Susquehanna Basin Headwaters In-Lieu Fee Program

Instrument

Developed under
Part 332.8,
Federal Register Volume 73, Number 70

Sponsor:

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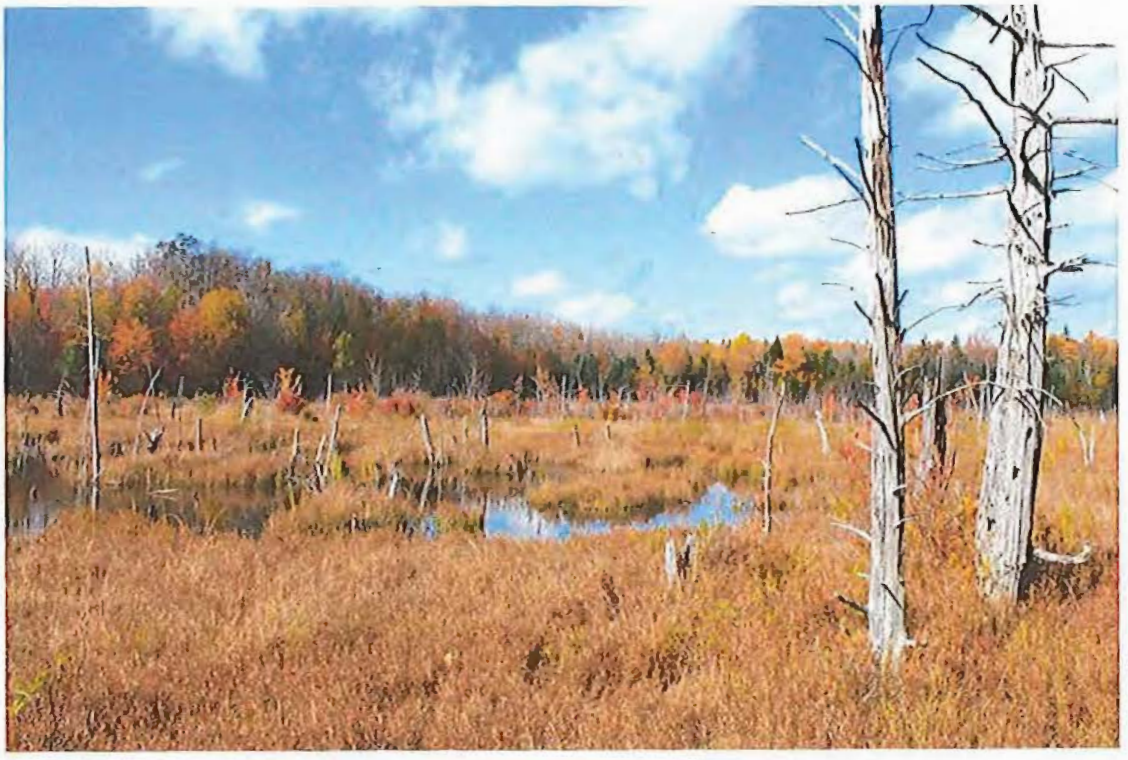

June 2013

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Introduction

On 10 April 2008 the final rules for wetland mitigation were published in Federal Register Volume 73(70): 19594-19,705 for Compensatory Mitigation for Losses of Aquatic Resources AGENCIES: U.S. Army Corps of Engineers, Department of Defense and Environmental Protection Agency.

The rules describe the requirements of an In Lieu Fee Wetland Mitigation Program. This Instrument describes an in lieu-fee program covering the headwaters of the Susquehanna River in New York. It provides-for a "revolving fund" of 100 advance wetland mitigation credits spread across 5 service areas that will be used to fund a mix of re-establishment, establishment, rehabilitation, preservation and enhancement opportunities. It also describes an innovative "assurance" component that provides the necessary confidence that mitigation acres will be successfully completed. The assurance approach will substantially increase the overall number of high quality wetlands being preserved while still meeting the "no net loss" requirements for impacted wetlands.

Objectives

The primary goal of the Susquehanna Basin Headwaters In-Lieu Fee Program (ILFP) is to provide wetland mitigation services on a watershed scale to compensate for permitted wetland losses. More specifically, the ILFP will:

1. match mitigation needs with opportunities and priorities in the watershed;
2. target specific sites or sub-watersheds that can provide long-term wetland sustainability and better watershed functionality;
3. use a science-based analysis of existing information (e.g. NY Natural Heritage Program and other databases) in conjunction with field data to ensure biological quality;
4. use known high quality wetlands as reference wetlands to help design mitigation efforts;
5. replace and increase the acreage, quality, diversity and functionality of wetland community types found in the basin, and limit the species and biodiversity lost to development and other stressors;
6. use an assessment protocol to quantify functional values and guide restoration efforts;
7. develop a Corps required mitigation plan for each site that contains all elements listed in Federal Register Volume 73, Number 7033CFR 332.4; and
8. To further the TWT's core mission, which is to restore, conserve and protect wetlands.

Section 1. Service Areas

This ILFP encompasses the entire 4 million acres or 6,270 square miles of the Susquehanna River Headwaters in NY. It is divided into five (5) separate service areas with each service area being the 8-digit Hydrological Unit (HU) depicted in the map and described in the table below. To streamline discussion about each service area we will use the last two digit HU code as a reference (i.e., 01,02,03,04,05 underlined in table). The use of 8 Digit HU's allows for wetland planning on a watershed scale that is large enough to be successful while still addressing the need for local compensation. The Wetland Trust (TWT) will provide compensatory mitigation for permitted impacts within the same service area in which the impacts occur, unless the district engineer in consultation with the IRT has agreed to an exemption. The exemption request would be for an adjacent service area.

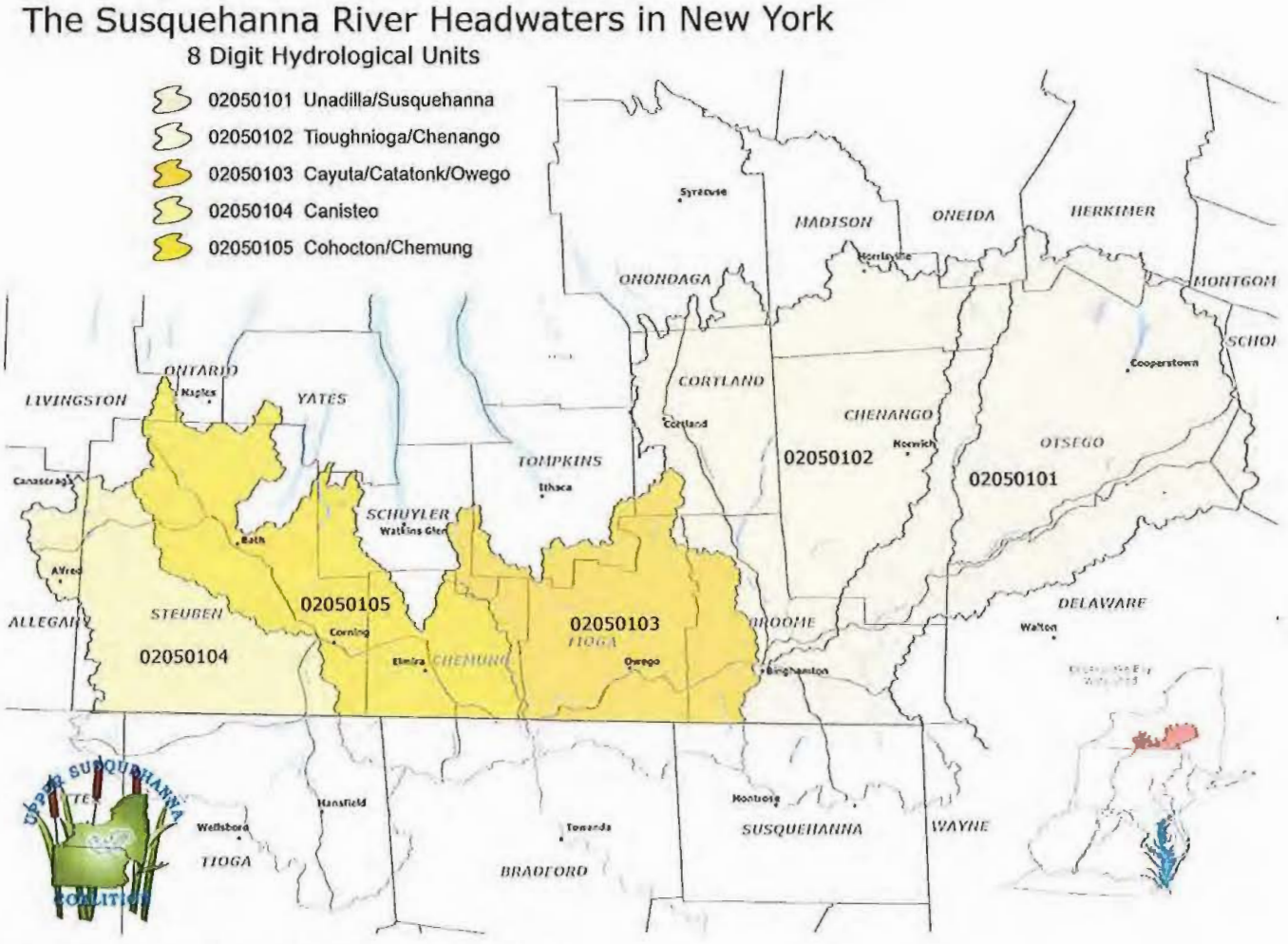


Figure 1. Susquehanna Headwaters Service Areas

Table 1. Service Area Breakdown

8 Digit HU	Service Area HU 8 Name	Size Acres	NWI Acres	% Wetlands	% Forest	% Ag
02050101	Unadilla/Susquehanna	1,289,051	90,302	7.1	69.1	27.2
02050102	Tioughnioga/Chenango	1,027,924	58,071	5.6	69.2	27.2
02050103	Cayuta/Catatonk/Owego	577,867	25,873	4.5	71.5	23.1
02050104	Canisteo	457,513	7,296	1.6	68.5	30.0
02050105	Cohocton/Chemung	659,883	32,765	5.0	67.9	27.3
Total		**4,012,238**	**214,308**	**5.3**	**69.2**	**27.0**

Section 2. Accounting Procedures

TWT will establish and maintain an accounting system for tracking credit production, credit transactions and financial transactions between TWT and permittees. Credit production, credit transactions and financial transactions will be tracked separately for each of the 5 service areas, and within each service area for each individual mitigation project that has its own mitigation plan. The Program Account and how it functions is described in Section 9 "Program Accounting Information."

Section 3. Legal Responsibility for Providing Compensatory Mitigation

TWT assumes all legal responsibility for satisfying the mitigation requirements of the Clean Water Act sections 404 and 401, Section 10 of the Rivers and Harbors Act and other state and federal authorizations as appropriate for which fees have been accepted. This responsibility includes design, implementation, performance, permanent preservation, long-term management and meeting approved performance criteria.

The transfer of liability from the Permittee to the TWT is established by:

1. the approval of this In-Lieu Fee instrument;
2. receipt and acceptance by the District Engineer of a credit sale form that is signed and dated by TWT (see Section 5, "Reporting Protocols"); and
3. the transfer of fees from the permittee to TWT.

Section 4. Program Default and Closure Provisions

Program Default: If the Corps determines that TWT has failed to provide the required compensatory mitigation in a timely manner, that is, TWT has failed to:

- meet performance -based milestones set forth in the project-specific mitigation plan;
- submit monitoring reports in a timely manner;
- establish and maintain an annual ledger report and individual ledgers for each project in accordance with the provisions in Section 2, "Accounting Procedures" and/or Section 9 "Program Accounting Information";
- submit an annual financial assurances and long-term management funding report;
- report approved credit transactions;
- complete land acquisition and initial physical and biological improvements by the third full growing season after the first advance credit in that service area is secured by a permittee; and/or
- otherwise comply with the terms of this instrument.

The district engineer must take appropriate action to achieve compliance with the terms of this instrument and all approved mitigation plans. Such actions may include suspending credit sales, decreasing available credits, requiring adaptive management measures, terminating the agreement, directing that the financial assurances or contingency funds be used to provide alternative compensation, directing the use of in-lieu fee program account funds to provide alternative mitigation (e.g., securing credits from another third party mitigation provider), or referring the non-compliance with the terms of the instrument to the Department of Justice.

Any delay or failure of TWT to comply with the terms of this agreement shall not constitute a default if it is primarily caused by any force majeure or other conditions that the district engineer determines is beyond TWT's reasonable control. Conditions may include flood, fire, landslide, lightning, earthquake, drought, disease, regional pest infestation or condemnation or other taking by a governmental body. However should such events occur during the mitigation process (e.g., before closure) the Corps may require for those site plans to be modified, unsold credits be reduced or suspended and the mitigation credits sold but not completed (still having to meet success criteria and reverting to long-term management) be replaced at TWT's expense. TWT shall give written notice to the district engineer if the performance of any of its in-lieu fee projects is affected by any such event as soon as is reasonably

practicable.

Program Closure: Either party to this agreement may terminate the agreement within 60 days of written notification to the other party. In the event that the ILF Program operated by TWT is terminated, TWT is responsible for fulfilling any remaining project obligations including the successful completion of ongoing mitigation projects, relevant maintenance, monitoring, reporting and long-term management requirements. In other words, TWT, the sponsor, will remain responsible for the fulfillment of all credits sold.

TWT shall remain responsible for fulfilling these obligations until such time as the long-term financing obligations have been met and the long-term ownership of all mitigation lands has been established (either transferred to a party responsible for ownership and all long-term management of the project(s) or owned and managed by TWT). Funds remaining in the ILF Program accounts after these obligations are satisfied must continue to be used for the re-establishment, establishment, rehabilitation, preservation and enhancement of aquatic resources in the same service area from which the credits were sold.

Should this instrument be terminated, the Corps shall direct TWT to use ILF Program funds to secure credits from another source of third-party mitigation, including but not limited to another in-lieu fee program, mitigation bank or another entity such as a governmental (i.e., NYS Department of Environmental Conservation (NYS DEC), Soil and Water Conservation Districts) or non-profit natural resource management entity willing to undertake the compensation activities. Should closure provisions be taken, 100% of funds from advance credit sales must be transferred to an appropriate entity (see Section10) and no administrative funds may be deducted. The funds should be used, to the maximum extent practicable, to provide compensation for the amount and type of aquatic resource for which the fees were collected. The Corps itself cannot accept directly, retain or draw upon those funds in the event of a default or closure.

Section 5. Financial and Credit Accounting Reporting Protocols

TWT must report to the district engineer and the IRT the following information:

- Monitoring reports, on a schedule and for a period as defined by each project-specific mitigation plan;

- credit transaction notifications;
- an annual program report summarizing activity from the program account (financial and credit accounting); and
- an annual financial assurances and long-term management funding report.

5.1 Monitoring Reports

Monitoring is required of all compensatory mitigation projects to determine if the project is meeting its performance standards and if additional measures are necessary to ensure that the compensatory mitigation project is accomplishing its objectives. If TWT fails to submit reports within 60 days of the deadlines outlined in the mitigation plan(s), the Corps may take appropriate compliance action (see Section 4 "Default and Closure Provisions").

Each project-specific mitigation plan is required to detail the monitoring report requirements including monitoring parameters, length of the monitoring period and the party responsible for conducting the monitoring. In almost all cases this will be the TWT or the Upper Susquehanna Coalition (USC), working under a Memorandum of Agreement (MOA) between TWT and USC that provides for shared services. Monitoring reports will be available to the public from Army Corp's Regulatory In-lieu fee and Bank Information Tracking System (RIBITS) found at http://geo.usace.army.mil/ribits/index.html.

5.2 Credit Transaction Notification

Section 3, "Legal Responsibility for Providing Compensatory Mitigation" establishes the terms by which the legal responsibility for compensation requirements is transferred from the permittee to TWT. These terms require TWT to submit a credit sale form to the Corps. The document must be signed and dated by TWT. The credit transaction form must include the permit number(s) for which TWT is accepting fees, and acres and resource type(s) (e.g., Cowardin or HGM class) of impacts and the number of credits being purchased. See Appendix A for a sample credit transaction form. TWT must submit the signed and dated credit transaction form within 15 days of receiving the fees from the permittee. A copy of each credit transaction form will be retained in both the Corp's and TWT's administrative and accounting records for the ILF Program. Copies of the Credit Transactions forms will also be emailed to IRT members if requested.

5.3 Annual Program Report

TWT must submit an annual report on the financial and wetland credit accounts to the district engineer and the IRT. Credit ledgers will be available to the public from the Army Corp's RIBITS found at http://geo.usace.army.mil/ribits/index.html. The annual program report must be submitted no later than 15 January for the previous year. The annual report (see Appendix B) must include information as follows:

Reporting - General:

- All income received, disbursements and interest earned by the program account for the program and by service area;
- The amount paid to the in-lieu fee program, total and by service area;
- The balance of advance credits and released credits at the end of the report period for the program and by service area;
- All additions and subtractions of credits; and
- Other changes in credit availability (e.g., additional credits released, increase or decrease in credit development at an ILF project site).
- Any site-specific data required by individual ILF project plans

Reporting - by Expenditure Category:

- A listing of in-lieu fee program expenditures/disbursements from the account (i.e., the costs of land acquisition, planning, construction, monitoring, maintenance, contingencies, adaptive management and administration) for the program and by service area.

Reporting - by Permit Number:

- A list of all permits for which in-lieu fee program funds were accepted by service area, including the Corps permit number;
- The service area in which the authorized impacts are located;
- The amount and type of authorized impacts;
- The amount of required compensatory mitigation; and
- The date the funds were received from the permittee.

5.4 Annual Financial and Alternative Assurances and Long-term Management Funding Report

TWT must submit an annual report (using the calendar year as the reporting time period) on financial assurances and long-term management to the district engineer and the IRT. TWT is required to give the Corps at least 60 days advance notice if required financial assurances will

be terminated. In addition, any financial assurance instrument must state that it is the obligation of the bonding company or financial institution to provide the Corps notice. Inclusion of a summary of any changes to the financial assurances in the reporting year does not alter this separate obligation.

The financial assurances and long-term management funding report must include:

- Beginning and ending balances of the individual project accounts providing funds for financial assurance and long-term management;
- Deposits into and any withdrawals from the individual project accounts providing funds for financial assurance and long-term management; and
- Information on the amount of required financial assurances and the status of those assurances, including the potential expiration of the financial assurances for each individual project ("potential expiration" refers to whether the financial assurances that are in place are somehow of a limited duration and could expire before the project closure occurs; "final" expiration occurs when the project is completed and approved by the district engineer).
- In the case of Alternative Assurances, an accounting of assurance credits held in each Service Area will be provided

Section 6. Compensation Planning Framework

6.1 Geographic service area

This ILF Instrument includes 5 geographic service areas each covering that portion of the 8-digit HU in New York State encompassing the headwaters of the Susquehanna River, which ultimately flows to the Chesapeake Bay. All five service areas are quite similar in land cover (two thirds forest and one third agriculture), topography (rolling hills and flashy streams) and history (largely agriculture at the beginning of the 20th century, then reverting to forest). However the two major basins (Chemung and Susquehanna) have characteristics unique to themselves. For example the three eastern service area's (01,02,03) wetland flora tend to have species (i.e., northern white cedar) and topographic features (karst) uncommon in the two western service areas (04,05). The service areas within each Chemung and Susquehanna sub basins are quite similar.

6.2 Threats

There are three major threats to habitat loss in the Basin: construction, logging and flooding. The first threat is related to new construction and development, especially linear developments such as pipeline and highway construction, and to a lesser degree development of infrastructure, shopping malls, housing and other similar projects. Past impacts may not be a good predictor of future issues: for example, in 2005 only 2.08 wetland acres required mitigation (USACE data) and if development of the Marcellus gas field becomes reality one can expect a substantial increase in wetland impacts.

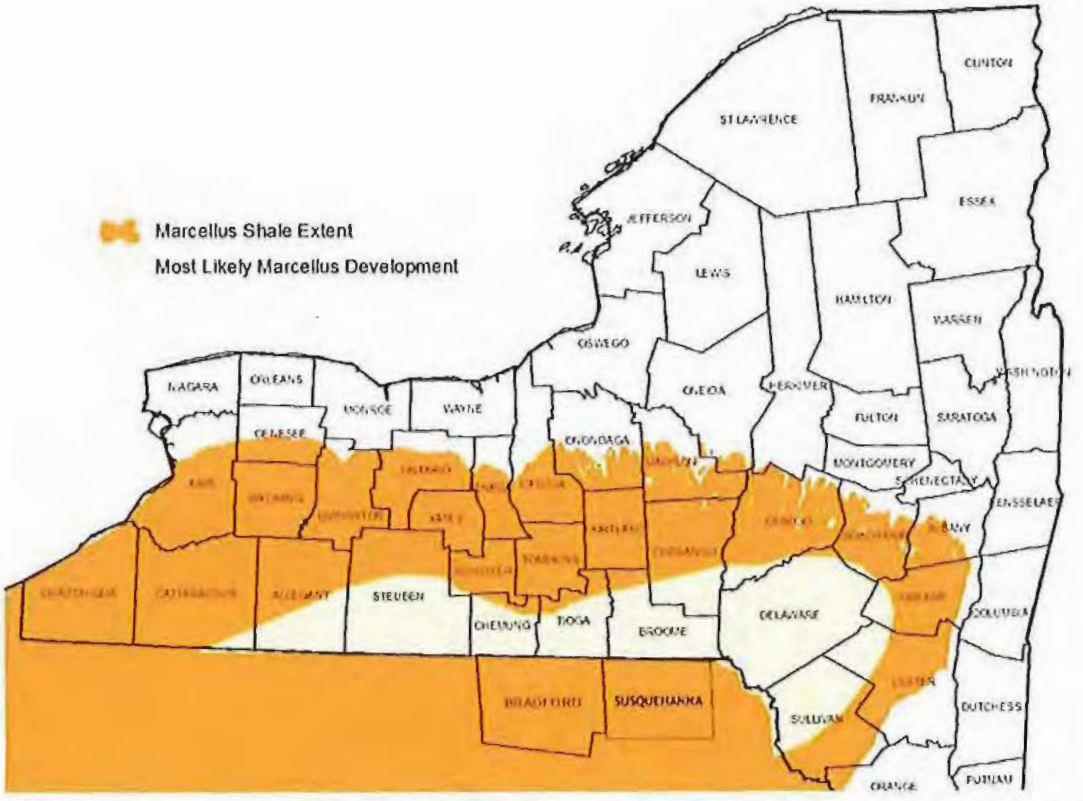


Figure 2. Area most likely developed for gas in the Marcellus shale layer (adapted from page 21, Smith, T and J. Leone. 2011. Utica and Marcellus potential in New York State. New York State Museum. 35p.) http://esogis.nysm.nysed.gov/esogisdata/downloads/talks/Smith_1130_Weds_AAPG_Shale.pdf

Recent information obtained from the PA Department of Environmental Protection provides some insight into the extent for potential development (http://www.portal.state.pa.us/portal/server.pt/community/marcellus_shale/20296). For example Bradford and Susquehanna counties in PA are about a third of the size of the "most likely" gas development in NY (light yellow area in map). and there were 1668 gas wells drilled between 2009 and mid-2012. We expect gas development to occur much slower in NY due to the regulatory climate and price of natural gas. Be that as it may,

NY holds a tremendous amount of gas resources and future development will probably occur at a slower but still extensive pace. Sufficient credits need to be available to meet gas development potential.

On 1 July 2011 the NYS DEC issued a revised Draft Supplemental Generic Environmental Impact Statement (DGEIS) on gas development. It suggested that gas drilling should be reduced or disallowed in large blocks of forest and grass habitats, on state lands and over certain aquifers. This approach will concentrate development at least in the early years near the PA border where the shale layers are thicker and there is access to the Millennium gas transmission pipeline. We estimate that 100 acres of impacts spread out over the first five years of development in NY is a reasonable assumption considering permitting probably will go slower in NY and 0.1 to 0.4 acres per permit is a reasonable assumption for the size of impact. The NYS DEC review and low natural gas prices will temporarily slow down the process, which may provide sufficient time to secure the surface rights on quality sites before the surface rights are sold or pipeline routes are approved. Most recently, in June 2012 there have been suggestions by the State that it will limit permits to deeper portions of the shale layer, which includes Steuben, Chemung, Tioga, Broome and Chenango counties. This selection will still result in impacts to all Service areas.

An important aspect of the gas development is there will be a network of pads, roads and pipeline rights of way that can impact the entire "shale fairway" in the relatively near future. This development is not related to highways or centers of human habitation, but rather well pads and pipelines will be spread throughout the landscape. We request that the IRT take this into consideration when reviewing a Mitigation Plan that has a "preservation" component. We suggest properties within the Marcellus Shale Fairway, where development is allowed should be considered meeting the "under demonstrable threat" criteria for consideration for protection. Protection of wetland complexes and corridors should be a priority long before drilling begins, as the development can be rapid and overwhelming as has been shown in PA. All mitigation sites described and mapped in each individual mitigation plan will be clear of all surface mineral leases (e.g., TWT will own all surface rights). However eminent domain cannot be precluded, so accommodations will be made under financial assurances to address that issue should it arise.

A second threat is related to the historical land uses in the Basin, namely agriculture and logging. These ongoing activities, many times working within the present wetland regulatory framework, have modified wetlands over the years through land clearing, wetland draining and surface modifications to flow. Agricultural practices, especially tile draining of wet soils (see 6.4 Historic resource loss below) represent both a historic and existing threat to wetlands. Dairy is the most common farm type in the five service areas and there is continual pressure on the landscape for developing corn/hay fields on well-drained soils, even when the soil is not.

Logging occurs extensively throughout all five service areas with little oversight or regulation; most loggers are very small operations and very hard to track. Many properties are logged intensively just before being sold. Logging and the associated roads, reduced canopy, soil exposure and compaction increases runoff and erosion. Logging can easily disrupt the forest hydrology and combined with the past extensive forest removal and agricultural plowing has greatly impacted (e.g, flattened) the forest microtopography. Forested wetlands can be logged even if they are regulated by NYS DEC. Use of smaller logs, especially white cedar for posts and rustic furniture in the eastern basins is a niche industry that directly impacts the white cedar swamps and the high numbers of rare species found in that habitat. Indeed, if one reviews tax map parcels of large forested wetland communities surrounded by agriculture in the eastern Service Areas they are often broken up into small, narrow tracts due to the historic need by farmers for fence posts.

A third factor impacting wetlands is the Basin's relatively steep topography that accentuates runoff into powerful, flashy events. The small watersheds concentrate infrastructure and development into the relatively narrow and flatter stream corridors, which result in flooding that erodes streambanks and road ditches. Post-flooding maintenance operations are usually poorly planned and although they tend to impact streams, can also impact nearby wetlands. In addition, beavers are generally common, at least since the 1980's and although great wetland builders, they often come in conflict with human habitation by plugging road culverts, not only causing their own demise, but the loss of the wetlands they built. Wetlands are also typically smaller due to the generally steep topography of the region, which makes them more easily drained.

Climate change will become an important factor accentuating flooding. Weather events at the extremes (large volume rainfall events and longer drought periods) are becoming more common.

Analyses by the National Oceanic and Atmospheric Association, and other top weather institutions have documented increased frequency of severe weather events (e.g., flooding, drought and high temperatures) such that risk designations regarding the classic 100 year storm may no longer be relevant as storms of such magnitude may become far more frequent with ongoing climate change (e.g., Easterling et al. 2000)

6.3 How ILFP will offset wetland loss

The ILF Program will use mitigation funds to re-establish, establish, rehabilitate, preserve and enhance wetlands based on the watershed analyses and strategies described within this instrument. Within each service area properties will be located that provide appropriate opportunities for these activities in priority locations. To the degree possible, sites with the potential for high quality re-establishment, establishment, rehabilitation, preservation and/or enhancement will be purchased in each service area before they are needed so that the site will be secured and design/construction can be initiated quickly. Other sites will be put on a confidential waiting list with a landowner agreement that the site is available if certain conditions are met at the time of purchase.

Sites with a potential for connecting to larger wetlands or other natural resource areas and sites that have adequate hydrological resources and that can be protected in the long term are priorities. Headwater areas are another priority as they have great potential not only for wetlands, but also for small intermittent streams that are important source water areas for the entire watershed. Riparian wetlands will also be a priority as they provide for wildlife corridors and also buffer the stream system. Although the Basin has a high percent of forest, most is second growth on lands that were greatly impacted in the past. Efforts will be made to re-establish forested wetlands by re-establishing the pit and mound microtopography that was eliminated when the forest was removed and soils farmed. This will best be accomplished at the "edge" of an intact-forested wetland, expanding the existing site. Enhancement of an existing forested wetland is also a possibility, but it must be done with great care to ensure functions and values are not lost. Microtopography provides fine scale habitat diversity within wetland environments, which contributes to biological diversity (e.g., Huenneke and Sharitz, 1986); re-establishing or establishing ephemeral wetlands within forest communities will help provide this added diversity.

Agricultural lands are a priority for re-establishment sites because historically they held wetland acres that were subsequently drained. Farmland has been naturally reverting to wetlands because agricultural operations have slowed; adding mitigation acres alongside these wetlands maximizes the total footprint of a project (i.e., purchase a parcel with existing wetlands and then re-establish or establish wetlands adjacent to those existing wetlands).

6.4 Historic resource loss

NYS DEC has estimated that half of New York State's historic wetlands have been lost (Huffman and Associates 2000). In the Susquehanna Basin this loss largely appears to be a result of clear-cutting forests and conversion to agriculture. NY is the home of the drain tile first used in 1835 and in common use by 1850, with over 75,000 miles of clay tile laid by 1900 (Biebighauser 2007). Drain tiles efficiently eliminated wetland areas and their hydric soils and these tiles often function after the site has reverted to forest (Biebighauser 2007).

More recently (1980s and 1990s) total wetland acres increased by an estimated 3,000 acres but these were "open water" wetlands (NYS DEC Bureau of Habitat), while during that same period palustrine scrub shrub (PSS) swamps declined by about 5,000 acres and palustrine emergent marsh (PEM) declined by 16,000 acres (NYDEC 2005). The two photographs below from the Seeley Creek watershed depict the land use changes that are ubiquitous throughout the Basin.

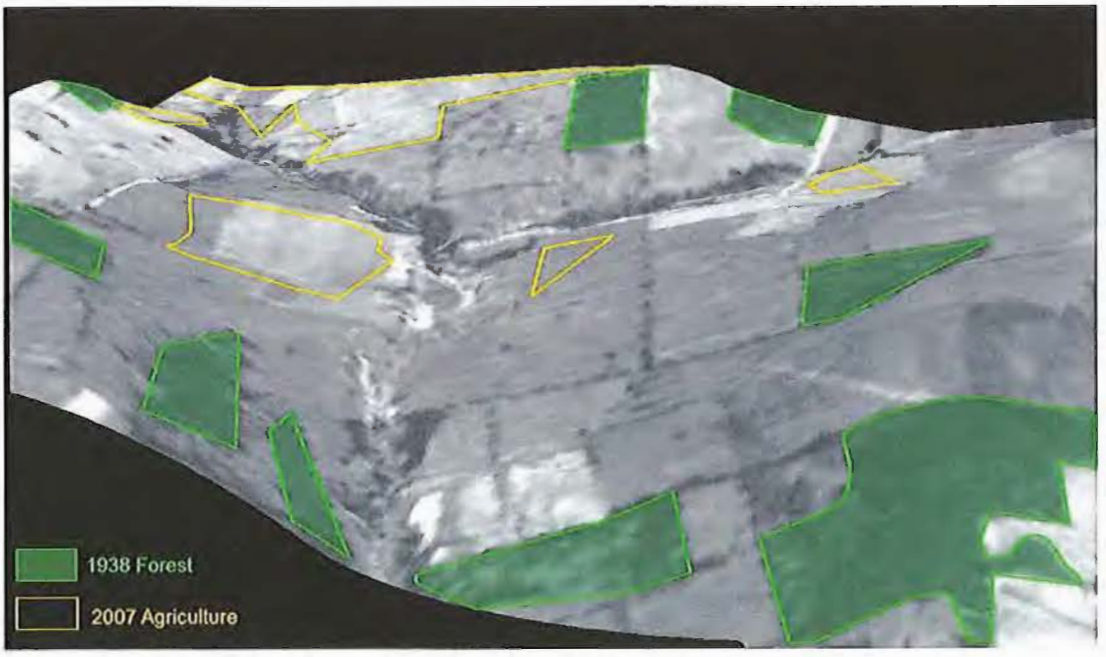


Figure 3. 1938 aerial photo comparison of agriculture and forest cover

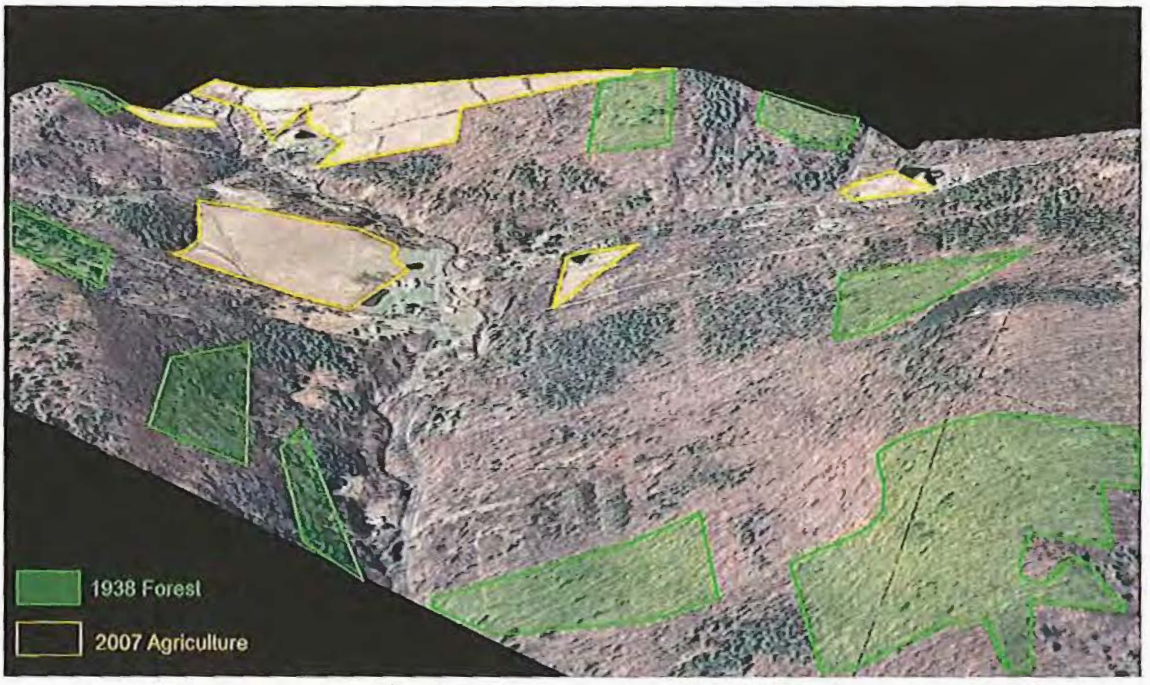


Figure 4. 2007 aerial photo comparison of agriculture and forest cover

6.5 Current aquatic resources

About 5 percent of the approximately 4 million acres in the NY Basin landscape are wetlands, with the remaining about 69 percent forest, 25 percent agriculture and 3 percent urban/suburban/developed (Table 2). The 5 percent wetland and open water depicted in the table overlap somewhat with the other land uses. In the past forests were cleared for agriculture, resulting in lower quality second growth forest, but also lower quality wetlands that re-established themselves. With less microtopography variation and many species extirpated or reduced only those more aggressive in reoccupying sites have become common. We believe that "older growth forests", that is those forested areas found in 1930 aerial photos, will more likely harbor rarer species as they provided a refuge from agricultural conversion. An example is in Schuyler County, where the only Jefferson Salamander observation reported to NYS Heritage came from an oak forest woodlot depicted on a 1938 photo, with multiple vernal pools and pit and mound topography that indicated it was never plowed.

Table 2. Existing Wetland Acreage by Service Area.

HU	Name	NWI Acres	Total Wetlands %	Percent of total wetland acres					
				PEM %	PFO %	PSS %	River %	Pond %	Lake %
101	Unadilla/Susquehanna	90,302	7.5	20	27	16	20	6	10
102	Tioughnioga/Chenango	58,071	5.6	14	30	17	24	5	9
103	Cayuta/Catatonk/Owego	25,873	4.5	9	15	11	54	9	2
104	Canisteo	7,296	1.6	15	22	7	26	15	4
105	Cohocton/Chemung	32,765	5.0	11	17	12	47	6	7
Entire NY Susquehanna Basin		214,308	5.3	16	25	15	30	7	8

6.6 Aquatic goals, including general amounts, types and locations

The overall goal of this NY Susquehanna Basin ILFP is to increase the acreage, quality, diversity and functionality of wetland community types and the numbers and biodiversity of species otherwise lost to development. The ILFP goals described below cover all five service areas due to their similarity in past land use, topography and potential impacts.

General Amounts

- To address historical losses and the potential for increased wetland impact from Marcellus Shale development, which could be up to 10 acres per year in service areas 01,02, and 03 and possibly 5 acres per year in 04 and 05 for the first decade of development.
- To distribute sites within each 8-digit HU Service Area to increase diversity, local connectivity, maximize restoration and target high quality sites for protection and as a base for expanding into larger wetland complexes
- To ensure long-term site sustainability and wetland functionality through a combination of wetland and uplands. Sites of 10 to 100 acres or more, adjacent to already protected lands, especially wetlands, would provide additional survival assurance.

General Types

- To re-establish/establish/rehabilitate/enhance microtopography (pit and mound-type landscape) lost to historic land clearing activities, such as pothole construction within forested areas to add hydrology and topography, but not within existing forested wetlands and not to conflict with other existing important habitats.

- To eliminate effects of drain tiles and redevelop hydric soils.
- To enhance/rehabilitate diversity in existing wetlands that have been degraded due to encroachment by invasive plants, such as reed canary grass (*Phalaris arundinacea*), and keep invasive species from overwhelming the re-established diversity in the long-term.
- To select land parcels including high quality uplands to maximize wetland functionality.
- To select parcels with historically intact forests (based on the 1930's aerial photos) for re-establishment/establishment of adjacent wetlands and to increase habitat connectivity for rare species still populating these refugia.
- To target functions lost from the impacted wetland, but also add other functions/services in that wetland type to replace historical losses and to address watershed/service area priorities.
- To re-establish/establish wetlands that support habitats or species that may have been historically reduced or decreasing, such as emergent wetlands for breeding marsh birds (i.e., American bittern, pied-billed grebe); ephemeral headwaters wetlands for amphibians (i.e. mole salamanders, wood frogs); wetlands along ridge tops for migratory bats and scrub shrub wetlands for songbirds and American woodcock.
- To use the NYS Heritage community types and attributes as guides for mitigation projects.
- To incorporate wetland projects in river floodplains.
- To add a climate change design component to potentially "buffer" weather extremes.

General Locations

- To locate parcels in, adjacent to or near rare or high quality communities (i.e., cedar swamps, hemlock/hardwood peat swamps, fens and bogs), especially those not adequately preserved.
- To select locations in those areas where long-term sustainability of high quality wetland sites (already existing and those to be re-established, established, rehabilitated, preserved and/or enhanced under this Program) are most likely.
- To select locations that add to the development of a sustainable ecology across the watershed consisting of large natural resource/wetland hubs connected by wetland and riparian habitat corridors.

6.7 Prioritization Strategy - Screening to locate general areas and sites

This ILFP's prioritization strategy will use five screening tools to locate and nominate sites for inclusion in the Program. First, within each service area certain sub-watersheds, wetland corridors and larger regions of interest will be located based on information gleaned from:

- A computer "quality assessment" using MaxExtent of important landscape factors ranking all known wetlands and potential restoration sites (Appendix C)
- A search for landscapes with "suitable soils" for wetlands
- A review of other comprehensive analyses
- A review of expert opinions
- A review of a potential site's quality using a draft wetland assessment tool, SUSRAM (Appendix D)

To some degree there is overlap of these screens, which is a benefit as the more times a location comes up on the "screen" the more likely it is a high priority opportunity. It also imperative that multiple areas be targeted as an important objective of this ILF Program is to be able to secure a site in a high priority location when it becomes available. This timing can be measured many times in days and at most months. We will target Category 3 sites as priority work areas for preservation and category 0 or 1 for re-establishment/establishment.

Table 3. Site Review Categories

	Category 1	Category 2	Category 3	Automatic Category 3
MaxExtent score (Appendix C)	<29	29-65	>65	>76
SusRAM score (Appendix D)	<35	35-65	>65	*Na*
SusRAM answers (Appendix D)				"yes" to Questions 2,3,4,6,7,8a,9d
Mitigation type: All sites begin as category 0*for re-establishment or establishment or start as a Category 1 for rehabilitation or enhancement, and must be a Category 2 to qualify for Preservation				

6.8 A computer "quality assessment" using MaxExtent of important landscape factors ranking all known wetlands and potential restoration sites

The State University of New York College of Environmental Sciences and Forestry (SUNY ESF) analyzed the five service areas to locate sites that show promise for the re-establishment,

establishment, rehabilitation, preservation and enhancement of wetlands that have a high potential for promoting functionality and biodiversity. SUNY ESF examined the landscape setting of existing wetlands and rare wetland communities to predict the best locations to create wetlands where suitable environments exist, but are not presently wetlands (Amon et al. 2005, Bedford and Godwin 2003, Godwin et al. 2002). SUNY-ESF used a maximum entropy modeling program "MaxEnt" to predict where wetlands should have been had they not been impacted by human use (Philips et al. 2006).

Analysis was based on National Wetland Inventory categories (i.e., class, subclass, hydroperiod) and the presence of rare obligate wetland species (NYNHP 2011, unpublished data, SUNY-ESF). These locations were categorized by elevation, slope, aspect, geology, and soil type to predict: unmapped wetlands locations, locations harboring rare wetland types, and locations of former wetlands (e.g., potential restoration sites). Appendix C provides an in-depth explanation of this analysis.

6.9 A search for landscapes with "suitable soils" for wetlands

We quantified soil types lying under NWI wetlands and then identified the remainder of those same soil types that had no wetlands. We hypothesize that under the right conditions, with either hydrologic or mechanical manipulation, these soils may provide suitable wetland restoration opportunities and combined with classic wetland soils (i.e., hydric) without wetlands, provide a screen for potential mitigation sites. Each potential site can be ranked by size of the suitable soil type footprint, location in the watershed (stream order and proximity to existing wetlands) and position in relation to agriculture (is it on active farmland?). An analysis of Otsego County located many sites including 60 agricultural acres shown below which have great potential for wetland re-habilitation as well as stream buffering.

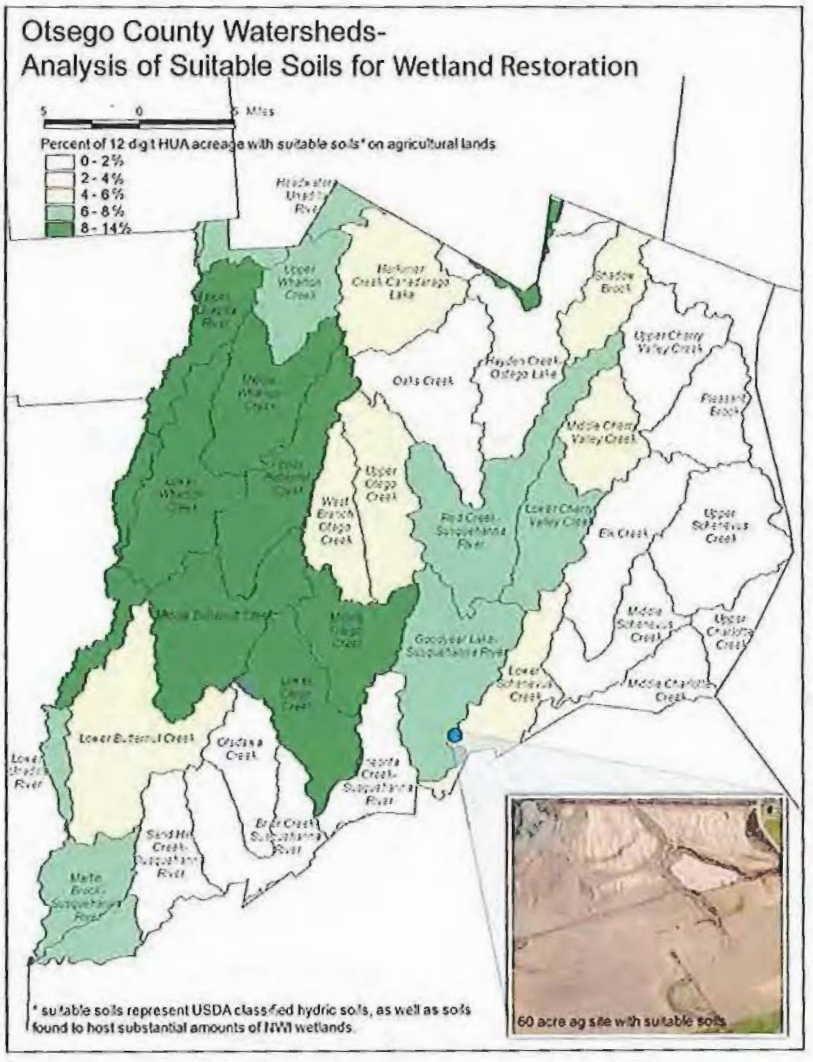


Figure 5 – Sample watershed-based analysis for Otsego County

6.10 A review of other comprehensive analyses

A review of analyses and reports was conducted to inform and guide the development of the ILFP. Examples are shown in the Table 4. The reports included:

- Conservation Focus Areas of the Upper Susquehanna Watershed. 2012. Finger Lakes Land Trust. 43p. (http://www.fllt.org/linkfiles/uppersusqreport.pdf)
- Burger, M.F. and J.M. Liner. 2005. Important Bird areas of New York, Habitats Worth Protecting. 2005. BookMasters Press. Second Edition. 352p.
- NYSDEC. 2005. Comprehensive Wildlife Conservation Strategy for New York-Susquehanna Basin pages 467-501. (http://www.dec.ny.gov/docs/wildlife_pdf/susquehannatxt.pdf)

- NYSDEC. 2009. New York Open Space Conservation Plan. New York Department of Environmental Conservation. Albany. 240p (http://www.dec.ny.gov/lands/47990.html)
- USFWS 2012. New York and Long Island Field Offices Strategic Plan FY 2012. New York. 625p. (http://www.fws.gov/northeast/nyfo/Full%20report%202012%20Web.pdf)

Table 4. Examples of Targeted Natural Areas by Watershed.

8 Digit HU	Name	Targeted Natural Areas	References
101	Unadilla/Susquehanna		
102	Tioughnioga/Chenango	Pharsalia Woods Long Pond Nine mile swamp Morrisville Swamp Sangerfield Swamp	NYSDEC 2005 Burger and Liner 2005
103	Cayuta/Catatonk/Owego	Connecticut Hill Emerald Necklace Michigan Hollow Swamp/Spencer Lake/Spencer Marsh complex	NYSDEC 2009 FLLT 2012 Burger and Liner 2005 Tompkins County files
104	Canisteo	Canisteo Headwaters	NYSDEC 2009
105	Cohocton/Chemung	Cohocton Headwaters	Edinger et al. 2002

6.11 A review of expert opinions

Development and implementation of the ILFP includes input from local, state, regional, and federal scientific experts and input from natural resources groups such as the Upper Susquehanna Conservation Alliance.

6.12 Site specific ranking and quality assessment of potential sites

Once geographical regions are identified as priorities within each Service Area we will evaluate parcels for potential mitigation sites to purchase. A "parcel" is defined as the tax parcel being purchased and a "site" that portion of the parcel that is the mitigation area. Sites on parcels for sale and those of significant interest for future acquisition will be ranked. We may discuss with a landowner the potential for purchase for certain high-ranking sites.

Potential sites will be evaluated using SusRAM (Appendix D) to provide a general sense of "quality" and to ensure each site is reviewed comprehensively for the same parameters. It should also provide an estimate of the amount of "functional lift" a wetland mitigation project might provide after implementation efforts. It will also compliment the MaxExtent computer analysis (Section 6.7) to determine the quality of parcels nominated for preservation, especially for "assurance acres". SusRAM will not be used to measure success of a mitigation plan or whether a specific site is to be included in the ILF Program. The IRT will make specific site-by-site determinations for inclusion into the ILFP based on all information provided and use the specific success criteria approved by the IRT in that site's mitigation plan to determine if a mitigation project has been successful.

6.13 Criteria for selecting specific mitigation sites

Each of the following factors will be considered during the site selection process; they are displayed not in priority order, but in an attempt to group similar traits together. Some factors may overlap with the previous screening exercises such as presence of endangered species, thus providing additional support for that priority level. However other criteria will help to determine the sites defensibility, long-term viability and higher value over other sites.

1. Suitable soils (i.e., hydric soils, soils conducive to wetlands, site suitable for inducing hydric soils).
2. Hydrology and water quality on site and in the water source is adequate for long-term sustainability.
3. High quality upland component[1] on the parcel or in close enough proximity to maximize wetland functionality.
4. Conducive to microtopography reestablishment (pit and mound type landscape), especially in forested wetlands.
5. Site can add to local wetland habitat connectivity.
6. Site is within or adjacent to a large wetland or potential wetland areas or corridors.
7. Parcels are sufficiently large (could be 10 + acres, but more likely in the 100-acre range) to buffer outside influences.
8. Parcel adjacent to or near preserved lands.
9. Sites adjacent to, near or within rare communities (i.e., fens and bogs [2]) or NYS DEC Class I Wetlands[3], especially those not adequately preserved.[4]

10. Parcels with historically intact forests that potentially or are known to support rare species; endangered species will be addressed separately and thoroughly following state and federal guidelines.
11. Wetlands that support habitats or species that may be historically reduced or decreasing.
12. The site has the possibility of addressing climate change (i.e., can buffer or survive weather changes).
13. Presence of invasive species at the site or in close proximity.
14. Parcel cost within the credit cost structure established for the Service Area.

[1]a high quality upland is one with attributes that would provide habitat for the non-wetland life history stages, such as mature forest, pit and mound topography, shrubs for nesting, deep topsoil layer, diverse plant community

[2]the classic kettlehole bog is the only wetland type specifically named as a DEC Class 1 wetland and because of its rarity any bog that is found not fully protected will be a priority:

"Classic kettlehole bogs are wetlands which are at least 75 meters (approximately 246 feet) in diameter within a closed drainage basin, having a minimal or no surface inlet or outlet. These bogs have complete or virtually complete concentric zones of differing vegetative cover types. The innermost zone of the bog is open water that is of pH 5.00 or lower and is typically anoxic and dark brown. Surrounding this is a floating mat of sphagnum mosses, liverwort, and shrubby heath plants; this mat is surrounded in turn by coniferous swamp above deep deposits primarily of partly decayed sphagnum mosses.

Wetlands of this type are very rare, as are many of the life form within them, and therefore they contribute to the ecological, geological, and aesthetic diversity of the state. This in turn provides educational and scientific research benefits."

[3]Other DEC Class I Wetlands include those that:
a. is resident habitat of an endangered or threatened animal species;
b. contains an endangered or threatened plant species; or
c. supports an animal species in abundance or diversity unusual for the state or for the major region of the state in which it is found.

[4]*Wetlands that are regulated may not be adequately protected from degradation because selective logging, agricultural ditching, vehicular traffic and other activities are still allowed without restriction.*

6.14 How Mitigation Site are selected and developed

Most potential sites will be initially located through computer analyses, with others nominated by partner organizations. The parcels of interest are overlaid with a tax map parcel to determine ownership boundaries and finally a contact with the owner is made to determine willingness to sell. All major real estate Internet sites are tracked to locate parcels on the TWT list that may come up for sale.

For sites expected to move through the mitigation process the sponsor will obtain an option to buy after it has been sufficiently vetted. Vetting includes sites visits to determine mitigation potential, invasive species problems, potential for environmental hazards, hydrological issues and other related matters.

Each site is developed following its site specific, IRT approved mitigation plan. The plan includes an adaptive management approach to ensure weather conditions, equipment problems, soil anomalies and other such issues are addressed during the construction process.

6.15 Preservation Strategy, ensuring preservation addresses impacted wetlands

Preservation objective: The objective of the preservation strategy is to select sites to ensure preservation of the highest and best functions, values and wetland acres.

Preservation criteria: The criteria in Section 6.12 will also be used for the preservation strategy. Additional information on rare or high quality communities (e.g., cedar swamps, hemlock/hardwood peat swamps, fens and bogs), endangered species and species of special concern (Section 6.9) will be included. Preservation parcels with re-establishment potential "on-site" will also be an important consideration.

Preservation strategy: The TWT, with the help of SUNY ESF's computer analysis described in section 6.7, has compiled an extensive list of unique fens and bogs as well as other high quality wetland communities that have unique functions, rare species or other quantifiable qualities. The analysis would review the continuum of community types, some of which are described by Edinger et al. 2002, targeting the top 15% in the patch rankings (Figure 2). Rare wetland types such as bogs or fens will be priorities to ensure the highest quality sites are selected and to potentially address climate change. Ongoing research at SUNY-ESF is demonstrating that groundwater-supported wetland ecosystems (e.g., fens) not only support many boreal species at their southern range margins in New York State, but these areas are also buffered from changes in regional climate due to their steady flow of cold groundwater during the growing season.

TWT will periodically update the list of potential sites, including nominations from local experts. The same list and strategy will also be used for selecting "assurance acres" to meet financial obligations. Using "assurance wetlands" as the major preseveration component may be the most productive venue because it would provide for substantial acreages of preserved wetlands while still addressing the "no net loss" of wetlands that the mitigation acres must directly address.

Addressing temporal aspects of impacts: Preservation is based on the need to document a stressor that may impinge on the functions, values and acreage of a particular wetland. We suggest that there are two types of stressors that should be addressed, those that are "immediate" and most commonly observed (i.e., new housing developments, airport expansions or gas field development); and those that are "gradual cumulative impacts" that especially stress high quality, diverse wetlands.

Gradual, cumulative impacts resulting from continual long-term activities that accumulate and degrade wetlands are important wetland stressors. For example where the preservation of a high quality wetland by the owner is not a priority or even a consideration the land can be easily impacted by many seemingly uneventful activities such as farming or recreation (e.g., ATV traffic). The concept of preservation to eliminate likely stressors is in harmony with the Corp's requirements that there be secondary easements on mitigation lands that are already fully protected to ensure preservation "in perpetuity". We will use that same conservative approach and review all very high quality biodiverse rare habitats that are not under some type of conservation control and make the case to the IRT that those parcels may be in jeopardy of impacts and available for inclusion into the preservation component of the Program.

Indeed Brooks et al. (2005) makes a strong case to have a program that includes protecting against the loss of wetland functions. He argues that not preserving existing high quality wetlands leads over time to a homogeneity of wetlands in a region as subtle stressors will slowly degrade high quality wetlands unless they are under a preservation envelope.

Preserved versus Regulated wetlands: Preserved wetlands are those owned by organizations or agencies whose mission is long-term resource protection. Regulated wetlands, in NY's case wetlands greater than 12.4 acres (http://www.dec.ny.gov/permits/6279.htm), provide protection from impacts that require a permit, but are still vulnerable to gradual impacts from exempt activities, including:

1. "Normal agricultural practices, except filling, clear cutting of trees or construction of non-agricultural structures." This would include drainage ditches and tile lines that attempt to dry out an agricultural field but also can reduce an adjacent wetland's hydrology. Farmers can also stress or eliminate certain wetland wildlife species by clearing natural upland

areas necessary to complete their annual life cycle (i.e., overwintering, egg laying, feeding). Trees can legally be cut within a wetland to reduce shading on the adjacent crop field or as a source of fence posts.

2. "The harvesting of natural products and recreational activities (fishing, hunting, trapping, hiking, swimming, picnicking, or firewood collection)" . Private landowners can greatly impact wetlands through tree cutting, log removal and combined with heavy ATV use trails and roads can divert water flows as well as directly impact both vegetation and wildlife.
3. "Continuance of lawfully existing land uses"; and
4. "Selective cutting of trees and harvesting of fuel wood (not clear cutting)." Loggers can still substantially harvest trees from regulated wetlands. In service Areas 01 and 02 cutting of northern white cedar for furniture and posts is a niche industry that appears to be a substantive threat to white cedar swamps.

Purchase strategy: Because priority parcels only rarely come up for sale, there will be a constant vigil to find and acquire parcels when an opportunity arises. This will include a swift and confidential request to the IRT for approval of a preservation site to be included into the ILFP. We may submit for a preliminary review before a parcel becomes available or at least early in the negotiation phase. In order to add further functional value to the preservation strategy, the key preservation purchases will act as an "anchor property" to be expanded with additional wetland types (through re-establishment or establishment) and uplands to ensure there is biological diversity not only in species but also in functionality (i.e., nesting or overwintering habitat available).

6.16 Public and private involvement, coordination with federal, state and local aquatic agencies

The USC supports TWT's efforts to ensure public and private involvement through its USC Wetland Team that provides outreach to farmers, small watershed groups, community groups, private citizens, academics and government agencies. There is also a shared services memorandum of agreement (MOA) between TWT and USC that further solidifies this relationship. The MOA provides for sharing staff and equipment of projects of mutual interest. This MOA will facilitate the USC's work for the TWT within this instrument.

The TWT and USC have already developed a working relationship with federal, state and local agencies that deal with wetland issues and will continue to do so, incorporating the ILFP into this mix. The TWT Board provides a direct link with academia because board membership includes Dr. Donald Leopold and Dr. James Gibbs, SUNY ESF and Dr. Keith Porter, Cornell. The USC Watershed Coordinator and TWT Chair also work with Binghamton University (wetland and water quality), Ithaca College (salamander radio tracking), SUNY Oneonta, and Alfred University (stream rehabilitation and soon to be wetland restoration). The TWT Chair and several Board members actively participate in the Upper Susquehanna Conservation Alliance (USCA) led by the U.S. Fish and Wildlife Service; it includes a variety of agencies and NGOs who may offer valuable information on sites and mitigation techniques. TWT will support academic research through grants outside of the ILFP to develop further information and academic involvement in the mitigation process.

The TWT already works closely with local land trusts such as The Finger Lakes Land Trust (TWT Chair is on the FLLT Land Committee), the Otsego Land Trust and the Chemung Valley Conservancy (TWT Chair is on the CVC Board). Private landowners and energy companies may also be a source for potential mitigation sites.

At this time, although NY State is a member of the IRT it may not become a signatory of this Instrument. Current NYS freshwater wetland regulations limit the use of ILF for Article 24 wetlands. Thus it remains for future modifications of this Instrument to address potential mitigation of wetlands regulated by NY State under Article 24 because at present that option is not available.

6.17 Long term protection and management strategies by sponsor

The TWT's long-term protection and management strategy is to own the sites as fee simple property. Every property in the program will be supported by an endowment investment that will provide long-term funding for future management actions. The TWT, being a 501C(3) nonprofit will own the properties, tax exempt under section 420-a of the NY Real Property Tax Law. Additional information under Section 4, Default and Closure Provisions describes the process of transferring the parcels to other land stewards such as NYS DEC should that issue arise.

6.18 Periodic evaluation

An annual review and report will ensure that goals and priorities are still valid. The review would include the following topics:

1. A copy of the reports required and submitted as part of the ILFP accounting as described in Section 5, Reporting Protocols.
2. A review of research conducted by TWT, SUNY ESF, BU and other academic partners with regard to wetland communities, wetland diversity, rare species, wetland siting and other related topics. This review will be used to develop an updated/enhanced/expanded ILF Compensation Planning Framework for review and approval by the IRT.
3. A review of the potential mitigation needs for each Service Area as gas development in NY is better defined.

Section 7. Advance Credits

Mitigation credits will be identified as Advance Credits or Released Credits. Advance Credits are made available before the ILF mitigation plans have been written or implemented and are allocated by service area (Table 5). Released Credits are generated from mitigation projects when performance measures and milestones have been achieved. As credits are released, they will first be used to fulfill any Advance Credits that have already been sold within the service area before any released credits can be directly sold to permittees. Once previously sold Advance Credits have been fulfilled, an equal number of Advance Credits may be re-allocated to the sponsor for sale consistent with the Instrument. The number of Advance Credits available to the Sponsor at any given time to sell to permittees in a given service area is equal to the number of Advance Credits specified in the Instrument in Table 5, minus any that have already been sold but not yet fulfilled through released credits from mitigation sites.

A Mitigation Plan for each ILF site will be submitted for IRT review and approval and public comment. This plan will have the major elements required by 33CFR 332.4 that will specifically describe the nominated site. These elements are:

1. Objectives
2. Site selection

3. Site protection instrument
4. Baseline information, including a review for potential endangered species on the site
5. Determination of credits
6. Credit release schedule
7. Mitigation work plan
8. Maintenance plan
9. Performance standards
10. Monitoring requirements
11. Long-term management plan, including financial arrangements
12. Adaptive management plan, including addressing invasive species control
13. Financial assurances

The number of advance credits was determined based on several assumptions:

- Marcellus shale development would be greatest in the eastern three service areas and greatest in Service area 01.
- Enough credits need to be available to accommodate projects other than gas development.
- Each mitigation site is closely planned, monitored and approved by the IRT; having a liberal amount of advance credits does not provide any less assurances for success as they will be developed over time and the IRT always has the ability to reduce the credit number.

Table 5. Advance Credits available by Service Area.

Service Area Name (Area Hydrological Unit)	Number of ILF sites	Number of credits being developed for release and not part of Advance Credit sale	Advanced Wetland Credits	Credits sold and in the process of being released	Advance Credits available for sale
Unadilla/Susquehanna (02050101)			***28***		
Tioughnioga/Chenango (02050102)			***24***		
Cayuta/Catatonk/Owego (02050103)			***24***		
Canisteo (02050104)			***10***		
Cohocton/Chemung (02050105)			***14***		

TWT shall complete land acquisition and initial physical and biological improvements by the third full

growing season after the sale of Advance Credits. If TWT fails to meet these deadlines, the district engineer must either make a determination that more time is needed to plan and implement an ILF project or, if doing so would not be in the public interest, direct TWT to disburse funds from the ILF Program "program account" to provide alternative compensatory mitigation to fulfill those compensation obligations.

The number of Advance Credits was determined based on the potential need for credits, being highest in the eastern service areas due a slighter greater population, the thicker Marcellus shale layers and the pending 30-inch Constitution Pipeline being planned for 2014 in the Unadilla/Susquehanna Service area. The USC is the major TWT partner who will implement some sites, working on about 5 sites in any one year. A total of 25 acres of wetlands per year is well within the capacity of the partners. Indeed the USC in the past two years has initiated or implemented four mitigation project sites while restoring/establishing basic non-mitigation wetlands on over 250 acres of wetlands and wetland complexes in the basin.

Section 8. Fee Calculations

Fee calculations are based on a cost estimate that assumed the purchase of 80 acres that holds 8 credits worth of potential mitigation of any kind (re-establishment, establishment, rehabilitation, preservation and enhancement). This schedule is valid for all Service Areas.

Table 6. Details for developing the cost of one mitigation credit

Credit Component	Sub-component description	Charge per Credit All Service Areas
Land acquisition*	property (mitigation site and assurance acres purchase) boundary survey closing costs/legal fees land acquisition/search	
Project planning and design*	watershed planning wetland mitigation plan permits (SWPPP) SHPO	
Construction*	site layout construction equipment and labor erosion control planting	
Plants and other materials*	plants seeds erosion control supplies signs water well/data logger (2)	
Monitoring, based on 10 years and resulting the remediation or adaptive management activities*	annual monitoring surveys report writing re-grading replanting erosion control	
Long-term management and preservation	stewardship endowment deposit payment to second land steward	
Contingency costs*	funds for unexpected occurrences	
Program administration for duration of the credit (10 years)	tracking credits paying bills payroll audit/ accounting office/supplies	
Financial assurances for TWT *	funding used to meet default during implementation and to rectify loss in case of condemnation	
USC Commitment *	to (re-) establish wetlands as part of assurance commitment	
TOTAL		$ 91,580

* *See Section 9 for additional information*

Section 9. Credit Assurances Methodology

In an effort to more efficiently use mitigation funds TWT has developed an alternative assurance methodology referred to herein as the three-pronged approach. The three-pronged approach will provide sufficient credit replacement in the event of a default while adhering to the overall mission of the Wetland Trust to restore, conserve, and protect wetland biota, functions and values. This three-pronged approach may be used as assurance for a mitigation site, or the sponsor may propose traditional financial assurances for a particular site. Both options are designed to ensure a high level of confidence that the compensatory mitigation project will be successfully completed, and the preferred option will be selected on a case-by-case basis and submitted to the IRT for consideration during the mitigation plan approval process.

The three-pronged "alternative assurance" approach centers on the acquisition by TWT of a "secondary" mitigation parcel for each "primary" mitigation parcel proposed by TWT and approved by the Corps and IRT. The secondary parcel will be sufficient in nature and size to be able to offset all mitigation obligations of TWT intended to be offset by the primary parcel should the primary parcel fail or the program otherwise default on its assumed mitigation obligations. Such potential offset provided by the secondary parcel would be by a combination of preservation and establishment/reestablishment activities sufficient to achieve no net loss of wetland function and acreage in the service area. The parcel will be protected in perpetuity regardless of whether it is ever needed to offset failure or default of the primary parcel. However, the restoration activities would be required to occur only if needed to fulfill mitigation obligations assumed by TWT but unfulfilled at the primary parcel. All assurance credits would be developed within the same service area as the wetland credits they insure.

The assurance credits will be developed using a three-pronged approach:

9.1 First Prong: Protection of quality wetland acres

The core of the wetland assurance credits is based on the purchase and protection of high quality wetlands owned in title and fee by The Wetland Trust and set aside explicitly for this purpose. These wetlands would:

- be initially purchased by a third party in each service area using private funds until funds from advance credit sales are available to reimburse said private entities. Funds used to

initiate the program are exclusive of all state and federal pass through natural resource improvement dollars and will include no federal or state funds;

- credits generated by the secondary parcel will be determined by the IRT on a case-by-case basis following the same guidelines as used for primary parcels in Table 7;
- be protected by a conservation easement similar to the easement developed for a primary mitigation site and subject to approval by the Corps.

9.2 Second Prong: Commitment by the USC to provide establishment/re- establishment activities on primary or secondary mitigation parcels in the event of site or program default to ensure no net loss of wetlands

A second layer of assurance is established by a commitment to construct by the Upper Susquehanna Coalition and its administrator Tioga County SWCD* should the TWT default (See signed Resolutions in Appendix E). More specifically:

- the wetlands to be established/re-established (only net increase in wetland acres applies) could be located either on parcels specifically purchased for assurance or within a primary parcel.
- Sufficient acreage would be established/re-established to ensure that no net loss of wetlands in each service area occurred due to the operation of this instrument. The amount of acres needed in the event of program default would be the difference between the "Authorized impacts by acre and type" in the table "Reporting- Accounting by Permit Number" in Appendix B and the total acres re-established or established wetlands at the time of default, based on the total credits released from all site specific mitigation plans in that Service Area. Once that loss is covered, outstanding wetland credits will be fulfilled through preservation described in 9.1.

9.3 Third Prong: Set aside funds to assist the USC in completing tasks described in 9.2

To provide a third layer of assurance, all advance credits sold will reserve 20% of required project completion costs (Project planning and design, plants and other materials, monitoring or adaptive management, contingency costs, program administration; see Table 6) in a separate account. These funds will be:

- transferred to the USC's administrative lead, Tioga County SWCD, or an alternative entity approved by the District Engineer(s), in the event of a TWT default or site failure and used

to support efforts in 9.2 and under the approval of the District Engineer

- released to the TWT to be used in the service area where it was generated once sufficient sites have been constructed that cover all advance credits and there have been two consecutive years where the ILF site(s) intended to fulfill the advance credits sold have met all success criteria as defined in their mitigation plans. The financial assurance determination to release any amount of funds is at the discretion of the District Engineer(s) in consultation with the IRT.

The Upper Susquehanna Coalition (USC) of Soil and Water Conservation Districts works under a Memorandum of Understanding (MOU) signed by each County District that is within the Susquehanna River Basin in NY as well the NY State Department of Agriculture and Markets. The authority to make this Understanding is found under NY Soil and Water Conservation Districts Law, as Amended Through the Laws of 2004- as of November 17, 2004, The law states "AN ACT establishing the State Soil and Water Conservation Committee, and creating Soil and Water Conservation Districts, constituting chapter nine-b of the consolidated laws: **§ 10 Cooperation between districts - The directors of any two or more districts organized under the provisions of this chapter may cooperate with one another in the exercise of any or all powers conferred in this chapter."*

The MOU further assigns and directs the Tioga Soil and Water Conservation District, 183 Corporate Drive, Owego, NY 13827 to be the administrator the USC. Tioga SWCD also owns the construction equipment and employs technical staff who make up the USC Wetland Team.

Section 10. Credit Calculations

The ILFP will generate credits based on the net increase in benefits to aquatic resources at sites that meets or exceeds its Mitigation Plan success criteria. The IRT will determine credit ratios based on Table 7 during the final review of each site's Mitigation Plan, including:

- determination of an adequate buffer of at least 50 meters, where credit production may be reduced;
- modified by a sliding scale of quality based on the assessment of functions and services on a site-by-site basis; and
- the IRT using the best available assessment tools.

Table 7. Credit Schedule for developing one Mitigation Credit, valid for all Service Areas.

Re-establishment: Acres to generate 1 credit.	Up to 1:1
Establishment: Acres to generate 1 credit.	Up to 1:1
Rehabilitation or Enhancement: Acres to generate 1 credit.	3:1 to 10:1
Preservation (wetland): Acres to generate 1 credit	10:1 to 20:1
Upland Preservation of a buffer: Acres to generate 1 credit	15:1
Upland Re-establishment or establishment of a buffer: Acres to generate 1 credit	4:1 to 15:1
Price per credit	$91,580

Section 11. Program Accounting Information

11.1 Provide an acceptable FDIC Program Account

The ILFP Account will have a separate checking account for each service area established by TWT at a bank that is a member of the Federal Deposit Insurance Corporation (FDIC). Each will be named "Susquehanna Basin Headwaters In-Lieu Fee Instrument, Service Area 1,2,3,4 or 5". Each ILF site will have a separate budget within the account, with sufficient specificity to track cost items (i.e., property purchase, construction, plant materials, etc.), as shown below. These checking account(s) will be separate and different from other TWT accounts.

Once a project is implemented the budget will stay open to track the long-term items such as monitoring, adaptive management and financial assurances and will not be closed until all of the credits that are available from that site are released. Each credit or portion of a credit sold to support the site will have its original funds dispersed based on Table 6 and tracked by a Project Budget for that ILFP Site as shown below. Funds remaining once the District Engineer has released all credits at a site will remain in the service area account for continued program development and dispersed, with Corps approval, for additional tasks depicted in one or more of the project component categories described Table 6. Any and all interest and other funds accruing in the account will be used to provide compensatory mitigation for impacts to aquatic resources in the same service area from which the credits were sold.

11.2 Financial accounting

Reporting requirements for financial reporting are described in Section 5, "Reporting Protocols." The ILF Program account will track funds accepted from permittees separately from those accepted from other entities and for other purposes (i.e., fees arising out of an enforcement action, such as supplemental environmental projects). The program account will be established after this instrument is approved and before any fees are accepted.

If the Corps determines that The Wetland Trust is failing to provide compensatory mitigation by the third full growing season after the first advance credit is secured, the Corps may direct the funds to be turned over to other mitigation providers. Additional information on failure to fulfill the terms of the instrument is discussed in Section 4 "Default & Closure provisions". The Corps has the authority to audit the program account records at any time.

Funds paid into the ILF Program account may only be used for the direct replacement and management of aquatic resources. This means the selection, design, acquisition (i.e., appraisals, surveys, abstracts, filing fees, title insurance, etc.), implementation, and management (of the entire project parcel and the mitigation site within) of in-lieu fee compensatory mitigation projects. This may include fees associated with securing a permit for conducting mitigation activities, activities related to the restoration, enhancement, creation and preservation of aquatic resources, maintenance and monitoring of project parcels and the mitigation sites they contain.

Fifteen percent of all fees paid into the ILF Program will be set aside used for administrative costs. Such costs include bank charges associated with the establishment and operation of the program, staff time for carrying out program responsibilities, expenses for day to day management of the program, such as ILP reporting to the Corps, bookkeeping, audits, mailing expenses, printing, office supplies, computer hardware or software, training, travel, and hiring private contractors and office space.

11.3 Credit accounting

The Wetland Trust shall establish and maintain an annual report ledger that tracks the production of released credits for its ILF Program and for each individual in-lieu fee project. Reporting requirements for the annual report ledger are described in Section 5, Reporting

Protocols and Appendix B. On the income side, TWT shall track the fees and all other income received, the source of the income (i.e., state or local permitted impact, state or local resolution of violations,, etc.), and any interest earned by the program account. The ledgers shall also include a list of all the permits for which in-lieu fee program funds were accepted, including the appropriate Corps permit number, the service area in which the specific authorized impacts are located, the amount (acreage) of authorized impacts, the aquatic resource type impacted by Cowardin class, the amount of compensatory mitigation required, the amount paid to the in-lieu fee program for each of the authorized impacts, and the date the funds were received from the permittee. TWT shall establish and maintain a report ledger for the ILF Program that will track all program disbursements/ expenditures and the nature of the disbursement (i.e., costs of land acquisition, planning, construction, monitoring, maintenance, contingencies, adaptive management, and administration).

TWT will also track funds by cost category. The ledger (Appendix B) shall also include, for each project, the permit numbers for which the in-lieu site is being used to offset compensatory mitigation requirements, the service area in which the project is located, the amount of compensation being provided by method (i.e., re-establishment, establishment, rehabilitation, preservation and enhancement), the aquatic resource type(s) represented (e.g., Cowardin class, forested/non forested, vernal pools), the amount of compensatory mitigation being provided in acres and the number of credits certified by the IRT. The annual report ledger shall also include a balance of advance credits and released credits at the end of the report period for each service area.

Section 12. ILF Project Site Closure Specifications

A specific mitigation will be closed after meeting requirements of its site specific mitigation plan, including:

- all applicable performance measures have been achieved;
- all available credits for that site have been sold, debited or otherwise been extinguished;
- the Sponsor has prepared a Long-Term Management and Maintenance Plan, that has been approved by the IRT;
- the Sponsor has prepared and submitted to the IRT and the appropriate locality a GIS

shapefile or similar exhibit depicting the location and extent of project site contained within the ILF Program;

- the Sponsor has either: (i) assumed responsibilities for accomplishing the Long-Term Management and Maintenance Plan, in which case the Sponsor will fulfill the role of Long-Term Manager, or (ii) has assigned those responsibilities to another Long-Term Manager;
- the stewardship endowment has been funded and its contents have been transferred to the Long-Term Manager, if it is not the Sponsor
- the Sponsor has complied with all other terms of the Instrument.

Upon bank closure, no further credit transfer may occur and the period of long-term ownership and preservation will commence. The IRT will issue a written certification of satisfaction to the Sponsor and to the escrow agent, if there is one and thereafter any remaining funds will be released to the Sponsor for use in that Service Area on any and all tasks that are sanctioned under this Instrument..

Section 13. Transfer of Long-Term Management Responsibilities

The long-term manager for each mitigation site will be identified at the time that the site is proposed to the IRT. The TWT fully intends to be the fee simple owner and long-term manager of all mitigation properties. However, should TWT choose to transfer the responsibilities for long-term management to another long-term steward TWT it must first seek Corps approval in writing. The Corps must also be given the option of being a signatory to any contract or other arrangement assigning the rights and delegating the responsibilities to the steward.

Transfer of long-term stewardship responsibilities for any site shall not occur until after performance standards have been achieved and all Released Credits have been sold. Once long-term management has been transferred to a land stewardship entity, said party is thereby responsible for meeting any and all long-term management responsibilities outlined in the project-specific mitigation plan.

If a transfer occurs, the TWT shall transfer long-term management responsibilities to a "land stewardship entity, such as a public agency or non-governmental organization." In the NY

Susquehanna Basin the three most likely entities are the NYS DEC, the Finger Lakes Land Trust, other local land trusts, the USC or one of the 16 County Soil and Water Conservation Districts USC members that cover the region. Until such time as long-term management responsibilities are transferred to another party, TWT will be considered responsible for all long- term management of the mitigation project. If long-term stewardship responsibilities are transferred to another land stewardship entity, TWT shall also transfer the long-term management funds for that account or otherwise arrange for disbursements from such an account to be accessible to the land steward.

Section 14. Financial Arrangements for Long-Term Management

Financial arrangements will be specified in each site's mitigation plan. TWT fully intends to be the fee simple owner and long-term manager of all mitigation properties. All long-term management funds will be deposited in a separate account from the project implementation account and will be clearly named "Long Term Management Account" or other descriptive title.

Section 15. Signatures:

James Cwalina — Chair — 10 October 2013
The Wetland Trust — Title — Date

Diane C Kozlowski — Branch Chief, Regulatory — 21 Oct 2013
for Jos
District Engineer, USACE LRB District — Title — Date

Thomas M. Creamer 25 Oct 2013 — Chief, Operations, Readiness and Regulatory Functions Division — OCT 25 2013
FOR
District Engineer, USACE NAN District — Title — Date

US Fish and Wildlife Service — Title — Date

US Environmental Protection Agency Region 2 — Title — Date

NY State Department of Environmental Conservation — Title — Date

Jeffrey G. Parker — Chair — 9/30/13
Upper Susquehanna Coalition — Title — Date

John A. Fitzgerald — Chair — 10/3/13
Tioga County Soil and Water Conservation District — Title — Date

References cited:

Amon, J.P., C.S. Jacobson and M.L. Shelley 2005. Construction of fens with and without hydric soils. Ecological Engineering 24:341-357.

Bedford, B.L. and K.S. Godwin 2003. Fens of the United Sates: Distribution, characteristics, and scientific connection versus legal isolation. Wetlands 23:608-629.

Brooks, R.P., Wardrop, D.H., Cole, C.A., and D.A. Campbell. 2005. Are we purveyors of wetland homogeneity? A model of degradation and restoration to improve wetland mitigation performance. Ecological Engineering 24: 331-340.

Burger, M.F and J.L. Liner. 2005. Important Bird Areas of New York, Habitats worth Protecting. Second edition. Audubon New York. BookMasters, Inc. Albany NY. 352p.

Clute, W. N. 1898. Flora of the Upper Susquehanna. Library of New York Botanical Garden, Binghamton, NY.

Easterling, D.R.,G.A. Meehl, C. Parmesan, S.A. Changnon, T.R. Karl, and L.O. Means. 2000. Climate extremes: Observations, modeling and impacts. Science 289: 268-274.

Edinger, G.J., D.J. Evans, S. Gebauer, T.G. Howard, D.M. Hunt, and A.M. Olivero (editors). 2002. Ecological Communities of New York State. Second Edition. A revised and expanded edition of Carol Reschke's Ecological Communities of New York State. (Draft for review). New York Natural Heritage Program, New York State Department of Environmental Conservation, Albany, NY.

Finger Lakes Land Trust 2012. Conservations Focus Areas of the Upper Susquehanna Watershed within the Finger Lakes Land Trust's Service Area. Finger Lakes Land Trust, Ithaca, NY. 43 p.

Godwin, K.S., J.P. Shallenberger, D.J. Leopold and B.L. Bedford 2002. Linking landscape properties to local hydrogeologic gradients and plant species occurrence in minerotrophic fens of New York State, USA: A hydrogeologic setting (HGS) Framework. Wetlands 22:722-737.

Huenneke, L.F. and R.R. Sharitz 1986. Microsite abundance and distribution of woody seedlings in a South Carolina Cypress-Tupelo swamp. Am.Midl.Nat. 115:328-335.

Hunter, E. A., Raney, P.A. Gibbs, J.P., Leopold, D.J., 2012(accepted). Improving wetland mitigation site identification through community distribution modeling and a patch-based ranking scheme. Wetlands.

Keddy, P. A. 2010. Wetland ecology, principles and conservation, Second Edition edition. Cambridge University Press, New York, USA.

Lee, J.T., S.J. Woddy and S. Thompson 2001. Targeting sites for conservation: Using a patch-based ranking scheme to assess conservation potential. J.Environ.Manage. 61:367-380.

NYSDEC. 2005. Comprehensive Wildlife Conservation Strategy for New York- Susquehanna Basin pages 467-501. In: Comprehensive Wildlife Conservation Strategy Plan. New York Department of Environmental Conservation, Albany. 1584 p.

NYSDEC. 2009. New York Open Space Conservation Plan. New York Department of Environmental Conservation. Albany. 240p

NYNHP. 2011. Rare species and community occurrences, Biodiversity Databases, Element Occurrence Record Digital Data Set. New York Natural Heritage Program, Albany, NY.

Smith, S., J. 1945. Contributions to the flora of Central New York, I edition. The University of the State of New York, Albany, NY.

USFWS 2012. New York and Long Island Field Offices Strategic Plan FY 2012. New York. 625p.

van Diggelen, R., B. Middleton, J. Bakker, A. Grootjans and M. Wassen 2006. Fens and floodplains of the temperate zone: Present status, threats, conservation and restoration. Applied Vegetation Science 9:157-162.

APPENDIX A

Susquehanna Basin Headwaters In-Lieu Fee Program: Credit Transaction Form

Credit Transaction Form
TWT Service Area: _____

Project Name:
US Army Corps Permit Number:

Permittee:
name:
address:
telephone:
fax:
email:

Impacted 8 digit HU:
Acres impacted:
Resource type impacted:

Number of Credits purchased:

Date:

By:

Title:

_____
The Wetland Trust

Sponsor: The Wetland Trust, 4729 State Route 414, Burdett, NY 14818, phone/fax 607-546-2528
www.thewetlandtrust.org

APPENDIX B
Susquehanna Basin Headwaters In-Lieu Fee Program: Annual Program Report

Annual Program Report

1 January through 31 December _____

Reporting - General							
Service Area	Income received	disbursements	Interest earned	Advanced Credits available[1]	Advanced Credits sold	Advanced Credits fulfilled	Released Credits remaining
1							
2							
3							
4							
5							
Total							

[1]Explain any changes in credit availability such as change in the number of credits developed at a specific ILF site.

Reporting - Accounting by Expenditure Category						
Expenditure	Service Area 1	Service Area 2	Service Area 3	Service Area 4	Service Area 5	Program Total
Land Acquisition						
Planning/design						
Construction						

Plants and other materials						
Monitoring and Adaptive Management						
Long-term management and protection						
Contingencies						
Financial assurances						
Administration						
Total						

Reporting - Accounting by Permit Number					
USACE Permit Number	Service Area[1]	Authorized impacts by acre and type[2]	Compensatory mitigation by credit[3]	Amount paid	Date funds received

[1] if Impact is not in the same Service Area as Compensation, make note
[2]PEM, PSS, PFO or Other, describe (e.g., fen, bog)
[3] an In-Lieu Fee Credit always equals an acre in this program

Project Budget for each individual ILFP Site.			
Service Area:			
Project Site name and number:			
Income: (list by permit number, date and total funds deposited)			
Project Component	**Expense**	**Budget**	**Balance**
Land acquisition			
Project plan and design			
Construction			
Plants and other materials			
Labor			
Monitoring, based on the number of years planned			
Remediation/adaptive management and contingency costs			
Program administration			
Long-term management and preservation: stewardship endowment			
Financial assurances			
Third party easement			
TOTAL			

Sponsor: The Wetland Trust,
4729 State Route 414,
Burdett, NY 14818,
phone/fax607-546-2528
www.thewetlandtrust.org

APPENDIX C
Susquehanna Basin Headwaters In-Lieu Fee Program Upper Susquehanna Coalition Site Selection computer modeling protocols

Upper Susquehanna Coalition Site Selection computer modeling protocols

A) Executive Summary:

We have implemented a comprehensive site selection protocol that remotely identifies and sets wetland mitigation priorities within the Upper Susquehanna River Basin. Our site selection approach has two main components: 1) identify drained wetland occurrences and community types using geo-statistical modeling, and 2) rank suitable restoration and protection areas according to abiotic criteria known to impact wetland quality and functioning (e.g., wetland size, distance to roads). Using validation measures, our approach outperforms existing methods for detection of areas suitable for mitigation, and does so for our entire focal area (>16,000 km^2). This approach also identifies biologically rare communities (fens, bogs) for mitigation that either provide, or could provide refuge for rare and underrepresented species – an endeavor that furthers organizational objectives for many governmental agencies in our focal region (e.g., US Fish and Wildlife, NYS-Dept. of Environmental Conservation).

In the following sections, we describe the general methods utilized for the modeling procedure, and an example of our default "patch" ranking system for targeting restoration and protection of large landscapes containing rare communities with high capacity to support biodiversity. Using the procedures described below to develop this database, we will target the top 15% highest ranked priorities in the Upper Susquehanna River Basin for restoration and protection activities. The overall goal of this approach is to: identify priority locations for wetland restoration activities that improve watershed functioning, habitat connectivity, and biodiversity value. ***We note that this ranking system was explicitly designed to be flexible and to meet watershed specific functional and biological needs.*** A more detailed account of the modeling procedure, site ranking, and validation can was recently submitted to a scientific journal to undergo an external peer review process.

B) Background on need for improved site selection protocol

Although attempts to stem wetland loss have resulted in compensatory mitigation frameworks, methods for mitigation site selection have been insufficient to develop effective watershed-level biologically relevant conservation and restoration plans. Another key limitation for implementing sound mitigation practices has been the lack of scientific rigor in developing mitigation priorities. Particularly the identification of focal areas for mitigation has been haphazard, often relying on a combination of: incomplete field and aerial photograph surveys, soil maps, the immediate availability of parcels for sale, and so called "expert" opinion. This approach fails to identify and prioritize mitigation targets that would have the largest impacts on hydrological functioning and biodiversity conservation because it fails to analyze entire watersheds.

To overcome these limitations, we have collaborated with researchers at SUNY-ESF, to implement an improved site selection protocol that remotely identifies and sets comprehensive wetland mitigation priorities within the Upper Susquehanna River Basin. Our site selection approach has two main components each of which are followed by appropriate validation measures: 1) identify drained

wetland occurrences and community types, and 2) rank suitable restoration and protection areas according to abiotic criteria known to impact wetland quality and functioning (e.g., wetland size, distance to roads). Using statistical modeling, we identified areas that were: previously drained, and both extant and drained rare wetland community types. We combined the drained areas and rare communities identified by this model with known wetland occurrences from NWI to create a comprehensive database of potential banks, hereafter "patches". Using this database of potential banks, we developed a flexible "patch" ranking system that can be utilized to meet a range of wetland mitigation goals depending on specific needs in a given watershed.

C) Model Development

We used GIS layers in the program MaxEnt (maximum-entropy modeling) to systematically identify previously drained wetland areas for restoration and rare community types for protection. We used five background environmental variables: elevation, slope, aspect, surface geology, and soil type, all scaled to 10 m^2. The program MaxEnt was chosen due to its superior prediction capabilities compared to other approaches (Elith et al. 2006). For modeling, we created a database of poorly drained areas that included randomly selected locations within examples of each of the four main wetland types present (emergent, deciduous forested, evergreen forested, and scrub-shrub). Occurrence records to model bogs were taken from acidic designations in existing National Wetlands Inventory data. Data from the New York Natural Heritage Program on the occurrence of fen locations (n=9) (NYNHP 2011) were combined with occurrence data (n=26) from previous site visitation to produce a rich fen occurrence layer for modeling.

Model output produced goodness-of-fit statistics, and we validated the model using the correct classification rate for extant wetlands. The rationale for statistical model validation using known wetlands to test model precision and accuracy is as follows: the same underlying environmental conditions that produced extant wetlands also produced the original wetlands that are now drained (e.g., geology, low slopes, hydric soils), thus as a comprehensive statistical model validation measure, modeled "wet" areas should include extant wetlands (here, National Wetlands Inventory) if the procedure is viable. This type of remote statistical model validation is common in the peer reviewed scientific literature, and allows for more robust "Verification" than would be feasible based on field visitation alone.

For comparison with the MaxEnt modeling procedure, we also created a basin-wide, *hydric soils, low slope model*, which we called the "*Expert Model*". The expert model was designed to mimic the search procedure wetland planners use to select mitigation sites: *typically planners sift through hydric soils and topographic maps to identify areas with appropriate soils and hydrology for wetland restoration.* Expert model patches were created using areas with low slopes (< 1%) and soils high in organic content (muck, silt loam, and loam), which largely represent designated hydric soils (NRCS 2010) for the area. The expert model was evaluated using the same model validation techniques as the MaxEnt model.

D) Modeling Procedure Results

Model validation measures indicated that MaxEnt generally outperformed the expert model. Model validation using an independent sample of known wetlands indicated that maximum entropy-based models predicted wetland locations well (Area Under the Curve = 0.86-0.98, out of 1), and dramatically outperformed the "expert opinion" model (91% correct classification rate for MaxEnt versus 62% for the expert model). Furthermore simple aerial photo interpretation, site visitation, and NWI comparison show that MaxEnt is clearly an improvement over previously utilized methods. We

demonstrate the utility for mitigation purposes (Figures 1: A, B, C). These validation results and aerial photos provide strong evidence that MaxEnt models outperform existing methods for identifying locations with hydrological conditions suitable for wetland restoration. Furthermore this procedure allowed us to perform a thorough analysis of our entire focal region.

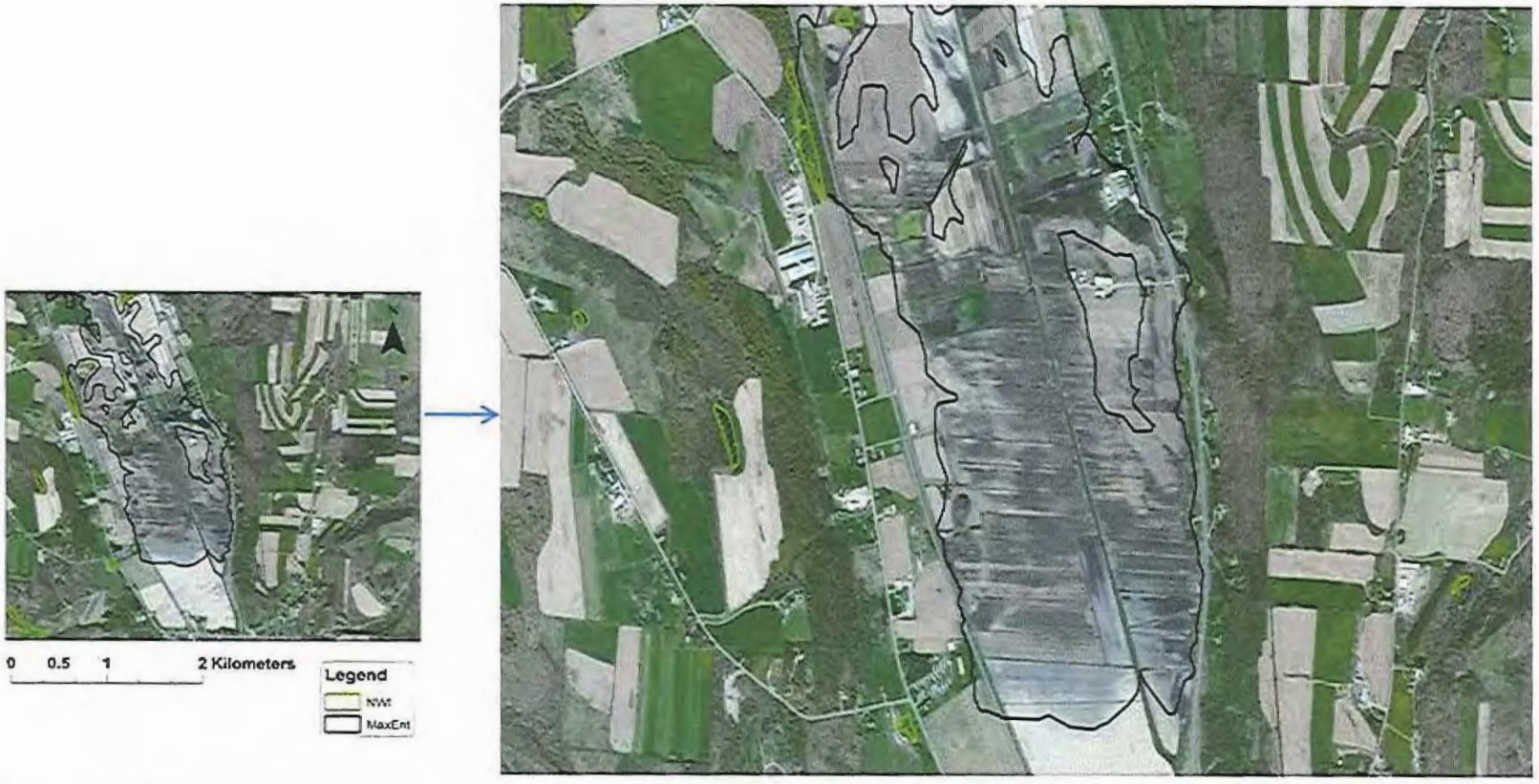


Figure 1-A: MaxEnt (black outline) clearly identifies more area than NWI (dashed green). Example includes a large drained muckland with visible drain pipe lines (right).

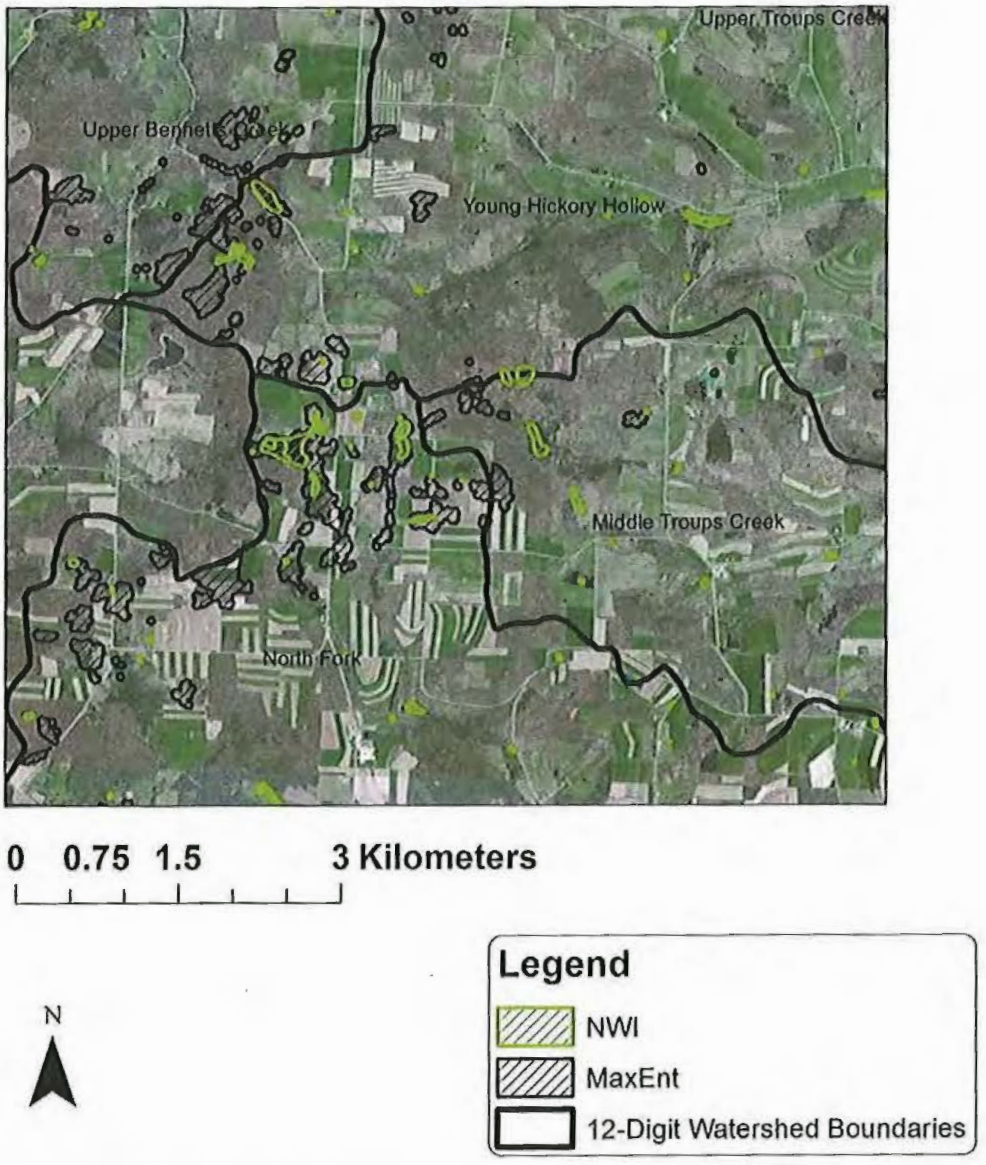


Figure 1-B: MaxEnt identifies restoration targets in areas lacking many wetlands.

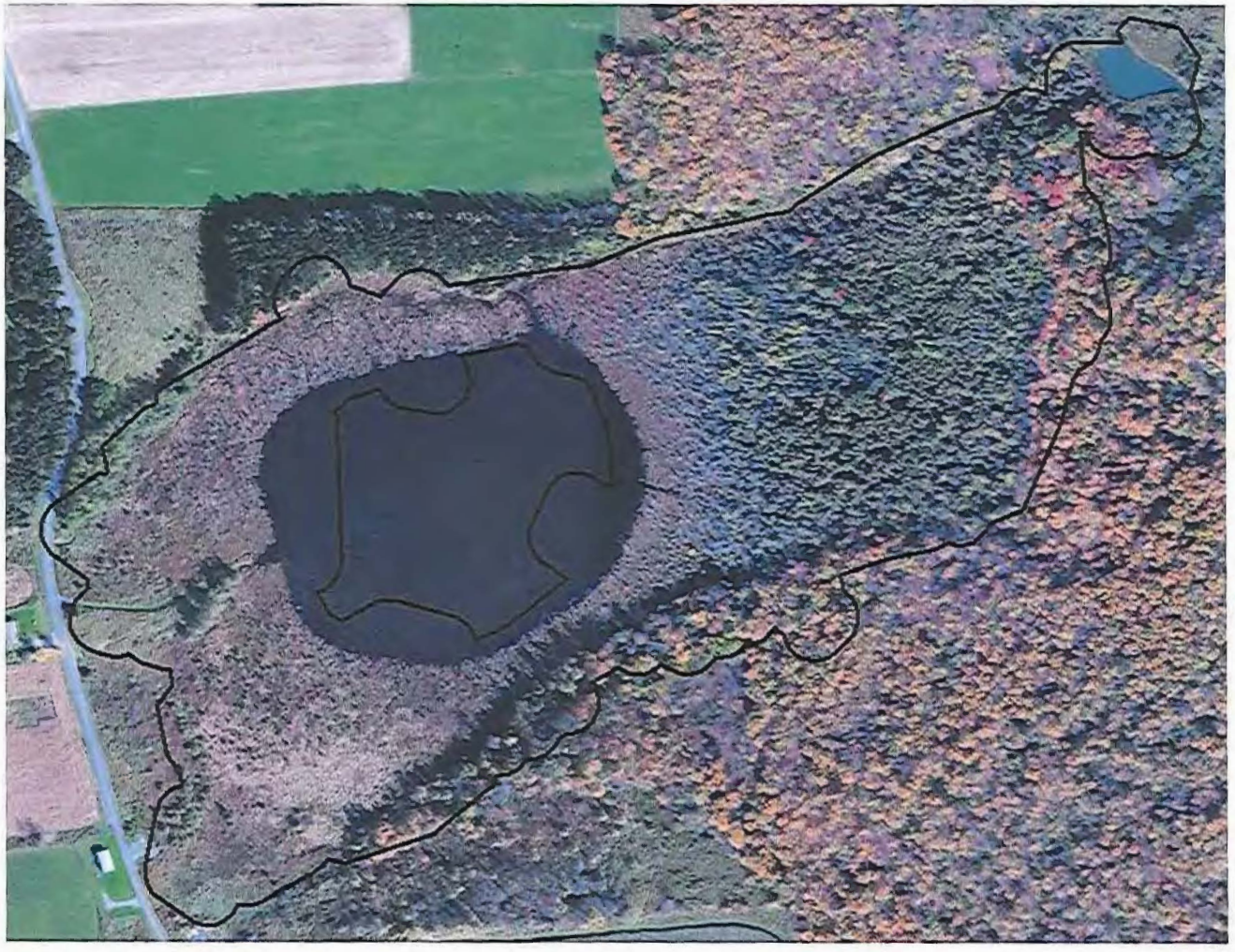


Figure 1-C: MaxEnt identifies rare communities, a previously unknown rich fen pictured.

E) Potential Mitigation Site Ranking Procedure

For the purpose of prioritizing potential mitigation areas, we combined the model output with NWI wetland occurrences to produce a comprehensive coverage of wetland resources (patches). This approach effectively augmented NWI databases with: wetland occurrences omitted by NWI, previously drained wetlands, and fen and bog designations as appropriate. This approach advantageously allowed for potential mitigation areas to be systematically compared and ranked in terms of landscape viability using simple parameters with strong ecological underpinnings. *We note that watersheds differ in their needs for restoration. Our ranking approach will be tailored to the varying needs in specific watersheds, and will be updated through time as more information becomes available.* Below we provide an overview of our default patch ranking, which favors a combination of restoration and protection of large areas with a diversity of wetland habitats (emergent, forested, scrub-shrub) and rare communities (fens and bogs). *These quantitative patch rankings, tailored to meet project and watershed specific goals comprehensively identify the best place to work to meet certain objectives.*

Patches were ranked according to the following criteria: (log) patch area (*A*), predicted designation as significant natural community (*B*), distance to nearest road (*R*), distance to nearest large remaining wetlands (*W* :NWI wetlands ≥ha). These criteria were chosen due to their documented influence on biodiversity and the functioning of ecological communities, particularly wetlands (MacArthur and Wilson 1963, Edinger et al. 2002, Kaushal et al. 2005, Karraker et al. 2008). Variables were divided by respective maximum values to produce indices on 0-1 scales for summation. *Fens and bogs received a *B* value of 1 (all other wetlands received 0). The following formula was used for patch ranking: $A + B + R + (1 - W) / Max(A + B + R + (1 - W))$.

**As modeling focused on hydrogeologic settings (unique soil conditions) fens and bogs in this scheme encompassed a variety of successional stages (from emergent to scrub shrub to forested), therefore not biasing mitigation towards a single type. Plant ecologists are increasingly expressing wetland communities in terms of source hydrology, and are less focused on the form of vegetation (forested vs. emergent) thus North American wetlands with mineral rich groundwater discharge are referred to as fens regardless of presence of a tree canopy cover (Bedford and Godwin 2003).*

F) Potential Mitigation Site Ranking Procedure Results

To test the efficacy of the patch based ranking, we calculated the average ranking for all patches, and for the ten New York Natural Heritage Program wetland occurrences falling within our focal region (NYNHP 2011). Average patch rank out of a 0 to 0.99 scale for all patches was 0.40 (± 0.14 SD), while average patch rank for heritage sites was 0.79 (± 0.13 SD), a dramatic difference (Figure 2). Nine of the ten NYNHP sites also ranked in the top 15% of sites, indicating this method possesses the ability to identify biologically important sites.

We were also interested in determining the relative diversity of wetland types (emergent, forested/shrub) present within the targeted ranking procedure. To do so, Palustrine NWI wetlands that were intersected by the top 15% of ranked sites were selected (n=6056). Within this sample, 51% were designated by NWI as forested/shrub wetlands, 30% as emergent, and 20% as ponds (ponds being found within larger wetland complexes). This assessment provides evidence that the selection method targets a variety of wetland types.

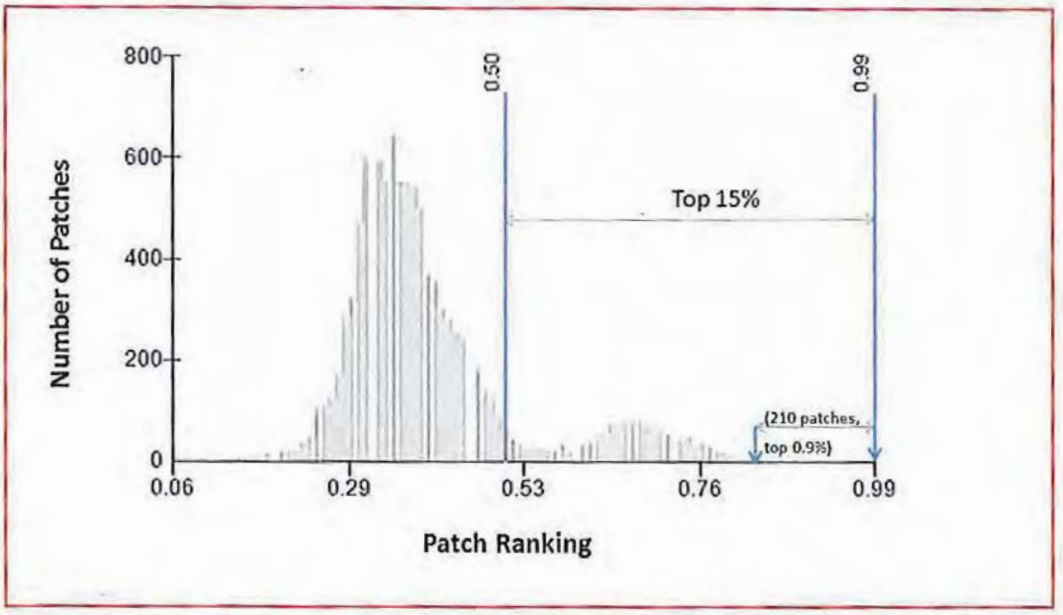


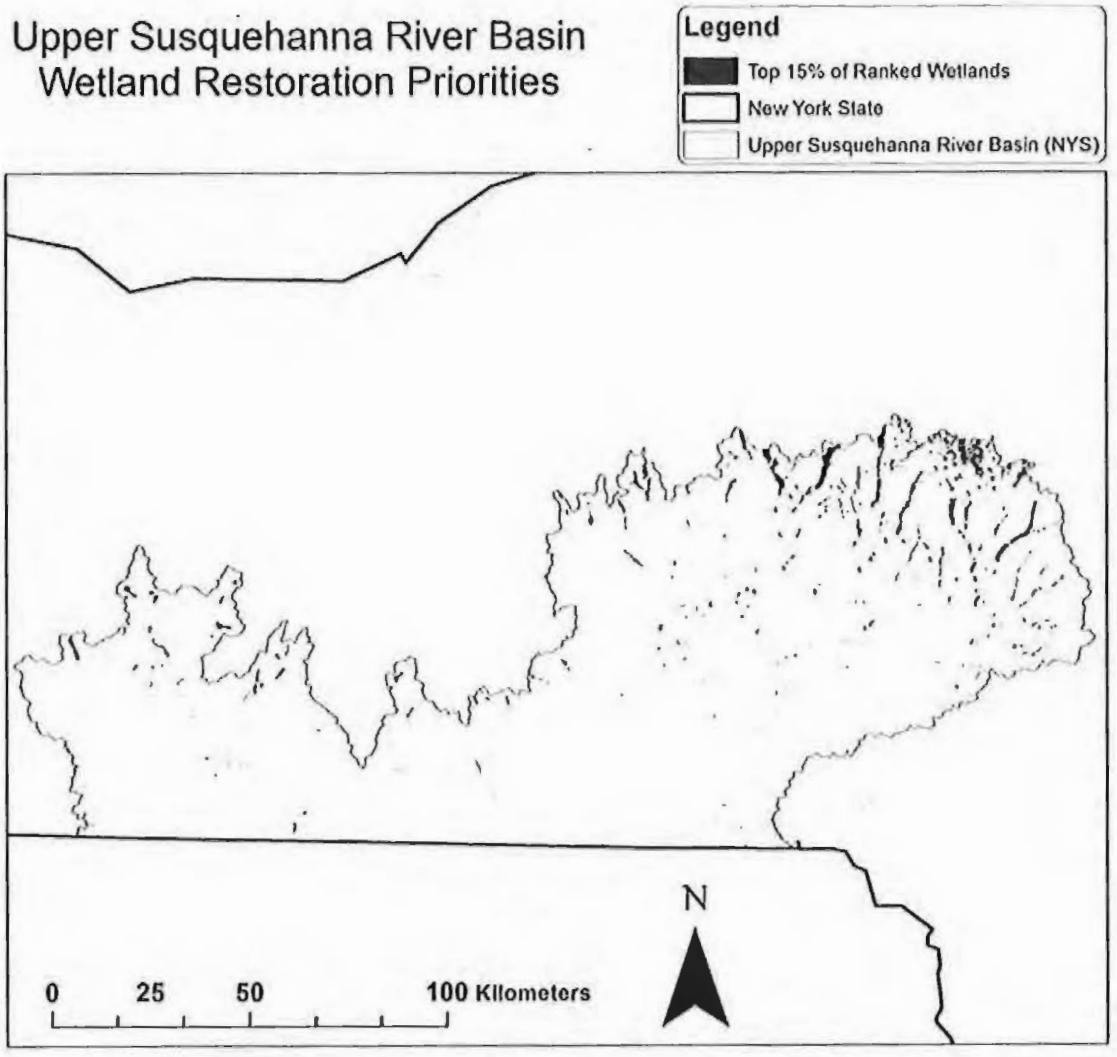
Figure 2: Histogram of patch ranks for the Upper Susquehanna River Basin (N=21,970) indicates the majority of wetlands in our focal area are small, common wetland types found near human impacts (roads are common entry points for invasive species). 85% of patches ranked lower than 0.50. Nine out of ten wetlands identified by the Natural Heritage Program as biologically significant ranked in the top 15% in our study.

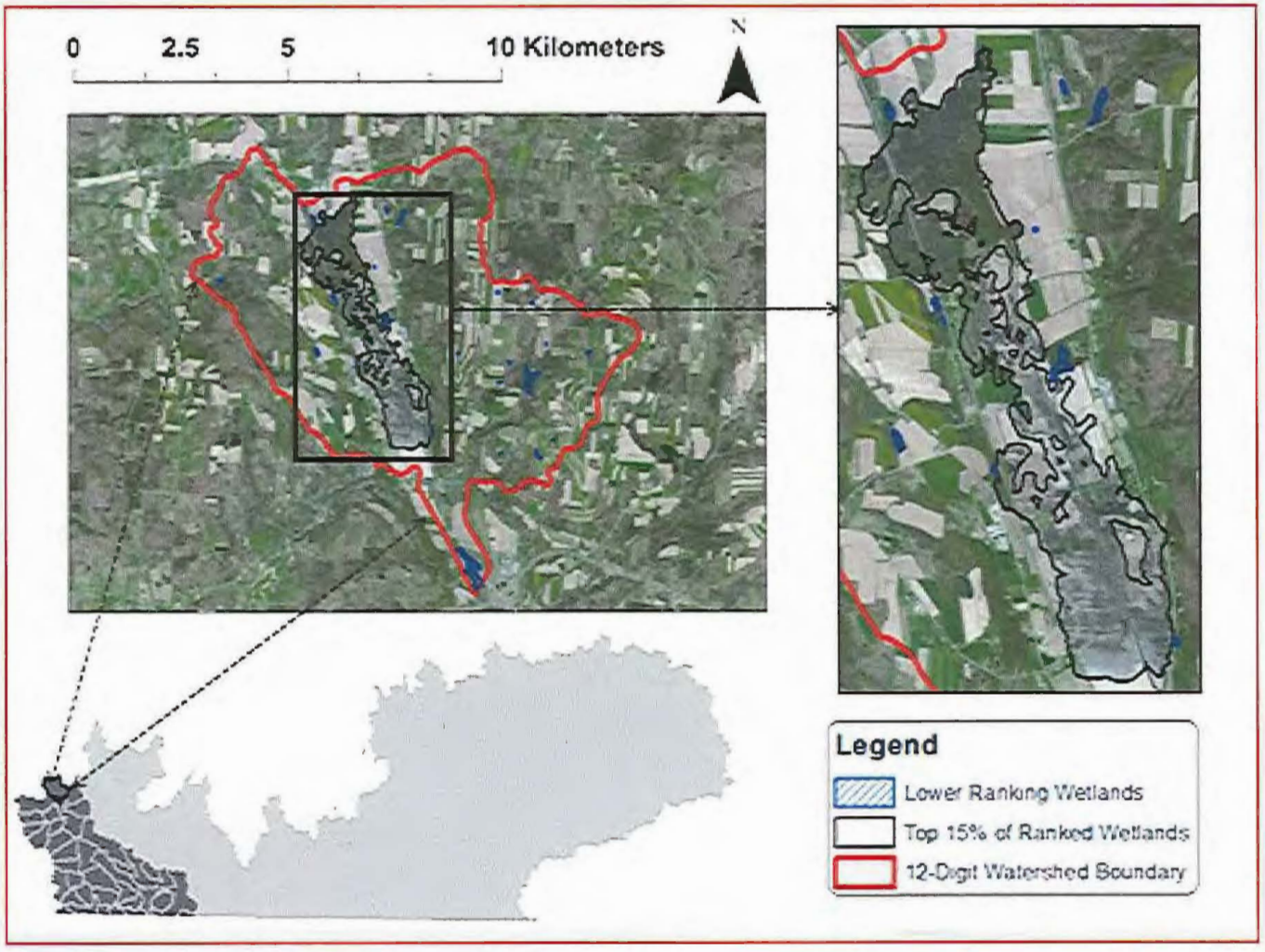
A) Summary

We note that typical methods for mitigation site selection are far less comprehensive than those described here and commonly fail to provide a similar quantitative rigor for assessing potential mitigation bank quality. With the positive results of the validation measures for both our modeling procedure and the ranking system, we feel well justified in using this approach to identify priority focal areas for mitigation work. We will continue to improve our site selection procedure through augmentation of this database with relevant GIS layers, target species inventories, and field visitations. Based on our analyses, we believe this approach is a vast improvement over traditional techniques relying on expert opinion, aerial photography and hydric soils alone. In the following section we provide example of target areas within each of the five service areas in the Upper Susquehanna River Basin.

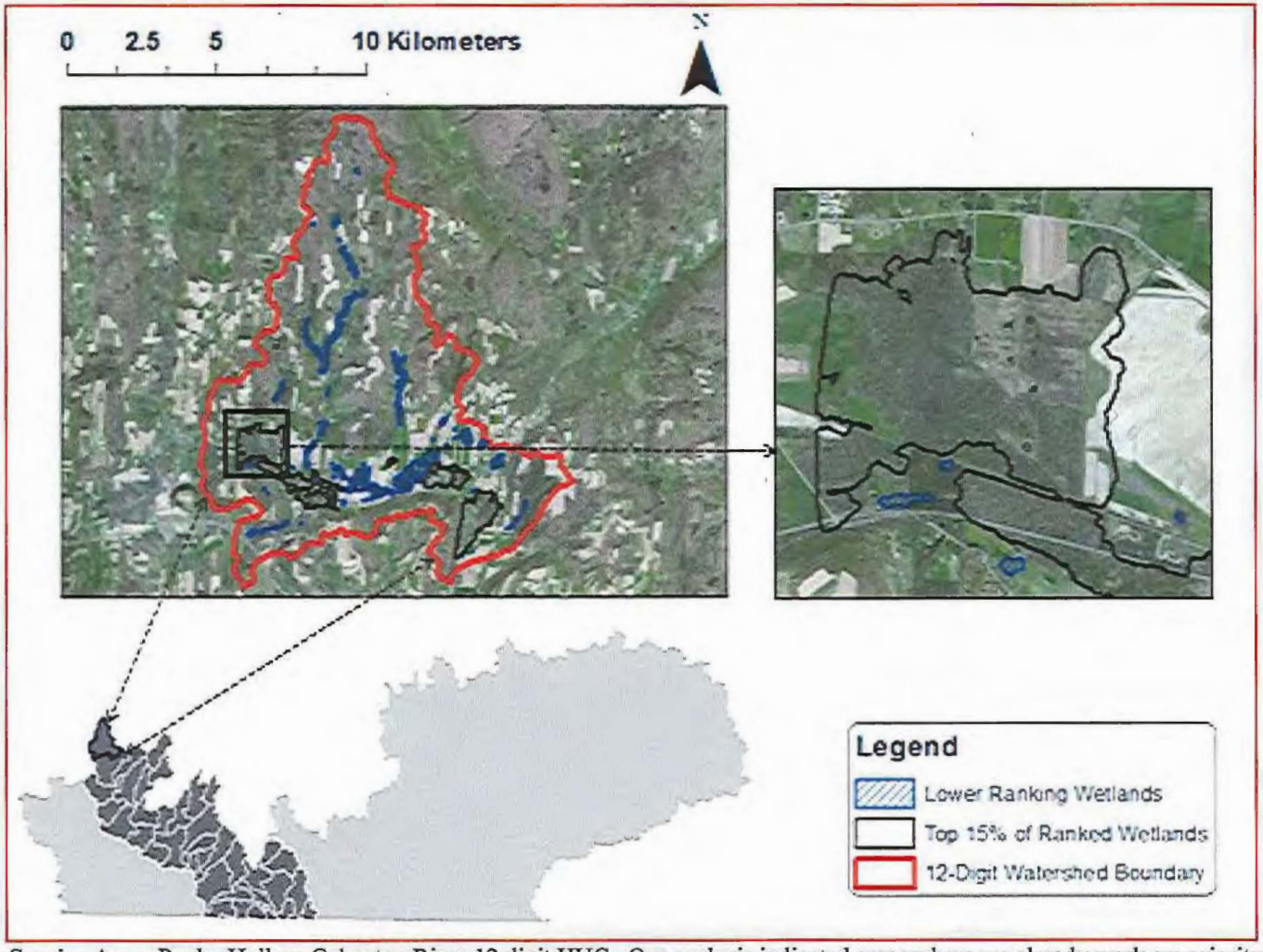
B) Mapping: Upper Susquehanna River Basin Priority Mitigation Areas

In this section, we provide an overview of our target areas for the Upper Susquehanna River Basin, followed by example targets within 12 – Digit watersheds. Maps for 12-Digit HUC's show ranked priorities, including polygons of wetland resources derived by augmenting remaining wetland area (NWI), with occurrence locations of drained wetlands from the MaxEnt wetland model.

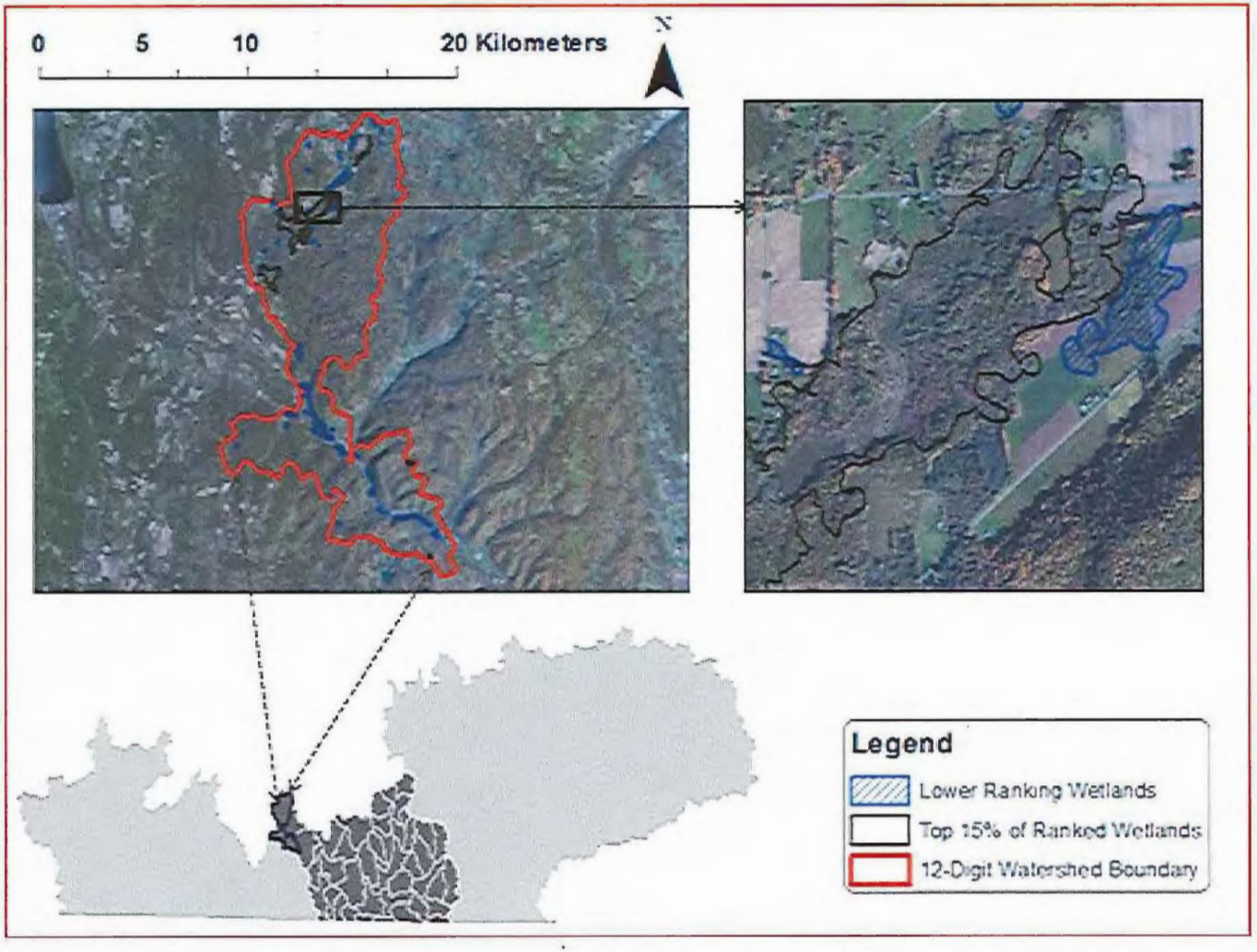

Upper Susquehanna River Basin
Wetland Restoration Priorities
Legend
Top 15% of Ranked Wetlands
New York State
Upper Susquehanna River Basin (NYS)
N
0
25
50
100 Kilometers



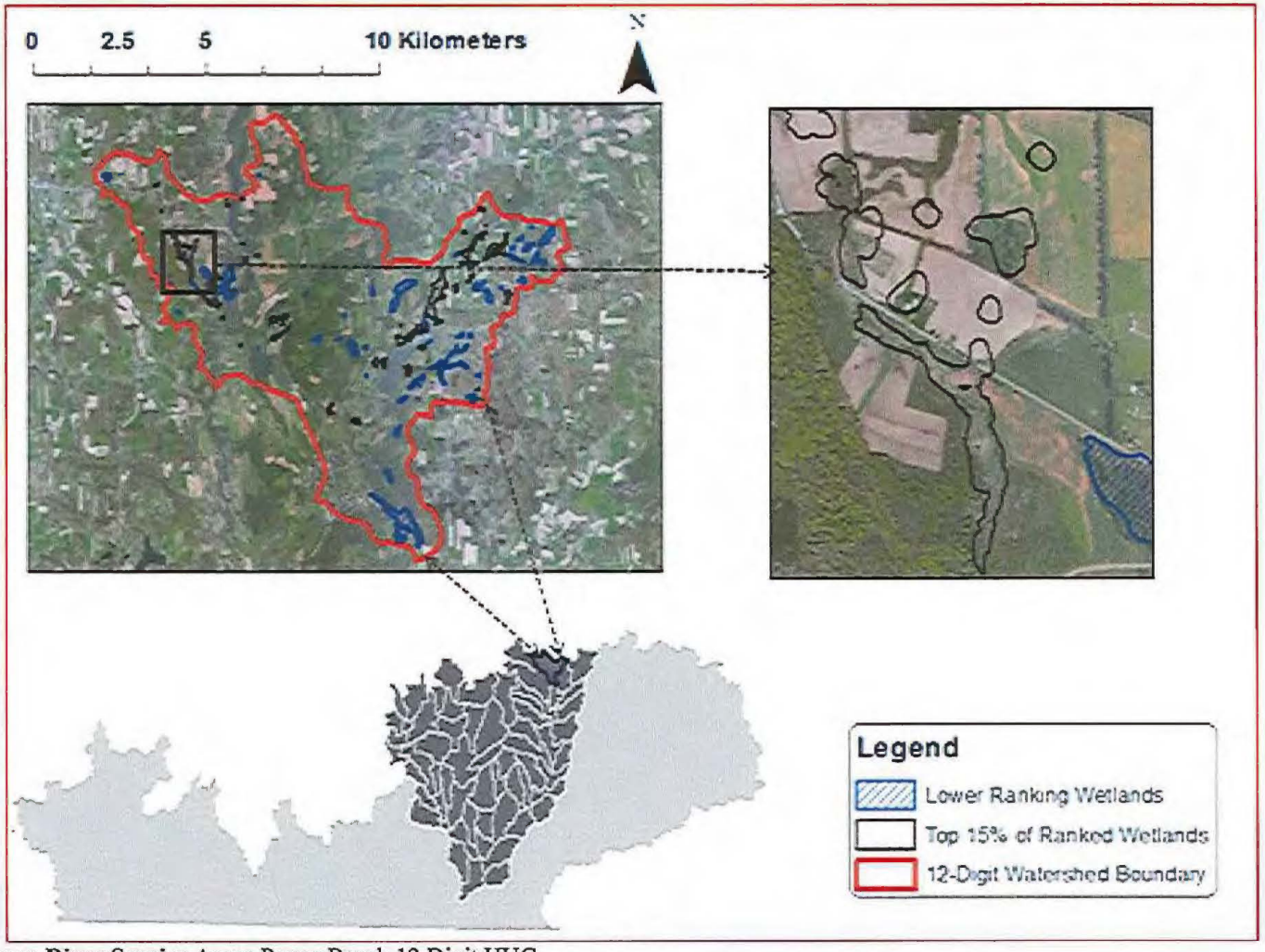
Canisteo Service Area: Lime-Kiln Creek 12 digit HUC. Modeling and ranking procedure identified a large, partially intact wetland complex, with drained muckland visible to the southern end that is suitable for restoration efforts.



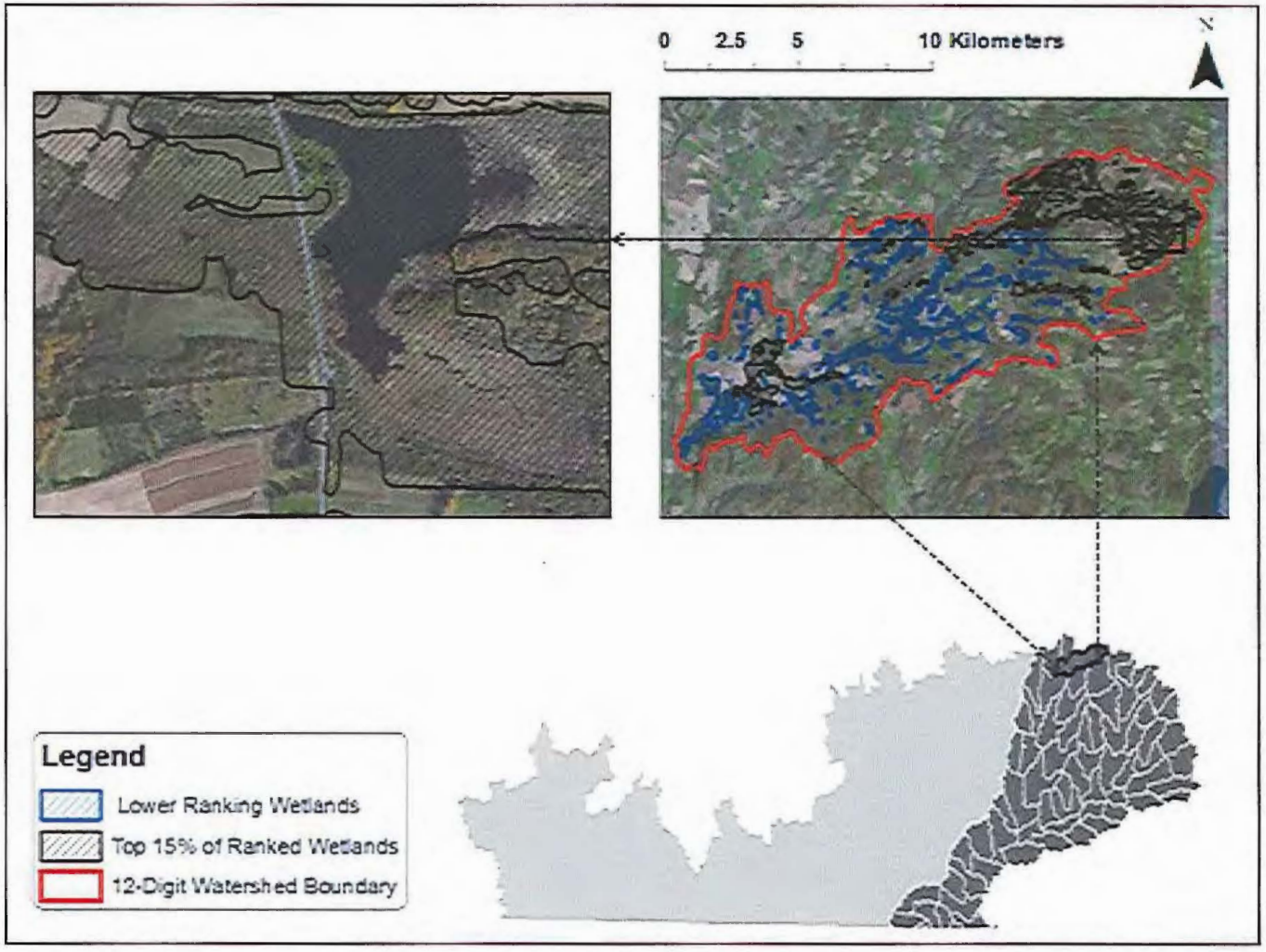
Cohocton/Chemung Service Area: Punky Hollow-Cohocton River 12 digit HUC. Our analysis indicated areas where we already work are priority focal areas, this site lies near a Natural Heritage Program designated dwarf shrub bog (a rare community type for New York State).



Cayuta/Catatonk/Owego Service Area: Headwaters of Cayuta Creek 12 Digit HUC.



Tioughnioga/Chenango River Service Area: Payne Brook 12 Digit HUC.



Unadilla/Susquehanna Service Area: Headwaters of the Unadilla River 12 Digit HUC. Example includes a high quality remnant calcareous fen likely to support rare species (left), restoration potential to northwest.

References

Bedford B. L., K. S. Godwin. 2003. Fens of the United Sates: Distribution, characteristics, and scientific connection versus legal isolation. Wetlands **23**:608-629.

Edinger G. J., D. J. Evans, S. Bebbauer, T. M. Howard, D. M. Hunt, and A. M. and Olivero. 2002. Ecological communities of New York State. A revised and expanded edition of Carol Reschke's Ecological Communities of New York State. (Draft for review). New York Natural Heritage Program, Albany, NY.

Elith J., C. H. Graham, R. P. Anderson, M. Dudik, S. Ferrier, A. A. Guisan, R. J. Hijmans, F. Huettmann, J. R. Leathwick, A. Lehmann, J. Li, L. G. Lohmann, B. A. Loiselle, G. Manion, C. Moritz, M. Nakamura, Y. Nakazawa, J. McC. Overton, A. T. Peterson, S. J. Phillips, K. R. Richardson, S. Scachetti-Pereira Robert E., J. Soberon, S. Williams, M. S. Wisz, and N. E. Zimmermann. 2006. Novel methods improve prediction of species' distributions from occurrence data. Ecography **29**:129-151.

Phillips S. J., R. P. Anderson, and R. E. Schapire. 2006. Maximum entropy modeling of species geographic distributions. Ecological Modelling **190**:231-259.

Karraker N. E., J. P. Gibbs, and J. R. Vonesh. 2008. Impacts of road deicing salt on the demography of vernal pool-breeding amphibians. Ecological Applications **18**:724-734.

Kaushal S. S., P. M. Groffman, G. E. Likens, K. T. Belt, W. P. Stack, V. R. Kelly, L. E. Band, and G. T. Fisher. 2005. Increased salinization of fresh water in the northeastern United States. Proceedings of the National Academy of Sciences of the United States of America **102**:13517-13520.

MacArthur R. H., E. O. Wilson. 1963. An equilibrium theory of insular zoogeography. Evolution **17**:373-387.

NYNHP. 2011. Rare species and community occurrences, Biodiversity Databases, Element Occurrence Record Digital Data Set. New York Natural Heritage Program, Albany, NY.

Version 1.0	**Susquehanna Rapid Pre- and Post Assessment Method for Wetland Categorization**	
	Background Information **Scoring Boundary Worksheet** **Narrative Rating** **Field Form Quantitative Rating** **SUSRAM Summary Worksheet** **Wetland Categorization Worksheet**	Interim In-Lieu Fee Assessment support for Susquehanna Service areas in NY

Instructions

The Narrative Rating is designed to categorize a wetland or to provide alerts to the Rater based on the presence or possible presence of threatened or endangered species. The presence or proximity of such species is often an indicator of an uncommon wetland community of disproportionate conservation importance for our region.. This form is designed to categorize wetlands as low quality (Category 1) or high quality (Category 3) regardless of the wetland's score on the Quantitative Rating. In addition, the Narrative Rating also alerts the investigator that a particular wetland *may* be a Category 3 wetland, again, regardless of the wetland's score on the Quantitative Rating.

It is *IMPORTANT* to properly and thoroughly answer each of the questions in the SUSRAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to Scoring Boundary worksheet and the User's Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

Background Information

Name:
Date:
Affiliation:
Address:
Phone Number:
e-mail address:
Name of Wetland:
Vegetation Communit(ies):
HGM Class(es):
Location of Wetland: Include map, address, north arrow, landmarks, distances, roads, etc.

Lat/Long or UTM Coordinate	
USGS Quad Name	
County	
Township	
Hydrologic Unit Code	
Site Visit	
National Wetland Inventory Map	
Soil Survey	
Delineation report/map	

Name of Wetland:	
Wetland Size (acres, hectares):	
Sketch: Include north arrow, relationship with other surface waters, vegetation zones, etc.	
Comments, Narrative Discussion, Justification of Category Changes:	
Final score :	**Category:**

Scoring Boundary Worksheet

INSTRUCTIONS. The initial step in completing the SUSRAM is to identify the "scoring boundaries" of the wetland being rated. In many instances this determination will be relatively easy and the scoring boundaries will coincide with the "jurisdictional boundaries." For example, the scoring boundary of an isolated cattail marsh located in the middle of a farm field will likely be the same as that wetland's jurisdictional boundaries. In other instances, however, the scoring boundary will not be as easily determined. Wetlands that are small or isolated from other surface waters often form large contiguous areas or heterogeneous complexes of wetland and upland. In separating wetlands for scoring purposes, the hydrologic regime of the wetland is the main criterion that should be used. Boundaries between contiguous or connected wetlands should be established where the volume, flow, or velocity of water moving through the wetland changes significantly. *Areas with a high degree of hydrologic interaction should be scored as a single wetland.* In determining a wetland's scoring boundaries, use the guidelines in the SUSRAM Manual Section 5.0. In certain instances, it may be difficult to establish the scoring boundary for the wetland being rated. These problem situations include wetlands that form a patchwork on the landscape, wetlands divided by artificial boundaries like property fences, roads, or railroad embankments, wetlands that are contiguous with streams, lakes, or rivers, and estuarine or coastal wetlands.

#	Steps in properly establishing scoring boundaries	done?	not applicable
Step 1	Identify the wetland area of interest. This may be the site of a proposed impact, a reference site, conservation site, etc.		
Step 2	Identify the locations where there is physical evidence that hydrology changes rapidly. Such evidence includes both natural and human-induced changes including, constrictions caused by berms or dikes, points where the water velocity changes rapidly at rapids or falls, points where significant inflows occur at the confluence of rivers, or other factors that may restrict hydrologic interaction between the wetlands or parts of a single wetland.		
Step 3	Delineate the boundary of the wetland to be rated such that all areas of interest that are contiguous to and within the areas where the hydrology does not change significantly, i.e. areas that have a high degree of hydrologic interaction are included within the scoring boundary.		
Step 4	Determine if artificial boundaries, such as property lines, state lines, roads, railroad embankments, etc., are present. <u>These should not be used to establish scoring boundaries unless they coincide with areas where the hydrologic regime changes.</u>		
Step 5	In all instances, the Rater may enlarge the minimum scoring boundaries discussed here to score together wetlands that could be scored separately.		
Step 6	Consult SUSRAM Manual Section 5.0 for how to establish scoring boundaries for wetlands that form a patchwork on the landscape, divided by artificial boundaries, contiguous to streams, lakes or rivers, or for dual classifications.		

End of Scoring Boundary Determination. Begin Narrative Rating on next page.

Narrative Rating

INSTRUCTIONS. Answer each of the following questions. Questions 1, 2, 3 and 4 should be answered based on information obtained from the site visit or the literature or the MaxEnt Prediction Model.
The remaining questions are designed to be answered primarily by the results of the site visit. Note: "Critical habitat" is legally defined in the Endangered Species Act and is the geographic area containing physical or biological features essential to the conservation of a listed species or as an area that may require special management considerations or protection.
"Documented" means the wetland is listed in the appropriate State of New York database.

#	Question	Circle one	
1	**Critical Habitat.** Is the wetland in a township, section, or subsection of a United States Geological Survey 7.5 minute Quadrangle that has been designated by the U.S. Fish and Wildlife Service as "critical habitat" for any threatened or endangered plant or animal species? Use USC GIS Wetland Model Coverage Boundaries	YES Wetland should be evaluated for possible Category 3 status Go to Question 2	NO Go to Question 2
2	**Threatened or Endangered Species.** Is the wetland known to contain an individual of, or documented occurrences of federal or state-listed threatened or endangered plant or animal species? "Use USC GIS Wetland Coverage Model Boundaries or other appropriate data"	YES Wetland is a Category 3 wetland. Go to Question 3	NO Go to Question 3
3	**Documented High Quality Wetland.** Is the wetland on record in Natural Heritage Database as a high quality wetland? "Use USC GIS Wetland Coverage Model Boundaries	YES Wetland is a Category 3 wetland Go to Question 4	NO Go to Question 4
4	**Significant Breeding or Concentration Area.** Does the wetland contain documented regionally significant breeding or nonbreeding waterfowl, neotropical songbird, or shorebird concentration areas? Use USC GIS Wetland Model Coverage Boundaries	YES Wetland is a Category 3 wetland Go to Question 5	NO Go to Question 5
5	**Category 1 Wetlands.** Is the wetland less than 0.5 hectares (1 acre) in size and **hydrologically isolated** and either 1) comprised of vegetation that is dominated (greater than eighty per cent areal cover) by invasive species: *e.g., Phalaris arundinacea, Lythrum salicaria,* or *Phragmites australis*, or 2) is on the list of NY Heritage designated as Palustrine Cultural? (see belo w	YES Wetland is a Category 1 wetland Go to Question 6	NO Go to Question 6
6	**Bogs.** Is the wetland a peat-accumulating wetland that 1) has no significant inflows or outflows, 2) supports acidophilic mosses, particularly *Sphagnum* spp.., 3) the acidophilic mosses have >30% cover, 4) at least one species from Table 1 is present, and 5) the cover of invasive species (see Table 1) is <25%? Use USC GIS Wetland Model BoundarieCoverage Boundaries and	YES Wetland is a Category 3 wetland Go to Question 7	NO Go to Question 7
7	**Fens.** Is the wetland) saturated during most of the year, primarily by a discharge , mineral rich, ground water with a circumneutral ph (5.5-9.0) and dominated by >30% cover ofone or more plant species listed in Table 1 and the cover of invasive species listed in Table 1 is <25%? Use USC GIS Wetland Model Boundaries and site visits	YES Wetland is a Category 3 wetland Go to Question 8a	NO Go to Question 8a
8a	**"Old Growth Forest."** Is the wetland a forested wetland and is the forest characterized by, but not limited to, the following characteristics: overstory canopy trees of great age (exceeding at least 50% of a projected maximum attainable age for a species); little or no evidence of human-caused understory disturbance during the past 80 to 100 years; an all-aged structure and multilayered canopies; aggregations of canopy trees interspersed with canopy gaps; and significant numbers of standing dead snags and downed logs - (review 1930's aerial	YES Wetland is a Category 3 wetland. Go to Question 8b	NO Go to Question 8b

8b	**Mature forested wetlands.** Is the wetland a forested wetland with 50% or more of the cover of upper forest canopy consisting of trees with large diameters at breast height (dbh), generally diameters greater than 45cm (17.7in) dbh? site visit and transect	YES Wetland should be evaluated for possible Category 3 status. Go to Question 9a	NO Go to Question 9a
9a	Does the wetland have a predominance of native species within its vegetation communities, although non-native or disturbance tolerant native species can also be present?	YES Wetland is a Category 3 wetland Go to Question 10	NO Go to Question 9b
b	Does the wetland have a predominance of non-native or disturbance tolerant native plant species within its vegetation communities?	YES Wetland should be evaluated for possible Category 3 status Complete Quantitative Rating	NO Complete Quantitative Rating

C. PALUSTRINE CULTURAL

1. Reverted drained muckland:
Distribution: throughout upstate New York, north of the Coastal Lowlands ecozone. ***Rank:* G5 S5**

2. Impounded marsh:
Distribution: throughout upstate New York, north of the Coastal Lowlands ecozone. ***Rank:* G5 S5**

3. Impounded swamp
Distribution: throughout upstate New York, north of the Coastal Lowlands ecozone. ***Rank:* G5 S5**

4. Reedgrass/purple loosestrife marsh:
Distribution: throughout New York State. ***Rank:* G5 S5**

5. Dredge spoil wetland:
Distribution: throughout New York State. ***Rank:* G5 S5**

6. Mine spoil wetland ***Rank:* G5 S5**

7. Water recharge basin:
Distribution: throughout New York State. ***Rank:* G5 S5**

Table 1. Characteristic plant species.

invasive/exotic spp.	fen species	bog species
Hydrilla verticilata	*Alnus incana* spp.. *rugosa*	*Andromeda polifolia*
Lythrum salicaria	*Calamagrostis candensis*	*Calla palustris*
Myriophyllum spicatum	*Carex flava*	*Carex atlantica* var. *capillacea*
Najas minor	*Carex lasiocarpa*	*Carex echinata*
Phalaris arundinacea	*Carex sterilis*	*Carex oligosperma*
Phragmites australis	*Carex stricta*	*Carex trisperma*
Potamogeton crispus	*Chara vulgaris*	*Chamaedaphne calyculata*
Ranunculus ficaria	*Cladium mariscoides*	*Decodon verticillatus*
Rhamnus frangula	*Cornus sericea*	*Eriophorum virginicum*
Rhamnus cathartica	*Cypripedium reginae*	*Larix laricina*
Typha angustifolia	*Drosera intermedia*	*Picea mariana*
Typha x *glauca*	*Equisetum fluviatile*	*Nemopanthus mucronatus*
	Eriphorum viride-carinatum	*Sarracenia purpurea*
	Geum rivale	*Drosera intermedia*
	Larix laricina	*Schechzeria palustris*
	Lobelia kalmii	*Sphagnum* spp.
	Menyanthes trifoliate	*Vaccinium macrocarpon*
	Muhlenbergia glomerata	*Vaccinium corymbosum*
	Parnassia glauca	*Vaccinium oxycoccos*
	Pogonia ophioglossoides	*Woodwardia virginica*
	Potentilla fruticosa	*Xyris difformis*
	Rhamnus alnifolia	
	Rhynchospora alba	
	Salix candida	
	Salix pedicellaris	
	Solidago patula	
	Solidago uliginosa	
	Sphagnum teres	
	Sphagnum warnstorfii	
	Thuja occidentalis	

End of Narrative Rating. Begin Quantitative Rating on next page.

SUSRAM v. 1.0 Field Form Quantitative Rating

Site:	Rater(s):	Date:

Metric 1. Wetland Area (size).

max 6 pts. subtotal

Select one size class and assign score.

- ☐ >50 acres (>20.2ha) (6 pts)
- ☐ 25 to <50 acres (10.1 to <20.2ha) (5 pts)
- ☐ 10 to <25 acres (4 to <10.1ha) (4 pts)
- ☐ 3 to <10 acres (1.2 to <4ha) (3 pts)
- ☐ 0.3 to <3 acres (0.12 to <1.2ha) (2pts)
- ☐ 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
- ☐ <0.1 acres (0.04ha) (0 pts)

Metric 2. Upland buffers and surrounding land use.

max 14 pts. subtotal

2a. Calculate average buffer width. Select only one and assign score. Do not double check.

- ☐ WIDE. Buffers average 50m (164ft) or more around wetland perimeter (7)
- ☐ MEDIUM. Buffers average 25m to <50m (82 to <164ft) around wetland perimeter (4)
- ☐ NARROW. Buffers average 10m to <25m (32ft to <82ft) around wetland perimeter (1)
- ☐ VERY NARROW. Buffers average <10m (<32ft) around wetland perimeter (0)

2b. Intensity of surrounding land use. Select one or double check and average.

- ☐ VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
- ☐ LOW. Old field (>10 years), shrub land, young second growth forest. (5)
- ☐ MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field. (3)
- ☐ HIGH. Urban, industrial, open pasture, row cropping, mining, construction. (1)

Metric 3. Hydrology.

max 30 pts. subtotal

3a. Sources of Water. Score all that apply.

- ☐ High pH groundwater (5)
- ☐ Other groundwater (3)
- ☐ Precipitation (1)
- ☐ Seasonal/Intermittent surface water (3)
- ☐ Perennial surface water (lake or stream) (5)

3b. Connectivity. Score all that apply.

- ☐ 100 year floodplain (1)
- ☐ Between stream/lake and other human use (1)
- ☐ Part of wetland/upland (e.g. forest), complex (1)
- ☐ Part of riparian or upland corridor (1)

3c. Maximum water depth. Select only one and assign score.

- ☐ >0.7 (27.6in) (3)
- ☐ 0.4 to 0.7m (15.7 to 27.6in) (2)
- ☐ <0.4m (<15.7in) (1)

3d. Duration inundation/saturation. Score one or dbl check.

- ☐ Semi- to permanently inundated/saturated (4)
- ☐ Regularly inundated/saturated (3)
- ☐ Seasonally inundated (2)
- ☐ Seasonally saturated in upper 30cm (12in) (1)

3e. Modifications to natural hydrologic regime. Score one or double check and average.

- ☐ None or none apparent (12)
- ☐ Recovered (7)
- ☐ Recovering (3)
- ☐ Recent or no recovery (1)

Check all disturbances observed

- ☐ ditch
- ☐ tile
- ☐ dike
- ☐ weir
- ☐ stormwater input
- ☐ point source (nonstormwater)
- ☐ filling/grading
- ☐ road bed/RR track
- ☐ dredging
- ☐ other

Metric 4. Habitat Alteration and Development.

max 20 pts. subtotal

4a. Substrate disturbance. Score one or double check and average.

- ☐ None or none apparent (4)
- ☐ Recovered (3)
- ☐ Recovering (2)
- ☐ Recent or no recovery (1)

4b. Habitat development. Select only one and assign score.

- ☐ Excellent (7)
- ☐ Very good (6)
- ☐ Good (5)
- ☐ Moderately good (4)
- ☐ Fair (3)
- ☐ Poor to fair (2)
- ☐ Poor (1)

4c. Habitat alteration. Score one or double check and average.

- ☐ None or none apparent (9)
- ☐ Recovered (6)
- ☐ Recovering (3)
- ☐ Recent or no recovery (1)

Check all disturbances observed

- ☐ mowing
- ☐ grazing
- ☐ clearcutting
- ☐ selective cutting
- ☐ woody debris removal
- ☐ toxic pollutants
- ☐ shrub/sapling removal
- ☐ herbaceous/aquatic bed removal
- ☐ sedimentation
- ☐ dredging
- ☐ farming
- ☐ nutrient enrichment

subtotal this page

Site:	Rater(s):	Date:

subtotal first page

Metric 5. Special Wetlands.

max 10 pts. subtotal

Check all that apply and score as indicated.

- [ ] Bog (10)
- [ ] Fen (10)
- [ ] Old growth forest (10)
- [ ] Mature forested wetland (5)
- [ ] Sedge Meadow (5)
- [ ] Vernal Pool (3)
- [ ] Harbors NY Species of Special Concern (5)
- [ ] Known occurrence state/federal threatened or endangered species (10)
- [ ] Significant migratory songbird/water fowl habitat or usage (10)
- [ ] Category 1 Wetland. See Question 1 Qualitative Rating (-10)

Metric 6. Plant communities, interspersion, microtopography.

max 20 pts. subtotal

6a. Wetland Vegetation Communities.
Score all present using 0 to 3 scale.

- [ ] Aquatic bed
- [ ] Emergent
- [ ] Shrub
- [ ] Forest
- [ ] Mudflats
- [ ] Open water
- [ ] Other_____

6b. horizontal (plan view) Interspersion.
Select only one.

- [ ] High (5)
- [ ] Moderately high(4)
- [ ] Moderate (3)
- [ ] Moderately low (2)
- [ ] Low (1)
- [ ] None (0)

6c. Coverage of invasive plants. Refer to Table 1 SUSRAM long form for list.
Add or deduct points for coverage

- [ ] Extensive >75% cover (-5)
- [ ] Moderate 25-75% cover (-3)
- [ ] Sparse 5-25% cover (-1)
- [ ] Nearly absent <5% cover (0)
- [ ] Absent (1)

6d. Microtopography.
Score all present using 0 to 3 scale.

- [ ] Vegetated hummucks/tussucks
- [ ] Coarse woody debris >15cm (6in)
- [ ] Standing dead >25cm (10in) dbh
- [ ] Amphibian breeding pools

Vegetation Community Cover Scale

0	Absent or comprises <0.1ha (0.2471 acres) contiguous area
1	Present and either comprises small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
2	Present and either comprises significant part of wetland's vegetation and is of moderate quality or comprises a small part and is of high quality
3	Present and comprises significant part, or more, of wetland's vegetation and is of high quality

Narrative Description of Vegetation Quality

low	Low spp. diversity and/or predominance of nonnative or disturbance tolerant native species
mod	Native spp. are dominant component of the vegetation, although nonnative and/or disturbance tolerant native spp. can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare threatened or endangered spp.
high	A predominance of native species, with nonnative spp. and/or disturbance tolerant native spp. absent or virtually absent, and high spp. diversity and often, but not always, the presence of rare, threatened, or endangered spp.

Mudflat and Open Water Class Quality

0	Absent <0.1ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 to <4ha (2.47 to 9.88 acres)
3	High 4ha (9.88 acres) or more

Microtopography Cover Scale

0	Absent
1	Present very small amounts or if more common of marginal quality
2	Present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of highest quality

End of Quantitative Rating. Complete Categorization Worksheets

SUSRAM Summary Worksheet

		circle answer or insert score	Result
Narrative Rating	Question 1 Critical Habitat	YES NO	If yes, Category 3.
	Question 2. Threatened or Endangered Species	YES NO	If yes, Category 3.
	Question 3. High Quality Natural Wetland	YES NO	If yes, Category 3.
	Question 4. Significant bird habitat	YES NO	If yes, Category 3.
	Question 5. Category 1 Wetlands	YES NO	If yes, Category 1.
	Question 6. Bogs	YES NO	If yes, Category 3.
	Question 7. Fens	YES NO	If yes, Category 3.
	Question 8a. Old Growth Forest	YES NO	If yes, Category 3.
	Question 8b. Mature Forested Wetland	YES NO	If yes, evaluate for Category 3; may also be 1 or 2.
	Question 9b. Lake Erie Wetlands - Restricted	YES NO	If yes, evaluate for Category 3; may also be 1 or 2.
Quantitative Rating	Metric 1. Size		
	Metric 2. Buffers and surrounding land use		
	Metric 3. Hydrology		
	Metric 4. Habitat		
	Metric 5. Special Wetland Communities		
	Metric 6. Plant communities, interspersion, microtopography		
	TOTAL SCORE		Category based on score breakpoints

Complete Wetland Categorization Worksheet.

SUSRAM Summary Worksheet

		circle answer or insert score	Result
Narrative Rating	Question 1 Critical Habitat	YES NO	If yes, Category 3.
	Question 2. Threatened or Endangered Species	YES NO	If yes, Category 3.
	Question 3. High Quality Natural Wetland	YES NO	If yes, Category 3.
	Question 4. Significant bird habitat	YES NO	If yes, Category 3.
	Question 5. Category 1 Wetlands	YES NO	If yes, Category 1.
	Question 6. Bogs	YES NO	If yes, Category 3.
	Question 7. Fens	YES NO	If yes, Category 3.
	Question 8a. Old Growth Forest	YES NO	If yes, Category 3.
	Question 8b. Mature Forested Wetland	YES NO	If yes, evaluate for Category 3; may also be 1 or 2.
	Question 9b. Lake Erie Wetlands - Restricted	YES NO	If yes, evaluate for Category 3; may also be 1 or 2.
Quantitative Rating	Metric 1. Size		
	Metric 2. Buffers and surrounding land use		
	Metric 3. Hydrology		
	Metric 4. Habitat		
	Metric 5. Special Wetland Communities		
	Metric 6. Plant communities, interspersion, microtopography		
	TOTAL SCORE		Category based on score breakpoints

Complete Wetland Categorization Worksheet.

Wetland Categorization Worksheet

Choices	Circle one		Evaluation of Categorization Result of SUSRAM
Did you answer "Yes" to any of the following questions: Narrative Rating Nos. 2, 3, 4, 6, 7, 8a, 9d	YES Wetland is categorized as a Category 3 wetland	NO	Is quantitative rating score *less* than the Category 2 scoring threshold (*excluding* gray zone)? If yes, reevaluate the category of the wetland using the biological and/or functional assessments to determine if the wetland has been over- categorized by the SUSRAM
Did you answer "Yes" to any of the following questions: Narrative Rating Nos. 1, 8b, 9e	YES Wetland should be evaluated for possible Category 3 status	NO	Evaluate the wetland using the 1) narrative criteria and 2) the quantitative rating score. If the wetland is determined to be a Category 3 wetland using either of these, it should be categorized as a Category 3 wetland. Detailed biological and/or functional assessments may also be used to determine the wetland's category.
Did you answer "Yes" to Narrative Rating No. 5	YES Wetland is categorized as a Category 1 wetland	NO	Is quantitative rating score *greater* than the Category 2 scoring threshold *(including* any gray zone)? If yes, reevaluate the category of the wetland using the narrative criteria and biological and/or functional assessments to determine if the wetland has been under-categorized by the SUSRAM
Does the quantitative score fall within the scoring range of a Category 1, 2, or 3 wetland?	YES Wetland is assigned to the appropriate category based on the scoring range	NO	If the score of the wetland is located within the scoring range for a particular category, the wetland should be assigned to that category. In all instances however, the narrative criteria can be used to clarify or change a categorization based on a quantitative score.
Does the quantitative score fall with the *"gray zone"* for Category 1 or 2 or Category 2 or 3 wetlands?	YES Wetland is assigned to the higher of the two categories or assigned to a category based on detailed assessments and the narrative criteria	NO	Rater has the option of assigning the wetland to the higher of the two categories or to assign a category based on the results of a non-rapid wetland assessment method, e.g. functional assessment, biological assessment, etc, and a consideration of the narrative criteria.
Does the wetland otherwise exhibit *moderate OR superior* hydrologic OR habitat, OR recreational functions AND the wetland was *not* categorized as a Category 2 wetland (in the case of moderate functions) or a Category 3 wetland (in the case of superior functions) by this method?	YES Wetland was undercategorized by this method. A written justification for recategorization should be provided on Background Information Form	NO Wetland is assigned to category as determined by the SUSRAM.	A wetland may be undercategorized using this method, but still exhibit one or more superior functions, e.g. a wetland's biotic communities may be degraded by human activities, but the wetland may still exhibit superior hydrologic functions because of its type, landscape position, size, local or regional significance, etc. In this circumstance, the narrative criteria are controlling, and the under-categorization should be corrected. A written justification with supporting reasons or information for this determination should be provided.

Note: Interim SUSRAM Score is based on the Ohio RAM analysis rating breakpoints

Category	SusRAM Rating
1	0 -34.9
2	35 - 59.9
3	60-100

End of NY Susquehanna Rapid Assessment Method for Wetlands

APPENDIX E

Susquehanna Basin Headwaters In-Lieu Fee Program: USC Resolution

Resolution by the Upper Susquehanna Coalition (USC), 11 January 2013, Bi-monthly Meeting, Public Safety Building, Owego, NY 13827, page 1 of 2

Whereas the Upper Susquehanna Coalition of County Soil and Water Conservation Districts, under a memorandum of understanding signed by all members as well as New York State, works on watershed issues within NY's Susquehanna River watershed, and

Whereas the USC has a Memorandum of Agreement with The Wetland Trust (TWT) to share staff and equipment for benefits to both parties, and

Whereas the USC is knowledgeable about all aspects of wetland mitigation and specifically has re-established wetlands in the past for mitigation, following exact Corps criteria as described in Federal Register Volume 73, Number 70, 33CFR 332.4, and

Whereas the USC believes no net loss of wetlands in its Basin is an important objective,

Now Therefore Be It Resolved the USC will commit to provide construction services to re-establish or establish wetlands for the TWT to meet its financial assurance requirements as described in the TWT's Susquehanna Basin Headwaters In-Lieu Fee Program Instrument, and

Be It Further Resolved the USC will request the USC Chair to sign the Instrument to ensure its commitment to provide construction services, with the commitment binding on each and every USC member that has signed this resolution, which will attached to said Instrument.

Adopted, 11 January 2012 by a vote of _____10_____ for and _____1___ against.

Note: Construction services include land manipulation during initial design and construction at the site, plants and planting, site monitoring and adaptive measure to ensure the site meets its success criteria.

Attached on the following two pages is the original signed resolution.

Resolution
by the Upper Susquehanna Coalition (USC)
11 January 2013
Bi-monthly Meeting
Public Safety Building
Owego, NY 13827

Whereas the Upper Susquehanna Coalition (USC) of county soil and water conservation districts, under a memorandum of understanding signed by all members as well as New York State, works on watershed issues within NY's Susquehanna River watershed, and

Whereas the USC has a Memorandum of Agreement with The Wetland Trust (TWT) to share staff and equipment for benefits to both parties, and

Whereas the USC is knowledgeable about all aspects of wetland mitigation and specifically has re-established wetlands in the past for mitigation, following exact US Army Corps of Engineers criteria as described in Federal Register Volume 73, Number 70, 33CFR 332.4, and

Whereas the USC believes no net loss of wetlands in its Basin is an important objective,

Now Therefore Be It Resolved the USC will commit to provide construction services to re-establish or establish wetlands for the TWT to meet its financial assurance requirements as described in the TWT's Susquehanna Basin Headwaters In-Lieu Fee Program Instrument, and

Be It Further Resolved the USC will request the USC Chair to sign the Instrument to ensure its commitment to provide construction services, with the commitment binding on each and every USC member that has signed this resolution, which will be attached to said Instrument.

Adopted, 11 January 2012 by a vote of 10 for and 1 against.

Signatures and counties:

by	title	county	date
	Executive Director	Delaware	1/11/13
	Manager	Madison	1/11/13
	Manager	Schuyler	1/11/13
	Manager	Otsego	1/11/13
	Manager	Steuben	1/11/13
	Executive Director	Broome	1/11/13
	Manager	Tioga	1/10/13

Resolution
by the Upper Susquehanna Coalition (USC)
11 January 2013
Bi-monthly Meeting
Public Safety Building
Owego, NY 13827

by	title	county	date
Mark W. Watts	District Manager	Chemung	2-12-2013
Amanda C. Barber	District Manager	Cortland	6-11-13