TWT NY Hudson River Bank

A Prospectus for the
TWT NY Hudson River
Wetland Mitigation Umbrella Bank

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

Prepared by: The Wetland Trust
4729 State Route 414, Burdett, NY 14818

www.thewetlandtrust.org

Submitted to:
United States Army Corps of Engineers
Internal Review Team

November 2018

Table of Contents

1. Goals and Objectives

The goals of the **NY Hudson River Wetland Mitigation Umbrella Bank** are to provide wetland reestablishment/establishment, rehabilitation/enhancement, and preservation services for compensation of wetland loss, while also aiding rare and declining reptiles and amphibians. The objectives to meet these goals are:

- To meet USACE mitigation bank requirements developed under Part 332.8, Federal Register Volume 73, Number 70.
- To provide general mitigation services to the entire NY Hudson Estuary Watershed where no Wetland Bank or In Lieu Fee Program exists.
- To establish service areas whose watershed encompasses similar geographical and geological characteristics.
- To enhance wetland services (e.g., habitat improvement, movement corridors) in the region's critical area of documented and potential habitat for such species as the federally-threatened Bog Turtle* (*Glyptemys muhlenbergii*), New York state-threatened Blanding's Turtle (*Emydoidea blandingii*), and New York state-endangered Northern Cricket Frog *(Acris crepitans*).
- To aid other special concern amphibian and reptile species within the Bank service areas.
- To enhance wetland services in the East of Hudson portion of the New York City Water Supply Watershed.
- To provide, where possible, mitigation credits that also meet USFWS conservation needs, goals and requirements.

**Species location information will not be made public*

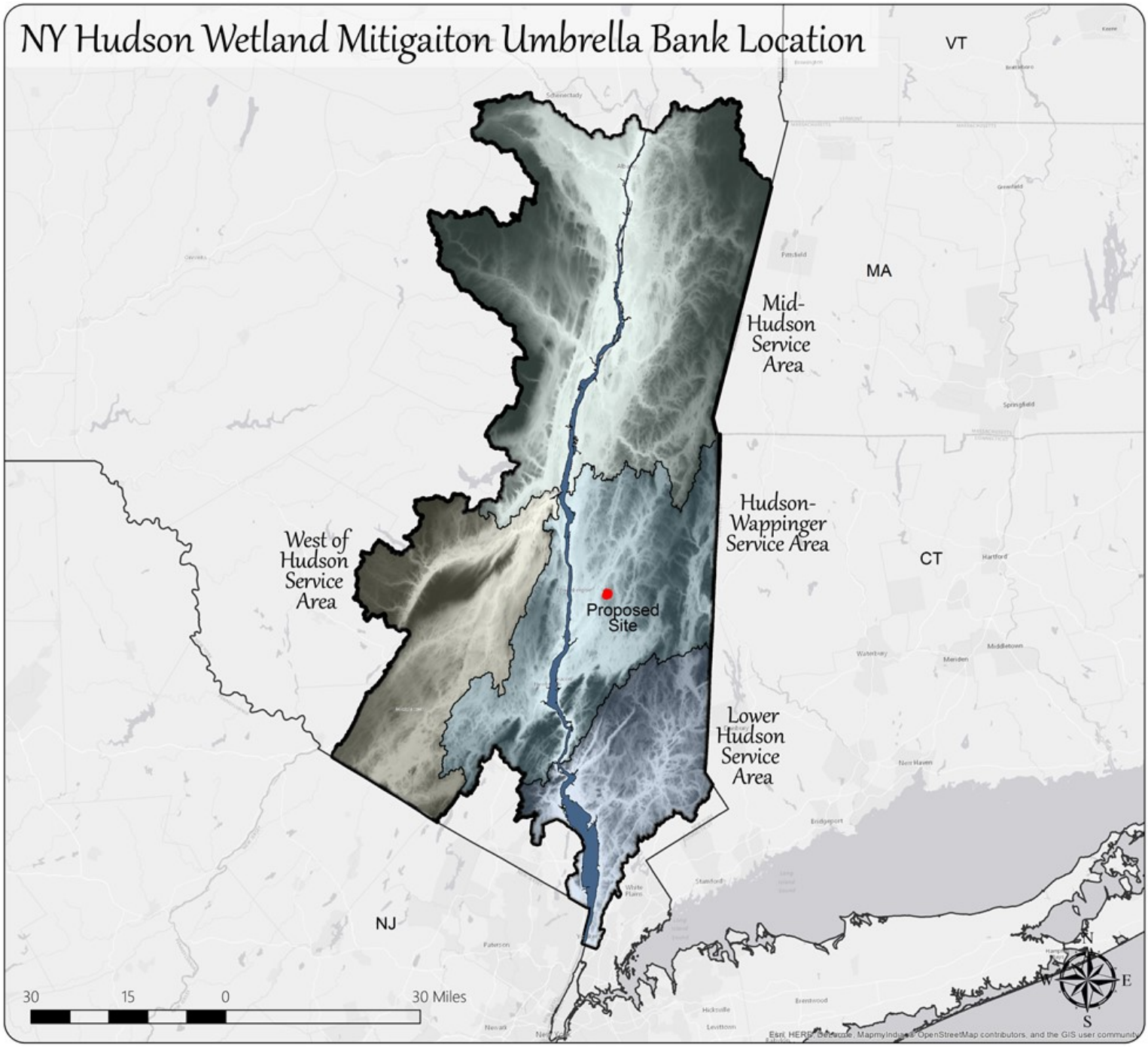


Figure 1. General location of proposed NY Hudson Wetland Mitigation Umbrella Bank.

2. Bank Establishment and Operations

2.1 Establishment

Federal law provides for a priority order of preference for wetland mitigation to use a Mitigation Bank, then an In-Lieu Fee Program and finally a permittee-responsible project. The Hudson River region presently has only permittee-responsible mitigation available and the proposed umbrella bank will fulfill a need for scientifically based regional comprehensive mitigation services.

This Prospectus describes a Wetland Mitigation Umbrella Bank composed of four service areas supporting, when fully functional, multiple independent sites, each developed following its own specific mitigation plan. Having multiple sites will provide a better dispersal of mitigation benefits to each service area, target the highest of quality sites and provide for additional services on a watershed scale. For example, the Bank Instrument's overall footprint covers the full extent of critical habitat for the Bog Turtle, Blanding's Turtle, and Northern Cricket Frog in NY's Hudson and Housatonic Regions. Using multiple sites will not only help make mitigation benefits be more local to the impacts but provide the opportunity to develop sites that will help with targeted species habitat needs and conductivity, a Bank objective, something that one large centralized bank site could not accomplish.

The Wetland Trust (TWT) will be the Bank sponsor and administrator for all bank operations (e.g., site development, credit sales, accounting). TWT and The Upper Susquehanna Coalition of Conservation Districts (USC) will provide the scientific and technical support as described in Section 6. Mitigation sites will be composed of properties owned by TWT and possibly other nonprofits, municipal, or private landowners. All sites will be protected in perpetuity under a conservation easement held by a separate conservation organization (i.e., The Wetland Conservancy).

2.2 Operations

2.2.1 Accounting Procedures:

TWT will establish and maintain an accounting system for tracking credit production, credit transactions, and financial transactions between the Bank and permittees.

2.2.2 Legal Responsibility for Providing Compensatory Mitigation:

TWT will assume all legal responsibility for satisfying the mitigation requirements of the Clean Water Act section 404 permits for which fees have been accepted (i.e., the implementation, performance, and long-term management of the compensatory mitigation approved for this proposed Mitigation Bank).

The transfer of liability from the Permittee to the TWT is established by the approval of the proposed banking instrument and receipt by the US Army Corps District Engineer (DE) of a signed and dated TWT credit sale form detailing the amount of credits sold and certifying

transfer of fees from the permittee to TWT. The credit sale form will include:

US Army Corps Permit Number:
Project Name:
Permittee Name:
Permittee Contact Name:
Permittee Address:
Permittee Telephone:
Permittee Contact Email:
Impacted 8-digit HU:
Latitude/Longitude of impacted area:
Authorized Acres impacted:
Resource Type(s) Impacted: Acres of PEM, PSS, PFO
Number of Credits Purchased:

2.2.3 Default Provisions:

Should the District Engineer (DE), acting in consultation with its Internal Revue Team (IRT) determine that the Sponsor is in material default of any provision of a site's Mitigation Plan or the Bank Instrument, may notify the Sponsor that the sale or transfer of any credits from that particular site (or in the case of a Bank Instrument default, all sites) will be suspended until the appropriate deficiencies have been remedied. Upon notice of such suspension, the Sponsor agrees to immediately cease all sale or transfer of mitigation credits until the Corps informs the Sponsor in writing that sales or transfers may be resumed. Should the Sponsor remain in default, the DE, acting in consultation with the IRT, may terminate operation of one or more sites as a bank site; in the case of a Bank Instrument failure, the DE, acting in consultation with the IRT would terminate the entire Bank. Upon termination, the Sponsor agrees to perform and fulfill all obligations relating to credits that were sold or transferred prior to termination, either from the specific site terminated or the entire Bank, depending on the specific circumstances being addressed.

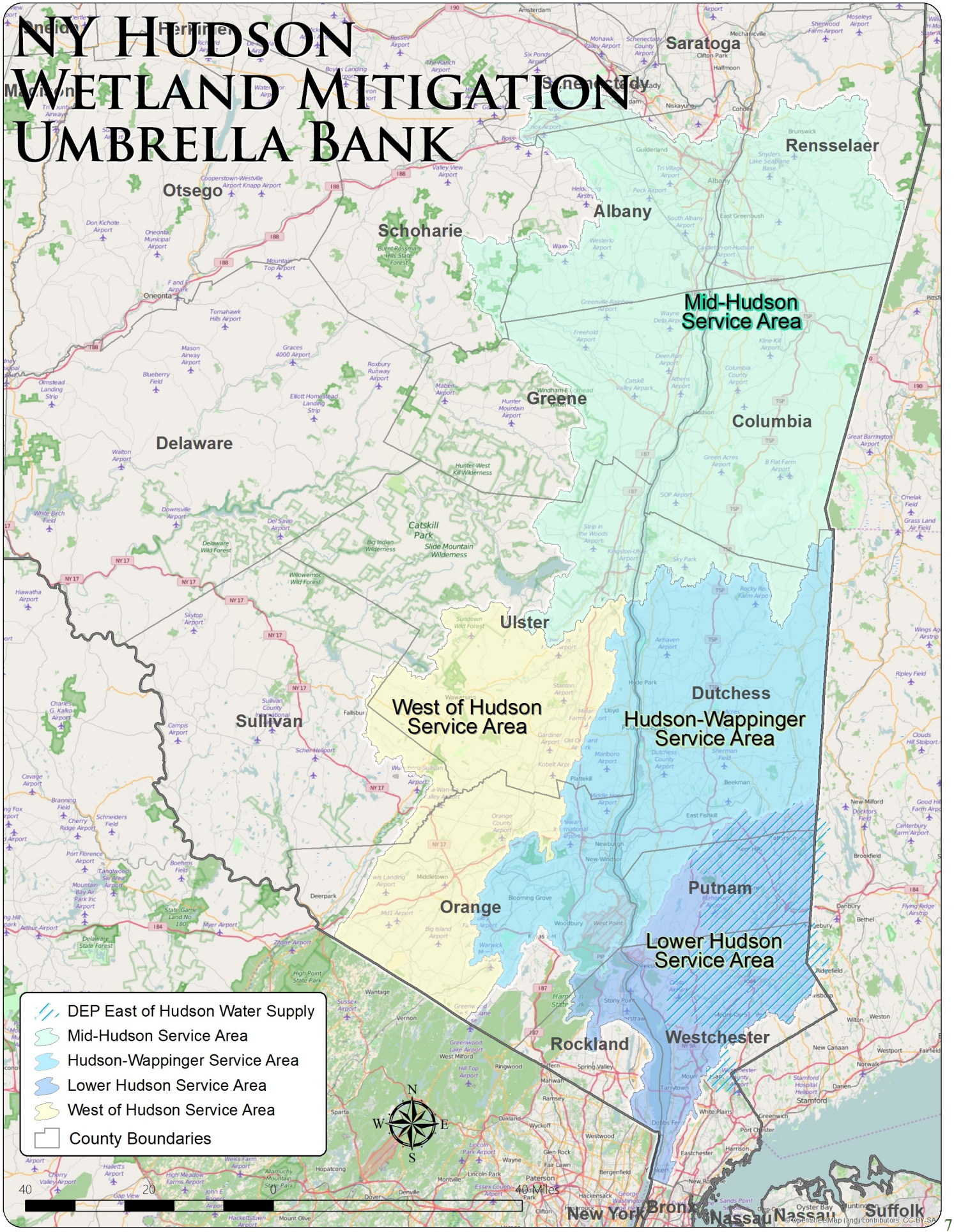
2.2.4 Closure Provisions:

Prior to closure of a bank site, the DE, acting in consultation with the IRT, will perform a final compliance inspection. Bank site closure will occur upon the determination by the DE, acting in consultation with the IRT, and the Sponsor, that all applicable performance measures have been achieved, all available credits for that bank site have been debited or abandoned, and the sponsor has complied with all other terms of the Mitigation Plan and Instrument. Upon bank closure (i.e., all individual sites within the Bank have been closed), no further credit sale or transfer may occur and the period of long-term ownership/stewardship and preservation will commence.

2.2.5 Reporting Protocols

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

Figure 2. Proposed Service Areas in the Hudson River Umbrella Bank



3. Service Areas

The proposed umbrella mitigation bank lies within the Lower New England and Northern Piedmont Ecoregion. It includes four (4) Service Areas (SA), each covering, more or less, an eight (8) digit Hydrological Unit (HU), from west to east, the West of Hudson, Mid-Hudson, Hudson-Wappinger and Lower Hudson (Figure 2). Each SA does not become active until a mitigation plan is approved by the DE, acting in consultation with the IRT, for a site within that SA.

3.1 Hudson River Basin Biological Needs

Service areas were primarily selected to ensure wetland impacts within watersheds would be provided appropriate mitigation. A secondary goal was to add value by targeting sites, to the degree possible, that support amphibian and reptile biodiversity. TWT selected geographic areas based on the distribution of critical habitat for several rare and declining wetland-dependent species including Bog, Blanding's, Spotted, and Wood turtles and the Northern Cricket Frog. Critical habitats were analyzed to encompass both extant and potential (i.e., suitable but undocumented) habitat, including corridors to facilitate seasonal movements and longer-term metapopulation dynamics. The diverse and high-quality habitats required by the aforementioned target species similarly benefit habitat for at least 10 other rare, declining, and/or uncommon reptiles and amphibians described in Table 1.

The secondary goal, when met, will generate additional mitigation credits based upon the enhanced functions provided. For instance, we propose that upland areas, which provide nesting areas for protected aquatic species should generate credits beyond those generated by uplands which merely buffer aquatic areas. For example, where those areas are absolutely necessary to the success of protected aquatic species, and therefore to a crucial biological function the wetland provides those upland area credit requests may be in the range of 4:1.

Table 1. A synopsis of reptiles and amphibians of interest in the TWT NY Hudson River Bank.

Status	Species	Scientific Name	Habitat Needs
NY/CT/NJ Endangered; Federally Threatened	Bog Turtle	*Glyptemys muhlenbergii*	The bog turtle is a semi-aquatic turtle that occurs within wetlands characterized by a mosaic of PEM, PSS, and PFO communities. The hydrology of bog turtle habitat is supported by groundwater, usually in the form of seeps, springs, or direct saturation from shallow water tables. Water levels are shallow (<10 cm) and demonstrate very minimal fluctuation. In southeastern New York, flooding is uncommon in bog turtle habitat, as most sites are located along wetland margins. Surface water may be absent in mid-summer but soils almost always maintain permanent saturation, as high ground-level humidity is critical to the species. Seasonally, bog turtles use PEM and PSS components of wetlands during the active season (May-September). These PEM and PSS communities generally fall under the 'rich fen' classification and feature a high diversity of sedges, forbs, ferns, and mosses, and short-stature shrubs including shrubby cinquefoil, red-osier dogwood, poison sumac, and shrubby willows. A sizeable area of open, short -stature vegetation is required for egg incubation which occurs in moist sedge and moss hummocks. Brumation (October-April) is often within PSS and PFO wetland areas at springheads that discharge among the roots of shrubs and trees. Bog turtles are omnivorous and long-lived.
NY Endangered	Northern Cricket Frog	*Acris crepitans*	The Northern Cricket Frog requires a permanent, open-water breeding habitat located within a forested context that supports spring seeps, rocky crevices, fissures or mammal burrows within which it can brumate. Its breeding area typically consists of shallow, lakes with thickly-vegetated, boggy shorelines and abundant aquatic vegetation, including water lilies and bladderwort. Buttonbush and swamp loosestrife are also common. The lakes in southeastern New York at which the species has been documented are mostly natural (glacial) in origin, although there are some instances of the species utilizing impoundments within modified wetlands. Water chemistry is usual circumneutral. Northern Cricket frogs breed along the shallow margins of the lake May-July. Adults forage along the shoreline and open mudflats and often venture into adjacent wetlands. During late summer, northern cricket frogs disperse from their summer aquatic habitat and seek out areas within adjacent swamps (PFO, PSS) and forested uplands for brumation. Emergence occurs in April, at which time they will aggregate in shallow-water areas, e.g. vernal pools, wet meadows (PEM), intermittent streams, springs, flooded tire ruts, before migrating to their summer breeding habitat at the lake.
NY Threatened	Blanding's Turtle	*Emydoidea blandingii*	The Blanding's turtle is an aquatic turtle that occupies open-water habitats rich in aquatic vegetation. Many populations in southeastern New York are associated with kettle holes, which range from large, marshy lakes and small, shrubby semi-permanent ponds occurring within forested upland or wetland (PFO) settings. The smaller, semi-permanent kettle holes are vulnerable to seasonal drops in water levels, and thus populations of Blanding's turtles that utilize these ponds require nearby aquatic refugia in the form of other kettle holes or alternatives such as such as streams, swamps, ponds, and lakes. As aquatic as they may be, the Blanding's turtle is very adept at overland movement both for seasonal dispersal among core aquatic habitat and nesting. Blanding's turtle requires a very narrow range of soil conditions for incubating their eggs and have been documented traveling over a mile to nest. Blanding's turtle is omnivorous and forages aquatically. Many of the shrubby kettle hole ponds support breeding habitat for vernal pool amphibians, which are an important food spring resource for Blanding's turtle. As a species that travels far and wide to nest and exploit aquatic resources, it is highly vulnerable to habitat fragmentation and road mortality.

Status	Species	Scientific Name	Habitat Needs
NY/CT Special Concern/ CT Declining	Spotted Turtle	*Clemmys guttata*	The spotted turtle is a semi-aquatic turtle that inhabits a wide variety of fresh water wetlands. Spotted turtle populations are generally centered around some form of open-water habitat that may occur in the form of flooded marsh, slow-moving stream, kettle hole, beaver pond, bog, or modified wetland, including drainage ditch, canal, or farm pond. In all cases, the aquatic habitats contain lush emergent and submergent vegetation, which provide spotted turtles with cover, basking substrates, and foraging habitat. Seasonally, spotted turtles exploit various wetlands beyond their core aquatic areas. Vernal pools are favorite foraging areas in the spring; fens are sought for nesting and have been documented supporting juvenile spotted turtles for the first few years of their lives. Spotted turtles nest in loamy upland soils or atop hummocks within wetlands, similar to the bog turtle. Spotted turtles are omnivorous but forage primarily aquatically. Because of their proclivity for utilizing various wetlands throughout the season, they are highly vulnerable to habitat fragmentation and road mortality.
NY/CT Special Concern	Jefferson Salamander	*Ambystoma jeffersonianum*	*Ambystoma* salamanders are large-bodied, woodland species that require seasonal ponds for reproduction. The seasonal, or 'vernal,' ponds occur in many forms and are associated with a wide classification of wetland types. The key feature of vernal ponds is that their seasonal (winter-early summer) hydroperiod inhibits the occurrence of predatory fish, providing a safe haven for salamander eggs and larvae. The most classic vernal pond is that of a 'woodland pool,' which is a glacially-scoured, isolated wetland depression in a wooded, often rocky setting that fills with water from winter precipitation. Other more common seasonal pond habitats used by *Ambystoma* salamanders are shrub swamps (PSS), bottomland swamps (PFO), and seasonally-flooded meadows and marshes (PEM). Breeding occurs in these habitats during March and April in southeastern, NY. Juvenile salamanders emerge in June and July. *Ambystoma* salamanders are often opportunistic, selecting excavated pits, farm ponds, and ditches that hold water seasonally. This attribute makes the species-group very easy to manage for; hundreds of created and/or enhanced wetlands throughout the NE support breeding *Ambystoma*.
NY Special Concern/NJ Endangered	Blue Spotted Salamander	*Ambystoma laterale*	
NY Special Concern	Marbled Salamander	*Ambystoma opacum*	
NY/CT Special Concern	Eastern Box Turtle	*Terrapene carolina*	The eastern box turtle is a terrestrial turtle that uses a wide variety of habitat types. Most closely associated with woodlands and early-successional fields, the eastern box turtle makes fair use of wetlands when they occur in proximity to their preferred upland habitat, particularly for foraging. Margins of PEM wetlands, including marshes, fens, and meadows, are often rich in gastropod prey (slugs, snails), which feed on hydrophtyic plants including skunk cabbage, jewelweed, and boneset. Box turtles are commonly encountered in the late morning hours foraging and post-foraging basking among these species, bearing the hallmark 'slug beard' around their mouths.
NY Special Concern/NJ Threatened	Longtail Salamander	*Eurycea longicauda*	Long-tailed salamanders in southeastern New York are mostly associated with PFO wetlands characterized by woodland streams and springs with cool, flowing water, flat stones, and rocky crevices. Protecting groundwater recharge areas, restoring degraded streams, and maintaining buffers along forested wetlands are critical to maintaining the integrity of long-tailed salamander habitat.

Status	Species	Scientific Name	Habitat Needs
CT Special Concern/ NJ Threatened	Wood Turtle	*Glyptemys insculpta*	The wood turtle is a semi-aquatic turtle that requires large areas of undeveloped land associated with clean, slow-moving rivers or streams. The aquatic component of its natural history generally occurs between October and March, where wood turtles utilize riverine habitats for breeding (Oct-Nov) and eventually brumation (Dec-Mar). From April to September wood turtles are terrestrial, venturing from the rivers into adjacent forested (PFO) and scrub-shrub (PSS) floodplains, meadows/fens (PEM), upland forests, and agricultural areas. During this period, many types of wetlands are used for foraging and cover. Vernal pools and shallow marshes replete with amphibian eggs and larva, and slug-rich fens and meadows are all favorite foraging habitats of wood turtles. In the summer, wood turtles often seek wetlands with thick vegetative cover and saturated soils as refuge from thermal stress. Egg incubation occurs within gravelly or loamy substrates within open riparian corridors or more typically, adjacent areas disturbed by agricultural or mining activities. Little is known about juvenile wood turtles; however, in southeastern New York they are frequently encountered in wet meadows (PEM) and shallow-water habitats associated with riparian zones. Habitat fragmentation and associated road mortality are the biggest threats to wood turtles in southeastern New York.

3.2 Geographic Needs

The shape of each 8-digit HU SA has been slightly modified to better meet Bank objectives:

- We removed the West of Hudson western most 10-digit HU that covers the NYC water supply. That HU would have to be a separate SA because NYC requires impacts to be mitigated within its water supply drainage, and such a small SA would not be economically functional.
- In the Hudson-Wappinger and Mid-Hudson we added the small portions of the Housatonic in Columbia and Dutchess counties in NY (adjacent to the CT border) to make the SA more functional by providing mitigation services to those small areas that lie within NY State that otherwise have no services available. These areas also have potential for rare species, an inclusion that helps meet other Bank's objectives.
- All SAs were limited to the boundary of NY State to coincide with the NY USACE IRT boundary.

3.3 Geological, Water Quality, Municipal, and Additional Specific Biological Needs

3.3.1 West of the Hudson River:

Situated between the Shawangunk Ridge and Hudson River, this SA contains a mosaic of wetland communities, many of which have had a long history of agricultural use and/or modification. Areas of significant biodiversity have been identified in the Shawangunk Kill watershed (and adjacent grassland habitat) and the Esopus/Lloyd Wetlands and Ridges in Ulster County (Penhollow et al. 2006). Wetlands in the Upper Wallkill River Valley's Black Dirt region of Orange County support regionally significant concentrations of wintering raptors. Calcareous wetlands in the Warwick-Pine Island section of Orange County are noted for robust populations of salamanders of the Jefferson/blue-spotted (*Ambystoma jeffersonianum x A. laterale*) complex.

3.3.2 Mid-Hudson River:

This area includes significant rare species habitats and completes the footprint of the Hudson River Estuary Corridor as described by NYS DEC for its tremendous biodiversity. It also provides services to an area with substantial development pressure (Albany and the surrounding environs).

3.3.3 Hudson-Wappinger:

This area is located east of the Hudson River and includes two regionally significant wetland biodiversity areas: the Harlem Valley Calcareous Wetlands and Dutchess County Wetlands. Both areas are noted for containing critical habitat for several threatened and endangered plants, reptiles, insects; globally-rare ecological communities (e.g., calcareous fens), breeding concentrations of waterfowl and wading birds, and the highest diversity of turtles in New York state (Penhollow et al. 2006).

3.3.4 Lower Hudson:

The Lower Hudson is part of the Appalachian Highlands watershed, encompassing portions of Dutchess, Putnam, and Westchester counties. This rugged region also serves as a headwater for part of New York City's water supply. Several townships in these counties have also promulgated their own wetland impact requirements, increasing the need for local mitigation services. Much of the wetland habitat within this SA is characterized by riparian systems and extensive hardwood and shrub swamps noted for high avian and amphibian richness. Although in decline, significant populations of two New York State-Special Concern turtles, the Wood Turtle and Spotted Turtle, occur here.

4. General Need and Technical Feasibility

4.1 General Need

- This Bank's objectives are in direct alignment with The Wetland Trust's mission. Its mission is "to increase the acres of high quality wetlands that cover the spectrum of functions, types and sizes, providing habitats for a wide variety of plants and animals, *especially those amphibians and reptiles that rely on wetlands* for their life cycle needs … Restoration and protection will be funded in part through wetland banking projects and in lieu fees." The need for an umbrella bank that can restore wetlands at multiple sites is a good fit to help target important habitats in this region. It includes:
- The bank service areas (Figure 2) cover a large percentage of the Hudson Valley whose species diversity is of worldwide importance[1].
- There is no watershed based wetland mitigation (ILF or Bank) in the Hudson Region; an Umbrella Bank can cover a large area with multiple sites, having a wider and more localized mitigation footprint, providing for a comprehensive biological approach for mitigation.
- TWT has specifically targeted federal and state-listed species, so by definition, they are under threat, and the restoration and/or enhancement of these species' habitats within a mitigation site component will help reduce that threat. Thus TWT will be fulfilling a higher mission while restoring wetlands to meet federal mitigation loss criteria.

- Although some funds and technical assistance resources may be available for state and federally -listed turtles from USDA'S Natural Resources Conservation Service, the other species in Table 1 have no viable funding source for protecting, managing and/or restoring habitat.
- The Bank is adjacent to the entire CT distribution of bog turtles, where "Unless aggressive actions are taken within the next decade, the bog turtle could be the first reptile to become extinct in Connecticut" (Klemens 1998b)".
- USFWS has been working diligently to develop a viable Conservation Banking approach in the region for federally listed species. The effort however has been wrought with challenges including high land prices; lack of program sponsors; and most importantly, a consistent source of funds. This Bank could address these three impediments to success, while also providing a comprehensive approach for restoration and long-term protection of critical habitats. USACE mitigation wetlands are by far the most highly planned, monitored, reviewed, and protected in the US, and thus could provide an alternative to meet USFWS goals for certain species.
- The Lower Hudson Service Area includes the NYC Croton water supply watershed. In addition to important habitat sites in its headwaters, it provides another venue for water quality improvements to a world-class water supply for over 9 million people. We will ensure that impacts within this NYC watershed will also be mitigated within its watershed boundaries.

[1]"*Among terrestrial vertebrates, 85% (28 species) of New York's total amphibian species, 73% (27 species) of New York's total reptile species, 87% (199 species) of New York's total breeding bird species, and 92% (54 species) of New York's total mammal species can be found in the Hudson River Estuary Area of Biological Concern (Smith et al. 2001). The Hudson River Estuary corridor offers opportunities found nowhere else in the state for conservation of amphibian and reptile biodiversity. In the case of turtles, a 200-million-year-old group of reptiles, the Hudson River and its tributaries is one of the most important river systems in the world. The number of turtle species found in the Hudson River Valley is matched only by the Suwannee River (Florida), the Mekong River (south- east Asia), and the Irrawaddy River (Myanmar)."*

[1]From: http://www.dec.ny.gov/docs/remediation_hudson_pdf/hrebcfII2.pdf

4.2 Technical Feasibility

This bank generates typical wetland credits while enhancing and restoring rare species habitats and provides for water quality enhancement for the largest municipal water supply on the US East Coast. The umbrella bank approach allows for multiple mitigation sites. That flexibility not only provides for targeting certain specific sites to add value for specific rare species, but it also provides a better opportunity to reestablish a wider variety of wetland types. That opportunity will help provide a portfolio of wetlands that should cover all wetland types impacted. Key personnel involved have the extensive biological, restoration, and mitigation experience necessary to implement all aspects of a mitigation plan, from site selection, design, planning, construction, planting through final monitoring and long-term stewardship. Indeed, the Bank will be established and implemented by the same individuals who developed the successful TWT Susquehanna Basin Headwaters and Adjacent Basins ILF Program.

4.3 Site Selection

Because this is an Umbrella Bank, site selection will be an ongoing component of the mitigation credit development process; TWT will use a science-based analysis developed previously for its ILF wetland program in NY. TWT will solicit input from private and agency experts to develop a short list of quality sites and provide important habitat attributes to be used in its modeling analysis.

A Maxent computer model will "quality assess" each SA using environmental attributes (e.g., soil classes, slope, elevation, wetness, species habitat needs) of existing wetlands and rare wetland communities to predict additional locations where wetlands previously and currently exist (Godwin et al. 2002, Bedford and Godwin 2003, Amon et al. 2005). A comprehensive discussion can be found in Appendix C of *Susquehanna Basin Headwaters and Adjacent Basins In-Lieu Fee Program Instrument, March 2015* (thewetlandtrust.org).

Factors to be considered, (grouped with similar traits together) to help determine the sites sustainability, long-term viability and biological value include:

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 relative to potential market value of generated credits.

[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 *"are resident habitat of an endangered or threatened animal species; contain an endangered or threatened plant species; or support 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."*

4.4 Credit Determination

4.4.1 General Approach:

For an umbrella bank to be active, at least one SA must have an approved site and approved mitigation plan for that site. TWT will activate this bank by nominating a property it currently owns, fee simple, the Overlook Wetlands Site in the Hudson-Wappinger SA. A synopsis of the Overlook Wetlands Site mitigation plan is found in Section 8.

Each SA will come "on line" as their sites and accompanying mitigation plans are approved by the DE, acting in consultation with the IRT. We estimate that each SA will have 3 to 8 credits active at any one time, which should be sufficient to provide for mitigation needs; these credits may be generated form more than one site. With the umbrella bank approach TWT can concentrate on locating and securing additional quality restoration sites over time as they become available. From a biological and wetland-planning standpoint this approach is far superior to a typical bank that would purchase a large site, and develop it for maximum credit generation. It offers the potential of having several sites dispersed in the service area, which may better offset the spectrum of impacts that occur in that area. It also allows for sites to be nominated that may have a longer timeline for approval due to rare species presence. Indeed, TWT has several such sites in the Hudson-Wappinger SA. A mitigation plan for each site selected will be developed and submitted to the DE, acting in consultation with the IRT as an instrument modification.

4.4.2 Potential for Additional Credits based on Rare Species:

For sites that harbor rare species TWT may suggest additional site practices for credit generation, based on section 332.3(c)(2) "*A watershed approach….includes the protection and maintenance of terrestrial resources...when those resources contribute or improve the overall ecological functioning of aquatic resources in the watershed*." These additional site practices will be proposed in the specific site mitigation plan for approval or denial by the DE, acting in consultation with the IRT.

Examples may include:

- Enhancement of "critical habitats for rare wetlands species," such as enhancing poor quality wetlands through treatment of invasive species to reduce shading of potential nesting, feeding, and basking sites to accommodate the turtle's thermoregulation needs. The practice may not meet standard mitigation success criteria, but would be highly successful for the turtle.
- Developing Blanding's turtle nesting habitat, a life cycle component that can be shown to be in short supply. Without upland nesting habitat, most aquatic turtles populations are not viable; thus these areas could generate substantially more credits than typical boundary buffers if nesting can be documented.
- A specific VIBI target should be developed for a site that specifically targets some biological aspect of the site.

4.4.3 Potential for Conservation Banking Credits:

TWT will explore the possibility within a specific site mitigation plan whether credits may be developed that meet USFWS standards for Conservation Banking as described in section 230.93(j)(3) *"Compensatory mitigation projects may also be used to provide compensatory mitigation under the Endangered Species Act or for Habitat Conservation Plans…"*

TWT will attempt within the bank to develop some credits that may have a dual purpose. All credits will meet USACE wetland mitigation standards, and some may be functional for USFWS as conservation credits. TWT will review this possibility with USFWS and ask them to determine if there are any portion of credits at a particular site that may serve that function. With this approach, the Bank will proceed as if there are no Conservation Credits; if USFWS determines there are credits that may be used as Conservation Credits only then will TWT add that option for purchase. With this procedure, there will be no time lost with an additional layer of credit determination and of course all credits, regardless of designation can be sold as regular bank credits

5. Ownership Arrangements and Long-Term Management Strategy

5.1 Ownership Arrangement

TWT will acquire mitigation sites for fee simple ownership and presently owns several parcels that may qualify. TWT will also partner with other landowners. Jason Tesauro, a TWT board member, currently works with several private landowner partners who understand both the biological significance of their properties and the need for habitat restoration who are willing to allow a conservation easement to be placed on their property that fulfill USACE Bank requirements. Also, there is great potential for TWT to partner other land trusts (i.e., Friends of the Great Swamp, Dutchess Land Conservancy, Oblong Conservancy) in the preservation and restoration of high quality properties throughout the targeted watersheds.

5.2 Long Term Management Strategy

Each site will be developed according to its Mitigation Plan. A long-term management strategy will be implemented once mitigation monitoring is completed and the DE, acting in consultation with the IRT gives final approval. The strategy, part of the site's mitigation plan, will describe the specific needs for optimal conservation and also provide a general discussion of positive and negative attributes of the surrounding watershed that should be taken into account for long-term site protection.

6. Sponsor and Partner Qualifications

6.1 Sponsor: The Wetland Trust

The Wetland Trust is a nonprofit corporation established in New York in 2008 that meets requirements under Section 501c(3) receiving its IRS letter of determination in September 2009. The TWT will be the Bank Sponsor. It currently owns 30 parcels covering about 1,500 mostly wetland acres. Website: *thewetlandtrust.org*.

Several TWT Board members will provide critical expertise to the success of this Bank:

- Jason Tesauro, a herpetologist and nationally recognized Bog Turtle expert, will lead site selection and turtle habitat restoration efforts; the Hudson Basin is his geographical area of expertise.
- Dr. James Gibbs, SUNY ESF Professor, Department of Environmental and Forest Biology has vast experience in vertebrate conservation with specific expertise in Bog Turtles in the Hudson. As author of Amphibians and Reptiles of New York State: Identification, Natural History and Conservation, he provides an important perspective to help develop projects.
- James Curatolo, Biologist, has expertise in wetland restoration and mitigation, having established and manages TWT's Wetland In Lieu Fee Mitigation Program covering 15 different watersheds in NY. He has also initiated in 1995 a Blanding's Turtle headstarting program, and restored critical nesting habitat at TWT's Overlook Wetland Preserve, a potential Bank site. Those headstarted turtles are still present, and old enough to nest.
- Melissa Yearick is a Biologist with expertise in GIS, wetland delineations, and wetland mitigation restoration techniques. She is also Wetland Coordinator for the Upper Susquehanna Coalition, who implements and monitors sites in TWT's Wetland In Lieu Fee Mitigation Program.
- Sheila Hess, Principal Ecologist and CEO of Environment & Planning, has wetland design, restoration, and mitigation experience.

6.2 Partners:

- Dr. Donald Leopold, SUNY ESF Distinguished Teaching Professor and Chair, Department of Environmental and Forest Biology is an expert on wetland biota particularly those occurring in fens, which are an important wetland community in the region.
- The Upper Susquehanna Coalition of Soil and Water Conservation Districts (USC) may provide technical support on mitigation plans, equipment and operators for reestablishment construction activities, and monitoring services. Tioga County SWCD also owns the construction equipment and employs the USC Wetland Team technical staff. A key staff person is Jeremy Waddell, Biologist and Field Project Manager, lead for design and construction operations for mitigation sites on TWT's ILF Program. Website: *u-s-c.org*.
- TWT has formed an ad-hoc committee of Turtle Experts for biological opinions on restoration locations and techniques. The group includes TWT board members Jason Tesauro James Gibbs, Jim Curatolo, and Alan Tousignant; Erik Kiviat, Hudsonia, Glenn Johnson, Department of Biology SUNY College at Potsdam; Lisa Masi and Angelena Ross, NYSDEC; Krista Munger, TWT Land steward and Blanding's researcher; Bryan Windmiller, Ph.D., Director of Conservation, Zoo New England.

7. Ecological Suitability and Assurances of Sufficient Water Rights

Because this is an umbrella Bank with multiple sites, each Site Mitigation Plan will address the site's ecological suitability based on surrounding Service Area's physical, biological, chemical, hydrological needs, and characteristics.

8. Site Specific Mitigation Plan

This Prospectus provides the draft mitigation plan for Overlook Wetlands in the Hudson-Wappinger SA in Appendix A. A complete plan will be submitted with the final Wetland Bank Instrument for approval by the DE, acting in consultation with the IRT. Additional sites will be nominated and mitigation plans developed for other SA's to provide sufficient credits to meet mitigation needs for the entire Bank.

A Mitigation Plan for each service area will be submitted for review and approval by the DE, acting in consultation with the IRT, 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. Introduction and Objectives
2. Site Selection
3. Site Protection Instrument
4. Determination of Credits
5. Baseline Ecological Characteristics
    - 5.1 Historic and Existing Plant Communities, Including Wetlands
    - 5.2 Site Land Use History, Including Structures, if any
    - 5.3 Soil Conditions
    - 5.4 Historic and Existing Hydrology
    - 5.5 Animal and Plant Species Including Endangered Species
6. Mitigation Work Plan
    - 6.1 Geographic Boundaries
    - 6.2 Construction Methods, Timing and Sequencing
    - 6.3 Grading Plan, Including Elevations and Slopes of Substrate
    - 6.4 Methods for Establishing Desired Plant Community
    - 6.5 Sources of Water, Connections to Existing Waters and Upland Runoff
    - 6.6 Invasive Species
    - 6.7 Soil Management and Erosion Control Measures
7. Maintenance Plan
8. Performance Standards:
    - 8.1 First Interim Goal Releases 15% of Credits
    - 8.2 Second Interim Goal Releases 15% of Credits
    - 8.3 Third Interim Goal Releases 15% of Credits
    - 8.4 Final Vegetative Goal Releases 25% at the End of the 10-Year Monitoring Period
    - 8.5 Wetland Hydrology and Hydric Soils
9. Monitoring Requirements
    - 9.1 Monitoring Report Requirements
    - 9.2 Reporting Schedule

10. Long-term Management Plan, Including Financial Arrangements
11. Adaptive Management Plan, Including Addressing Invasive Species Control
12. Financial assurances

Where appropriate, TWT will follow specific species habitat regulatory restoration protocols for sites that may harbor rare species. For example, should a site have the potential for Bog Turtles then TWT will follow the USFWS 10 September 2010 Biological Opinion "Effects of the implementation of habitat restoration practices by the natural resources conservation service on the northern population of the bog turtle, Connecticut, Delaware, Maryland, Massachusetts, New Jersey, New York and Pennsylvania, prepared by: U.S. Fish and Wildlife Service Region 5 – Ecological Services. Indeed, Jason Tesauro, TWT Board member and a key team member for this Bank provided important information to the help USFWS develop these protocols. Similarly, TWT will follow protocols described in the draft Recovery Plan for New York State Populations of the Blanding's Turtle, *Emydoidea blandingii*, NYSDEC, Albany NY.

9. Literature Cited

Edinger, G.J., D.J. Evans, S. Gebauer, T.G. Howard, D.M. Hunt, and A.M. Olivero (editors). 2014. *Ecological Communities of New York State.* Second Edition. A revised and expanded edition of Carol Reschke's Ecological Communities of New York State. New York Natural Heritage Program, New York State Department of Environmental Conservation, Albany, NY.

Klemens, M.K.1993. Amphibians and reptiles of Connecticut and adjacent regions. State Geological and Natural History Survey of Connecticut, Bulletin No. 112.

Myers A.T. and J.P. Gibbs. 2013. Landscape-level factors influencing bog turtle persistence and distribution in southeastern New York State. Journal of Fish and Wildlife Management 4(2) 255-266.

Penhollow, M.E., Jensen, P.G., and L.Z. Zucker. 2006. Hudson River Estuary Wildlife and Habitat Conservation Framework. Cornell University. 153p.

Ross, A and Johnson, G. 2018 Recovery Plan for New York State Populations of the Blanding's Turtle, *Emydoidea blandingii*, NYSDEC, Albany NY. 87 p.