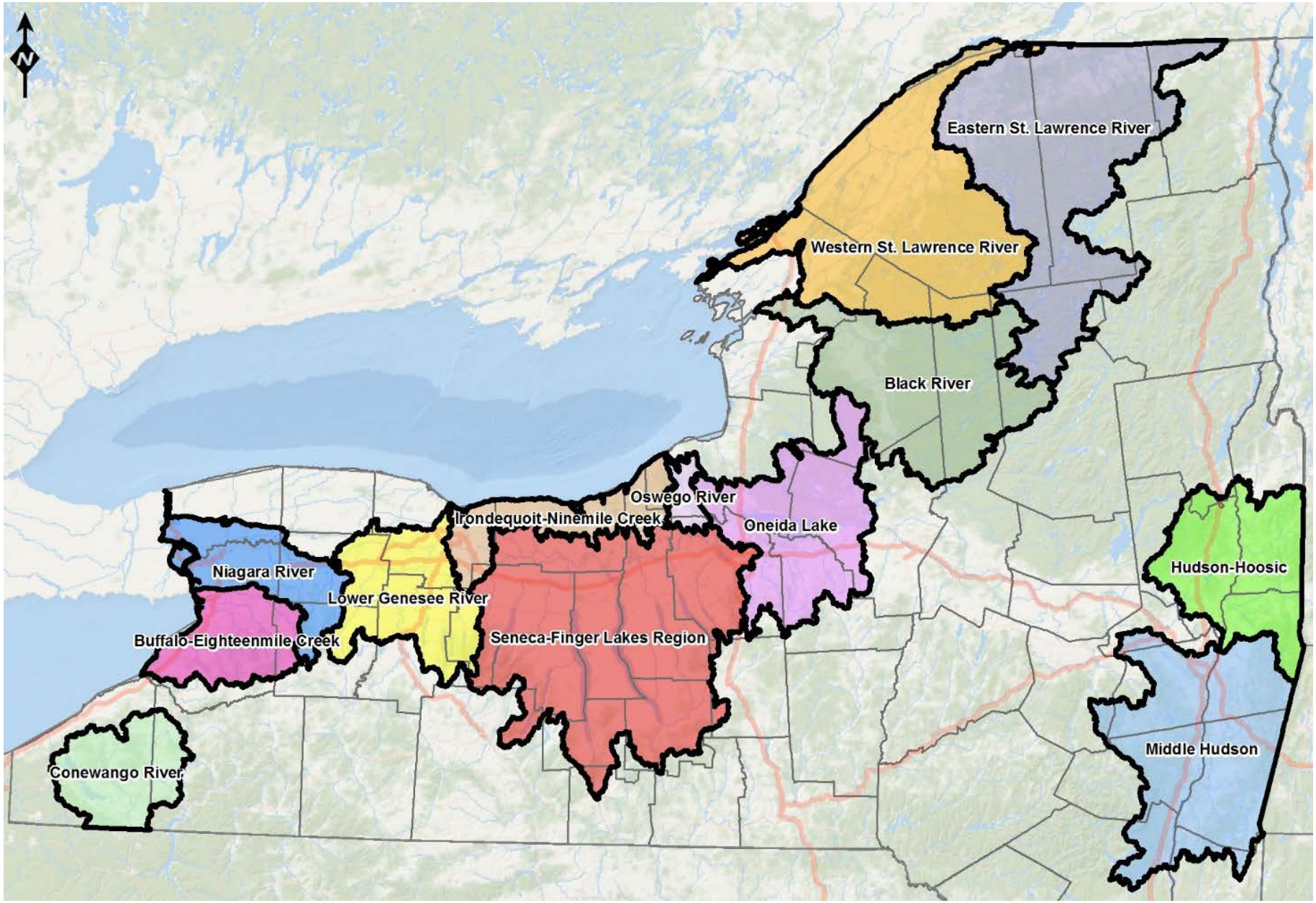

Figure 1. Ducks Unlimited New York ILF Service Areas.

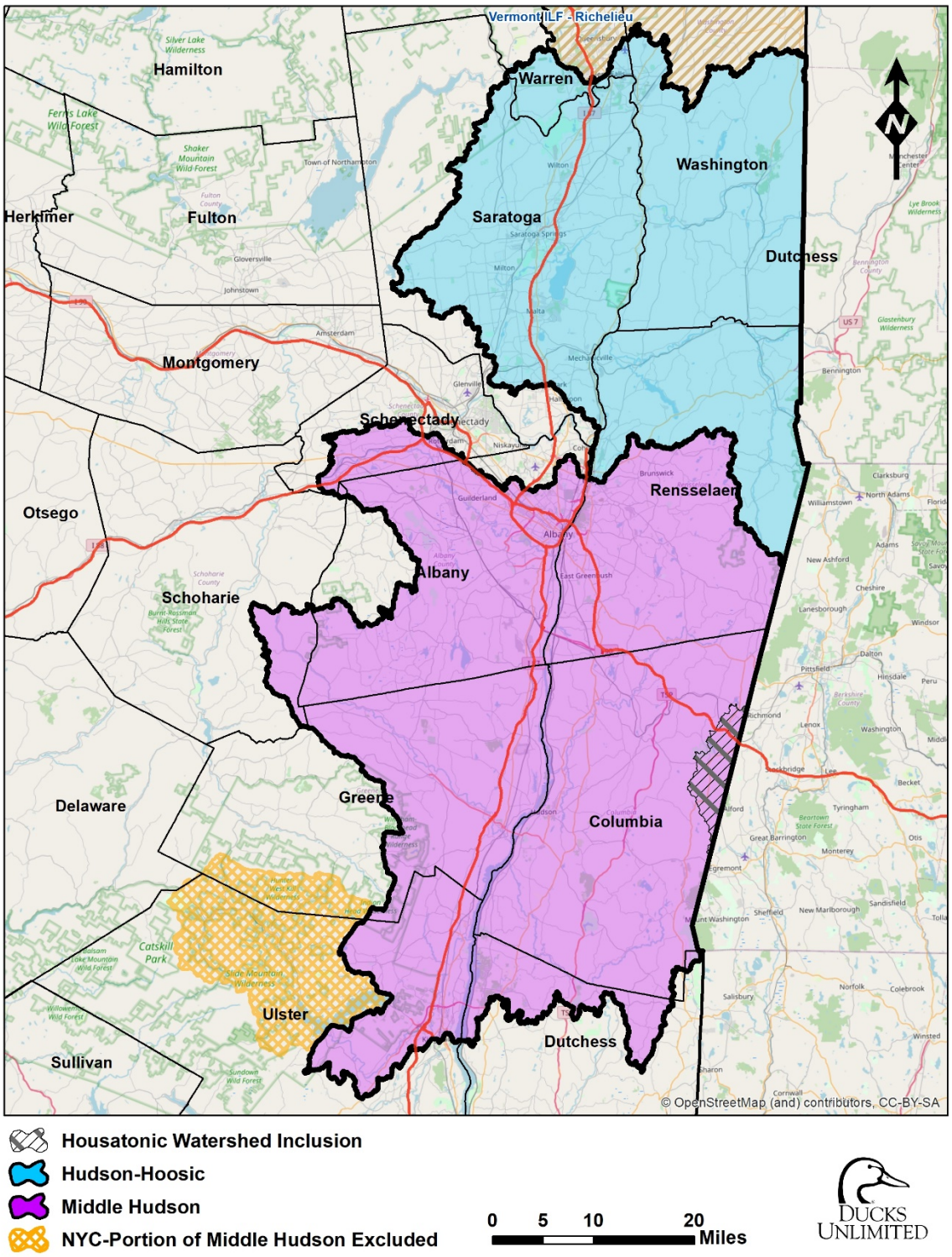

Figure 2. Ducks Unlimited New York Hudson River ILF Service Areas.
The Hudson-Hoosic Service Area is comprised of an HUC-8: 02020003. The Middle Hudson Service Area is comprised of the majority of the Middle Hudson HUC-8: 02020006, excluding New York City Water-Supply portions of the watershed (Orange hatching). A small portion of the Housatonic watershed (HUC-8: 01100005) near the Massachusetts border (Gray hatching) is included in the Middle Hudson Service Area to extend coverage to the NY-MA border.

2. Hudson River Basin Service Area Needs

The Hudson River flows into an ecologically and economically significant estuary. Non-point source pollution from runoff including fertilizers, pesticides, oil and sediment negatively impact water-quality and harm coastal wetlands and dependent biota (NYS-DEC 2015). The Middle Hudson and Hudson-Hoosic watersheds have some of the greatest mitigation demand in New York State and would benefit from having a mitigation option that facilitates development of larger, more-sustainable mitigation sites (Hunter et al 2012; Brett and Bliss 2019). Placing larger mitigation sites using a watershed-based selection approach in the middle and northern portions of the Hudson River Basin is likely to lead to improved water-quality benefits downstream, as wetland restoration is a key strategy to reducing nutrient loading in estuaries (Batiuk et al. 2013).

Numerous rare and threatened species call the Hudson River Basin home including: bog turtle (*Glyptemys muhlenbergii*), Blanding's turtle (*Emydoidea blandingii*), spotted turtle (*Clemmys guttata*), eastern box turtle (*Terrapene carolina*), wood turtle (*Glyptemys insculpta*) Jefferson Salamander (*Ambystoma jeffersonianum*), blue spotted salamander (*Ambystoma laterale*), marbled salamander (*Ambystoma opacum*), northern cricket frog (*Acris crepitans*), bald eagle, least bittern, pied-billed grebe, Kentucky warbler (*Geothlypis formosa*), scarlet tanager (*Piranga olivacea*), worm-eating warbler (*Helmitheros vermivorum*), and Cerulean warbler (*Setophaga cerulea*) (e.g., Mudd and Tabak 2017). All of these species use or can use wetlands for at least a portion of their lifecycle (NYS-DEC 2015). Bog turtle is federally listed as threatened. Habitat loss, fragmentation, succession are among the largest threats to this species (Shoemaker and Gibbs 2013). This small turtle utilizes early-successional groundwater wetlands known as fens and surrounding red maple swamps (Bedford and Godwin 2003; Myers and Gibbs 2013). Moreover, the majority of extant bog-turtle populations in New York State are located within the Hudson River Basin, underscoring the importance of preserving and restoring high-quality wetland habitats (Myers and Gibbs 2013).

Common waterfowl species found in this portion of the Atlantic Flyway include: mallards, American black ducks, wood ducks, green-winged teal, American wigeon, Canada geese, Atlantic brant, and greater snow geese. Mallards, Atlantic brant, and Canada geese have experienced negative growth trends in recent years in the Atlantic Flyway. Expansion of the DU-NY-ILF program is likely to enable projects that would provide important breeding habitat suitable for mallards and Canada geese.

Watershed Characteristics Service Areas 11 & 12: Hudson-Hoosic (HUC 02020003) & Middle Hudson (HUC 02020006)

**Service Areas 1-10 are described in the DU-NY-ILF Program Instrument.*

The Hudson River and its tributaries drain central and eastern portions of New York State, southwestern Vermont, western Massachusetts and Connecticut. The Hudson-Hoosic service area in particular spans 1,285 square miles, encompassing most of Saratoga, Washington, and Rennselaer counties, as well as parts of Warren, and Albany Counties. The Middle Hudson service area spans 2,170 square miles including most of Columbia and Albany counties, as well as portions of Greene, Ulster, Schoharie, Schenectady, and Dutchess counties. Land-uses in these watersheds are dominated by forested cover, agricultural fields, and developed portions of Albany and outlying service areas (Homer et al. 2015). The Hudson-Hoosic watershed has approximately 135,967 acres (11.2% of the watershed) of wetland habitat, and approximately 60,000 acres of those wetlands are New York State regulatory freshwater wetlands (NRCS 2015). An additional 18,059 acres occurs as open water in the watershed according to NLCD (Homer et al. 2015). The Middle Hudson watershed has approximately 115,341 acres (7.4% of the watershed) of woody/emergent herbaceous wetland habitat, and approximately 58,000 acres of those wetlands are New York State regulatory freshwater wetlands (NRCS 2011). There are approximately 36,655 acres of open water in the Middle Hudson watershed. The wetlands in these watersheds are largely palustrine emergent, scrub/shrub, and forested, and there are also tidal wetlands in the influence of the Hudson River. The major economic activities in the watershed are education services, health-care, public administration, retail, agriculture, logging, mining, and recreation/tourism, and a growing solar sector (NYS-DEC 2015).

Threats and Impacts

The atmospheric deposition of pollutants such as acid rain and mercury originating outside the basin negatively impact water quality (NYS-DEC 2015). Similarly, the water quality is affected by agricultural practices and industrial development and legacy impacts of polychlorinated biphenyls (PCBs) within the Hudson River and adjacent wetlands. Hazardous wastes and other industrial impacts associated with resource extraction are also a concern in specific areas. In sum, approximately 230 river miles and 918 acres of freshwater lakes in the Hudson-Hoosic watershed are listed by the EPA as impaired waters (EPA 2014). In the Middle Hudson, approximately 252 river miles, 46 square miles of estuary, and 10,333 acres of freshwater lakes are similarly listed as impaired waters (EPA 2014).

Development pressure from energy projects, solar, transportation, and new construction are also high (Brett and Bliss 2019). Non-point source pollution including fertilizers, pesticides, oil and grease, and sediment are other factors affecting the health of waters in the Hudson River Watershed (EPA 2014).

Current Watershed Threats (NYSDEC 2015):
(**Bold** represents threat that will be targeted by the DU-NY-ILF program)

- **A) Habitat loss and fragmentation**
- **B) Degraded water quality**
- C) Atmospheric deposition
- **D) Altered hydrology**
- **E) Invasive species**
- F) Human-wildlife interactions
- G) Climate change

3. Conservation Planning

The primary cause of impairment in the Hudson-Hoosic watershed is phosphorous loading (NYS-DEC 2015). The NYSDEC, New York Natural Heritage Program, and Scenic Hudson have identified conservation strategies to improve water-quality, habitat connectivity, and adaptability to climate change for the Hudson River Valley (Penhollow et al. 2006, Howard and Schlesinger 2012, Mudd and Tabak 2017). Key to these spatially-explicit strategies are protection and restoration of priority connective lands and wetlands. With the addition of DU's wetland targeting tools to the existing suite of GIS-conservation planning tools (e.g., Howard and Schlesinger 2012, Mud and Tabak 2017, Raney and Leopold 2018) DU will focus on wetland restoration projects that include restoration of important non-tidal wetland areas, reducing gaps in connectivity, and preservation of significant areas for biodiversity. Critical gaps in habitat connectivity have been identified (Howard and Schlesinger 2012), and will be a focus for acquisitions in the DU-NY-ILF. Such areas are well identified in existing spatial conservation planning tools and will be targeted for acquisition by DU.

The priority habitats and their associated priority species include the following (*information below was adapted from NYSDEC comprehensive Hudson River Estuary Wildlife Habitat Conservation Framework 2006*):

A) Large habitat blocks: Priority targets will contribute to habitat connectivity and larger habitat restorations. Habitat fragmentation threatens diversity of forest interior birds and wide-ranging mammals, such as fisher (*Martes pennanti*).

B) Early succession habitats: Support a host of early successional birds such as Canada warbler (*Wilsonia canadensis*), ruffed grouse (*Bonasa umbellus*), and American woodcock (*Scolopax minor*); raptors, such as long-eared owl (*Asia outs*), and forest interior birds
C) Wetlands: Areas of concern are floodplain forest, shrub swamps, and calcareous fens. These wetland habitats support a diversity of state-listed turtles: Blanding's turtles (*Emydoidea blandingii*), bog turtles (*Glyptemys muhlenbergii*), and spotted turtles (*Clemmys guttata*).
D) Freshwater tributaries: Support a mixture of wetlands and associated buffers reduce limit nutrient loading. These tributaries are important for migratory fish.
E) Grasslands: Support populations of bobolink (*Dolichonyx oryzivorus*), Henslow's sparrow (*Ammodramus henslowii*), savannah sparrow (*Passerculus sandwichensis*), and sedge wren (*Cistothorus platensis*).

Watershed Management
(**Bold** represents watershed goals that ILF projects may support)

1) Work with conservation stakeholders to manage, protect, and enhance the at-risk biodiversity
2) Manage animals, habitats, and land use practices to produce sustainable benefits for species of conservation concern
3) Identify, manage, maintain, and protect/restore habitats and communities over a broad spatial scale
4) Control invasive species
5) Development, infrastructure and storm water management: reduce the adverse impacts from new development, reduce loading of nutrients, bacteria, and sediment into water bodies
6) Agricultural practices and management: maintain viable agricultural land use, minimize negative impacts
7) Floodplain management: Improve preservation of riverine and lacustrine floodplains and shorelines, improve coverage and accuracy of floodplain delineation
8) Forestry practices: Ensure continued viability of the forestry practices, minimize negative impacts
9) Work with land managers to incorporate wildlife-based objectives

4. Site Selection

DU will continue to utilize the Site Selection and Evaluation Key described in the DU-NY-ILF Program Instrument. Additionally, DU has a complete suite of state-wide GIS tools that enable screening of sites for their suitability for wetland restoration potential (Figures 3-5). The modeling processes by which these tools were derived are described by Raney and Leopold (2018) and Hunter et al. (2012). These tools include state-wide coverages of topographic wetness indices that illustrate areas of water accumulation from overland flows (Beven and Kirkby 1979), modeled areas of emergent and forested wetland plant communities and locations of fens. These models rely mostly on terrain and soils variables, and show both extant and restorable wetland locations, thus making effective remote pre-screening tools. These tools assist DU with identifying areas that may be suitable for wetland restoration. High-resolution (≤ 2m – 2ft) contour data derived from LiDAR mapping are also widely

available for much of New York State, further aiding in the identification of potential water sources, and topographic settings suitable to restore wetland features. LiDAR is a highly accurate, light-detection and ranging technique that precisely estimates surface elevation. When LiDAR-derived contour data is used in conjunction with existing wetland maps (e.g., NWI) and modeled wetland features, DU can quickly assess site restoration potential, making field verifications more effective. Furthermore, DU will engage with local area land trusts and partners to identify and secure the properties that will further existing conservation efforts.

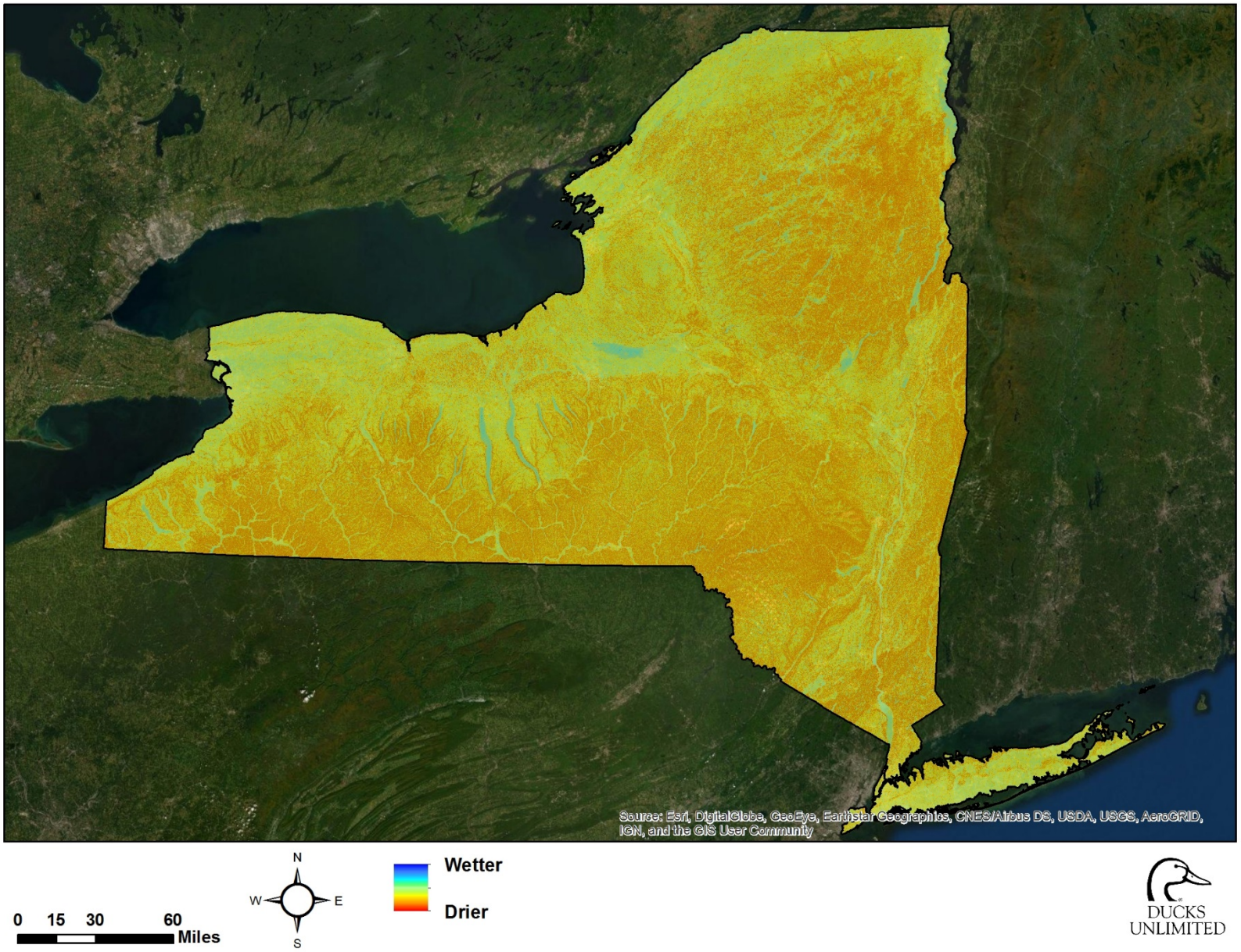

Figure 3. State-wide topographic wetness index (TWI).
TWI is based on a model of overland water accumulation described by Beven and Kirkby (1979), it is a proxy for hydrological influence.

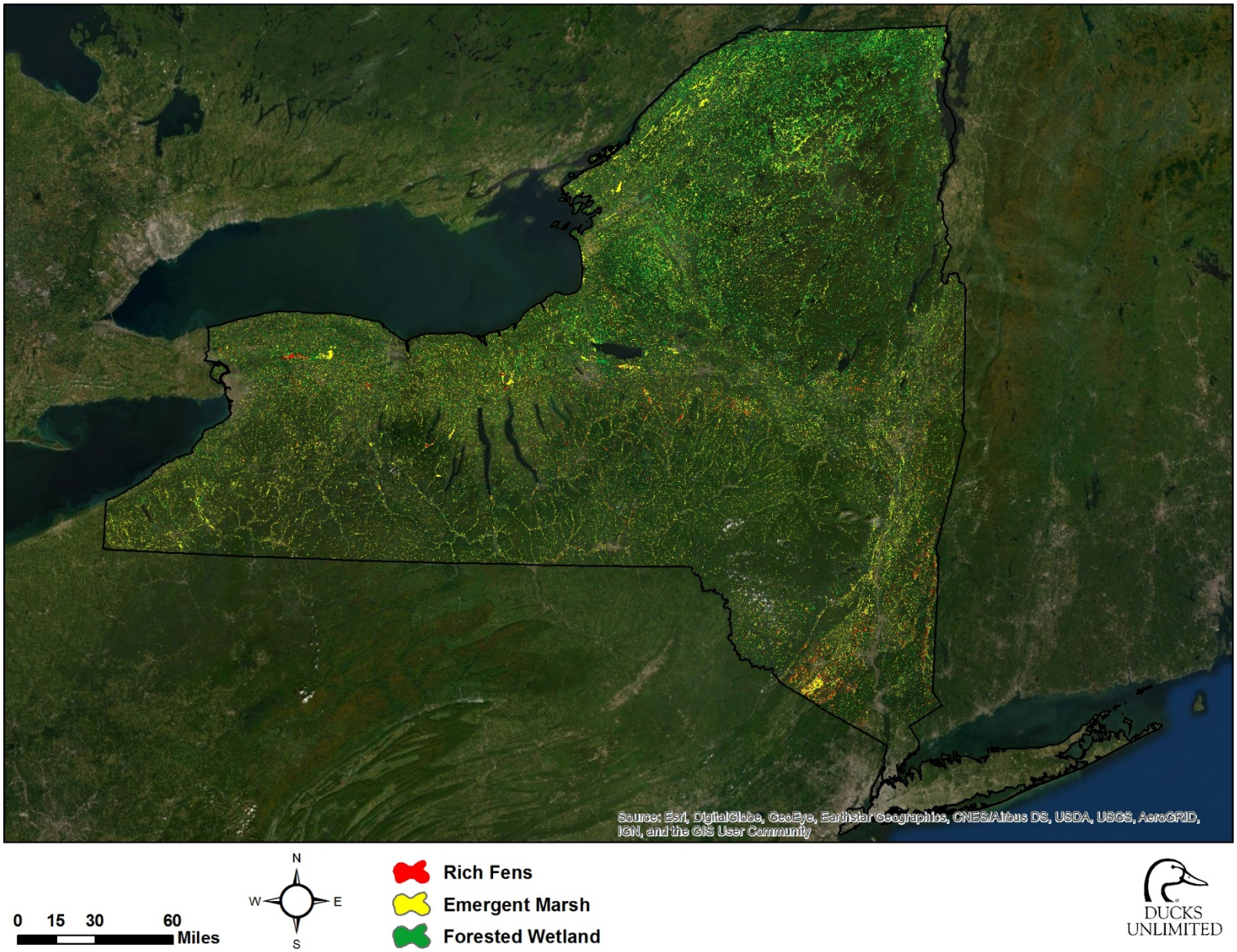

Figure 4. State-wide modeled distribution of wetlands.
These models show extant wetlands as well as areas that may have experienced past drainage, following Raney and Leopold (2018).

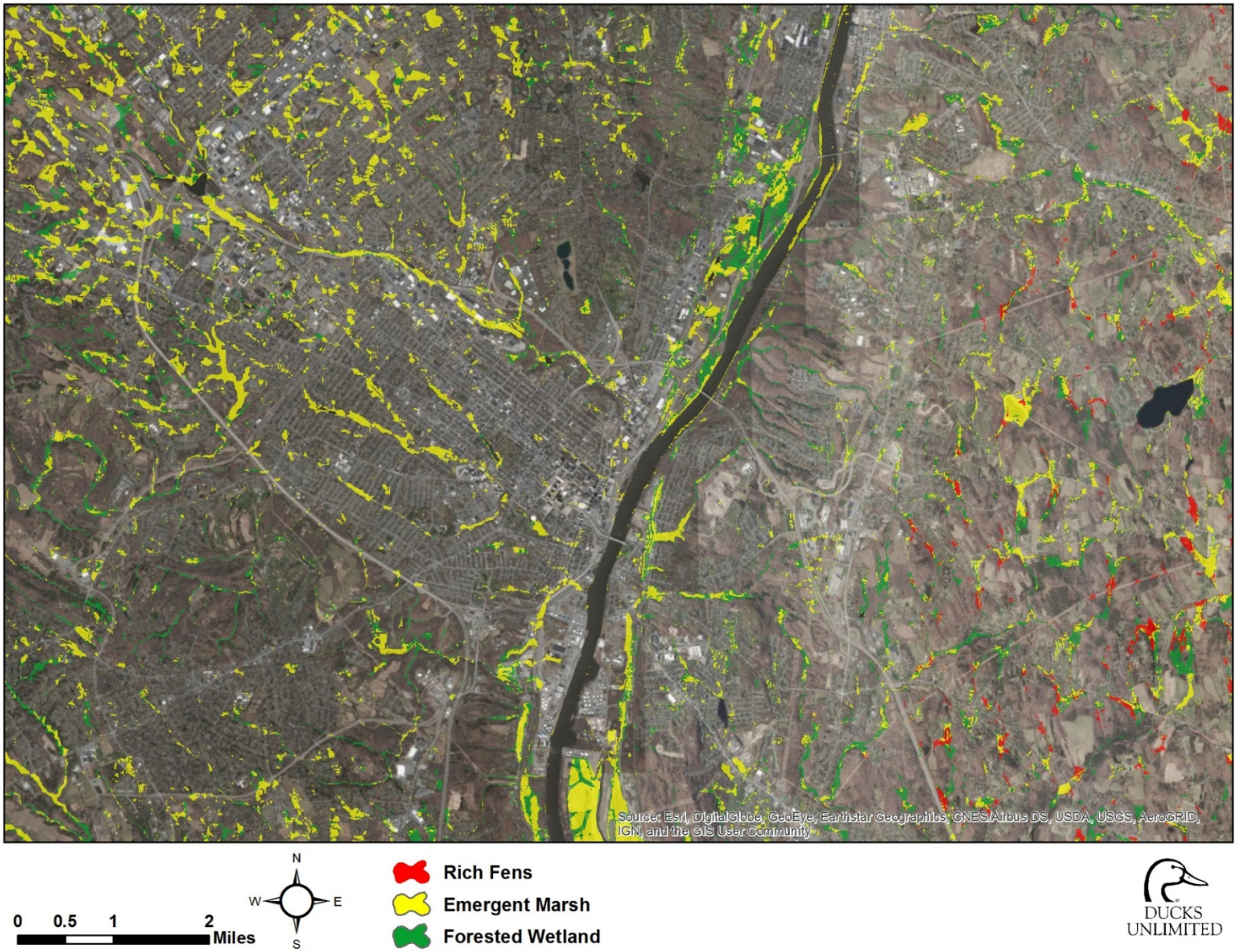

Figure 5. Site identification tools showing the greater Albany Area.
Shows modeled distribution of wetlands, can be viewed in conjunction with NWI to evaluate areas suitable for restoration.

4. Cost of Credits

The credit fee will be determined by DU in conjunction with input from the Interagency Review Team (IRT) and the U.S. Army Corps of Engineers and will be based on full cost accounting. The credit fee covers project expenses for site identification, travel costs, land acquisition, mitigation plan development, permitting, construction, land protection, land protection endowment fee, performance monitoring, contingency measures for adaptive management, long-term management endowment, financial assurances, legal fees, an administrative fee, and any other factors as deemed necessary by DU or the IRT. The credit fee must take into account contingency costs appropriate to the stage of project planning, including uncertainties in construction and real estate expenses. Fees may be adjusted as deemed necessary to reflect the full cost accounting of operating an ILF program.

DU will receive an administrative fee of 17.5% per credit. The administrative fee will be deducted when payment is received and deposited into the DU Program account. The administrative fee is not subject to credit release and is used to offset expenses associated with program administration which includes managing credit sale transactions, annual reporting, accounting, marketing, education and training, and other activities not related to project implementation.

Table 2. Credit Cost Breakdown.

**17.5% of each credit sale is for associated administrative costs of operating the ILF Program.*

Land acquisition costs vary by watershed:
Middle Hudson and Hudson Hoosic watersheds have higher land prices relative to other service areas in the DU-NY-ILF. Land purchase price was estimated based on market comps for vacant land suitable for wetland restoration. Urban watersheds typically have added costs for identifying a suitable site.

Category	Unit Price	Frequency	Total Cost
Land Purchase	$355,000	1	$355,000.00
Land Purchase Acquisition repayment to WAT for access to unencumbered acquisition capital	$22,994	5	$114,969.35
Taxes (Years)	$6,500	5	$32,500.00
Closing Cost per Transaction, Survey, Due diligence	$40,000	1	$40,000.00
Site Identification & Land Acquisition	$60,000	1	$60,000.00
Mitigation Plan (Site visit IRT, permitting)	$150,000	1	$150,000.00
Construction and Planting Contractor Cost	$225,000	1	$225,000.00
Construction and Planting Staff Cost	$55,000	1	$55,000.00
Monitoring	$11,000	10	$110,000.00
Adaptive Management	$9,000	10	$90,000.00
Long Term Protection Endowment (CE monitoring)	$57,000	1	$57,000.00
Long Term Stewardship Endowment	$125,000	1	$125,000.00
Financial Assurances	$11,900	1	$11,900.00
Subtotal cost			$1,426,369
Contingency Fund (10%)			**$142,637**
Delivery Cost			**$1,569,006**
Assuming 15 credits available (82.5% of credit price)	$104,600	15	$1,569,006
Admin (17.5% of credit price)	*$22,188*		
Total cost of 1 credit:	***$126,788***		

New York Ducks Unlimited ILF Budget Explanation

Land Purchase – Direct site acquisition cost, as negotiated through a purchase agreement; DU pays fair-market value or less, based on an independent appraisal.
Land Purchase Acquisition repayment to WAT for unencumbered access capital – Purchase agreement timelines that can be negotiated with sellers to secure a site rarely align with the necessary regulatory review times to enable land to be purchased directly from ILF funds. Because of this DU often has to utilize dollars external to the ILF program to acquire sites. The annual interest rate charged for access to capital is 6.5%.
Taxes – annual property taxes. DU as a policy pays taxes on purchased parcels as to maintain local municipality tax bases.
Closing cost – attorney, real-estate brokerage fees, permit costs, subdivision costs, legal survey costs.
Site Identification & Land Acquisition – staff and travel costs associated with land acquisition, appraisal costs. GIS time to develop maps for review with the IRT; site visits with the IRT. Meetings with long-term site protection partners on-site.
Mitigation Plan – expense for topographic survey, engineering design, hydro-CAD analyses, basin modeling, flow-calculations, water-control structure sizing, erosion modeling. Staff expense to develop a mitigation plan (up to 3 revisions). Permitting, archeological-sensitive areas review. All associated travel expenses. Contract administration for tree planting and construction. Wetland delineation.
Construction and Planting Staff Cost – Bid Preparation. Staff and or subcontractor construction oversight and as-built development costs, weekly to monthly SWPPP inspections.
Construction and Planting Contractor Cost – Direct construction cost, and planting contractor costs.
Monitoring – 4 to 6 annual monitoring visits to evaluate performance and adaptive management needs to meet performance goals as defined in the final mitigation plan. Time spent toward development and submittal of monitoring reports.
Adaptive Management – staff expense and contractor costs to achieve adaptive management needs; depending on the scope of management needs, may necessitate coordination with Corps of Engineers.
Long Term Protection Endowment (CE) – establishment of a long-term endowment for conservation easement enforcement. Staff expense associate with setting up long-term conservation easement.
Long Term Stewardship Endowment – to be funded upon transfer of the property to a third-party land steward. Depending on terms negotiated with the third-party land steward it may be possible to fund this endowment in installments if during the active monitoring period; must be paid in full at site closure. Staff expense associate with setting up long-term protections.
Contingency Fund – DU sets aside 10% of the total project cost when sufficient credit sales have occurred. These contingencies will only be called upon when all other funding from direct credit sales has been exhausted. DU will request permission from the US Army Corps of Engineers to utilize these funds; otherwise they remain in the service area account.
Financial Assurances – cost of a bond.

Table 3. Credit Pricing by Service Area.

Service Area	Price
Hudson-Hoosic	***$126,788***
Middle Hudson	***$126,788***

Table 4. Advanced Credits by Service Area.

Service Area	Advanced Wetland Credits	Advanced Stream Credits
Hudson-Hoosic	20	N/A
Middle Hudson	20	N/A

References

Batiuk RA, Linker LC, Cerco CF (2013) Featured collection introduction: Chesapeake Bay total maximum daily load development and application. Journal of the American Water Resources Association 49:981–985. doi: 10.1111/jawr.12114

Bedford BL, Godwin KS (2003) Fens of the United Sates: Distribution, characteristics, and scientific connection versus legal isolation. Wetlands 23:608–629. doi: 10.1672/0277-5212(2003)023[0608:FOTUSD]2.0.CO;2

Beven KJ, Kirkby MJ (1979) A physically based, variable contributing area model of basin hydrology. Hydrological Sciences Bulletin 24:43–69. doi: 10.1080/02626667909491834

Brett C, Bliss K (2019) Freshwater wetland compensatory mitigation: State and Federal.

Homer CG, Dewitz JA, Yang L, et al (2015) Completion of the 2011 National Land Cover Database for the conterminous United States-Representing a decade of land cover change information. Photogrammetric Engineering and Remote Sensing 81:345–354. doi: 10.14358/PERS.81.5.345.

Howard T, Schlesinger M (2012) PATHWAYS: Wildlife Connectivity in the Changing Climate of the Hudson Valley.

Hunter EA, Raney PA, Gibbs JP, Leopold DJ (2012) Improving wetland mitigation site identification through community distribution modeling and a patch-based ranking scheme. Wetlands. doi: 10.1007/s13157-012-0315-7

MacArthur RH, Wilson EO (1963) An equilibrium theory of insular zooegeography. Evolution 17:373–387.

Myers AT, Gibbs JP (2013) Landscape-level factors influencing bog turtle persistence and distribution in Southeastern New York State. Journal of Fish and Wildlife Management 4:255–266.

NYS-DEC (2015) New York State Wildlife Action Plan. 102.

NRCS (2011) NEW YORK Rapid Watershed Assessment Profile Hudson - Hoosic Watershed. Produced By: Syracuse State Office This Watershed is Serviced By: Ballston Spa Service Center Greenwich Field Office Troy Service Center Pittsfield Service Center, MA Rutland Service Center, VT

NRCS (2015) NEW YORK Rapid Watershed Assessment Profile Middle Hudson Watershed. Produced By: Syracuse State Office This Watershed is Serviced By: Ballston Spa Service Center Greenwich Field Office Troy Service Center Pittsfield Service Center, MA Rutland Service Center, VT

Raney PA, Leopold DJ (2018) Fantastic Wetlands and Where to Find Them: Modeling Rich Fen Distribution in New York State with Maxent. Wetlands 38:81–93. doi: 10.1007/s13157-017-0958-5

Shoemaker KT, Gibbs JP (2013) Genetic Connectivity among Populations of the Threatened Bog Turtle (Glyptemys muhlenbergii) and the Need for a Regional Approach to Turtle Conservation. Copeia 2013:324–331. doi: 10.1643/OT-12-022

Zedler JB (2003) Wetlands at your service: reducing impacts of agriculture at the watershed scale. Frontiers in Ecology and the Environment 1:65–72. doi: 10.1890/1540-9295(2003)001[0065:WAYSRI]2.0.CO;2