

# **SCOPING DOCUMENT**

## **SAW MILL RIVER BASIN, NEW YORK ECOSYSTEM RESTORATION STUDY**



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## LIST OF ACRONYMS AND ABBREVIATIONS

CFR	Code of Federal Regulations
District	New York District
ER	Environmental Regulations
FWCA	Fish and Wildlife Coordination Act
NEPA	National Environmental Policy Act
NYSDEC	New York State Department of Environmental Conservation
Study	Saw Mill River Basin Ecosystem Restoration Study
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey



## EXECUTIVE SUMMARY

The United States Army Corps of Engineers (USACE), New York District (District) in partnership with West Chester County, is conducting an Ecosystem Restoration Study of the Saw Mill River Basin located in Westchester County, New York, herein referred to as the Study. The Study area begins at the headwaters of the Saw Mill River in the Town of New Castle in Westchester County and ends at the river's confluence with the Hudson River. The Study area is approximately 19 miles in length and 26.5 square miles in area, and includes Nannyhagen Brook, Tertia Brook, Mine Brook and Rum Brook. The District was authorized under Section 201 of the Flood Control Act of 1965, Public Law 89-298 as modified and Section 216 of the Flood Control Act of 1970, Public Law 91-61 to identify recommendations in the interest of water resources development, including ecosystem restoration. The Saw Mill River Basin Reconnaissance Study (USACE 1999) evaluated Federal interest for providing ecosystem restoration measures and developing a Watershed Management Plan for the Study area.

The purpose of this scoping document is to formally coordinate with local, county, state, and Federal agencies, and to identify issues and concerns that may be associated with the Study. This scoping document provides a description of potential opportunities for ecosystem restoration, a discussion of the existing water, biological, and cultural resources within the Study area; a preliminary assessment of potential direct, indirect, and cumulative impacts of the Study; and, a discussion of the local, county, state and Federal policies and permits applicable to the Study. The scoping document was prepared in accordance with U.S. Environmental Protection Agency (USEPA) guidelines (40 Code of Federal Regulations [CFR] 1500-1508) and USACE guidelines (Environmental Regulations [ER]-200-2-2) as a precursor to preparation of an Environmental Impact Statement as required by the National Environmental Policy Act (NEPA).

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## 1.0 INTRODUCTION

The United States Army Corps of Engineers (USACE), New York District (District), was authorized under Section 201 of the Flood Control Act of 1965, Public Law 89-298 as modified and Section 216 of the Flood Control Act of 1970, Public Law 91-61 in the interest of water resources development, including ecosystem restoration. Accordingly, the Saw Mill River Basin Reconnaissance Study (USACE 1999) established Federal interest for providing ecosystem restoration measures and the developing a Watershed Management Plan in the Saw Mill River Basin. As a result of the reconnaissance study (USACE 1999), the District initiated the Saw Mill River Basin Ecosystem Restoration Study (Study) for which they are the lead Federal agency, and Westchester County is the non-Federal partner agency.

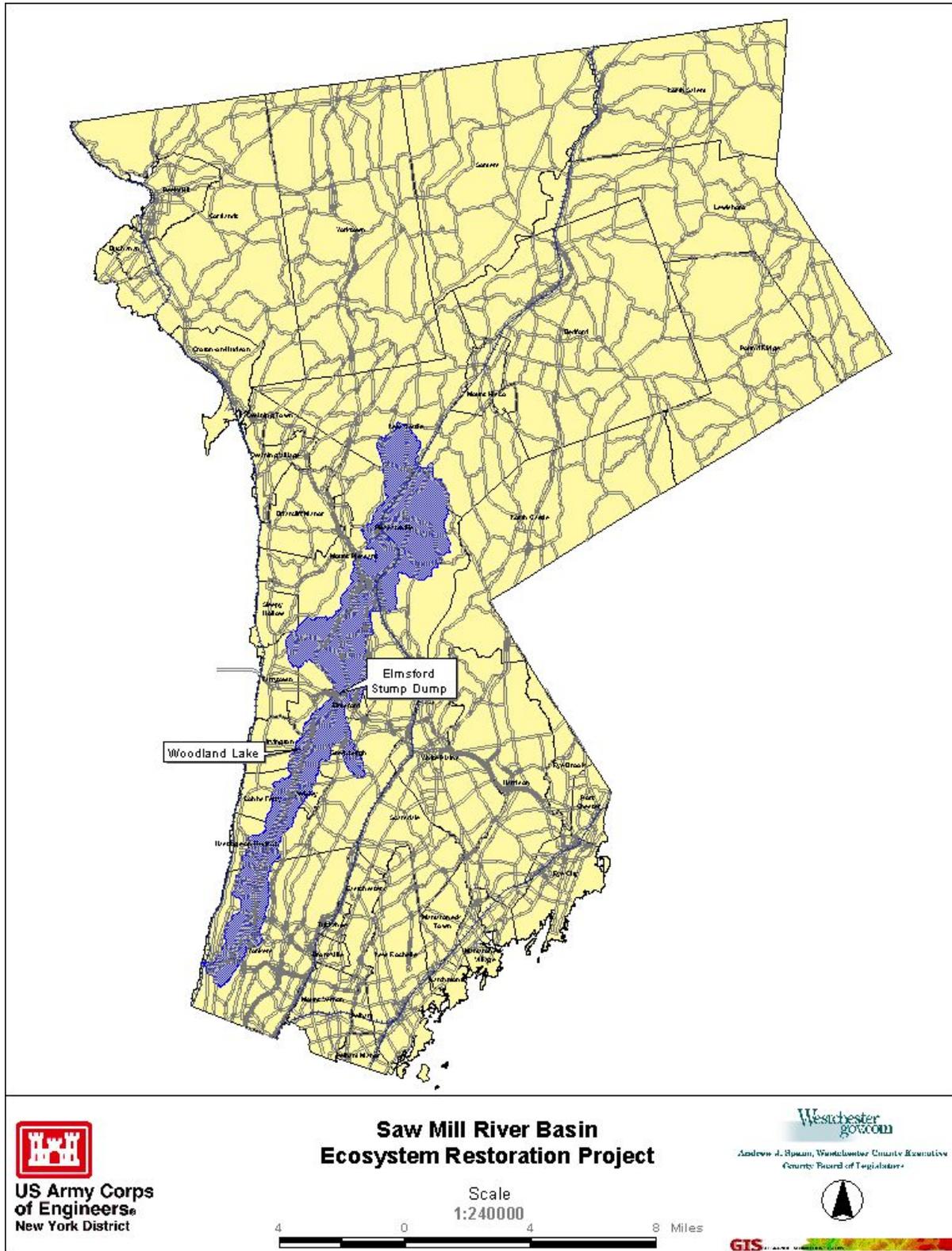
The Study area is located in Westchester County in southern New York (Figure 1). The watershed is approximately 19 miles in length from its headwaters, or the upper portion of the river, located in the Town of New Castle to its mouth at the Hudson River. The drainage area of the Saw Mill River Basin is approximately 26.5 square miles and includes Tertia Brook, Nannyhagen Brook, Rum Brook and Mine Brook.

Intense urbanization and development has led to the degradation of the environment within the Study area. For example, direct development impacts on ecological resources in the Study area include increased streambank erosion, increased sedimentation, loss of wetland acreage, nutrient and pollutant loading. Indirect impacts include increased rates and volumes of stormwater runoff, reduced groundwater recharge, reduced flood storage, increased stream temperatures, and increased acreage of invasive species. As a result of these direct and indirect impacts, opportunities for ecosystem restoration, including fish and wildlife habitat enhancement, water quality improvement, and restoration of natural floodplain values exist within the Saw Mill River Basin (USACE 1999).

This scoping document was prepared in accordance with the National Environmental Policy Act (NEPA), the Council on Environmental Quality's *Guidance Regarding NEPA Regulations*, and the USACE's *Procedures for Implementing NEPA* (Environmental Regulations [ER]-200-2-2) for distribution to local, county, state, and Federal agencies that may have an interest in the impacts and benefits derived from implementation of flood control and ecosystem restoration measures. This document provides a description of potential solutions for ecosystem restoration; a discussion of the existing water, biological, and cultural resources within the Study area; a preliminary assessment of the direct, indirect, and cumulative impacts and benefits of the Study; and, a discussion of the local, county, state, and Federal policies and permits applicable to the Study. The purpose of this scoping document is to 1) formally coordinate with local, county, state, and Federal agencies, 2) inform the public of the District's proposed Study, and 3) identify issues and concerns that may be associated with the Study.



Figure 1. Location of the Saw Mill River Basin, Westchester County, New York.



## 2.0 STUDY DESCRIPTION

The Saw Mill River Basin Reconnaissance Study (USACE 1999) preliminarily evaluated potential ecosystem restoration measures to demonstrate Federal interest in implementing solutions to environmental degradation and other related water resource issues. This section briefly describes measures that might be implemented within the Study Area through the proposed aquatic ecosystem restoration sites and the development of the watershed management plan.

### 2.1 ECOSYSTEM RESTORATION COMPONENT

During the Reconnaissance Study, the District identified potential ecosystem restoration areas based on a thorough review of previous studies, maps, and restoration proposals, as well as site visits and several meetings and interviews with stakeholders, local organizations, and individuals. Potential ecosystem restoration measures were evaluated based on their ability to achieve the following objectives:

- Restore ecosystem structure and function,
- Expand and improve habitat,
- Restore natural vegetation,
- Connect or enlarge wetlands and critical habitat areas, and
- Improve public access and recreational opportunities.

The ecosystem restoration projects would also provide secondary benefits including improved water quality, enhanced aesthetics and passive recreational opportunities.

#### 2.1.1 Ecosystem Restoration Areas

At this time, the District has identified two potential ecosystem restoration areas within the Study area (Figure 2). The following provides a brief description of the problems and opportunities of each of the ecosystem restoration sites.

- Elmsford Stump Dump (Figure 3): The former stump dump is located in the Village of Elmsford across the river and upstream from the Vreeland Avenue industrial park, which contains multiple salvage yards. The 3.7 acre site, which includes a small pond, is situated on floodplain behind a forested riparian strip. Much of the site is overgrown with invasive Japanese Knotweed, an upland species. Approximately 600 ft downstream of the stump dump is a one-acre wetland overgrown with *Phragmites australis*.

Proposed restoration opportunities include reestablishing the floodplain by regrading and removing fill, and replacing invasive plant species with native vegetation. In addition, restoration of these sites presents a recreational opportunity by linking two disconnected portions of the South County Trail, a rails-to-trails bikeway that parallels the Saw Mill River for approximately six miles.



- Woodlands Lake (Figure 4): Woodlands Lake is located within V. Everett Macy Park in the Village of Irvington. The lake, approximately one mile in length, is an in-line impoundment on the Saw Mill River formed by Macy dam. The primary factors contributing to the ecosystem degradation of the site are sediment accretion and purple loosestrife invading the wetlands in the upstream portion of the lake. Proposed restoration measures include wetland creation and restoration in conjunction with sediment control. Sediment control could be accomplished in the upstream end of the lake through construction of a forebay in combination with bank stabilization and wetlands restoration/creation. Dredging would be required to construct the forebay, which would include a baffle structure to induce sediment deposition and capture baseload transport. Access to the forebay would be a critical project feature to allow regular maintenance.

Westchester County recently completed dredging the lake as part of a long term restoration program that includes: (1) rehabilitating the dam, (2) reestablishing a café concession in the former restaurant onsite, (3) providing boat and bike rentals, (4) converting a large, lakeside parking lot into a picnic area, and (5) upgrading a modest trail system around the upstream end of the lake into an interpretive nature walk. The Federal restoration action will complement the county restoration effort, particularly in the upstream portion of the lake, by establishing a sediment management system, restoring substantial quantities of degraded wetlands, and stabilizing the lake/river shore.

## 2.2 WATERSHED MANAGEMENT PLAN

A stand-alone comprehensive watershed management plan will be prepared as an appendix to the feasibility report. The watershed management plan will inventory watershed characteristics, including: natural resources, stream stability and habitat; water quality; and threatened and endangered species. A basin-wide water quantity and quality model will be developed and used to identify floodprone areas and degraded aquatic habitats under both present conditions and anticipated future conditions. The watershed management plan will outline a strategy that facilitates the continued economic development of the watershed in concert with the preservation and enhancement of the watershed's natural resources.

Additionally, the detailed study of the basin may identify additional opportunities for ecosystem restoration such as daylighting the River in Yonkers or modifying the Corps flood control projects to incorporate fish and wildlife habitat. Non-structural components to environmental restoration, such as identifying regulatory actions that may be implemented on a municipal or local government level to enhance the structural restoration efforts will also be discussed. Other objectives for the watershed management plan have been identified through coordination with members of the Saw Mill River Coalition include:

- Manage, protect and improve water quality of Saw Mill River and tributaries;
- Improve fish, invertebrate, and wildlife habitat and biodiversity throughout the Basin;
- Remove, control and replace invasive plant species with native vegetation;



- Improve flood storage and flood damage reduction through ecologically sensitive means and responsible floodplain management;
- Develop stormwater management strategies;
- Increase public access and recreational opportunities along the Saw Mill River and tributaries;
- Promote environmental awareness; and
- Reduce impacts of road construction and maintenance (ie sedimentation, salting) to the River and River corridor.

### **2.3 BENEFITS DERIVED FROM STUDY**

Generally, benefits associated with the potential ecosystem restoration alternatives and development of the Watershed Management Plan include improved water quality, increased biodiversity, enhanced fish and wildlife habitat, improved recreational opportunities, flood storage and increasing the biological connections between the Hudson and the Saw Mill Rivers. The specific benefits achieved by implementing the restoration sites and the Watershed Management Plan will be studied in further detail in later phases of the Feasibility Study.



**Figure 2. Location of Ecosystem Restoration Areas in the Saw Mill River Basin, Westchester County, New York.**

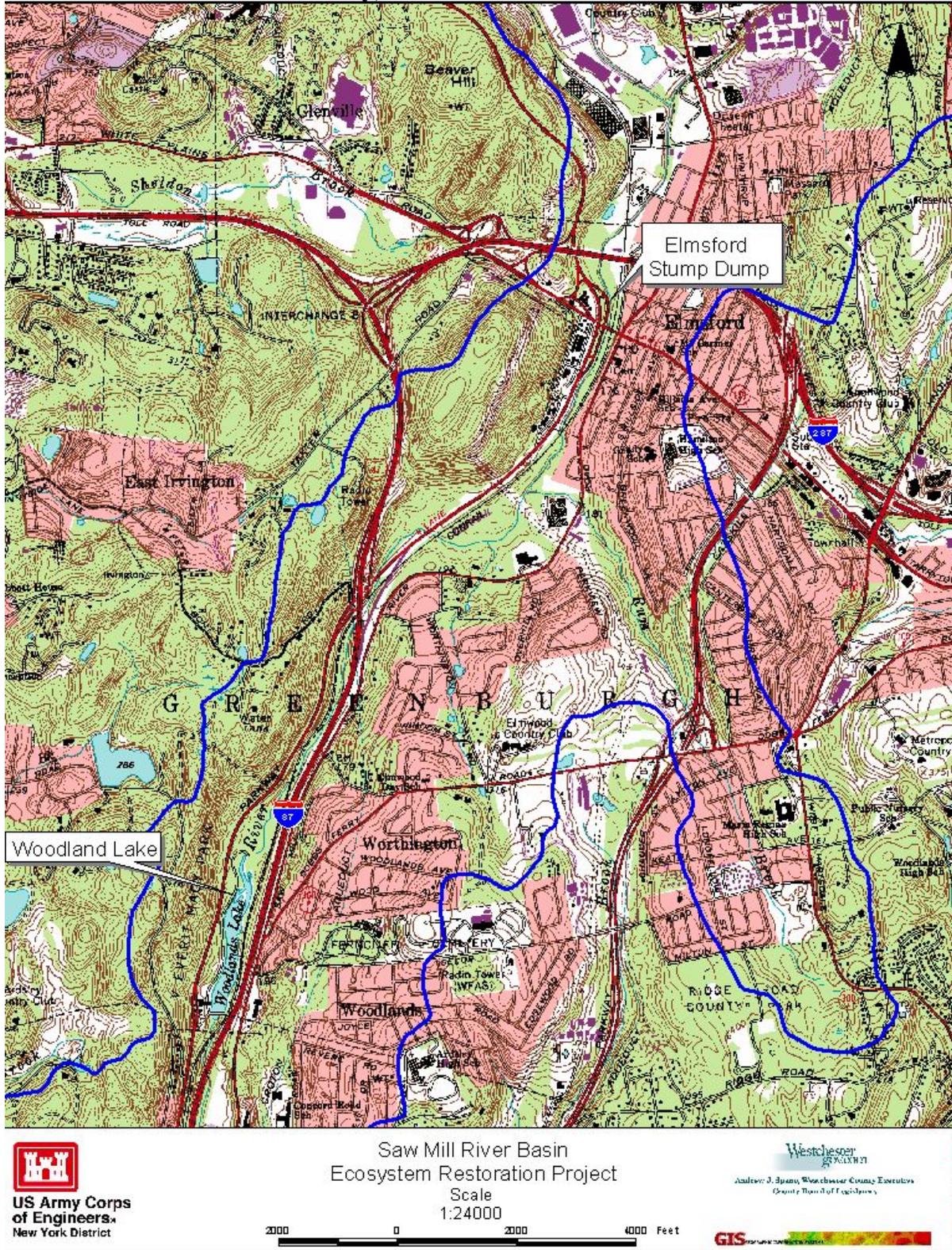


Figure 3 Ecosystem Restoration Site #1: Elmsford Stump Dump, Elmsford, New York

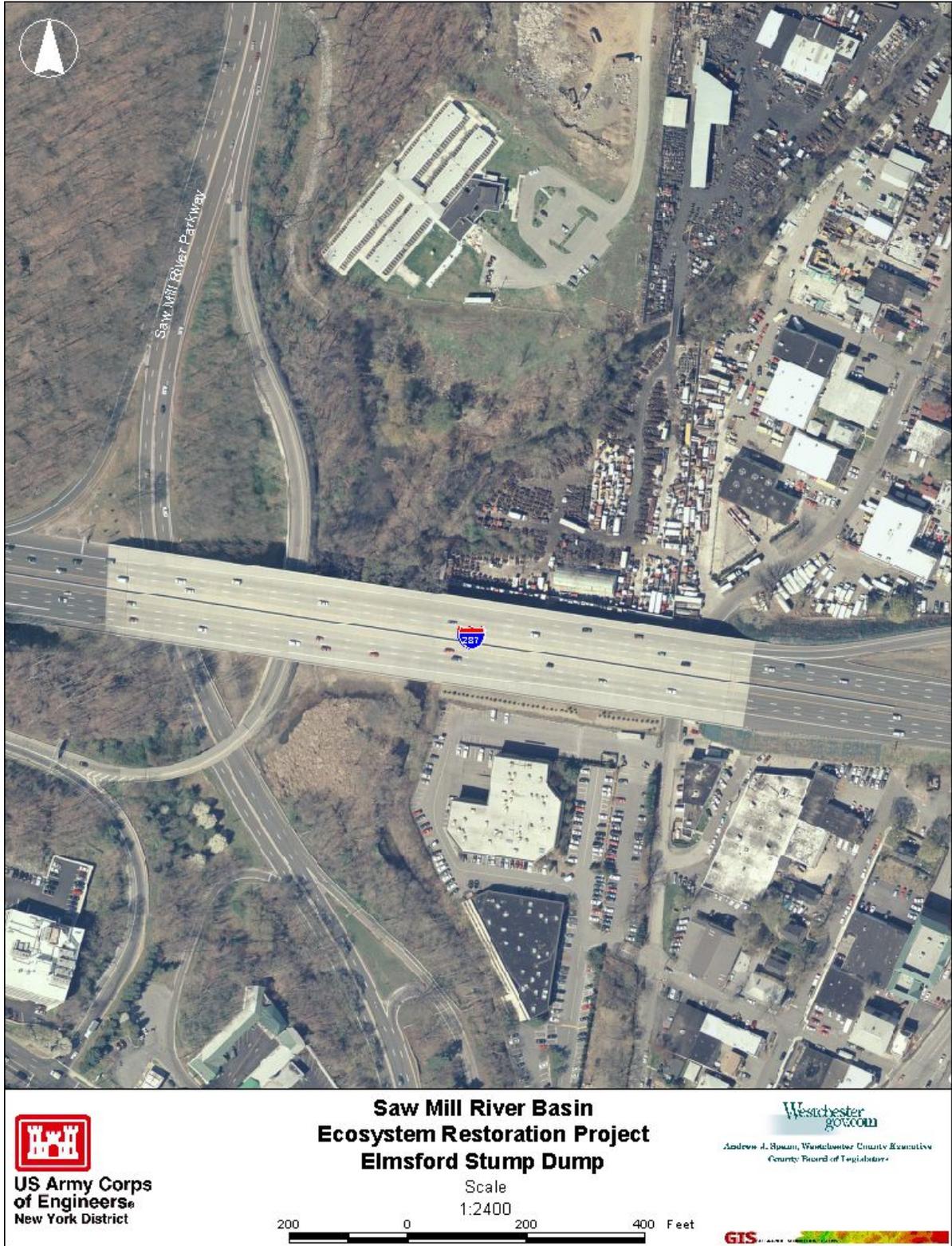


Figure 4 Ecosystem Restoration Site #2: Woodlands Lake, Village of Irvington, New York



### **3.0 EXISTING CONDITIONS WITHIN THE STUDY AREA**

This section discusses existing conditions within the Saw Mill River Basin Study area. In particular, water resources, biological resources, cultural resources, and hazardous waste sites known to occur in the Study area are identified and briefly discussed.

#### **3.1 WATER RESOURCES**

The headwaters of the Saw Mill River originate in the Town of New Castle and flow in a northeast to southwest direction, before emptying into the Hudson River. In addition, a number of tributaries such as Tertia Brook, Nannyhagen Brook, Rum Brook and Mine Brook are located within the Study area. The Saw Mill has been subjected to a variety of anthropogenic disturbances that have degraded its ecosystem. Extensive residential, commercial and industrial development within the Study area has resulted in an increase in impervious surfaces, encroachment into the floodplain, and loss of wetlands due to fill activities or altered drainage patterns. The natural stream channel in many reaches of the Saw Mill River has been intensively modified to accommodate development, infrastructure or to reduce flooding. Some examples of the alterations to the Saw Mill River can be found in Yonkers, where approximately 800 ft of the River has been covered, or by the three flood control projects constructed by the Corps in Chappaqua, the Nepera Park section of Yonkers, and in Yonkers between the Old Nepperhan bridge and the Old Croton Aqueduct. Other factors contributing to the degradation of water quality within the watershed are floatables and sewage overflows from the Saw Mill River Pump station in Mount Kisco. Adverse impacts associated with such disturbances include nutrient loading, establishment of invasive plant species, lack of stormwater retention and infiltration, excess sedimentation, streambank instability, and low dissolved oxygen concentrations.

The water quality of the Saw Mill River is not uniformly degraded. Under the New York Surface Waters and Groundwaters classification system, the lower portion of the Saw Mill is designated D, which does not support fish propagation, but is suitable for fish survival and limited primary and secondary contact. The central reach of the River is designated A, which is suitable as a source of water supply for drinking, culinary or food processing purposes, primary and secondary contact recreation, and fish propagation and survival. The northern reach is designated B, which is suitable for secondary contact recreation and propagation and survival of fish (NYSDEC 1967).

#### **3.2 BIOLOGICAL RESOURCES**

This section provides a brief description of the wetlands, terrestrial habitats, fish and wildlife, threatened and endangered species, and areas of special concern and/or management located in the Study area.

##### **3.2.1 Wetlands**

Wetlands and deepwater habitats located within the Study area include the Saw Mill River, its tributaries, and their adjacent freshwater wetlands. The predominant wetland type existing in the Study area is, palustrine although the area near the mouth is considered estuarine due to tidal influence from the Hudson River. Palustrine wetlands in the Study area include all inland, freshwater (saline content of <0.5 parts per thousand) wetlands, which lack flowing water. Considerable differences in vegetation types exist among palustrine wetlands due to hydrology, water chemistry, soils, and human disturbance. Palustrine wetlands identified within the Saw



Mill River Study area are broad-leaved deciduous forests, freshwater marshes, and woody swamps.

### 3.2.2 Upland Habitats

The upland habitats in the Study area primarily consist of scrub-shrub, forest, open and disturbed lands including athletic fields, recreational areas, and disturbed or developed areas. Upland species commonly found within the Study area include oaks (*Quercus* spp.), ash (*Fraxinus* spp.), maples (*Acer* spp.), sycamores (*Platanus* spp.), American beech (*Fagus grandifolia*). Open fields, residential communities, and athletic fields include habitats of maintained ornamental lawns and grasses.

### 3.2.3 Fish and Wildlife

The Corps has not completed a comprehensive biological inventory for the Saw Mill River Basin, although the New York Department of Environmental Conservation and environmental organizations have conducted various biological surveys of the River. Fish species identified within the Saw Mill River system include freshwater, anadromous, and catadromous species. Freshwater species, such as pumpkinseed (*Lepomis gibbosus*), white sucker (*Catostomus commersoni*), bluegill sunfish (*Lepomis macrochirus*), redbreasted sunfish (*Lepomis auritus*), largemouth bass (*Micropterus salmoides*), longnose dace (*Rhinichthys cataractae*), blacknose dace (*Rhinichthys atratulus*), golden shiner (*Notemigonus crysoleucas*), common shiner (*Notropis cornutus*), white perch (*Morone americana*), tessellated darter (*Etheostoma olmstedii*), brown trout (*Salmo trutta*) and common carp (*Cyprinus carpio*) have been identified in the upstream, freshwater reaches. Estuarine and open water species, including mummichog (*Fundulus heteroclitus*), anadromous such as striped bass (*Morone saxatilis*) and catadromous species such as American eel (*Anguilla rostrata*) utilize the interface between freshwater and saline water. (Pappantoniou 2003). Additionally, the New York State Department of Environmental Conservation annually stocks with rainbow trout (*Oncorhynchus mykiss*) and brown trout (*Salmo trutta*) (NYSDEC 2004).

Wildlife species most likely to occur within urbanized portions of the Study area are habitat generalists tolerant of development. For example, mammal species likely to be present in urbanized areas located in the Study area include eastern gray squirrel (*Sciurus carolinensis*), eastern cottontail (*Sylvilagus floridanus*), house mouse (*Mus musculus*), muskrat (*Ondatra zibethicus*), Norway rat (*Rattus norvegicus*), raccoon (*Procyon lotor*), and white-tailed deer (*Odocoileus virginianus*). Some of the common avian species include red-winged blackbird (*Agelaius phoeniceus*), blue jay (*Cyanocitta cristata*), American robin (*Turdus migratorius*), vireos (*Vireo* sp.), house sparrow (*Passer domesticus*), American goldfinch (*Carduelis tristis*), American crow (*Corvus brachyrhynchos*), European starling (*Sturnus vulgaris*) and mourning dove (*Zenaida macroura*). Waterfowl and waterbirds in the area may include mallard (*Anas platyrhynchos*), wood duck (*Aix sponsa*), black duck (*Anas rubribes*), herring gull (*Larus argentatus*), ring-billed gull (*Larus delawarensis*) Canada goose (*Branta canadensis*) and great egret (*Ardea alba*) (Bochnick 2000). Reptiles, such as the eastern painted turtle (*Chrysemys picta*), common snapping turtle (*Chelydra serpentina*), common garter snake (*Thamnophis sirtalis*), and amphibians such as northern spring peeper (*Pseudacris crucifer*), bullfrog (*Rana catesbeiana*), green frog (*Rana clamitans melanota*) may be found in wooded areas and wetlands within the watershed (NYSDEC 1999).



### **3.2.4 Threatened and Endangered Species**

Except for the occasional, transient bald eagle (*Haliaeetus leucocephalus*), osprey (*Pandion haliaetus*), no Federally or state listed threatened or endangered species are known to occur in the proposed restoration sites. However, a number of Federal and state listed threatened and endangered species may potentially occur within the Study area. Additionally, Westchester County has developed their own county specific Threatened, Endangered, and Special Concern Species designation list. Table 1 provides a list of threatened and endangered species known to occur in Westchester County.

### **3.2.5 Areas of Special Concern and/or Management**

A review of the New York Natural Heritage Program (NYNHP) database indicates that several areas of special concern or management for the Kentucky warbler are located within the Study area. Further, the Saw Mill River is an important tributary to the lower Hudson River which in 1999 was declared an American Heritage River and is already the beneficiary of an intensive state management plan (USACE 1999). The Saw Mill River has direct biological and hydrological connections with this estuary of national significance. Regionally, the river's riparian zone comprises an important greenway and a fish and wildlife corridor through Westchester County, a densely populated suburban county bordering New York City.

## **3.3 CULTURAL RESOURCES**

Section 106 of the Historic Preservation Act of 1966 requires Federal agencies or project local partners seeking Federal funding and/or permits to conduct cultural resource surveys to locate, identify, and evaluate historic and prehistoric resources in advance of project approval. An evaluation of the impact of alternative plans on historic properties will be developed in consultation with the State Historical Preservation Officer (SHPO). Cultural resource investigations will be conducted for the two ecosystem restoration sites but are not anticipated for the watershed management plan.

## **3.4 HAZARDOUS WASTE SITES/CONTAMINATED SEDIMENTS**

Given the industrial and commercial development along the River, hazardous materials may be present within the Study area as a result, in part, of past land uses. The U.S. Geological Survey (USGS) conducted a chemical quality assessment of the Saw Mill River from 1981-83. Results indicated heightened levels of PCB's, metals and polynuclear aromatic hydrocarbons (PAH's), particularly in the lower 4 miles of the river (USGS 1984). Subsequent tissue sampling of invertebrates inhabiting the Saw Mill performed by the NYDEC as part of a biological assessment of tributaries of the lower Hudson River supports the results of the USGS analysis (NYSDEC 2001). The District will conduct a full inventory of hazardous waste sites in and around the proposed restoration sites as part of the feasibility study phase. HTRW investigations are not anticipated for the watershed management plan.



**Table 1. Federal, State, and County Listed Threatened and Endangered Species Known to Occur in Westchester County, New York.**

Common Name	Scientific Name	Federal Status	State Status	Westchester County Status
<b>Reptiles and Amphibians</b>				
Bog Turtle	<i>Clemmys muhlenbergii</i>	T	E	E
Wood Turtle	<i>Clemmys insculpta</i>		SC	E
Timber Rattlesnake	<i>Crotalus horridus</i>		T	E
Spotted Turtle	<i>Clemmys guttata</i>		SC	T
Eastern Box Turtle	<i>Terrapene Carolina</i>		SC	T
Northern Fence Lizard	<i>Sceloporus sceloporus</i>		T	T
Eastern Ribbon Snake	<i>Thamnophis sauritus</i>			T
Jefferson/Blue-Spotted Salamander	<i>Ambystoma laterale</i>		SC	T
Northern dusky salamander	<i>Desmognathus fuscus</i>			T
Five-lined skink	<i>Eumeces fasciatus</i>			SC
Northern Copperhead	<i>Agkistrodon contortrix</i>			SC
Eastern hognose snake	<i>Heterodon platirhinus</i>			SC
Worm snake	<i>Carphophis amoenus</i>		SC	SC
Slimy salamander	<i>Plethodon glutinosus</i>			SC
<b>Birds</b>				
Bald Eagle	<i>Haliaeetus leucocephalus</i>	T	T	E
Cerulean Warbler	<i>Dendroica cerulea</i>		SC	E
Common tern	<i>Sterna hirundo</i>			E
Cooper's Hawk	<i>Accipiter cooperii</i>		SC	E
Golden-winged warbler	<i>Vermivora chrysoptera</i>			E
Grasshopper sparrow	<i>Ammodramus savannarum</i>		SC	E
Henslow sparrow	<i>Ammodramus henslowii</i>		T	E
Kentucky warbler	<i>Oporornis formosus</i>			E
King rail	<i>Rallus elegans</i>		T	E
Least bittern	<i>Ixobrychus exilis</i>			E
Loggerhead shrike	<i>Lanius exilis</i>			E
Northern Goshawk	<i>Accipiter gentiles</i>		SC	E
Osprey	<i>Panion haliaetus</i>		SC	E
Peregrine Falcon	<i>Falco peregrinus</i>		E	E
Red-shouldered hawk	<i>Buteo lineatus</i>		SC	E

**E = Endangered**

**T = Threatened**

**SC= Special Concern**



**Table 1. Federal, State and County Listed Threatened and Endangered Species Known to Occur in Westchester County, New York (continued).**

Common Name	Scientific Name	Federal Status	State Status	Westchester County Status
Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>		SC	E
Savannah sparrow	<i>Passerculus sandwichensis</i>			E
Seaside sparrow	<i>Ammodramus maritimus</i>		SC	E
Vesper sparrow	<i>Pooecetes gramineus</i>		SC	E
American woodcock	<i>Scolopax minor</i>			T
Bobolink	<i>Dolichonyx oryzivorus</i>			T
Common barn owl	<i>Tyto alba</i>			T
Common raven	<i>Corvus corax</i>			T
Eastern meadowlark	<i>Sturnella magna</i>			T
Saltmarsh sharp-tailed sparrow	<i>Ammodramus caudacutus</i>			T
Yellow-breasted chat	<i>Icteria virens</i>		SC	T
American black duck	<i>Anas rubripes</i>			SC
Canada warbler	<i>Wilsonia Canadensis</i>			SC
Common nighthawk	<i>Chordeiles minor</i>			SC
Prairie warbler	<i>Dendroica discolor</i>			SC
Whip-poor-will	<i>Caprimulgus vociferus</i>		SC	SC
Wood thrush	<i>Hylocichia mustelina</i>			SC
Worm-eating warbler	<i>Helmitheros vermivorus</i>			SC
<b>Mammals</b>				
River otter	<i>Lutra Canadensis</i>			SC
Bobcat	<i>Lynx rufiis</i>			SC
<b>Plants</b>				
Bicknel's sedge	<i>Carex bicknellii</i>			E
Bog clubmoss	<i>Lycopodiella inundata</i>			E
Cattail sedge	<i>Carex typhina</i>			E
Large twayblade	<i>Liparis lilifolia</i>			E
Marsh horsetail	<i>Equisetum palustre</i>			E
Purple everlasting	<i>Gnaphalium purpureum</i>			E
Soft fox sedge	<i>Carex conjuncta</i>			E
Spring avens	<i>Geum vernum</i>			E
Stiff-leaf goldenrod	<i>Solidago rigida</i>		T	E
Stone's violet	<i>Viola stoneana</i>			E
Tall thistle	<i>Cirsium altissimum</i>			E
Winter grape	<i>Vitis vulpina</i>			E

**E = Endangered**

**T = Threatened**

**SC= Special Concern**



**Table 1. Federal, State and County Listed Threatened and Endangered Species Known to Occur in Westchester County, New York (continued).**

<b>Common Name</b>	<b>Scientific Name</b>	<b>Federal Status</b>	<b>State Status</b>	<b>Westchester County Status</b>
Yellow harlequin	<i>Corydalis favula</i>			E
Angled spikerush	<i>Eleocharis quadrangulata</i>		E	T
Featherfoil	<i>Hottonia inflata</i>			T
Field beadgrass	<i>Paspalum leave</i>		E	T
Mudwort	<i>Limosella australis</i>			T
Purple milkweed	<i>Asclepias</i>			T
Shrubby St. Johnswort	<i>Hypericum prolificum</i>		T	T
Slender pinweed	<i>Lechea tenuifolia</i>			T
Spongy arrowhead	<i>Sagittaria calycina</i>			T
Spotted pondweed	<i>Potamogeton pulcher</i>			T
Strap-leaf arrowhead	<i>Sagittaria subulata</i>			T
Swamp agrimony	<i>Agrimonia parviflora</i>			T
Winged monkeyflower	<i>Mimulus alatus</i>			T
Yellow lady slipper	<i>Cypripedium calceolus</i>			T
Blunt mountain mint	<i>Pycnanthemum muticum</i>			SC
Dittany	<i>Cunilla origanoides</i>			SC
Eastern prickly pear	<i>Opuntia humifusa</i>			SC
Four-leaf milkweed	<i>Asclepias quadrifolia</i>			SC
Grass of parnassus	<i>Pamassia glauca</i>			SC
Large yellow-eyed grass	<i>Xyris smalliana</i>			SC
Pitcher plant	<i>Sarracenia purpurea</i>			SC
Prickly hornwort	<i>Ceratophyllum echinatum</i>			SC
Purple cliffbrake	<i>Pellaea atropurpurea</i>			SC
Small floating bladderwort	<i>Utricularia radiata</i>			SC
Showy orchis	<i>Galearis' spectabilis</i>			SC
Stiff yellow flax	<i>Linum straitum</i>			SC
Trailing arbutus	<i>Epigaea repens</i>			SC
Walking fern	<i>Asplenium rhizophyllum</i>			SC
Wild pink	<i>Silene caroliniana</i>			SC

**E = Endangered**

**T = Threatened**

**SC= Special Concern**



## **4.0 POTENTIAL DIRECT, INDIRECT, AND CUMULATIVE IMPACTS**

Although specific adverse and beneficial impacts to existing resources will depend on the final design of the ecosystem restoration components, potential impacts to water resources, biological resources, and cultural resources are identified and briefly discussed in the following sections.

### **4.1 WATER RESOURCES**

Construction activities are likely to result in a short-term, temporary decrease in water quality of the Saw Mill River due to localized increases in runoff and turbidity. In addition, disturbance of contaminated soils or sediments during construction may release contaminants into the water column, thereby degrading water quality. Erosion and sediment control best management practices will be implemented during construction to minimize excess sedimentation to the River.

Overall, a long-term improvement to water quality throughout the watershed is expected as a result of the restoration activities. Although specific benefits depend on the selected plan, restored wetland and riparian habitats will increase floodwater detention times, potentially lowering in-stream sedimentation rates, and act as natural filters, removing pollutants. Additionally, modifications to the stream channel and Woodlands Lake could result in increased dissolved oxygen levels, decreased sedimentation, and improved fish and wildlife habitat.

### **4.2 BIOLOGICAL RESOURCES**

This section identifies potential impacts to wetlands, upland habitats, fish and wildlife, threatened and endangered species, and areas of special concern and/or management that occur within the Study area.

#### **4.2.1 Wetlands**

Temporary impacts will occur to the existing wetlands within the Elmsford and Woodlands Lake sites as a result of construction activities. However, implementation of the selected plans will have a long-term beneficial impact by improving wetland function in existing wetland areas and increasing the amount of overall wetland habitat. Prior to implementing the proposed Study, the USACE will conduct wetland surveys of the proposed restoration sites to accurately determine direct or indirect impacts project implementation will have on existing wetlands.

#### **4.2.2 Upland Habitats**

The ecosystem restoration component of the Study would have no direct or adverse impact to upland habitats, but may provide indirect benefits by establishing improved habitat diversity and foraging opportunity for upland species.

#### **4.2.3 Fish and Wildlife**

Fish and wildlife species may be temporarily impacted during construction activities. Increased turbidity from in-water construction activities for the forebay installation and regrading to restore/create wetlands may hinder predation efficiency of sight feeding fish and may lead to gill abrasions and suffocation. However, fish species are generally mobile and will be able to avoid



direct impacts from construction activities. Regarding mammalian and avian species, temporary disturbances associated with general construction activity and increased noise levels may prohibit the use of certain habitats by these species. Although both are mobile and tend to avoid direct mortality, some species may be impacted indirectly by limited access to feeding or breeding habitats due to construction activities.

Both fish and wildlife would benefit from ecosystem restoration. Specifically, fish will benefit from habitat restoration activities that result in increased water quality (i.e., decreased sediment and pollutant loadings, increased dissolved oxygen levels), and from enhanced foraging, refuge, and spawning habitat associated with wetland restoration. Modifying the stream channel by restoring open water and wetland habitats would also increase habitat suitability for a number of fish and bird species. Additionally, improving riparian habitats, either by stabilizing bank habitat, creating vegetated buffers, or improving riparian wetland habitat will benefit wildlife species that utilize the river corridor.

#### **4.2.4 Threatened and Endangered Species**

The USACE will coordinate with the United States Fish and Wildlife Service (USFWS), NYSDEC and the Westchester County Parks Department to ensure that there are no adverse effects to Federally, state or county listed species will result from the proposed Study. Similarly, the USACE will coordinate with the USFWS, NYSDEC and Westchester County Parks Department to incorporate the needs of Federal, state or county listed species into the ecosystem restoration design.

#### **4.2.5 Areas of Special Concern and/or Management**

Implementation of ecosystem restoration measures is likely to positively benefit, directly and indirectly, areas of special concern and/or management by improving water quality, fish and wildlife habitat, and biodiversity.

### **4.3 CULTURAL RESOURCES**

Impacts associated with the implementation of the Study will be investigated during the next phase of the Study following an inventory of cultural and historic resources.

### **4.4 HAZARDOUS WASTE SITES/CONTAMINATED SEDIMENTS**

Impacts associated with the implementation of the Study will be investigated during the next phase of the Study following an inventory of hazardous waste sites and contaminated sediment.



## 5.0 APPLICABLE POLICIES AND PERMITS

The USACE is aware that the Study will require obtaining a variety of different permits and satisfying a number of different policies. Accordingly, prior to construction and/or restoration activities, the USACE will identify all of the publicly owned properties and respective policies, evaluate potential impacts on these properties. In addition, the USACE will notify and coordinate with the appropriate municipal or county agency.

In accordance with NEPA, the USACE will identify all Federal, state, local, and municipal environmental requirements prior to implementation of the proposed Study. For example, the USACE will coordinate with the appropriate Federal agencies to implement the Study in accordance with relevant environmental statutes including, but not limited to, Section 106 of the National Historic Preservation Act, the Fish and Wildlife Coordination Act (FWCA), the Clean Water Act, the Clean Air Act, the Endangered Species Act, and a number of Environmental Operating Principles set forth by the USACE. Local regulatory permitting requirements, including the approval of an erosion and sediment control plan by the Westchester County Soil and Water Conservation District, and coordination with local utility agencies, will also be required for both flood control and ecosystem restoration projects. A detailed list of all applicable policies, permits, and regulations will be prepared and presented in the required NEPA documentation.



## 6.0 REFERENCES

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