Section 2.5
Wetlands in the Upper Neversink Watershed

Wetlands are areas that are saturated or inundated at a frequency and duration that influences the development of soil characteristics and plant communities. Prolonged, regular inundation or saturation causes low-oxygen conditions to develop in wetland substrates, which results in the formation of 'hydric soils' and favors the growth of specially adapted plant species called 'hydrophytes'. While there are many types of wetlands, such as marshes, swamps, fens, and bogs, all can be generally characterized by the presence of periodic flooding or saturation, hydric soils, and hydrophytic vegetation.

Wetlands occur throughout the landscape and perform a variety of important functions. Floodplain wetlands intercept overland flow and detain overbank flooding to reduce flood flows. Wetlands located in depressions throughout the landscape detain overland flow, which also decreases flooding. Many wetlands intercept groundwater and serve as sources of headwater streams. Wetland vegetation takes up nutrients and pollutants and traps sediment to improve water quality. Chemical transformations unique to the low-oxygen conditions in wetland sediments also remove or retain nutrients and pollutants and sequester carbon. In addition to storing floodwaters, improving water quality, and providing stream flow, wetlands also provide critical fish and wildlife habitat. Eighty percent of breeding birds and over 50% of migratory birds are dependent upon wetlands. Almost all sport fish species are known to utilize wetlands for spawning and nursery grounds. Nearly half of the Nation's threatened and endangered species rely on wetlands for their survival.

It has been estimated that the nation has lost over half of its wetland area since the time of European settlement. It is now recognized that wetlands perform functions that benefit ecosystems well beyond their boundaries. Wetlands are currently protected, created, and restored through a variety of regulatory and non-regulatory programs. Much effort has also been placed on wetland mapping and research to assess the distribution, characteristics, and functions of wetlands.

National Wetlands Inventory

The U.S. Fish and Wildlife Service (USFWS) produces National Wetlands Inventory (NWI) maps to estimate the characteristics and extent of wetlands and deepwater habitats throughout the nation. NWI maps are produced by interpreting wet areas from aerial photography and provide only an estimate of wetland abundance, as certain wetland types are difficult to detect through remote sensing. For example, smaller, drier-end wetlands, and wetlands with forested evergreen canopies, are among those types that frequently escape detection in NWI mapping. While NWI maps provide a useful baseline estimation of wetland extent, field verification is required in order to obtain site-specific information. In addition, NWI maps are informational only, and not associated with federal or State wetland regulations. NWI maps can be viewed

online at www.fws.gov/wetlands/data/mapper.html or on Google earth at www.fws.gov/wetlands/Data/GoogleEarth.html.

The NWI maps for the West of Hudson portion of the New York City Watershed, including the Neversink Reservoir Basin, were updated in 2005 through a DEP contract with the USFWS. The NWI update was based on 2003 aerial photography and identified approximately 422 acres of vegetated wetlands and ponds in the Neversink Basin. This amounts to 0.7% of the basin's area. Forested wetlands were most abundant, accounting for nearly 40% of the wetland acreage, followed by ponds (25%), scrub-shrub (18%), and emergent wetlands (17%). (Figures 1 and 2). This basin-wide acreage is an estimate based on interpretation of color-infrared aerial photography. Site-specific, smaller-scale information requires field verification.

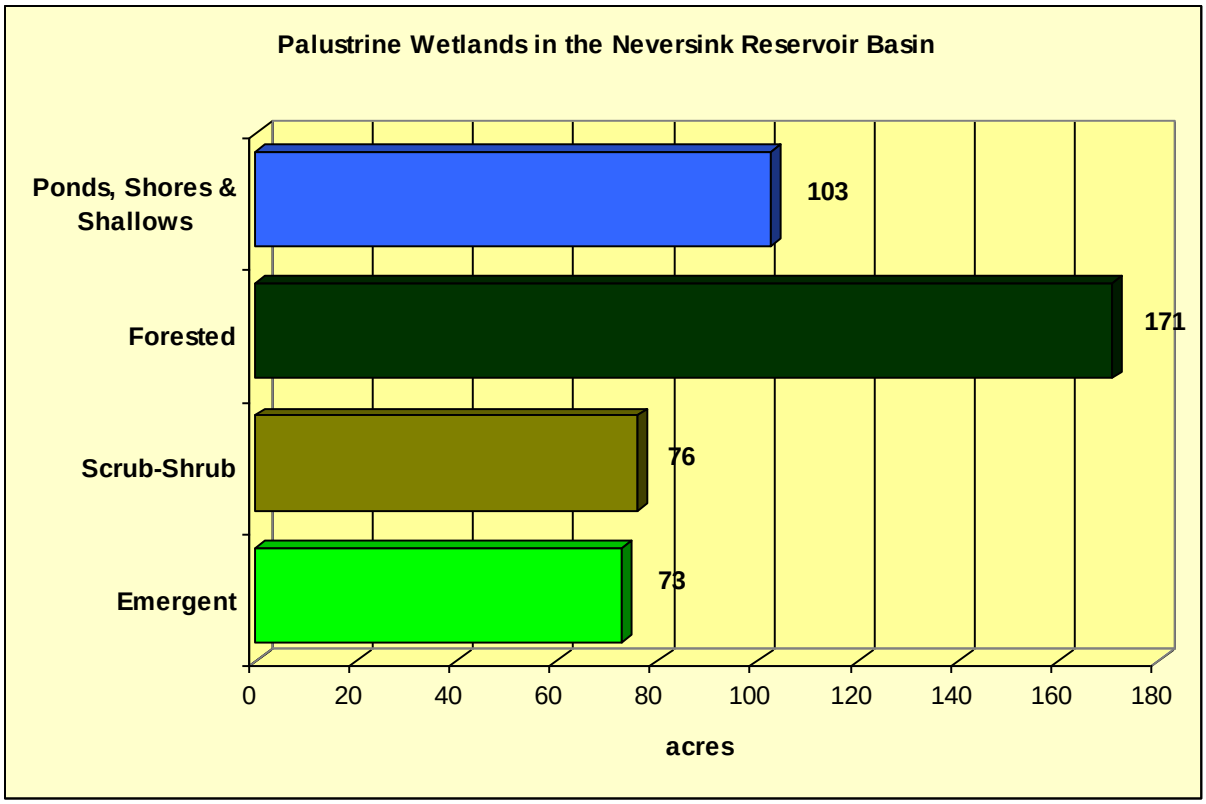

Figure 1 National Wetlands Inventory Wetlands in the Neversink Reservoir Basin.

Photo 1 Emergent portion of a wetland complex along an unnamed tributary to the Neversink Reservoir.

Photo 2 An emergent wetland in the headwaters of the West Branch of the Neversink River.

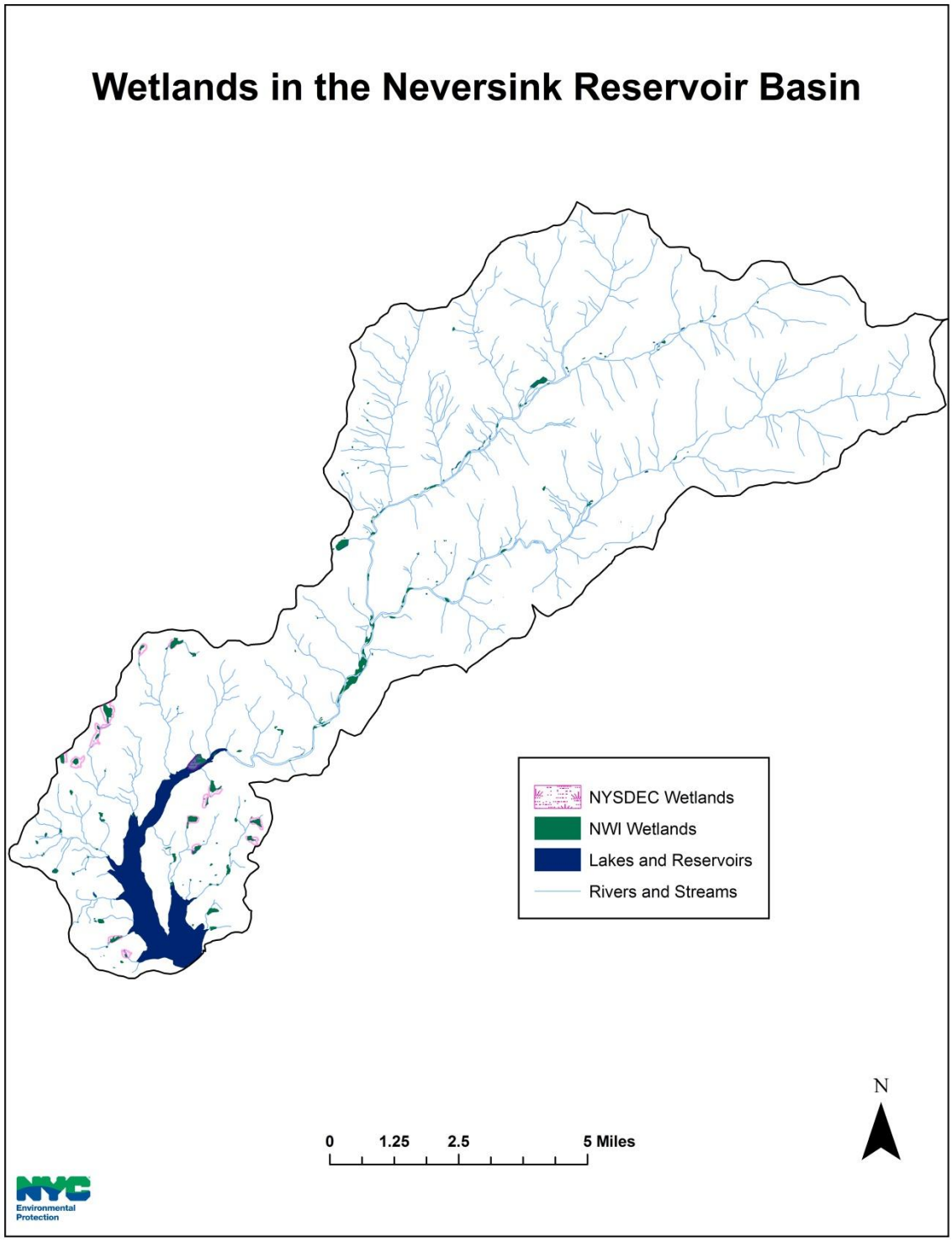

Figure 2 National Wetlands Inventory and DEC-mapped wetlands in the Neversink Reservoir Basin

NWI maps may also be used to estimate the distribution of wetlands among landscape positions throughout the Watershed, or individual reservoir basins, though these estimates are subject to the same constraints as the

NWI. The vast majority (94%) of the wetlands mapped in the Neversink basin is associated with surface waters, whey they perform important water quality, floodwater storage, habitat, and baseflow support functions. Forty seven percent are located in the headwaters of the basin, either as the source of streams (16%), or along headwater streams (31%). Forty six percent are along third or higher order streams, largely the Neversink River and its branches. One percent of the NWI-mapped wetlands are adjacent to deepwater habitats, such as the reservoir. Surface water outflows could not be ascertained through remote sensing for 6% of the wetlands in the basin. These wetlands may lack a surface water outflow, or may have an intermittent or ephemeral connection that could not be detected on the aerial photography. Isolated and intermittently connected wetlands provide important habitat for amphibians and other wildlife. They also provide other important watershed-scale functions such as surface water detention, nutrient cycling, and carbon sequestration (Figure 3).

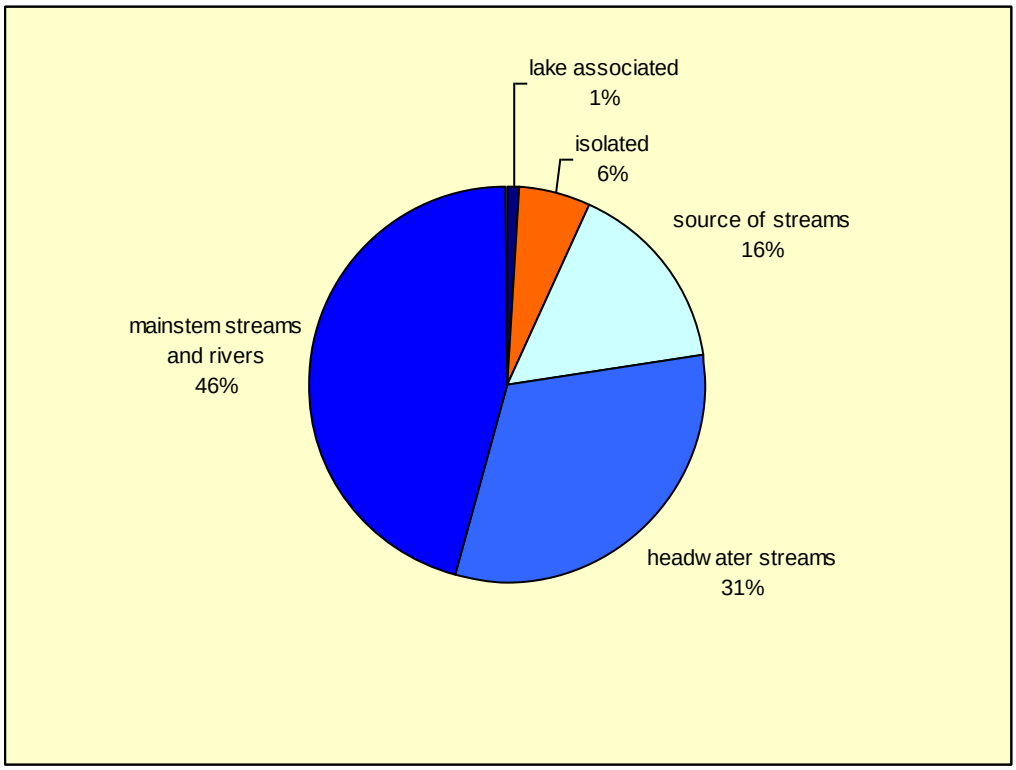

Figure 3 Landscape settings of National Wetlands Inventory wetlands in the Rondout Basin.

Wetland Protection

Wetlands are protected through State and federal regulations. Many municipalities implement local wetland regulations as well, though no municipal wetland ordinances have been implemented within the Neversink Basin. Nationally, the rate of wetland loss has declined since the implementation of wetland regulations. However, wetlands continue to be threatened through activities such as excavation or filling for the construction of residential, industrial, and commercial facilities, draining and clearing for agricultural production, and direct or indirect discharge of pollutants. Protecting wetlands from these threats is especially important, since wetlands occupy a small proportion of the landscape yet provide many functions.

Federal Regulations

Federal regulation of wetlands is primarily through the 1972 amendments of the Clean Water Act. Section 404 of Clean Water Act prohibits the discharge of dredged or fill material into "waters of the United States" without a permit from the U.S. Army Corps of Engineers. These permits usually require mitigation in the form of wetland creation or restoration for unavoidable impacts. The term "waters of the United States" includes wetlands, as identified through the presence of hydrology, hydric soils, and hydrophytic vegetation. The scope of included wetlands has changed due to recent judicial interpretations of the Clean Water Act. Determination of which waters are jurisdictional lies with the U.S. Army Corps of Engineers.

The Clean Water Act regulations authorize nationwide permits, which are general permits for certain activities deemed to have minimal adverse impacts on the environment. Proposed activities that meet the criteria established for the nationwide permits do not require an individual, project-specific permit from the U.S. Army Corps of Engineers, though notification is often required before construction can be undertaken.

State Regulations

In New York State, freshwater wetlands are regulated under the Freshwater Wetlands Act, which is administered by the New York State Department of Environmental Conservation (DEC). The scope of the Freshwater Wetlands Act is generally limited to wetlands that are 12.4 acres or larger. The Act also regulates a 100-foot-wide buffer area adjacent to the wetland's edge. The Act does provide for regulation of smaller wetlands deemed to be of "unusual local importance", should they meet specific criteria set forth in the regulations, though no such wetlands are designated in the Neversink Basin. Like the Clean Water Act, the Freshwater Wetlands Act regulates dredging and filling of wetlands, along with additional activities, such as draining, grading, clearing, and pollution, that substantially impair wetland function.

In order to be regulated in New York State, wetlands must be included on the State's existing Freshwater Wetlands Maps. The New York State Freshwater Wetlands Maps include approximately 286 acres of regulated freshwater wetlands in the Neversink Basin (Figure 2). Acreage discrepancies between NWI and

DEC maps are attributed several factors, including differences in source photography and mapping methodology, as well as to the differing criteria for inclusion of wetlands on State and federal maps. The official New York State Freshwater Wetlands Maps can be viewed online through the DEC's Environmental Resource Mapper at www.dec.ny.gov/imsmaps/ERM/viewer.html. Site-specific delineations are required to determine wetland boundaries at individual project sites.

New York City Watershed Rules and Regulations

New York City's Rules and Regulations for the Protection from Contamination, Degradation and Pollution of the New York City Water Supply and Its Sources include provisions prohibiting certain activities, such as the placement the installation of wastewater and subsurface sewage treatment systems and the construction of certain impervious surfaces, within specified distances of wetlands included on the New York State Freshwater Wetlands Maps for the New York City Watershed. These regulations also require the preparation of stormwater pollution prevention plans for certain land development projects to prevent the discharge of untreated stormwater into watercourses and DEC-mapped wetlands.

Non-regulatory Protection

Wetlands can also be protected through non-regulatory mechanisms such as fee acquisition or conservation easements. As of December 31, 2010, DEP has acquired an estimated 73 acres of wetlands in the Neversink Basin. Wetlands can also be managed, preserved, or restored through incentive programs such as the Conservation Reserve Enhancement Program (CREP), which allows watershed landowners to retire environmentally sensitive agricultural lands from production and helps establish streamside buffers. DEP jointly administers the CREP in the watershed along with Watershed Agricultural and Forestry programs that protect wetlands and their functions through the use of best management practices.