

**Appendix 14-C**  
**Wetlands Functional Assessment**

## **APPENDIX 14-C WETLAND FUNCTIONAL ASSESSMENT**

### **1.0 INTRODUCTION**

This Wetland Functional Assessment has been prepared in conjunction with the Draft Environmental Impact Statement (DEIS) for the CPV Valley Energy Project, Wawayanda, New York. This assessment has been prepared to identify key wetland functions and values that exist on the project site and to address potential site impacts to wetlands not only in terms of loss of wetland area, but also in terms of potential loss or change of functions resulting from these direct or indirect impacts.

For proposed alterations to state jurisdictional wetlands subject to the NYSDEC Freshwater Wetlands (FWW) Program, regulated under Article 24 of the Environmental Conservation Law and Regulations (6NYCRR Parts 663, 664 and 665) a functional assessment of wetlands to be altered is required. This functional assessment accounts for federal jurisdictional waters of the U.S. in the Project Area, which are subject to Sections 401 and 404 of the Clean Water Act, Water Quality Certification (WQC) Program, as well as the U.S. Army Corps of Engineers (ACOE) Section 404 General, or Nationwide Permit (NWP) Program. This wetlands functional assessment was prepared based on field visits in 2007 and 2008.

### **1.1 FUNCTIONAL ASSESSMENT METHOD**

A Descriptive Approach to assessing wetland functions and values described in a September 1999 supplement (the Supplement) to *The Highway Methodology Workbook* by the New England Division of the U.S. Army Corps of Engineers (ACOE) is the assessment method currently preferred by the NYSDEC. Functions and values of wetlands at the site are evaluated by this method and are discussed below.

The Supplement indicates “Wetland functions are self-sustaining properties of a wetland ecosystem that exist in the absence of society”. Wetland functions relate to the ecological significance of wetland properties without regard to subjective values. Wetland functions are generally considered to be the result of biologic, geologic, hydrologic, biogeochemical, and/or physical processes that occur or take place in a wetland. Functions attributed to wetlands include the following:

- Groundwater Recharge/Discharge
- Floodflow Alteration (Storage & Desynchronization)
- Fish and Shellfish Habitat
- Sediment/Toxicant/Pathogen Retention
- Nutrient Removal/Retention/Transformation
- Production (Nutrient) Export

- Sediment/Shoreline Stabilization; and
- Wildlife Habitat

Wetland values are generally considered to be benefits derived from either these functions or other characteristics of a wetland. Perceived values arise from the functional ecological processes exhibited by wetlands but are determined also by human perceptions, the location of a particular wetland, the human pressures on a wetland, and the extent of the resource (Mitsch and Gosselink, 2000). The value of a particular function, or combination thereof, is based on human judgment of the worth, merit, quality, or importance attributed to those functions. Values attributed to wetlands include the following:

- Recreation
- Education/Scientific Value
- Uniqueness/Heritage
- Visual Quality/Aesthetics; and
- Threatened or Endangered Species Habitat

A basic concept presented by the Supplement is an identification of “Considerations/Qualifiers” that can be used as indicators or descriptors of the presence of particular functions or values. From as few as three to as many as 32 of these “Considerations/Qualifiers” are identified in Appendix A of the Supplement for each of the respective wetland functions and values. These “Considerations/Qualifiers” therefore become a checklist or outline of indicators of functions and values for wetland scientists to observe, compare against, and structure assessments. The Supplement indicates these “Considerations” are intended to be flexible and are ultimately based on “best professional judgment.”

## **2.0 WETLAND FUNCTIONS AND VALUES**

The boundaries of wetlands have been delineated for the Project and are displayed on project plans (Section 14.0 Ecology). Descriptions of these wetlands are presented in Section 14.2.2 of the DEIS.

Functions and values of wetlands to be impacted by the proposed project are dependent on, and influenced by, various physical characteristics at the site, which are indicative of relative levels of function and value. These include: size and proximity of wetlands to ongoing development activity, geologic setting, soil characteristics, presence and duration of hydrology, landscape position, and wetland cover type. Consequently, the effects of changes to these physical characteristics are evaluated in assessing whether an activity or project impacts wetland-specific functions and values.

### **2.1 WETLAND DESCRIPTIONS**

Descriptions of the on-site wetlands are provided in Section 14.2.2. The ecological communities associated with the site have been categorized in accordance with

Ecological Communities of New York State (Edinger et al, 2002) (the updated, authorized version of Reschke, 1990) (see Section 14.2.1), along with associated typical and directly observed vegetative species. A map of the on-site ecological communities is found on Figure 14-1. Table C2.1-1 summarizes the site’s ecological communities:

<b>Table C2.1-1 Ecological communities of the CPV Valley Energy Center</b>	
<b>Ecological Communities</b>	<b>Location on Site</b>
<b>V. Palustrine Communities</b>	
A.2. Shallow emergent marsh	Eastern end
A.3 Shrub swamp	Northeastern part – fringe areas
C.2. Red maple-hardwood swamp	Eastern-central part
<b>VI. Terrestrial Communities</b>	
A.25 Successional old field	Western end
C.17 Beech-maple mesic forest	Central and western areas
C.27 Successional southern hardwoods	Various site areas
D.1. Cropland/row crops	Eastern part (Energy Center)
D.2. Cropland/field crops	Northwestern part
D.13 Mowed roadside/path	Along adjacent roads/highways

Three basic wetland types, all palustrine wetlands, were delineated in the Project area. These are described below.

***Shallow Emergent Marsh***

This is a marsh meadow community that occurs on mineral soil or deep muck soils (rather than true peat), that are permanently saturated and seasonally flooded. Shallow emergent marshes typically occur in lake basins and along streams often intergrading with deep emergent marshes, shrub swamps, and sedge meadows and they may occur in a complex mosaic in a large wetland. On-site, this community occurs in the eastern end of the site, along Carpenter Creek and the adjoining unnamed tributary stream, closest to Route 17M and the I-84 westbound on-ramp.

Dominant vegetation includes bulrushes (*Scirpus* sp.), bluejoint grass (*Calamagrostis canadensis*), cattails (*Typha latifolia*), and sedges (*Carex* sp.) amongst others. Vegetation observed within the shallow emergent marsh included meadowsweet (*Spiraea latifolia*), boneset (*Eupatorium perfoliatum*), purple loosestrife (*Lythrum salicaria*), golden rod (*Solidago* sp.), narrow-leaved mountain mint (*Pycnanthemum tenuifolium*), swamp milkweed (*Asclepias incarnate*), sensitive fern (*Onoclea sensibilis*), and tussock sedge (*Carex stricta*). Scattered shrubs included gray-stem dogwoods (*Cornus racemosa*) and slippery elm (*Ulmus rubra*).

### ***Shrub Swamp***

A shrub swamp is an inland wetland dominated by tall shrubs that occurs along the shore of a lake or river, in a wet depression or valley not associated with lakes, or as a transition between a marsh, fen, or bog and a swamp or upland community. The substrate is usually mineral soil or muck. This is a very broadly defined type that includes several distinct communities and many intermediates. Shrub swamps are very common and quite variable. The main shrub swamp on the site occurs in the central northern area of the property bounded by shallow emergent marsh to the south and cropland/field crops to the west. An additional smaller area of shrub swamp is located to the east and is bounded by shallow emergent marsh just north of Carpenter Creek.

Common shrub swamp vegetation includes speckled meadowsweet, steplebush (*Spiraea tomentosa*), gray-stem dogwood, swamp azalea (*Rhododendron viscosum*), highbush blueberry (*Vaccinium corymbosum*), and willows (*Salix* sp.). Vegetation observed during site visits included arrow-wood (*Viburnum recognitum*), slippery elm, and tartarian honeysuckle (*Lonicera tatarica*).

### ***Red Maple Swamp***

This is a hardwood swamp that occurs in poorly drained depressions, usually on inorganic soils. This is a broadly defined community with many regional and edaphic variants. In any one stand red maple (*Acer rubrum*) is either the only canopy dominant, or it is codominant with other hardwoods such as ashes (*Fraxinus pennsylvanica*), elms, yellow birches (*Betula alleghaniensis*), and swamp white oaks (*Quercus bicolor*). This community occurs in the eastern-central part of the site, and is in an upland-wetland complex with an upland forest community, described below.

The red maple-hardwood swamp on the site is dominated by a red maple canopy with ash and elm co-dominants. Shagbark hickory (*Carya ovata*), swamp white oak and pin oaks (*Quercus palustris*) were also noted. The herbaceous layer is composed primarily of jewelweed (*Impatiens pallida*), poison ivy (*Toxicodendron radicans*), cinnamon fern (*Osmunda cinnamomea*), and sensitive fern with scattered areas of phragmites (*Phragmites australis*). The shrub/sapling layer consisted of willows, slippery elms, ashes, and gray-stem dogwoods.

## **2.1 SITE WETLAND VALUES AND FUNCTIONS**

Functions and values of the wetlands impacted by construction of the proposed CPV Valley Energy Center are dependent on, and influenced by, various physical characteristics which are indicative of relative levels of function and value. These include: size and proximity of wetlands to ongoing development activity, geologic setting, soil characteristics, presence and duration of hydrology, landscape position, and wetland cover type. Accordingly, the effects of changes to these physical characteristics are evaluated in assessing whether the Project impacts will have a significant effect on wetland functions and values.

Each of the eight wetland functions is performed by one or more of the wetlands crossed by the Project. In addition, four of the five values are associated with one or more of the wetlands crossed by the Project; however, no wetlands serve as Threatened or Endangered Species Habitat.

The significance of the Considerations/Qualifiers to the principal and sub-principal functions and values performed by wetlands in the Project area is discussed below.

### ***Groundwater Recharge/Discharge***

The Orange County Soil Survey (USDA, 2008) includes mapped soils for the project area (see Section 11.0). The soils at the proposed CPV Valley Energy Center are a mix of silty loams, sandy loams, and gravelly loams. The soil survey indicates soils beneath wetland areas of the site are made up of the Rhinebeck, Raynham and Madalin Series which consists of deep to very deep, somewhat poorly-drained to very poorly-drained soils formed in clayey glaciolacustrine sediments. The surficial geology at the CPV Valley Energy Center and along the interconnections is mapped by the State of New York as a mix of kame deposits and recent alluvium over outwash sand and gravel. The kame deposit typically consists of coarse to fine gravel and/or sand. The recent alluvium typically consists of silts, clays, and oxidized fine sand to gravel and is associated with flood plains within a valley.

During on-site soil boring activities during August 2008, the presence of both kame deposits and recent alluvium over outwash sand and gravel material was confirmed. At the CPV Valley Energy center, the depth to bedrock is >25 feet. Based on these relatively permeable conditions, on-site wetlands would play a role in groundwater recharge.

Wetlands associated with a perennial or intermittent watercourse have hydric soils that may contribute groundwater baseflow to the stream when the water table is low and/or the stream may receive groundwater discharge when the water table is high. In general, streams and adjacent wetlands may serve as a localized area of groundwater discharge that contributes to the base flow of this stream.

Two main watercourses traverse the site and flow east toward Route 17M (see Appendix 14-E). Carpenter Creek enters the site near the existing site access road along Route 6 in the western part of the site, and flows east through the center of the site. A number of small, man-made drainage swales join Carpenter Creek from the adjacent fields, both from the north and south of the main channel. In addition, unnamed tributary stream enters the site from the south via a culvert beneath I-84, and flows northeast along the site's southern/eastern boundary with I-84. Both Carpenter Creek and the unnamed tributary stream join together in the far eastern part of the site, then flows beneath Route 17M via a culvert and joins Monhagen Brook approximately 1,000 feet to the east of Route 17M.

Wetlands that contribute to groundwater recharge or discharge often show signs of variable water levels. Indications of ponded water, water-stained leaves, water marks, and/or other indications that the water level changes periodically, were observed within both the shallow emergent marsh and red maple swamp on the site.

Wetlands with the Groundwater Recharge/Discharge function often lack an inlet or outlet, or have a constricted outlet. While unrestricted flow of low gradient streams through the site drives a significant part of the wetland hydrology, large shallow marsh, wet meadow and forested wetland communities provide opportunities for both seasonal groundwater recharge and discharge.

### ***Floodflow Alteration***

Commonly, wetlands suitable for Floodflow Alteration occur in the upper part of the drainage basin, in a relatively flat area of the basin, where there is little or no flood storage in the watershed above the wetland and/or the watershed contains largely impermeable surfaces that cannot absorb waters during storm events. This function is particularly important if developed areas or valuable properties occur in the floodplains of downstream watercourses. These include wetlands bordering perennial or intermittent watercourses that receive and retain flood waters from storm events. Other characteristics that indicate the potential to attenuate waters entering downstream tributaries include hydric soils and a high density of vegetation. Many of the wetlands that have a high potential to function for Floodflow Alteration have ponded water or visible signs of variable water level.

The on-site shallow emergent marsh, red maple swamp and the generally level topography of the site have some ability to function for Floodflow Alteration. In addition, the presence of two converging, low-gradient streams with a culverted outlet, and large, adjacent wetland communities indicate that Floodflow Alteration is a likely function of on-site wetlands. Evidence of bank overflow during two storm events over 1” during the summer of 2008 suggest that the wetlands within 50’ of Carpenter Creek in the eastern portion of the site do exhibit several inundation events annually. Similar leaf staining and drift lines were not observed on the western half of the site. However, as indicated on the Flood Insurance Rate Map (FIRM (see Appendix 14-E)) for the Town of Wawayanda, the presence of a 100 year floodplain has not been mapped on the site, indicating that the site is not within a large flood-prone hydrologic reach. In addition, the on-site streams and adjacent drainage channels have been channelized in the past through agricultural practices, somewhat limiting the occurrence of overbank flooding.

### ***Fish and Shellfish Habitat***

Streams or lakes providing Fish and Shellfish Habitat tend to have good water quality, often occurring in watersheds where undisturbed, forested land is dominant in the watershed upstream of the watercourse. Objects such as cobbles and woody vegetation in the substrate provide cover objects, and streamside vegetation overhanging the banks providing shade for suitable habitat.

For wetlands associated with perennial streams, slow to moderate streamflows with a defined stream channel characterize the best Fish Habitat.

Carpenter Creek and the unnamed tributary stream both provide potential Fish Habitat. Fish have been observed within the on-site streams, indicating that this function is present. While the streams are culverted, there also appears to be connectivity between upgradient and downgradient surface waters, providing at least some adequate fish passage.

### ***Sediment/Toxicant Retention***

The Sediment/Toxicant Retention function relates to the effectiveness of the wetland to act as a trap for sediments, toxicants, or pathogens in runoff water from surrounding uplands or upstream eroding wetland areas and reduces or prevents degradation of water quality. Typically, these wetlands are characterized by silty fine-grained soils, or organic soils that drain slowly. Sediment trapping occurs because water is ponded or moves slowly within the wetland, so that water is retained for a long time, allowing sediments, toxicants and/or pathogens to settle out. Dense vegetation also assists in trapping sediment. Wetlands serving this function are particularly important if known or potential sources of excess sediment or toxicants are present in the watershed above the wetland, and/or if their downstream drinking water sources (either surface or groundwater) that have the potential to become contaminated. Wetlands associated with a watercourse may be particularly involved in Sediment/Toxicant/Pathogen Retention, as excess sediments/toxicants are carried downstream and deposited in wetlands during flooding events.

Areas of shallow emergent marsh and red maple swamp within the property are suitable to function in the retention of excessive sediments and/or pathogens that may be carried by surface water runoff within the drainage. The presence of low gradient streams on-site provide in combination with current/former agricultural uses indicate that the on-site wetlands have the opportunity and the capability to provide this function.

### ***Nutrient Removal/Retention/Transformation***

Wetlands that function in Nutrient Removal/ Retention/ Transformation tend to share many of the characteristics that also assist in sediment trapping and sediment retention, such as ponded water and deepwater habitats, slowly-drained, fine-grained mineral or organic soils, and dense vegetation. Evidence of organic or sediment deposits often indicate that a wetland functions in nutrient removal. An abundance and diversity of vegetation allows for more uptake, retention and transformation of nutrients in wetland systems. Wetlands associated with watercourses may show a decline in water velocity within the wetland, which may be due to thick vegetation or a constricted outlet. The presence of excess nutrients in the watershed, due to agriculture, land disturbance/clearing, or other human activity, may increase the local importance of the Nutrient Removal/ Retention/ Transformation function.

As with Sediment/Toxicant Retention, the shallow emergent marsh area on-site may have some suitability for Nutrient Removal/Retention/Transformation.

### ***Production Export***

Wetlands performing this function usually have high productivity levels. Wildlife export organic material by consuming vegetation, invertebrates and/or other wildlife at lower trophic levels that are using the wetland. Export may also occur because of the utilization of flowering plants by nectar and pollen-gathering insects. Often, high productivity and high levels of production export are indicated by a dense vegetative community, containing both a relatively high species richness and a high structural diversity. Export may also occur via detritus carried by a permanent outlet, and many wetlands suitable for production export are associated with a perennial stream.

The largest contiguous section of red maple swamp appears suitable for Production Export. This red maple swamp is a large, forested wetland associated with Carpenter Creek. In addition, other on-site perennial streams flow alongside several wetland communities and then off-site, Production Export is a likely function of the on-site wetlands. High productivity and dense vegetation is present in the on-site wetlands, and export is likely to occur via the consumption of food sources by wildlife, particularly the fruits of gray-stemmed dogwoods, the nuts of shagbark hickories and the acorns of pin oaks. The red maple swamp is also likely to support a high population of insects which may be consumed by wildlife and fish. Detritus development and deep organic soils are also present within the red maple swamp.

### ***Sediment/Shoreline Stabilization***

Wetlands suitable for Sediment/Shoreline Stabilization are typically associated with a perennial or intermittent watercourse or drainage that is subject to erosive forces, especially during storm events when water is moving quickly. The presence of potential erosive forces in the wetland is often indicated by a topographical gradient within the wetland, evidence of sedimentation or siltation in the waterbody, channelized flow, and high water flow velocities. Wetlands functioning to stabilize the sediment and bank form a wide buffer zone adjacent to the waterbody, containing dense vegetation. Vegetation can consist of dense emergent or woody vegetation, or both. Large trees, saplings and other woody vegetation near a watercourse can serve to stabilize the existing banks and act to absorb energy during flood events.

No on-site wetlands were found to provide the function of Sediment/Shoreline Stabilization. While two perennial streams are located on the property, the general level/flat gradient of the site is not ideal for erosive forces. Additionally, no evidence of siltation and/or sedimentation within the streams was observed.

### ***Wildlife Habitat***

Seasonally inundated areas can provide aquatic breeding habitats to support populations of insects and other invertebrates, which in turn provide a food source for higher trophic levels. Emergent wetlands and other high-productivity wetlands, in particular, may support abundant insects. Structural complexity provided by the dense trees, shrubs and herbaceous vegetation present in the forested wetland is likely to enhance avian utilization by migratory and resident bird species.

Presence of an undeveloped buffer or a wildlife travel corridor can increase the value of wildlife habitat by providing overland access to other upland or wetland habitats. Even areas fragmented by development, however, habitat islands may provide important habitat refugia or stop-overs for migrating birds. Another consideration includes the presence of potential food sources within the wetland, including aquatic vegetation that may be used by waterfowl (e.g. woolgrass, *Scirpus cyperinus*), shrubs and trees producing berries that may be used by birds and mammals (e.g. blueberries, buckthorn, ashes), and hard-mast tree species (e.g. oaks, hickories) that produce acorns, which are often consumed or cached by mammal species. However, disturbance, human activity, and presence of invasive species may limit wildlife habitat value for otherwise suitable areas.

Most of the onsite wetlands have some functional value as Wildlife Habitat in several various contexts. In a few cases wildlife use was directly observed during field surveys, but primarily wildlife habitat value was inferred by characteristics of the wetland and its landscape setting and the presence of potential food sources. The most abundant wetland on the property consists of red maple forested wetland, which typically can provide habitat for a variety of species of birds and mammals.

### ***Recreation***

Considerations that increase potential recreational value include the presence of wildlife, aesthetic value, and perennial watercourses. The wetlands on the CPV property are not suitable for recreation, as they are located on private land without available public access, or available recreational facilities.

### ***Educational/Scientific Value***

Considerations that increase potential educational value include the presence of wildlife, a variety of wetland types at one location, and special or significant habitats (such as vernal pool habitat or perennial watercourses). None of the wetlands on the CPV property are suitable for educational/scientific value, as they are located on private land without available or safe public access, parking or facilities.

### *Uniqueness/Heritage*

The Uniqueness/Heritage value takes into account the special value of a site in the context of the overall landscape, cultural features, and the rarity of the wetland/habitat type in the local area. No wetlands on the property are considered to have some Uniqueness/Heritage value.

### *Visual Quality/Aesthetics*

Most wetlands on the CPV property are suitable for Visual Quality/Aesthetics, because they can be viewed from a publicly-accessible viewing location, mainly the roads surrounding the property however; the wetland quality has been somewhat degraded by disturbance and maintenance of the agricultural fields (which may serve as separate aesthetic components). The red maple swamp in particular is considered to have some value for its visual /aesthetic quality. This includes primarily larger, unfragmented wetlands that have a diverse assemblage of species or vegetative cover type. These wetlands may have red maples that turn bright colors in the fall, as well as wet meadow communities that flower in the summer and fall.

The shallow emergent marsh and shrub swamp, associated with the property, are also considered to have Visual Quality/Aesthetics as a principal value due to the relatively undeveloped nature of the property.

## **3.0 SUMMARY**

The combined functions and values associated with site wetlands considered to be of primary importance include:

- Groundwater Recharge/Discharge
- Fish and Shellfish Habitat
- Sediment/Toxicant/Pathogen Retention
- Nutrient Removal/Retention/Transformation
- Production (Nutrient) Export
- Wildlife Habitat
- Visual Quality/Aesthetics

Therefore, the assessment of unavoidable wetland impacts due to the Project has recognized these primary functions, and the site layout been designed to avoid or minimize impacts to these functions. Examples of this include minimizing conversion loss of forested wetland, avoiding alteration or blockage of stream flow, maintaining vegetated buffers and controlling stormwater volumes and peak flow discharges to wetlands. Accordingly, wetland mitigation planning has been developed to replace or enhance these wetlands functions to the extent possible.

Secondary/minor functions of site wetlands include:

- Floodflow Alteration (Storage & Desynchronization)
- Sediment/Shoreline Stabilization

Finally, functions and values considered not significant or provided by site wetlands include:

- Recreation
- Education/Scientific Value
- Uniqueness/Heritage
- Threatened or Endangered Species Habitat

#### **4.0 REFERENCES**

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