WETLAND DELINEATION REPORT

Roaring Brook Wind Power Project
Town of Martinsburg
Lewis County, New York

Prepared For: PPM Energy
7557 S. State Street, Suite 201
Lowville, NY 13367

Prepared By: Environmental Design & Research,
Landscape Architecture, Planning,
Environmental Services, Engineering and Surveying (EDR)
217 Montgomery Street, Suite 1000
Syracuse, New York 13202

Date: January 2008

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

1.0 INTRODUCTION

1.1 PROJECT DESCRIPTION

Environmental Design & Research, Landscape Architecture, Planning, Environmental Services, Engineering and Surveying, P.C. (EDR) was retained by PPM Energy to identify and delineate all wetlands and streams within or adjacent to the footprint of Roaring Brook Wind Farm generating site (the Project). The goal of the Project is to develop an approximately 78 megawatt (MW) wind-powered generating facility on approximately 4,000 acres of leased private land in the Town of Martinsburg, Lewis County New York (Figure 1). The Project is anticipated to include approximately 39 wind turbines, each with a generating capacity of 2.0 MW.

1.2 PURPOSE

This wetland delineation report has been prepared in support of the Draft Environmental Impact Statement (DEIS) currently being prepared by EDR in accordance with the requirements of the New York State Environmental Quality Review Act (SEQRA). Specific tasks performed for this study included a field delineation of all potential state and federal jurisdictional areas proximate to the Project footprint, a subsequent instrument survey of jurisdictional area boundaries utilizing a Global Positioning System (GPS) with sub-meter accuracy, and a detailed description of jurisdictional areas based on hydrology, vegetation, and soils data collected in the field.

This report describes the results of both the delineation and data collection efforts conducted by EDR as well as a description of the wetlands and waterbodies that were identified and delineated. This document is intended to provide all the information necessary for an agency jurisdictional determination, and to support a permit application, which may be submitted to the United States Army Corps of Engineers (USACOE) and the New York State Department of Environmental Conservation (NYSDEC).

1.3 RESOURCES

Materials and literature supporting this investigation have been derived from a number of sources including United States Geological Survey (USGS) topographic mapping (Sears Pond and Page, NY 7.5 minute quadrangles), United States Fish and Wildlife Service (FWS) National Wetlands Inventory (NWI) mapping, NYSDEC freshwater wetlands mapping, United States Department of Agriculture (USDA) Soil Conservation Service (SCS) (currently the

Natural Resources Conservation Service [NRCS]) Lewis County Soil Survey, the NRCS List of Hydric Soils of the State of New York, the NRCS list of New York Soils with potential hydric inclusions, and recent aerial photography.

Vascular plant names follow nomenclature found in Gleason and Cronquist (1991), and wetland indicator status for vegetative species was determined by reference to Reed (1988).

1.4 QUALIFICATIONS

EDR ecologists Diane Enders, Ben Brazell, William Trembath, James Pippin, Sara Stebbins and Brian Schwabenbauer, performed on-site wetland delineations and data inventories.

Ms. Enders is a senior project manager and regulatory specialist with 11 years of experience in wetland delineations, state and federal wetland permitting, ecological surveys, environmental impact analysis, New York State Environmental Quality Review Act (SEQRA) and National Environmental Policy Act (NEPA) compliance, and environmental construction monitoring. She has served as project manager on a variety of natural resource inventory, impact evaluation and regulatory compliance projects in the Northeast.

Mr. Brazell is a project manager and environmental scientist experienced in wetland delineations, ecological surveys, environmental impact analysis, SEQRA compliance, state and federal wetland permitting, and stream and wetland mitigation design and monitoring. He has acted as project manager of a variety of natural resource inventory, impact evaluation, and regulatory compliance projects in New York State and has served as a project scientist on a variety of stream mitigation/design, natural resource inventory, impact evaluation, and regulatory compliance projects in North Carolina.

Mr. Trembath is a project manager with over 18 years experience in the environmental field. His professional expertise includes environmental impact analyses and monitoring, wetland delineations, federal and state permitting, SEQRA compliance, hazardous waste operations, industrial health and safety, emergency response, and wildlife damage management.

Mr. Pippin is a project manager with over 13 years of experience in the environmental field. He received a bachelor's degree in Natural Resources Management from the University of Maryland at College Park. Professional experience includes wetland delineations, local,

state, and federal permitting, wetland mitigation monitoring, GPS mapping, and GIS data analysis.

Ms. Stebbins is an environmental analyst with 10 years of experience in the environmental field. She received a bachelor's degree in forest biology and a master's degree in forest resource management from SUNY College of Environmental Science & Forestry. Professional expertise includes rare plant surveys, floristic inventories, environmental impact analysis, habitat assessments, wetland delineations, and GIS analysis.

Mr. Schwabenbauer is an environmental analyst with over 5 years of experience in the environmental field. He received a bachelor's degree in environmental studies from Hobart College, and is currently pursuing a master's degree in environmental policy from SUNY College of Environmental Science and Forestry. Professional expertise includes GPS surveying and mapping, geographic information systems (GIS) analysis, wetland delineations, and SEQR compliance.

2.0 PHYSICAL CHARACTERISTICS AND RESOURCES

2.1 PHYSIOGRAPHY AND SOILS

The Project Site is located within the Central Tug Hill physiographic region of New York State (Reschke, 1990). It is situated on the Tug Hill Plateau, and is characterized by level to undulating topography. Elevations in the Project Area range from 1862 to 1990 feet amsl. According to the Lewis County Soil Survey (1960), slopes within the area generally range from 0 to 15%.

When conducting the Lewis County Soil Survey (1960), soils scientists made detailed and reconnaissance-level soil surveys, depending on location. The detailed soil survey covered the central part of the county, and generated typical soil series and mapping unit data (Figure 6). Detailed soil mapping was not done for a large portion of the central Tug Hill Plateau, including much of the Project area. The reconnaissance soil survey covered the eastern (Adirondack) and southwestern (Tug Hill) portions of Lewis County. At the time the fieldwork was being conducted in the early 1950s, this area was considered remote and inaccessible, "the least known area of the state." The reconnaissance-level soil surveys generated soil association maps instead of the more specific mapping units.

Mapped soil associations in the Project Site include Worth-Empeyville-Westbury, Empeyville-Westbury-Worth, Westbury-Tughill-Empeyville, Empeyville-Worth, and Peat/Muck. Stony loams and stony silt loams dominate these soil associations. Table 1A lists the soil associations found within the Project Site and their characteristics.

Table 1A. Soil Associations Within the Project Site[1].

Soil Association	Main Characteristics
Worth-Empeyville-Westbury (WE)	• Moderately stony soils with acid fragipan • Soils in association: Empeyville (20-40%), Worth (40-60%), Westbury (15-25%), and Tughill (10-15%)
Empeyville-Westbury-Worth (EB)	• Very stony soils with acid fragipan • Soils in association: Empeyville (40-60%), Worth (15-20%), Westbury (15-30%), and Tughill (10-20%)
Westbury-Tughill-Empeyville (BU)	• Very stony soils with acid fragipan • Soils in association: Empeyville (15-20%), Worth (10-20%), Westbury (30-45%), and Tughill (25-35%)
Empeyville-Worth (EW)	• Moderately stony soils with acid fragipan • Soils in association: Empeyville (40-65%), Worth (15-25%), Westbury (10-20%), and Tughill (5-15%)
Peat and Muck (P)	• Undifferentiated organic peat and muck • Cover of swamp vegetation or forest

[1]Information gathered from the Soil Survey of Lewis County, New York (USDA, 1960).

Although the soil series are not mapped within these associations, the Lewis County Soil Survey (1960) provides rough estimates of the percentage of different soil series within each association. Table 1B summarizes the characteristics of the dominant soil series found within the Project Site.

Table 1B. Dominant Soil Series Within the Project Site[1].

Soil Series	Main Characteristics
Empeyville Series	• Moderately well drained to somewhat poorly drained • Formed in glacial till derived from Oswego sandstone, with some shale and igneous rock • Undulating relief • Strongly developed fragipan below 18 inches
Tughill Series	• Very poorly drained • Formed in glacial till derived mainly from Oswego and Pulaski sandstones • Flat to depressed relief
Westbury Series	• Poorly drained to somewhat poorly drained • Formed in glacial till derived mainly from Oswego and Pulaski sandstones, with some shale • Level to gently sloping relief
Worth Series	• Well drained • Formed in glacial till derived mainly from sandstones • Undulating to steep relief • Very firm fragipan below 18 inches

[1]Information gathered from the Soil Survey of Lewis County, New York (USDA, 1960).

2.2 HYDROLOGY

The Project area is divided amongst the Black River and Oneida Lake drainage basins (USGS Hydrologic Units 04150101 and 04140202, respectively). The headwaters of Roaring Brook are located within the project area and flow to the Black River (located approximately 10 miles to the east of the Project area in the Black River Valley). The Black River has a watershed of approximately 1,920 square miles, including the northern portions of the Project area (Roaring Brook watershed). The North Branch of Fish Creek and it's unnamed tributaries flow through the southern portion of the Project area and eventually into Oneida Lake located approximately 45 miles to the south. Oneida Lake has a watershed of approximately 1,470 square miles.

The Project area contains a number of surface water features ranging from small streams and forested wetlands to larger waterways and marshes (Figure 4). Stream morphology for most of the streams on site, both named and unnamed, can be described as low-gradient drainage channels associated with floodplains within undulating upland terrain. Although stream banks are not as apparent in the flatter areas, many of these streams are less than 20 feet wide and predominantly perennial. Some of the streams have well-defined stream banks on drainages flowing from higher terrain, although the majority of waterways occur within floodplain corridors of larger wetland systems, and are less well defined. Streambed substrate is typically pebble/cobble and silt/mud with significant aquatic vegetation. Most streams had flow during the site investigation. Smaller streams were typically 4-6 inches in depth and larger streams up to a maximum depth of 12 inches.

3.0 JURISDICTIONAL AREA MAPPING

3.1 WATERS OF THE UNITED STATES

Waters of the United States as defined by the USACOE, include all lakes, ponds, streams, (intermittent and perennial), and wetlands. Wetlands, as referenced in this narrative, are defined in Section 404 of the *Clean Water Act* as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support and under normal circumstances do support a relevance of vegetation typically adapted for life in saturated soil conditions" (EPA, 2001). Jurisdictional wetlands are defined by the presence of three criteria: hydrophytic vegetation, hydric soils, and evidence of wetland hydrology during the growing season (Environmental Laboratory, 1987). However, as a result of the *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers* Supreme Court case (No. 99-1178; January 9, 2001), it has been determined that the USACOE does

not have jurisdictional authority over waters that are “nonnavigable, isolated, and intrastate” (EPA, 2001). Ultimately, the jurisdictional status of all on-site waters will be determined during a field visit with a Buffalo District USACOE representative.

National Wetland Inventory (NWI) mapping covers approximately one third of the Project area. Review of the portion that is covered by the NWI mapping indicates that there are numerous federally-mapped wetlands located within and adjacent to the Project Site. The federally mapped wetlands that are available are presented in Figure 5. The NWI maps indicate that forested wetlands are the dominant wetland type on-site. Broad-leaved forested wetlands and needle leaved evergreen wetlands dominate. Less common (on area covered by available data) are emergent wetlands with beaver activity and open water systems.

3.2 NEW YORK STATE FRESHWATER WETLANDS & PROTECTED STREAMS

The Freshwater Wetlands Act (Article 24 and Title 23 of Article 71 of the Environmental Conservation Law) gives the NYSDEC jurisdiction over state-protected wetlands and adjacent areas (100-foot upland buffer). The Freshwater Wetlands Act requires the NYSDEC to map all state-protected wetlands (typically over 12.4 acres in size) to allow landowners and other interested parties a means to determine where state jurisdictional wetlands exist. Review of NYSDEC mapping indicates that there are a large number of wetlands located in the vicinity of the Project area that are regulated under Article 24 of the Environmental Conservation Law. The state-regulated wetlands are identified in Figure 3.

Under Article 15 of the Environmental Conservation Law (Protection of Waters), the New York State Department of Environmental Conservation (NYSDEC) has regulatory jurisdiction over any activity that disturbs the bed or banks of protected streams. In addition, small lakes and ponds with a surface area of 10 acres or less, located within the course of a stream, are considered to be part of a stream and are subject to regulation under the stream protection category of Article 15. Protected stream means any stream, or particular portion of a stream, that has been assigned by the NYSDEC any of the following classifications or standards: AA, AA(t), A, A(t), B, B(t) or C(t) (6 NYCRR Part 701). A classification of AA or A indicates that the best use of the stream is as a source of water supply for drinking, culinary or food processing purposes; primary and secondary contact recreation; and fishing. The best usages of Class B waters are primary and secondary contact recreation and fishing. The best usage of Class C waters is fishing. Streams designated (t) indicate that they support trout, and also include those more specifically designated (ts) which support trout spawning.

On-site streams are classified by the NYSDEC as Class C, Class C(T), and Class C(TS) waters. Class C waters are not subject to regulation under the stream protection category of the Environmental Conservation Law, Article 15 (Protection of Waters). However, streams and small water bodies located in the course of a stream that are designated as C(T) or higher (i.e., C(TS), B, or A) are collectively referred to as "protected streams," and are subject to the stream protection provisions of the Protection of Waters regulations. These streams, along with all other perennial and intermittent streams in the study area, are also protected by the Corps of Engineers under Section 404 of the Clean Water Act. There are no streams regulated by Section 10 of the Rivers and Harbors Act of 1899 (navigable waters) within the generating site.

4.0 ON-SITE JURISDICTIONAL AREA DELINEATION

4.1 METHODOLOGY

EDR personnel performed identification and delineation of wetlands and streams in areas proposed for wind power development during the autumn of the 2007 growing season. The survey team applied the wetland survey methodology to within 100 feet either side of the centerline of a proposed access road, 200 feet from a turbine coordinate, and within the footprint of the building and grading limits of a proposed building or substation. No wetland/stream inventories or delineations were conducted along public roadways that may be used by construction vehicles/equipment or buried/overhead transmission lines because the transportation and electrical routing plans have not yet been finalized. Once these plans are completed, all wetlands and streams in the vicinity of anticipated public road improvements and electrical collection lines will be delineated (during the 2008 growing season), and an addendum to this wetland delineation report will be prepared.

The determination of wetland boundaries was made by EDR personnel according to the three-parameter methodology presented in the USACOE Wetland Delineation Manual (hereafter referred to as the 1987 Manual) (Environmental laboratory, 1987). A modified routine sampling procedure was chosen for the field investigation. Attention was also given to the identification of potential hydrologic connections between wetlands areas that could influence their jurisdictional status.

Wetland boundaries were defined in the field with sequentially-numbered pink surveyor's flagging, which was subsequently mapped using a Trimble Pathfinder® Pro XR GPS unit with reported sub-meter accuracy. Data was collected from one or more sample plots in

each delineated wetland (depending on the size of the delineated area), and was recorded on USACOE *Routine Wetland Determination* forms (Appendix B). The data collected for each of the wetlands delineated by EDR personnel included vegetation, hydrology indicators, and soils characteristics. This methodology was applied to all wetlands delineated on the Project Site.

The wetland vegetative community data collection process focused on dominant plant species in four categories: trees (>3" diameter at breast height), saplings/shrubs (<3.0" diameter at breast height and >3.2' tall), herbs (<3.2' tall), and woody vines. Dominance was measured by visually estimating those species having the largest relative basal area (trees), greatest height (saplings/shrubs), greatest number of stems (woody vines), and greatest percentage of aerial coverage (herbaceous) by species. Dominant species for each stratum in the plant community were identified for all wetland delineations on the Project Site. The dominant species from each category are defined as those plants with the highest ranking which, when cumulatively totaled, exceeds 50 percent of the total dominance measure for that category, plus any additional plant species comprising 20 percent or more of the total dominance measure for the category. The species were rank ordered for each category by decreasing value of percent cover.

Project Site soils data was collected by EDR personnel using a soil auger. Information concerning soil series, subgroup, drainage classification, texture, and matrix and mottle color was obtained for each delineated wetland. This information was used to determine whether the soils displayed hydric characteristics. Hydric soils are those that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part of the soil layer. Hydric soils are poorly drained, and their presence is indicative of the likely occurrence of wetlands (Environmental Laboratory, 1987). Hydric soils were determined in the field through observation of composition, color, and morphology. Soil colors were determined using *Munsell Soil Charts* (Kollmorgen Corp., 1988).

The 1987 Manual lists the following indicators as evidence of wetland hydrology (in order of decreasing reliability): (1) visual observation of inundation, (2) visual observation of soil saturation, (3) water marks, (4) drift lines, (5) sediment deposits, and (6) drainage patterns. Hydrologic characteristics (inundation and soil saturation) were visually assessed to a depth of 12 inches. The hydrology indicators described above are considered "primary indicators," and any one of these indicators is sufficient evidence that wetland hydrology is present when combined with a hydrophytic plant community and hydric soils. In addition, "secondary

indicators" used by EDR personnel included: (1) oxidized root channels in the upper 12 inches of soil, (2) water-stained leaves, (3) local soil survey data, and (4) morphological plant adaptations. Any two of these indicates the presence of wetland hydrology.

Photographs were taken of each wetland delineated within the proposed Project Site. Photographs representative of the delineated wetlands are included in Appendix C.

5.0 RESULTS

EDR personnel delineated a total of sixty-four (64) wetlands within the Project Site. Information pertaining to individual on-site wetlands is summarized in Table 2. In general, jurisdictional areas delineated on the Project Site exist as one of the following broad types: 1) emergent wetland, 2) scrub-shrub wetland and 3) forested wetland. All on-site delineated wetlands are depicted in Figure 7 (sheets 1-7, as indicated in Table 2), and descriptions of each community types are presented below.

As described in Section 4.1, wetland delineations were performed only in areas that could potentially be impacted a Project component. There are numerous large, complex wetland systems with the Project Site that were not delineated, or had just a tiny periphery of the entire system delineated. As described in Section 3.2, many of these large wetland systems are protected by the NYSDEC. The Project Site contains four wetland and stream communities considered significant from a statewide perspective by the New York Natural Heritage Program: shallow emergent marsh, shrub swamp, marsh headwater stream, and rocky headwater stream. None of these communities are inherently rare within the state. However, the on-site occurrences are considered high quality examples of more common community types due to their large size, diversity, remote location, and undisturbed condition within an intact landscape.

It should be noted that the community types listed below in Table 2 (and described in detail in Section 5.1) apply specifically to delineated wetlands, and do not represent the full range of wetlands community types present on-site. Many of the larger on-site wetlands exist as a mosaic of different wetland communities. Sedge meadow and deep emergent marsh are two examples of wetland communities found on-site that were not encountered in the survey area. Many of the deepwater communities on-site have been created and maintained through the activity of beaver (*Castor canadensis*), which create ponds by damming streams

and flooding adjacent areas. Beaver dams were observed on-site in excess of five feet in height.

Table 2. Delineated Wetlands.

EDR Wetland ID (NYSDEC Wetland ID)	Community Type[1]	Federal Jurisdiction (Yes/No/Undetermined)[2]	Reference Sheet #
A (NYSDEC P-8)/(Roaring Brook)	EM/ST	Yes	2,3
B (NYSDEC P-8)/(Roaring Brook)	SS/EM/ST	Yes	2,3
C (NYSDEC P-8)	FO/SS	Yes	2,3
D	EM	Yes	1
F	EM	Yes	1
G (trib. Of Edick Creek)	EM	Yes	1
H	EM	Yes	1
I	EM	Yes	1
J	EM	Yes	1
L	EM	Yes	1
M	EM	Yes	1
N	EM	Yes	1
O	EM	No	1
Q	EM	Yes	2,3,6
R	FO	Yes	2,3,6
S	FO	Yes	2,3,6
T	EM	Yes	2,3.6
U	FO	Yes	2,3,6
V	FO	Yes	2,3,6
W	EM	Yes	2,3
X	EM	Yes	
Y (NYSDEC P-19)	SS/EM	Yes	6
Z	EM	Yes	6
AA	EM	Yes	6
BB	FO/EM	?	6,7
CC (NYSDEC P-19)	EM	Yes	6,7
DD	FO/EM	?	6
EE (trib of N. Branch of Fish Creek)	EM	Yes	6,7
FF	FO/EM	?	6
GG (NYSDEC P-10)	FO	Yes	4
HH	FO/EM	?	6
II (NYSDEC P-10)	FO	Yes	4
JJ	FO	Yes	6
KK (NYSDEC P-10)	FO	Yes	4
LL	SS/EM	Yes	4
MM (NYSDEC P-10)/(trib. Of Roaring Brook)	EM	Yes	3,4
NN	SS	Yes	3,4
OO	EM	Yes	3
PP	EM	Yes	3
QQ	EM	Yes	3
RR	EM	Yes	6,7
SS (NYSDEC P-19)	FO	Yes	6,7
TT	EM	Yes	6,7
VV (NYSDEC P-27)	EM	Yes	6,7
WW (NYSDEC P-27)	SS/EM	Yes	6,7
XX (NYSDEC P-27)	EM	Yes	6,7

EDR Wetland ID (NYSDEC Wetland ID)	Community Type[1]	Federal Jurisdiction (Yes/No/Undetermined)[2]	Reference Sheet #
YY	SS	Yes	6,7
ZZ (NYSDEC P-22)/(N. Branch of Fish Creek)	FO/SS/EM	Yes	5,7
AAA (NYSDEC P-22)	EM	Yes	5
BBB	FO	Yes	5
CCC	EM	Yes	5
DDD	FO	Yes	5
EEE	EM	Yes	5
FFF (NYSDEC SP-39)	EM/SS	Yes	5
GGG	EM/SS	Yes	1
HHH (NYSDEC SP-39)	FO/SS/EM	Yes	1
III	EM	No	1
JJJ	EM	Yes	6,7
KKK	FO/SS	Yes	2
LLL	EM	No	1
MMM	EM/SS	No	1
AAAA (NYSDEC P-27)	FO	Yes	7
BBBB (NYSDEC P-27)	FO	Yes	7
CCCC	EM	Yes	7

[1] Wetland community types noted are based upon the Cowardin et al classification system: EM = emergent marsh; SS = scrub shrub; FO = forested.
[2] Based on NWI mapping and visual observation of hydrologic connectivity in the field. Final jurisdictional determination to be made by USACOE.

5.1 WETLANDS

Emergent wetland – The majority of delineated Project Site wetlands are emergent. These wetlands are characterized by persistent and/or deep inundation, often containing soils that remain inundated throughout the year. Emergent marshes on-site are dominated by herbaceous species such as common rush (*Juncus effusus*), bulrushes (*Scirpus cyperinus* and *Scirpus atrovirens*), sedges (*Carex crinita* and *Carex stricta*), spotted jewelweed *(Impatiens capensis*), joepyeweed (*Eutrochium maculatum*), and ferns (*Onoclea sensibilis, Osmunda cinnamomea, Osmunda regalis)*. The silt/silt loam textured soils are shallow for the most part with a rock layer that varies in depth within 16 inches. The soils are saturated at 2-3 inches and characterized by a low chroma value of 10 YR 2/1 on average. Evidence of water marks (inundation), water-stained leaves, oxidized root channels, and morphological plant adaptations (hummocks) occur throughout these wetlands.

Scrub-shrub wetland – Scrub/shrub wetlands within the study area are characterized by dense stands of shrub species less than 20 feet tall, including meadowsweet (*Spiraea alba*), willow (*Salix spp.*), speckled alder (*Alnus rugosa*), winterberry (*Ilex verticillata*), and mountain holly (*Nemopanthus mucronata*). Herbaceous vegetation in these areas is typically dominated by spotted jewelweed, sedges (*Carex spp.),* goldenrods (*Solidago spp.*), beggar's-ticks (*Bidens spp.*), purplestem aster (*Symphyotrichum puniceum*), and umbellate

aster (*Doellingeria umbellata*). The soils are saturated at 0 inches with a silt loam texture and characterized by a low chroma value of 10 YR 2/1. Hydrology is characterized by moist to saturated conditions. Evidence of water-stained leaves, oxidized root channels, and morphological plant adaptations (hummocks) occur throughout these wetlands.

Forested wetland – Forested wetland communities are dominated by trees that are 20 feet or taller, but also include an understory of shrubs and herbs. The forested wetlands on the Project Site include a mix of trees such as balsam fir (*Abies balsamea*), black spruce (*Picea mariana*), yellow birch (*Betula alleghaniensis*), and red maple *(Acer rubrum)*; and shrub species such as speckled alder and winterberry. The herbaceous layer in these wetlands is dominated by sphagnum moss, sensitive and cinnamon ferns, and sedges *(Carex spp.)*. The soils are typical of the Site with a rather significant organic layer followed by an A horizon with a dark low chroma value of 10YR 2/1 and a silt loam texture. At variable depths, 3-6 inches, a rock layer predominates preventing further soil profile investigation. Indicators of wetland hydrology include saturated soils, watermarks, water-stained leaves, oxidized root channels, and morphological plant adaptations (hummocks and root buttressing).

5.2 STREAMS

Many of the delineated jurisdictional wetlands on-site are associated with streams (both perennial and intermittent) however; none of the delineated systems were flagged as stream channel only. Streams contiguous to the Project Site include Roaring Brook and North Branch of Fish Creek. On-site streams are mostly lower-gradient streams that meander through wetlands and broad undulating settings. Most streams on the Project Site are perennial, with a pebble/cobble and silt/mud substrate, and aquatic vegetation. Water depths within the majority of perennial streams are typically 2 to 6 inches in riffles, with pool depths of 0.5 to 2 feet.

6.0 CONCLUSIONS

A total of sixty-four (64) wetlands were delineated by EDR personnel in areas within or immediately adjacent to the Roaring Brook Wind Farm generating site footprint. These wetlands were identified based on the presence of hydrophytic vegetation, hydric soils, and wetland hydrology. The delineated areas include forested and emergent wetlands, and streams (intermittent and perennial). The primary functions provided by these wetlands appear to include maintaining surface water flows, recharging groundwater supplies, storm

water detention, flood protection and abatement, water quality improvement, wildlife habitat, and nutrient production and cycling. Several of the larger forested wetlands provide habitat for forest-nesting songbirds while the open emergent wetlands offer habitat to migrating waterfowl. The functions of many of the delineated wetlands are portions of much larger systems, which may provide significant functions and values.

Of the sixty-four (64) wetlands and streams delineated on-site, it is likely that some of these may not be considered jurisdictional by the USACOE due to the lack of a definable surface water connection to likely jurisdictional wetlands/waters. However, a final determination of jurisdictional status must be made by the USACOE.

7.0 REFERENCES

Benyus, Janine M. 1989. *The Field Guide to Wildlife Habitats of the Eastern United States*. Simon & Schuster Inc., New York, NY.

Cowardin, L.M., V. Carter, F.C. Goblet and E.T. LaRoae. 1979. *Classification of Wetlands and Deepwater Habitats of the United States.* U.S. Fish and Wildlife Service, OBS-79/31, Washington, D.C.

Environmental Laboratory. 1987. *Corps of Engineers Wetland Delineation Manual.* Technical Report Y-87-1. U.S. Army Corps of Engineers: Waterways Experiment Station; Vicksburg, MS.

Gleason, H.A. and A. Cronquist. 1991. *Manual of Vascular Plants of Northeastern United States and Adjacent Canada.* D. Van Nostrand Co., New York, NY.

Grimm, William Carey. 1993. *The Illustrated Book of Wildflowers and Shrubs: The Comprehensive Field Guide to More Than 1300 Plants of Eastern North America.* Stackpole Books. Mechanicsburg, PA.

Kollmorgen Corporation. 1988. *Munsell Soil Color Charts.* Macbeth Division of Kollmorgen Corporation, Baltimore, MD.

Natural Resources Conservation Service. 1989. *New York Soils With Potential Hydric Inclusions*.

Natural Resources Conservation Service. 1995. *Hydric Soils of New York.* Revised December 15, 1995.

Newcomb, L. 1977. *Newcomb's Wildflower Guide.* Little, Brown and Co., Boston, MA.

Reed, P.B., Jr. 1986. *Wetland Plants of the State of New York.* U.S. Fish & Wildlife Service, St. Petersburg, FL.

Reed, P.B., Jr. 1988. *National List of Plant Species That Occur in Wetlands: Northeast (Region 1).* U.S. Fish & Wildlife Botanical Report, No. 88 (24). St. Petersburg, FL.

Reschke, C. 1990. *Ecological Communities of New York State.* New York Natural Heritage Program, New York State Department of Environmental Conservation, Latham, NY.

Tiner, Ralph W. 1999. *Wetland Indicators: A Guide to Wetland Identification, Delineation, Classification and Mapping*. Lewis Publishers, New York, NY.

USDA NRCS 1960. *Soil Survey of Lewis County, New York.* USDA Soil Conservation Service in Cooperation with Cornell University Agricultural Experiment Station, Washington, D.C.

United States Environmental Protection Agency (EPA). 2001. Interagency Memorandum from Gary S. Guzy (General Counsel for the U.S. Environmental Protection Agency) and Robert M. Anderson (Chief Counsel for the U.S. Army Corps of Engineers). Memorandum Subject: *Supreme Court Ruling Concerning CWA Jurisdiction over Isolated Waters.*

APPENDIX A

FIGURES

APPENDIX B

ROUTINE WETLAND DETERMINATION FORMS

APPENDIX C

PHOTOS OF REPRESENTATIVE WETLAND COMMUNITIES