APPENDIX 18.1
AMBREY NATURAL RESOURCES

Appendix 18.1: Natural Resources

INTRODUCTION

This analysis of the Ambrey Pond Reservoir Alternative considers the potential effects of the alternative on the local floodplains, and aquatic and terrestrial natural resources. The Ambrey Pond Reservoir Alternative area consists of largely undeveloped lands that provide foraging and breeding habitat for numerous species of wildlife. Much of this habitat is contiguous with the extensive Palisades Interstate Park system located adjacent to the Ambrey Pond area. The following sections assess the potential impacts to floodplain and natural resources from the Ambrey Pond Reservoir Alternative.

OVERVIEW OF CONCLUSIONS

The Ambrey Pond Reservoir Alternative would result in unavoidable adverse impacts to the ecological communities within the Ambrey Pond area due to inundation that would result from development of the reservoir. It would result in the permanent replacement of approximately 112 acres of existing wetland and terrestrial communities with an open water habitat. The loss of about 5 acres of oak-hickory forest and 63 acres of successional northern hardwood forest, while it is adverse, would not result in significant adverse impacts to this habitat type, which is distributed throughout the upstate New York region, and in particular, within the approximately 80-square-mile natural open space area comprising Harriman and Bear Mountain State Parks located immediately to the west of the Ambrey Pond area.

The Ambrey Pond Reservoir Alternative would have the potential to result in adverse impacts to terrestrial wildlife due to the reduction of habitat for wildlife species requiring upland or shallow wetland habitats for reproduction or overwintering (e.g., reptile and amphibian species) that would be lost through the development of the reservoir, and direct loss of individual wildlife that are less mobile (e.g., small mammals, turtles, snakes, salamanders, frogs, and toads), due to collision with construction equipment, or flooding. As the filling of the reservoir would be a gradual process, it is likely that highly mobile wildlife individuals (i.e., birds, most mammals, some reptiles and amphibians) would likely move to nearby suitable habitats in response to disturbance and habitat loss in the Ambrey Pond Reservoir Alternative site, if construction activities and flooding occurred during an active period of a particular species' life cycle. However, wildlife individuals unable to find suitable habitat nearby, less mobile species, and species for which the construction or flooding occurred during a period of seasonal inactivity (i.e., hibernation, torpor) in winter months, such as mammals present in underground burrows or snakes present in hibernacula, would be lost. Also, filling during the peak of breeding activity may impact wildlife reproduction by causing the mortality of young, mainly for species breeding close to the ground or underground. While the loss of some individuals would be adverse, it would not be expected to result in significant adverse impacts to regional populations of these species.

The Ambrey Pond Reservoir Alternative would have the potential to benefit wildlife species that depend on open-water aquatic habitats. Aquatic birds such as ducks, geese, loons, cormorants and others, and certain mammals that frequent large open water habitats (i.e., muskrat) may benefit from the creation of open-water foraging habitat.

FLOODPLAINS

Floodplains and floodways are managed by the Federal Emergency Management Agency (FEMA). FEMA identifies areas at risk (known as Special Flood Hazard Areas) from 100-year (Zone A) and 500-year frequency (Zone B) floods. Through the National Flood Insurance Program, FEMA provides property owners in participating communities the opportunity to purchase insurance protection against losses from flooding. In New York, the State developed the Floodplain Mapping program to aid FEMA's flood hazard mapping. On a community level, floodplain management generally includes requirements for zoning, subdivision or building, and special-purpose floodplain ordinances. These may include development restrictions, limitations on impervious surfaces, or incorporation of floodflow storage features. On the local level, certain streams (including Minisceongo Creek) in Rockland County are managed by the Rockland County Drainage Agency (RCDA). Any disturbance that would alter the cross-sectional area, height, volume or velocity of any County-managed stream is subject to approval by RCDA.

The Ambrey Pond Reservoir Alternative area is located within the Cedar Pond Brook Watershed (Figure 18.1-1), and includes the following surface water features: Lake Tiorati Brook (including its continuance as Cedar Pond Brook), Timp Mountain Brook, Lower Ambrey Pond and Upper Ambrey Pond. The stream courses and Ambrey Pond are depicted in Figure 18.1-2.

Old dams are present on both the Cedar Pond Brook and Timp Mountain Brook. The impoundment on Cedar Pond Brook, created by the Stony Point Dam, has been in existence since the late 1800s. Dams create both the Upper and Lower Ambrey Ponds on Timp Mountain Brook. The dam on Upper Ambrey Pond has been breached. It is likely that, in the past, downstream channel incision due to an increase in erosional forces associated with a reduction in sediment load has occurred and reduced the connection of these streams with their respective floodplains. It is unclear whether these systems have stabilized or are still undergoing change due past disturbances. The channel downstream of the Stony Point Dam also appears to have been modified through erosional forces. The banks appear to be unstable banks, but are vegetated.

The 100-year and 500-year floodplains for the Ambrey Pond Reservoir Alternative area are shown in Figure 18.1-3. The Ambrey Pond Reservoir and finished water tie-in/Cedar Pond Brook Diversion are located mostly within the 100-year floodplain; however, the raw water transmission line is located immediately outside the 500-year floodplain.

Access to construct the Ambrey Pond Reservoir and associated dams would require the development of construction roadways on UWNY property and within both the 500- and 100-year floodplains. These roads would be accessed from existing public roadways, including Cedar Flats Road and Bulsontown Road. Following construction, access roads no longer required would be abandoned and the roadway sites would be restored with native vegetation. Access roads required for the project operation and maintenance would be retained and accessed from Cedar Flats Road and Bulsontown Road.

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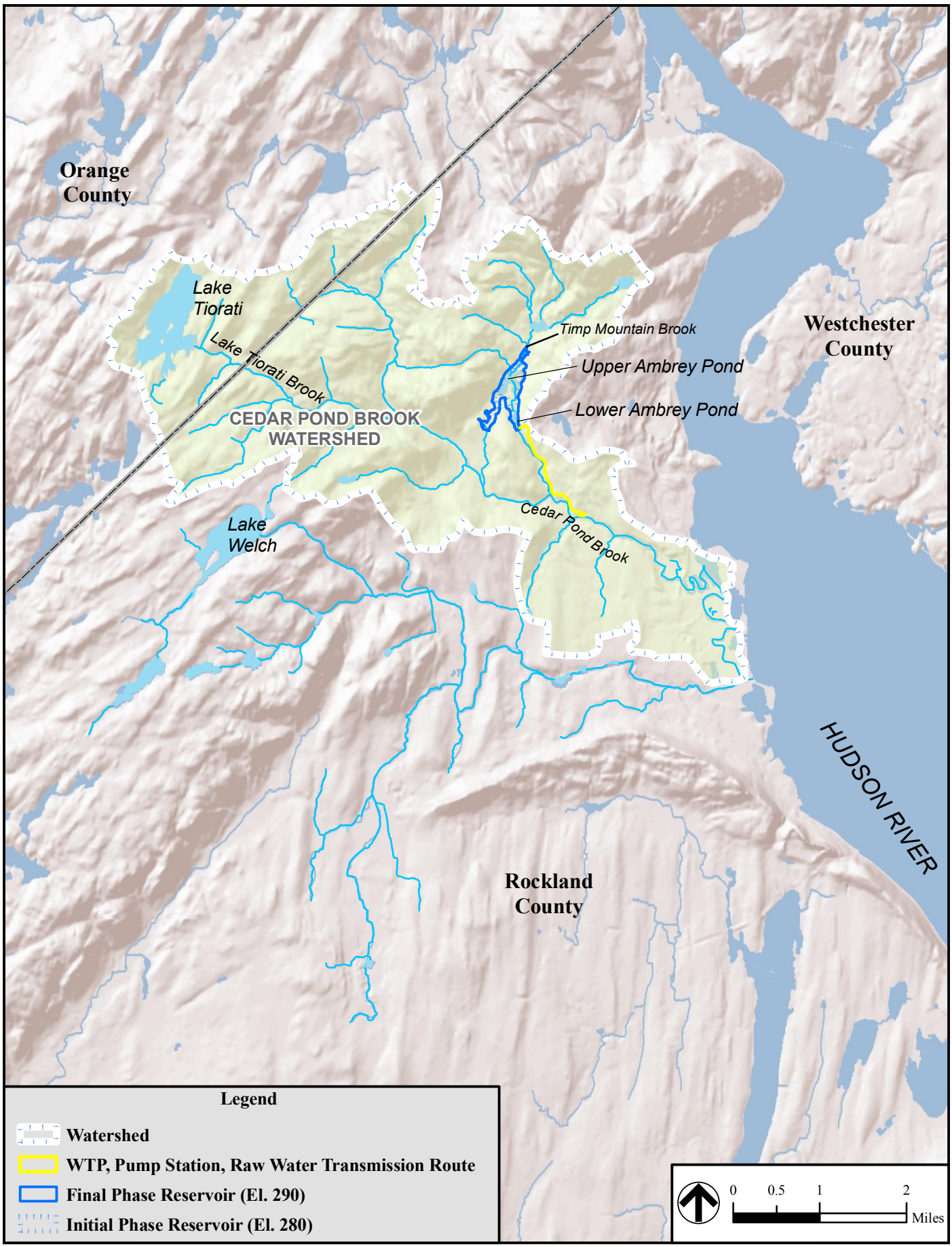

Figure 18.1-1

Ambrey Pond Reservoir Alternative
Cedar Pond Brook Watershed

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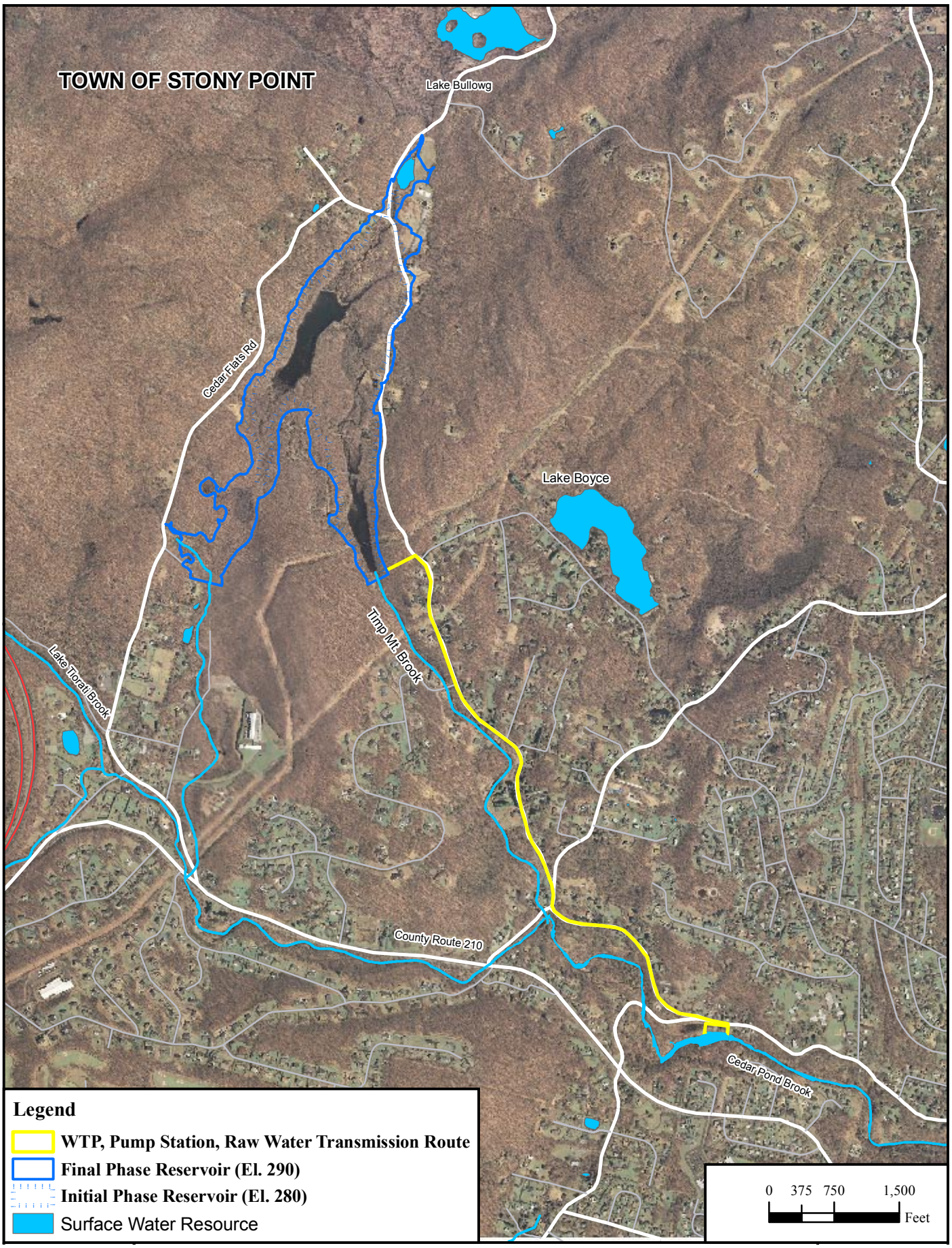

Figure 18.1-2

Ambrey Pond Reservoir Alternative Surface Water Resources

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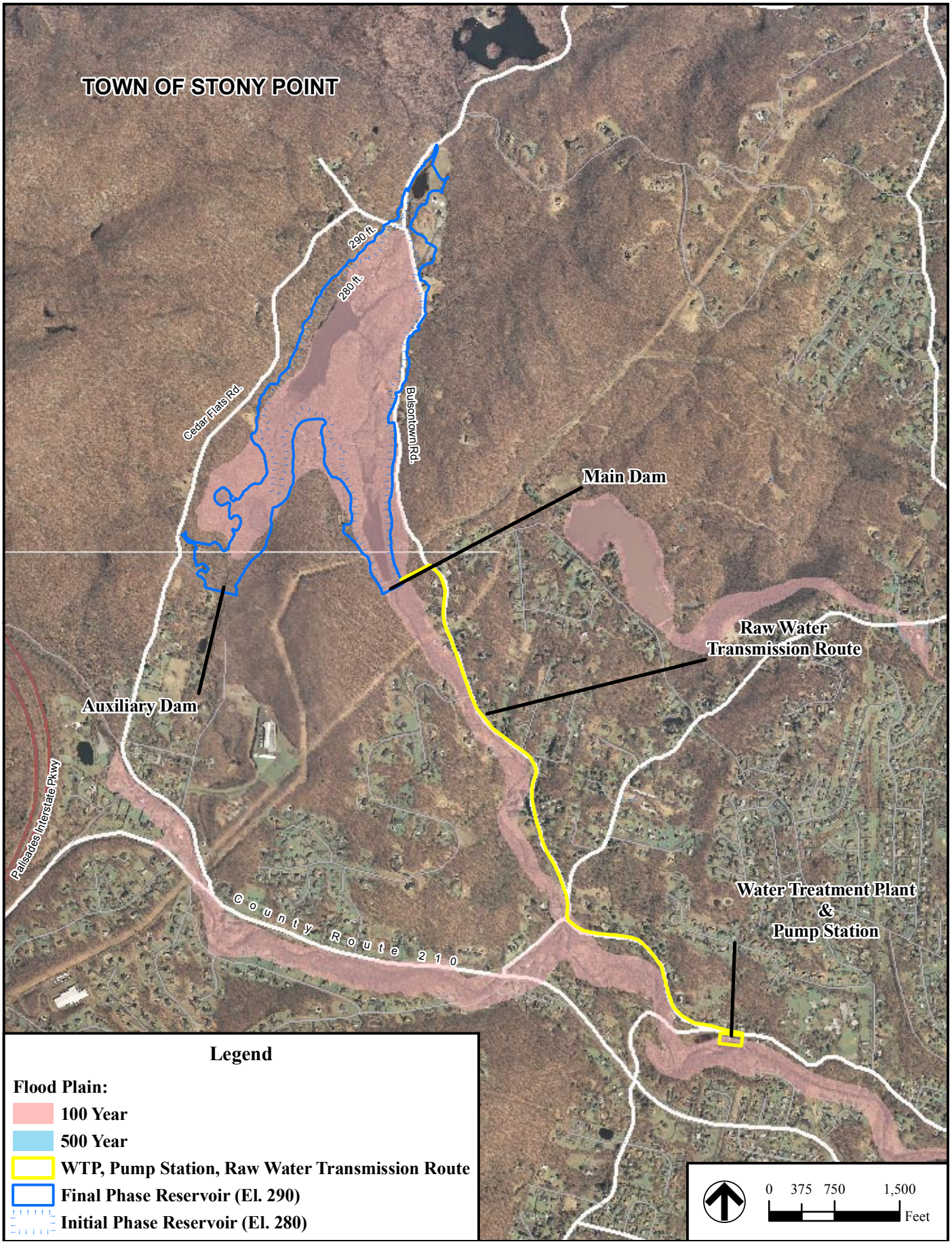

Figure 18.1-3

Ambrey Pond Reservoir Alternative Floodplains

The Ambrey Pond Reservoir Alternative would result in the permanent inundation of the floodplain within the footprint of the Ambrey Pond Reservoir on Timp Mountain Brook and the continued inundation of the area upstream of the Sandy Point Dam on Cedar Pond Brook. The Ambrey Pond reservoir and finished water tie-in/Cedar Pond Brook Diversion are located mostly within the 100-year floodplain; however, the raw water transmission line is located immediately outside the 500-year floodplain (Figure 18.1-3). As mentioned previously, it is likely that some disconnection of the river channels with their floodplains downstream of impounded areas has already occurred; however the reduction in flow and in the regularity of channel forming flows that is often associated with the operation of reservoirs may also contribute to this impact. Because the peak stormwater flow from the Ambrey Pond area would not be increased by the Ambrey Pond Reservoir Alternative during and after construction, the floodplain downstream of the Reservoir would not be increased in size. This alternative would not be expected to result in increased flooding of areas outside the project area. Roadways lying within the inundated area (portions of Mott Farm Road, Queensboro Road, Bulsontown Road and Cedar Flats Road) would be relocated outside the 100-year floodplain. The exact location of the relocated roadways would be determined during the design stage.

WETLANDS

The Ambrey Pond Reservoir Alternative site contains extensive areas of New York State Department of Environmental Conservation (NYSDEC) mapped freshwater wetlands and wetlands mapped by the US Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) (see Figures 18.1-4 and 18.1-5). Figure 18.1-5 indicates the locations and extent of NYSDEC mapped wetlands. Most of these wetlands developed as a result of the two low dams that created the existing Upper and Lower Ambrey Ponds. As the freshwater wetland complex is over 12.4 acres in size, these wetlands, and a 100-foot buffer surrounding the wetland complex, are regulated by NYSDEC under Article 24. NYSDEC has identified them as wetland "PX-1" by the NYSDEC.

NYSDEC classifies wetlands based on ecological, hydrologic, and social value from Class 1 (highest) to Class 4 (lowest). Wetland PX-1 is a Class 2 wetland due to the variety of plant communities (described below) within the wetland complex. USACE and USEPA regulate activities that would result in the dredging or placement of fill in wetlands and watercourses identified as "Waters of the United States," under Section 404 of the Clean Water Act. These wetlands would meet the regulatory definition of wetlands[1], and because they are hydrologically connected to the Hudson River, a navigable water body, through Timp Mountain Brook and Cedar Flats Brook, dredging or filling activities in these wetlands would be regulated by the USACE under Section 404 of the Clean Water Act.

There are four general wetland types identified by the NWI within the Ambrey Pond wetland complex, as described below:

[1] As defined in EPA Regulations listed at 40 CFR 230.3(t), wetlands are "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas."

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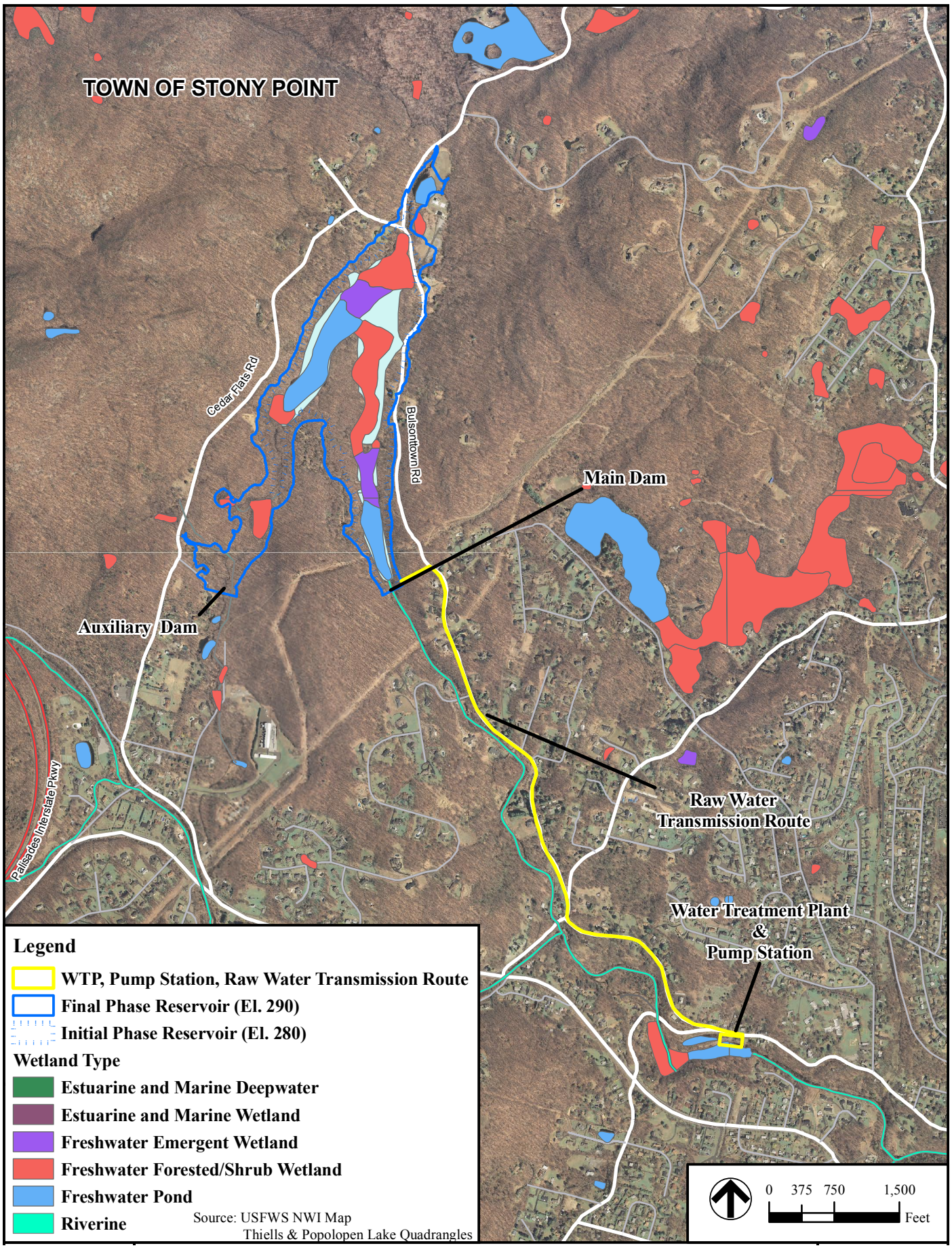

Figure 18.1-4

Ambrey Pond Reservoir Alternative
National Wetland Inventory Wetlands

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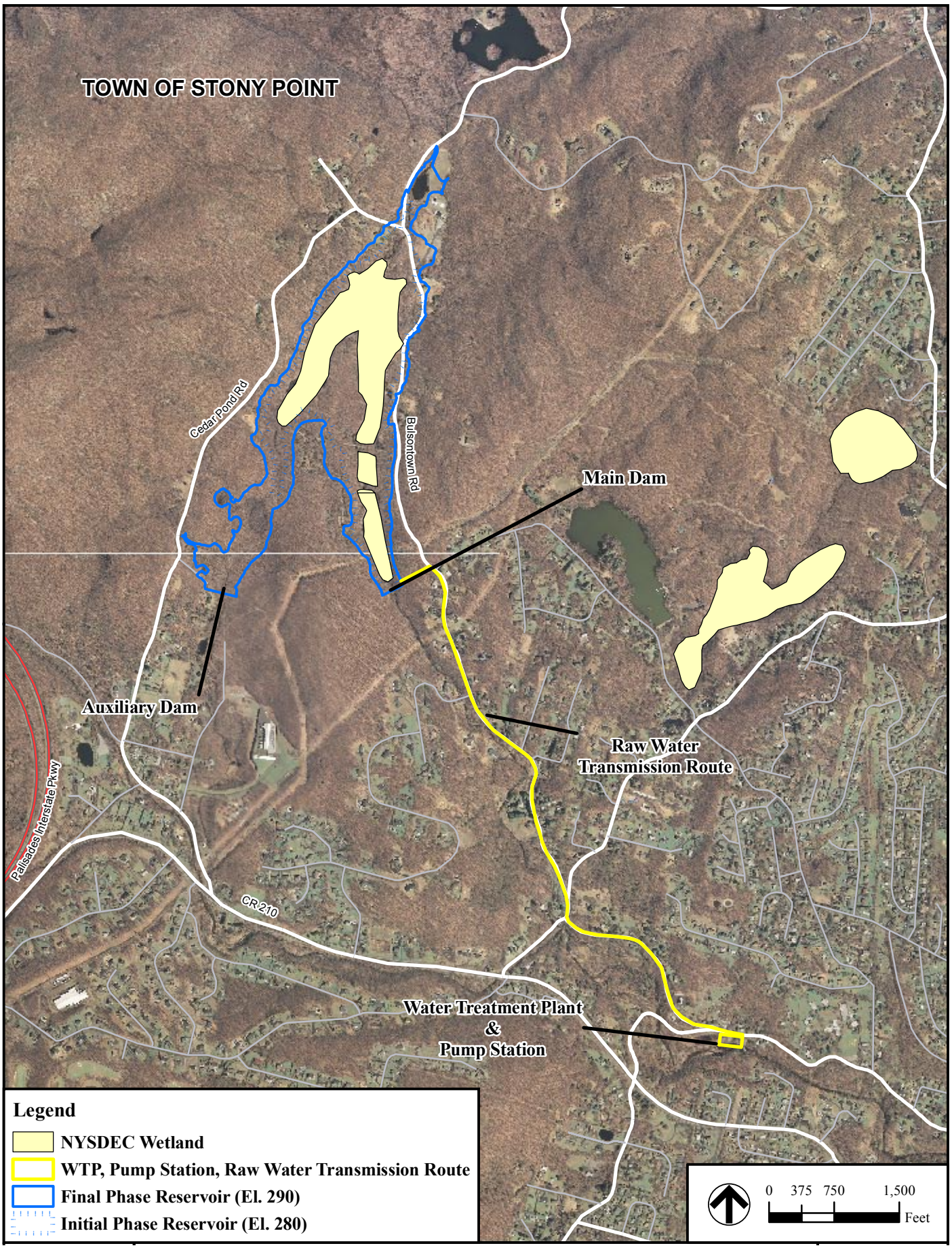

Figure 18.1-5

Ambrey Pond Reservoir Alternative
NYSDEC Wetlands

- Riverine wetlands (0.56 acre) – This wetland type consists of the streambed of Timp Mountain Brook.
- Open water wetlands (12.79 acres) – This wetland type comprises the permanently flooded portions of Upper and Lower Ambrey Ponds. The water depth ranges up to several feet with a moderately dense growth of rooted aquatic plants. This wetland type provides habitat for several fish species, aquatic reptiles (snapping and painted turtles) and amphibians.
- Emergent marsh (5.93 acres) – These wetlands are found adjacent to the ponds in areas that are frequently inundated with water and almost always have saturated soils. Common plant species in this wetland type are sedges, rushes, ironweed, jewelweed, bur-reed and smartweeds.
- Palustrine forested and shrub swamp (17.85 acres) – These wetlands are found in areas near Upper and Lower Ambrey Pond. The shrub swamp is found as a transitional area between the forested swamp and the emergent marsh. Dominant plant species are buttonbush, willows, alder, pepperbush, and maleberry. The forested swamp occurs in areas that are seasonally flooded or saturated. The dominant tree species are red maple, red elm and yellow birch; the dominant shrubs are spicebush, blueberry and azalea. There are extensive areas of skunk cabbage beneath the tree canopy; other herbaceous plants are ferns, jewelweed, and sedges. This wetland type is an important foraging and nesting habitat for birds.

The wetlands on the Ambrey site exhibit a high degree of plant diversity and function as habitat for wildlife species. Aside from ongoing use by all-terrain vehicles in some areas, the wetlands have little evidence of disturbance and little evidence of colonization by invasive plant species such as common reed and purple loosestrife. One area of common reed was observed north of Upper Ambrey Pond.

The Ambrey Pond Reservoir Alternative would not impact wetlands during construction of the Stony Point Dam, but could disturb wetlands within the area of Lower Ambrey Pond during the construction of Main Dam. The creation of the Ambrey Pond reservoir would result in the loss of the existing riverine (0.56 acres), emergent (5.93 acres), and palustrine forested and shrub wetlands (17.85 acres), and creation of a primarily deep-water lacustrine (lake-oriented) system. While the acreage potentially regulated as "Waters of the United States" under Section 404 of the Clean Water Act may increase, the functions and values of the existing wetland system would be adversely impacted. The NYSDEC Wetland PX-1 would be inundated; resulting in the permanent loss of vegetated wetland habitat for terrestrial wildlife (i.e., birds, mammals, reptiles, amphibians, insects).

Over time, there may be some small vegetated wetland areas created along the shorelines of the Ambrey Pond reservoir and within the littoral zone; however, the extent and persistence of these areas would likely be limited for reasons for the following reasons:

- steep slopes found along most of this alternative's reservoir bed would limit the size of any new wetlands;
- increases in open water and a lack of nearshore shallow water would result in unattenuated wave action reducing the persistence of rooted aquatic vegetation; and

- draw downs from the reservoir would result in nearshore and shoreline areas that are normally inundated and occasionally dry—a reversal of the conditions in natural ponds (Baxter 1977).

AQUATIC RESOURCES

Hydrology

The Ambrey Pond Reservoir Alternative area includes the following surface water features described in the following sections: Lake Tiorati Brook (including its continuance as Cedar Pond Brook), Timp Mountain Brook, Lower Ambrey Pond and Upper Ambrey Pond (see Figure 18.1-2).

Lake Tiorati Brook/Cedar Pond Brook

Lake Tiorati Brook originates at Lake Tiorati in the Palisades Interstate Park at an elevation of 1,032 ft. (314.8 m), and flows southeast, continuing as Cedar Pond Brook from below the bridge on old Route 210 at Cedar Flats Road, near the Palisades Interstate Parkway to tidewater at Stony Point, a distance of about 3 miles (Ayer and Pauszek, 1963). The total drainage area upstream of the confluence of Cedar Pond Brook with the Hudson River is 17.3 square miles (44.8 km^2). The stream has a steep gradient from Lake Tiorati to Cedar Flats Road and a moderate gradient below this point. A series of cascades and plunge pools are present in the area of the Palisades Interstate Parkway, and low gradient and velocity characterize the lower reaches before it enters the Hudson River. A run of the river dam, the Stony Point Dam, is located in the Town of Stony Point just south of West Main Street and downstream of the point where Reservoir Road crosses Cedar Pond Brook. A former 1mgd water treatment plant exists at this location.

Stream flow measurement data for Lake Tiorati Brook at Cedar Flats, New York, where the drainage area is 10.6 square miles (27.5 km^2), for the period October 1960 through September 1963, are reported by USGS. The average flow for the period of record is 18.5 cfs. The ratio of average flow to drainage area is 1.75 cubic feet per second (cfs) per square mile (i.e., 18.5/10.6). USGS also measured flow in Cedar Pond Brook at Stony Point, New York, where the drainage area is 17.3 square miles (44.8 km^2). The period of this record (October 1960 through September 1962) is shorter than that for the Cedar Flats station; the average flow for the period of record is 29.8 cfs. There was an entry point for a water diversion, which originated from Lower Ambrey Pond, between the two gauging stations on Cedar Pond Brook, as described below in Lower and Upper Ambrey Ponds section. The drainage area of Cedar Pond Brook and Timp Mountain Brook at the confluence of these two streams is estimated to be 15 square miles (39 km^2). The average flow just downstream of the confluence, extrapolated based on the ratio of 1.75 cfs per square mile for Lake Tiorati Brook at Cedar Flats, is 26. 2 cfs.

Timp Mountain Brook

Timp Mountain Brook originates on the south side of Timp Mountain and flows south through a series of small ponds where it joins with Lake Tiorati/Cedar Pond Brook at the junction of Bulsontown Road and Route 210. It is joined by two small tributaries immediately upstream from Upper Ambrey Pond. The stream bed within the Ambrey Pond area is rocky with ~~a~~ substrate ranging from gravel to large boulders. Old dams exist at the outlet of both Upper and Lower Ambrey Ponds. The Upper Ambrey Pond dam is breached and the Lower Ambrey Pond Dam has been described as a barrier to fish passage (ASA 2005). This brook has a low gradient

in the area of the Ambrey Pond reservoir site, and then drops steeply from the outlet of Lower Ambrey Pond to its confluence with Lake Tiorati/Cedar Pond Brook. Riffles and pools are present in the section below Lower Ambrey Pond and the dominant substrate is cobble. Drainage area and stream flow are not available for Timp Mountain Brook.

Lower and Upper Ambrey Ponds

These shallow water bodies are surrounded by forested uplands and several types of wetlands, including palustrine forested and shrub swamps, and emergent marsh. The water in these ponds is generally clear and there is an abundance of submerged aquatic macrophytes. There are no major areas of stream bank erosion in the Ambrey Pond area. The dam formed lower pond, which served as the reservoir for the Stony Point Water Treatment Plant was operated by the New York Water Service Division, Utilities and Industry Corporation. Water was diverted from the reservoir to Cedar Pond Brook. The average diversion from the lower pond for water supply during the 1959 to 1961 period was 1.25 cfs (Ayer and Pauszek 1963). Water is no longer withdrawn from lower Ambrey Pond for water supply.

As the Ambrey Pond Reservoir Alternative would disturb more than one acre, UWNY would obtain coverage under the SPDES General Permit for Stormwater Discharges from Construction Activity (GP-0-08-001). A detailed soil and sediment erosion control plan would be developed by UWNY for the construction project prior to starting any construction. The plan would be implemented by the construction contractor and inspections would be performed regularly to assure rigorous adherence to the plan and the permit. As the permit requirements were developed by NYSDEC to protect the water quality of watersheds, compliance with the permit requirements would minimize any adverse impact to surface waters resources.

The Ambrey Pond Reservoir Alternative would have the potential to affect the magnitude, timing, frequency and volume of flows within Timp Mountain Brook, and Cedar Pond Brook downstream of the its confluence with Timp Mountain Brook and below the Stoney Point Dam, as well as the hydrology of Timp Mountain Brook above the Upper and Lower Ambrey Ponds. Potential impacts to flows on these surface waters would result from management of the impoundment and withdrawal actions, and would occur during both construction (discussed in later section) and operation of the facilities.

Upper and Lower Ambrey Ponds

The Ambrey Pond area of Timp Mountain Brook would be converted from a riverine system with shallow impoundments to a lacustrine environment with deep open water habitat. Circulation within such impoundments is often driven by inflow and outflow rather than temperature or winds which typically drive patterns in natural lakes (Baxter 1977). These circulation patterns would be influenced by the depth of the reservoir, whether or not stratification occurs, and the depth of the outflow and could impact sediment transport, temperatures and oxygen levels. The Stony Point reservoir, created by modifications to the Stony Point Dam on Cedar Pond Brook, would likely have little impact on the current conditions because a dam already exists at its proposed location.

Downstream of reservoirs, stream flows are typically less variable across days and seasons, and may exhibit changes in the timing of peak and low flow events. Short-term (hourly, daily, weekly) flow in Cedar Pond Brook downstream of the Stony Point Dam would be changed either positively or negatively depending on the operation of the reservoir and water treatment

plant. The flow in Cedar Pond Brook upstream of the its confluence with Timp Mountain Brook would not be affected by the Ambrey Pond Reservoir Alternative's operation.

Timp Mountain and Tiorati/Cedar Pond Brooks

Large scale temporary disturbances would occur during the construction phase of both the Main and Auxiliary Dams, and the Stony Point Dam, and the filling phase of the Ambrey Pond reservoir. It is likely that water would be diverted from the current stream beds during dam construction and that flows to the downstream reach of Timp Mountain Brook would be greatly reduced until the reservoir elevation has stabilized. This reduction in flows from Timp Mountain Brook would also reduce flows within the Cedar Pond Brook. The diversion of flows from Cedar Pond Brook at the water treatment plant to facilitate filling of the Ambrey Pond reservoir may result in reductions in flows for Cedar Pond Brook downstream of the Stony Point Dam. The duration of these impacts depends on the time needed to achieve a stabile reservoir elevation. The flow in the natural drainage reach between the Ambrey Pond reservoir and the Stony Point Dam, which includes a portion of Timp Mountain Brook, would be increased when the reservoir is releasing more flow out of it than the flow into the reservoir. This condition is expected to occur during the summer when stream flows are seasonally below annual average flow rates. Conversely, the flow in this portion of Timp Mountain Brook would be reduced when the reservoir is in its annual filling phase, which typically occurs in late winter and early spring due to snow melt and precipitation patterns.

The withdrawal of water from the Stony Point Reservoir formed by the dam on Cedar Pond Brook would be staged according to three phases of the project. Phase 3 operation would withdraw an average flow of 7.5 mgd on a continuous basis for raw water inflow to the water treatment plant. The Phase 1 and 2 average flows are 2.5 and 5.0 mgd, respectively. The withdrawal of water, production of finished water and distribution of water to Rockland County would reduce the flow in Cedar Pond Brook downstream of the Stony Point Dam. As stated in the Lake Tiorati Brook/Cedar Pond Brook section, the average annual flow of Cedar Pond Brook immediately downstream of its confluence with Timp Mountain Brook is 26.2 cfs (16.9 mgd). Therefore, if the net change in the storage volume of the Ambrey Pond reservoir is zero over a long-term period of one or more years, the Phase 3 withdrawal would reduce the average flow in Cedar Pond Brook downstream of the Stony Point Dam by approximately 44 percent. The Phase 1 and 2 reductions in average flow at the same point are 15 percent and 30 percent, respectively. It should be noted that the former Stony Point Water Treatment Plant had an average withdrawal flow of approximately 1 mgd when it was in operation during the 1960s and 1970s (Ayer and Pauszek 1963). Hence, a portion of the projected flow reductions associated with the Ambrey Pond Reservoir Alternative has occurred in the past.

The finished water from the Stony Point reservoir would be distributed to customers in Rockland County who reside in watersheds other than the Cedar Pond Brook watershed. Most of these customers would generate sanitary wastewater that would be either collected and treated at wastewater treatment plants that discharge to either the Hudson or the Ramapo rivers, or disposed through an on-site septic system in the Hackensack, Ramapo or Hudson (including Minisceongo Creek) watersheds. Therefore, the Ambrey Pond Reservoir Alternative has the potential to increase the surface water flow in the out-of-basin rivers (i.e., Hackensack and Ramapo rivers). However, the percent change in surface water flow in any of these rivers would be lower than the projected change in Cedar Pond Brook flow because these two watersheds are

larger than the Cedar Pond Brook watershed. There would be little net change in the overall freshwater flow to the Hudson River because most of Rockland County's wastewater is treated at the two wastewater treatment plants in Orangeburg, New York and discharged through a joint outfall to the Hudson and because Cedar Pond Brook accounts for a very low percentage of the freshwater flow into the Hudson River. The reduction in flow within Cedar Pond Brook does have the potential to alter the extent of the tidal zone near the Hudson River confluence such that brackish water may inundate the brook beyond current conditions.

The stormwater analysis considers the changes to rainfall runoff as a result of the increase in impervious surface associated with the building, road and parking area at the plant site. The existing impervious surface area on the project site is approximately 30,000 sq ft. If the reservoir and associated facilities were constructed, the total impervious surface area would increase to approximately 100,000 sq ft. A stormwater management plan consisting of Best Management Practices (BMPs) would be developed in accordance with the NYS Stormwater Management Design Manual to minimize potential adverse impacts to surface water resources associated with the discharge of stormwater runoff from impervious surfaces.

Water Quality

Lake Tiorati Brook at the point of diversion for the reservoir is classified by the NYSDEC as a Class B(T) stream. The best usages of Class B waters are for primary and secondary contact recreation and fishing. These waters shall be suitable for fish propagation and survival. The "(T)" denotes that it is classified as a trout water. The criteria for this classification as shown in Table 18.1-1, below:

Table 18.1-1
Class B Classification Criteria

Parameter	Criteria
Total Coliforms	Monthly median is not to exceed 2400 #/100 mL, and more than 20 percent of the samples, from a minimum of five analyses, is not to exceed 5,000 #/100 mL
pH	6.5-8.5
TDS	< 200 mg/L
DO	For water suitable for trout, daily average not less than 6.0 mg/L, at no time less than 5.0 mg/L

Thermal criteria for trout waters do not allow a discharge at a temperature over 70°F at any time, or an increase in temperature of more than 2°F over that which existed before the addition of heat of artificial origin during June through September, or 5°F over that which existed before the addition of heat of artificial origin during October through May.

Three sets of water samples were collected at a series of stations on Lake Tiorati/Cedar Pond Brook and Timp Mountain Brook on November 30, 1978 and December 6 and 13, 1978 by Lawler, Matusky and Skelly Engineers ("LMS"). These samples were analyzed for 36 parameters, including 15 volatile organics. pH, color, hardness, alkalinity, nitrogen, phosphorous, coliform (MPN), turbidity and BOD data for Cedar Pond Brook indicated that the quality of the water in these streams at the time of sampling was very good (LMS 1979). In addition, no volatile organics were detected in any of the samples. Pesticide scans of the Stony

Point water treatment plant effluent have indicated no detectable levels. Recent water quality data are not available for the Ambrey Pond area.

Timp Mountain Brook, which would also contribute water to the reservoir, is also classified as a "B(T)" stream. Three sets of water quality samples were collected from Timp Mountain Brook at three stations by LMS in 1978 (LMS 1979). One of these stations was located above Upper Ambrey Pond and another was located just upstream from the confluence of Timp Mountain Brook and Lake Tiorati/Cedar Pond Brook. Therefore, water quality data collected at these stations provide some indication of the water quality in the two existing ponds on the Ambrey Pond reservoir site. These data indicate that the quality of water in both the upper and lower reaches of Timp Mountain Brook was good at the time of sampling and of similar quality to that of Lake Tiorati Brook/Cedar Pond Brook.

Elevated levels of suspended sediment are likely downstream of dams during construction. An increase in temperature downstream of the Stony Point Dam during the summer could occur during the time period needed for the Ambrey Pond reservoir elevation to stabilize. The potential impact of the Ambrey Pond Reservoir Alternative on water quality is primarily attributable to the impoundment of water formed by the reservoir. The increased detention time provided by this alternative's reservoir would decrease the elevated TSS concentrations and turbidity levels that occur during and after storms. Water in the reservoir may stratify due to vertical temperature gradients that may occur during late spring, summer and early fall. This has a greater likelihood in Phase 3 than in Phases 1 and 2 because the dam spillway elevation would be increased from 280 ft to 290 ft. The potential nutrient levels, sunlight penetration and detention time in the reservoir may promote the growth of algae in the summer. Decomposition of inundated organic matter coupled with possible stratification could lead to zones of low dissolved oxygen or anoxia. Leaching of soluble material from inundated soils could influence the chemistry of the reservoir including the possibility of increased levels of compounds such as methyl mercury (Baxter 1977). Updated water quality sampling data and a more detailed account of the Ambrey Pond reservoir operation would be needed to perform a quantitative assessment of water quality.

During operation, water entering these reaches as overflow from reservoir surface waters would be expected to reduce variation in seasonal, daily and diurnal temperature fluctuations. These reaches would be expected to be warmer than average in the winter and cooler than average in the summer and would be less responsive to weather patterns. If outflows from either impoundment occurred at a depth other than surface, temperature in reaches downstream could be affected differently than described here (e.g., a hypolimnetic outflow could result in significant cooling of downstream waters). These modifications would have the potential to change the classification of these reaches from Class B(T) to Class B if water flowing into stream from reservoirs has a higher temperatures than existing conditions. More information on the depth of the reservoir, the depth of outflow, and the temperature profiles at critical seasons is necessary to predict downstream impacts. The potential impacts downstream of the Stony Point reservoir would likely be few because a dam currently exists at its proposed location.

Aquatic Biota

Timp Mountain Brook

Timp Mountain Brook is a small low gradient stream in the reservoir area that is dammed in several places in its upper reach to create small impoundments. The dam on the Lower Ambrey Pond has been noted as a barrier to fish passage (ASA 2005). The brook is fed by numerous

seeps from the adjacent upland terrain. Timp Mountain Brook has a low gradient with gravel to large boulder substrate in the area of the Ambrey Ponds and has a steep gradient over a rocky substrate downstream of Lower Ambrey Pond. Based on its classification by the NYSDEC as a Class B(T) stream, and on surveys conducted during September 2005, the brook above the Lower Ambrey Pond would be expected to support a coldwater aquatic community (ASA 2005). An electrofishing survey conducted in 1978 found the following species downstream of Lower Ambrey Pond: American eel, brown bullhead, pumpkinseed sunfish and largemouth bass (Table 18.1-2). The pond areas may warm the water in the lower reach of the brook and serve as a source of species adapted to warmer or slower water to the stream. In addition, the lower reach can become essentially dry during extended warm periods of low precipitation, in part because of excess evaporation in the upstream pond areas. This intermittent flow condition presently limits use of this habitat by aquatic life.

Table 18.1-2
Fish Found in Timp Mountain Brook Below Lower Ambrey Pond

Common Name	Scientific Name	Number
American eel	*Anguilla rostrata*	5
Brown bullhead	*Ameiurus nebulosus*	1
Pumpkinseed	*Lepomis gibbosus*	1
Largemouth bass	*Micropterus salmoides*	4
Sources: NYSDEC 1978 in ASA (2005)		

Upper and Lower Ambrey Ponds

The existing ponds (Upper Ambrey Pond and Lower Ambrey Pond) are shallow impoundments on Timp Mountain Brook that likely support typical warmwater fish communities that are adapted to slow water. The dam at Upper Ambrey Pond is partially breached resulting in reduced water levels compared to its original condition. The fish communities in these ponds are likely to contain fish species similar to those found in the 1978 survey below Lower Ambrey Pond, as well as bluegill sunfish, yellow perch, chain pickerel, common shiner, golden shiner, fathead minnow, and other minnow species.

Tiorati/Cedar Pond Brook

Tiorati Brook originates at Lake Tiorati in Palisades Interstate Park and is also known as Cedar Pond Brook east of Cedar Flats. The brook flows east to the Hudson River, passing through the Town of Stony Point. West of Cedar Flats, it is a small, high gradient stream with cascades and plunge pools and substrate ranging from gravel to boulder. Abundant cover for fish and habitat for invertebrates is provided by large boulders, cobbles and submerged logs and branches (ASA 2005). Although it originates at the surface outlet of Tiorati Lake, it is well shaded and has the cool water temperatures (measured at 17ºC (63ºF) in the afternoon during a September survey) needed to support trout and other typical coldwater species. Electrofishing surveys conducted by the NYSDEC in 1962 and 1992 in this upper reach of Tiorati Brook supported this finding (Table 18.1-3). Tiorati/Cedar Pond Brook is stocked with brown trout and also maintains a wild

Table 18.1-3
Fish Found in Lake Tiorati/Cedar Pond Brook

Common Name	Scientific Name	Relative Abundance			Number	
		1956*	1962**	1978**	1992**	1995**
Eastern blacknose dace	*Rhinichthys atratulus*	A	A	A	20	118
American eel	*Anguilla rostrata*	C	A	C	8	120
Brown trout	*Salmo trutta trutta*	C	C	C	67	50
Longnose dace	*Rhinichthys cataractae*	C	A	C	3	19
White sucker	*Catostomus commersonii*	C	A	C	1	15
Cutlips minnow	*Exoglossum maxillingua*	U	C	U	1	10
Fallfish	*Semotilus corporalis*	R	C	C	-	4
Common shiner	*Luxilus cornutus*	C	A	C	-	2
Tessellated darter	*Etheostoma olmstedi*	-	-	-	-	23
Creek chub	*Semotilus atromaculatus*	-	-	-	1	1
Brown bullhead	*Ameiurus nebulosus*	-	-	R	-	1
Golden shiner	*Notemigonus crysoleucas*	U	-	-	-	1
Chain pickerel	*Esox niger*	-	-	-	1	-
Spottail shiner	*Notropis hudsonius*	-	-	C	-	-
Johnny darter	*Etheostoma nigrum*	-	-	C	-	-
Pumpkinseed sunfish	*Lepomis gibbosus*	-	R	R	-	-
Bluegill sunfish	*Lepomis macrochirus*	-	R	R	-	-
Banded killifish	*Fundulus diaphanus diaphanus*	-	-	R	-	-
Redfin pickerel	*Esox americanus americanus*	-	U	-	-	-
Yellow perch	*Perca flavescens*	R	-	-	-	-

Notes: *From NYSDEC data cited in 1979 Ambrey Project DEIS
**From NYSDEC Bureau of Fisheries electrofishing report
A = Abundant
C = Common
U = Uncommon
R = Rarely encountered
- = non sampled or found outside project area

Sources: NYSDEC (1979) in ASA (2005)

population of brown trout. Its tributary, Stillwater Brook, maintains a population of wild brook trout. A maintained release from Lake Tiorati is important for maintaining the trout population during the summer months. Tiorati Brook is an important local trout fishery that is used by anglers primarily during spring.

East of Cedar Flats, Tiorati/Cedar Pond Brook has a moderate gradient section consisting of riffles, pools, and runs. The stream substrate ranges from silt to boulder but is predominantly sand, gravel and cobble. Temperatures in this reach were measured at 18ºC (64ºF) at 1:30PM during a September survey. Although these characteristics should support a typical cool water fish community, information on stream temperatures during critical summer conditions would be necessary to determine the potential for this reach to support trout species year round (ASA 2005). As expected this middle section of the river contains greater diversity of aquatic life with both cool and warm water species present (Table 18.1-3). The impoundment upstream of the Stony Point dam likely provides habitat for warm water fish species described for the Ambrey Ponds, and may limit or prevent upstream fish passage. The section of the river near the confluence with the Hudson River is characterized as a low gradient, depositional area and lacks features such as riffles, boulders or other structures that would provide cover for stream dwelling fish or habitat for invertebrates. No surveys of aquatic bioata are available for this section of river.

Although the USFWS lists Atlantic sturgeon and shortnose sturgeon as potentially occurring in Rockland County, they would be expected to occur in the Hudson River only. Habitat for these species is not present at project site. American eel are present in both Timp Mountain Brook and Cedar Pond Brook. Although this species is not protected, it is increasingly being recognized as a species of concern. Activity that inhibits passage to upstream habitat would have the potential to adverse impact regional populations of American eel.

Construction and operation of the reservoir would have the potential to adversely impact aquatic biota in the reservoir and in Timp Mountain and Cedar Pond Brooks. The magnitude of potential impacts due to reservoir operation would vary from year to year depending on the occurrence of drought conditions and the demand for water in Rockland County. Adverse impacts would be greater in dry years than wet years. Creation of the reservoirs would displace stream specialized fish and invertebrate species from the portions of the Ambrey Pond reservoir area that are free flowing, resulting in the loss of individuals unable to move upstream to available suitable habitat. The loss of some individuals would not be expected to result in significant adverse impacts to regional populations of species expected to reside in the flowing portions of Timp Mountain Brook. A number of generalist species that currently exist in the system would be expected to inhabit the reservoir. Regulation of the reservoirs would have the potential to result in significant adverse impacts to individual fish inhabiting the reservoir and downstream stream segments should operation fail to maintain minimum flows within stream reaches downstream of both impoundments, and to time reservoir drawdowns outside of spawning and rearing periods (early spring through July) so as not to affect recruitment[1]. The loss of some individuals would not be expected to result in significant adverse impacts to regional populations of these generalist species, and populations of most species could likely recover after a single year of

[1] Fish born into a population within an area.

poor recruitment. However, repeated disturbance associated with low flows or low reservoir levels during spawning could result in significant adverse impacts to the fish community inhabiting the reservoir and Timp Mountain Brook below the dams.

Large scale temporary disturbances would occur during the construction phase of both the Main and Auxiliary Dams, and the Stony Point Dam. It is likely that water would be diverted from the current stream bed during dam construction and that flows would be reduced in the downstream reach of Timp Mountain Brook until the reservoir elevation has stabilized. While the loss of some individuals would be an adverse impact, it would not be expected to result in a significant adverse impacts to regional populations of the warmwater species expected to occur in the sections of the streams below the dams. Although some individuals living within these sections of stream would emigrate downstream, some fish individuals and aquatic invertebrates would be lost. This impact would be temporary and localized, and recolonization of these sections would be expected after completion of the dam. However, the disturbance and any resulting modification to the stream habitat, has the potential to result in a change in the fish community species composition. Construction activities associated with the construction of the Main and Auxiliary Dams and the modification to the Stoney Point Dam, have the potential to result in temporary increases in suspended sediment downstream of dam construction, similar to increases in suspended sediment observed in association with storm events observed in 1978. Sedimentation could impact fish and invertebrates by temporarily reducing water quality and visibility, and by filling interstices important for spawning and aquatic invertebrate habitat. These temporary increases in suspended sediment would not be expected to result in significant adverse impacts to aquatic biota and would be minimized through the implementation of erosion and sediment control measures consistent with the NYSDEC requirements.

Trout reproduction that may be occurring in the upper reaches of Tiorati Brook, upstream of the Ambrey Pond Reservoir Alternative site, would not be adversely affected by the construction or operation of this alternative. The upper reaches of Tiorati Brook would serve as a source population for recolonizing downstream sections of river.

Upper and Lower Ambrey Ponds

Filling of the Ambrey Pond reservoir would have both adverse and beneficial impacts on aquatic biota, with the degree of these impacts affected by the rate and duration of the filling phase. Ultimately, the existing aquatic habitats within the reservoir basin would be eliminated by the flooding of the reservoir area. Individual fish present in the existing ponds and intervening stream segments would find new and complex habitat and previously unavailable sources of terrestrial prey in the expanding reservoir. Some individual fish of species dependent upon moving water habitats ("lotic habitats") present within the portion of Timp Mountain Brook that would be flooded may emigrate upstream to suitable fluvial reaches. However, the conversion of lotic habitats to still water ("lentic") habitats within the reservoir site would be expected to result in the loss of fish individuals dependent upon lotic habitats that are unable to emigrate from the project site and find suitable habitat within the reservoir. Similarly, some fish individuals currently present within the relatively shallow water habitats in the Upper and Lower Ambrey Pond may be adversely impacted if suitable habitat is not available within the Ambrey Pond reservoir. Aquatic invertebrates dependent upon lotic habitats that are unable to move upstream as the reservoir fills would also be lost as a result of this alternative. While the loss of some individuals would be an adverse impact, it would not be expected to result in a significant

adverse impacts to regional populations of the warmwater fish species, or aquatic invertebrates expected to occur in the Timp Mountain Brook and Upper and Lower Ambrey Ponds.

New reservoirs have been found to be very productive of fish and other aquatic life. This is apparently due to the nutrient sources in the newly flooded land and the available space for expanding populations. Following an initial pulse of productivity that may last on the order of five years, most reservoirs adjust to a long term level of productivity that is substantially less than the initial years. This pattern is likely to occur under this alternative. This increase in productivity would likely be within populations of generalist (e.g., sunfish and largemouth bass) rather than those adapted to riverine habitats, especially insectivorous species (e.g., longnose dace and spottail shiner)(Freeman and Marcinek 2006). The latter species would likely be eliminated from impounded sections of stream and be located within stream habitat up and downstream of impoundments. The filling process would increase the length of nearshore habitat available for spawning and rearing of generalist and lake adapted species; however the steep banks would likely limit the extent of rooted vegetation and littoral habitat. The extent of this critical littoral habitat could be the limiting factor on production of all fish in the reservoir as it may limit the abundance of prey species. The created deep open water area would increase the diversity of available habitat and enable the development of plankton populations, but may be underutilized by fish species currently present in the system. According to Edinger et al. 2002, characteristic fish species reservoir/artificial impoundments in NY include: chain pickerel (*Esox niger)*, and other pikes (Esocidae); brown bullhead (*Ictalurus nebulosus*) or yellow bullhead *(I. natalis)*, sunfish such as bluegill (*Lepomis macrochirus*) and pumpkinseed (*L. gibbosus*); golden shiner (*Notemigonus crysoleucas*), and fathead minnow (*Pimephales promelas)*. The development of the reservoir may provide an opportunity to stock popular sport fish such as Northern Pike or Sauger, and brown trout. The stocking of any new species within the reservoir would have to take into consideration the existing and potential foodweb dynamics, and habitat quality within the reservoir.

Reservoir operation would generally involve filling of the reservoir with runoff during winter and early spring and drawdown of the reservoir in summer and fall. This general pattern could be modified substantially by unusual weather patterns which change the typical runoff patterns and water demand sequence that occurs in most years.

Drawdown of the reservoir would reduce available habitat for reservoir fishes and dewater shoreline habitat where much of the food resources for fishes originate. Drawdowns could adversely impact fish spawning because the fish community in Ambrey Pond reservoir would be dominated by shoreline spawning species. Yellow perch and chain pickerel spawn in early spring in shallow water over areas with weeds and organic debris. Largemouth bass, sunfish and bullheads spawn in nests from middle to late spring. For both groups of fish, drawdowns of the reservoir during spawning time could eliminate spawning habitat or destroy spawned eggs before they hatch. The seasonal timing of drawdowns could affect species differently in successive years.

Reservoir drawdowns could adversely impact the recruitment of juvenile fish to their respective populations because shallow, vegetated shoreline edge habitats where juveniles find protection from predators may be eliminated. Drawdowns could force juveniles into open water where they could experience excessive predation. The timing and frequency (successive years) of drawdowns would be a variable factor for the maintenance of many reservoir fish populations.

Tiorati/Cedar Pond Brook

Cedar Pond Brook would be a major source of water for Ambrey Pond reservoir from the diversion point at the treatment plant. The withdrawal of water from the brook would change its hydrological regime below the withdrawal point, which would alter the quantity of available habitat at times during an annual cycle. A bypass flow at the diversion point would maintain stream habitat above a minimum flow. At times this would result in a reduction of available habitat from current conditions, but could avoid periods of extreme low flows that were experienced in the past. Additionally, diversions from the brook at times of high natural flow would minimize the effects of withdrawal on stream habitat.

Tiorati Brook and its continuation as Cedar Pond Brook often experience very low flow conditions during summer and fall. Flow in Tiorati Brook is controlled at the dam at Lake Tiorati in Harriman State Park. This release has been maintained for many years and formerly supplied water to the treatment plant operated by UWNY at the site of this alternative. It is likely that in some years Tiorati Brook may have been nearly dry except for the controlled release.

Because the brook generally experiences low flow conditions, because a dam has existed at Stony Point for over a century, and because historically the brook was diverted for water supply at the diversion point, operation of Ambrey Pond Reservoir Alternative would not impose a new type of impact on stream resources, but has the potential to exacerbate stresses in this altered system. Trout angling in the brook is generally confined to the reach upstream of the diversion point. This reach would not be affected by reservoir operation, thus trout angling would not be impacted by the Ambrey Pond Reservoir Alternative.

Timp Mountain Brook

In addition to the impacts described for the Ambrey Ponds, the section of Timp Mountain Brook below the proposed Ambry Pond reservoir would also be affected. Currently this section of brook may run dry during summer months. The presence of a large impoundment could offer assurance that minimum flows be met within this reach so that fish and invertebrate populations could exist year round. The existing dam on the Lower Ambrey Pond already serves as a barrier to fish passage, therefore the construction of Main Dam would not block access to currently available habitat.

TERRESTRIAL RESOURCES

Habitat Communities

The Ambrey Pond area, located east of the approximately 80-square-mile natural open space area comprising Harriman and Bear Mountain State Parks, and west of the Hudson River, has extensive topographic and ecological diversity. Although the site has undergone various levels of human disturbance in the past, many disturbed areas have recovered into relatively diverse natural communities. The Ambrey Pond area is an approximately 112 acres site within extensive broadleaf-deciduous forest (Braun 1950) predominantly composed of oak-hickory forest communities.

Habitat communities in the Ambrey Pond area have undergone various degrees of human disturbance, including both minor to major historic alterations. Past disturbances include construction of dwellings and stone fences, clearing for agriculture and livestock, selective logging, grazing, firewood cutting, and damming of rivers with subsequent flooding and inundation of wetlands. Evidence of recent disturbance includes numerous all-terrain vehicle

(ATV) trails, evidence of hunting and fishing, and old fire pits in the vicinity of the ponds and at rocky outcrops at the higher elevations.

Presently, the area consists of both upland and wetland habitats. The major habitat types found within the Ambrey Pond area (Figure 18.1-6) have been classified using the plant associations described by Edinger et al. (2002). These ecological communities and their acreages are described below and in Table 18.1-4; wetland areas are also discussed in terms of their regulatory status in the following section.

Table 18.1-4
Ambrey Pond Area of Impact

Location	Ecological Community	Area of Impact	
		El. 280	El. 290
Reservoir Area	Brushy Cleared Land	0.46	0.97
	Freshwater Pond/Artificial Impoundment	12.16	13.14
	Mowed Lawn with Trees	0.05	2.84
	Oak-Hickory Tree Forest	1.33	5.38
	Red-maple Hardwood Swamp	9.51	10.77
	Shrub Swamp	0.80	0.80
	Skunk Cabbage Meadow	38.66	2.72
	Successional Northern Hardwoods	12.11	63.29
	Tussock Sedge Meadow		12.11
	Grand Total	75.09	112.02

- Freshwater Pond/Artificial Impoundment. The open water wetlands of both Upper and Lower Ambrey Ponds have resulted from damming of the Timp Mountain Brook, and are classified as reservoir/artificial impoundments (Edinger et al. 2002), About 13 acres of this habitat type are found within the study area. This habitat is an aquatic community of an artificial lake created by the impoundment of the river or creek with a dam. The two ponds are relatively shallow and provide warm-water habitats with soft, muck bottoms with remnant stumps and boulders supporting warm-water species.
- Riverine wetlands. The streambed of Timp Mountain Brook represents the entirety of this wetland community, totaling approximately half an acre.
- Red-maple hardwood swamp. This palustrine forested swamp covers about 11 acres. It is found on the northern end of Upper Ambrey Pond and along the eastern side and on the northern tip of Benson's Point. It appears to be flooded irregularly resulting from Timp Mountain Brook overflow, and overland runoff. This habitat is characterized by a canopy cover consisting mostly of red maple with other co-dominant species, such as green ash, slippery and yellow birch. The community has a very well-developed shrub community comprising spicebush, highbush blueberry, arrowwood, and swamp azalea. The herbaceous layer appeared to be very diverse, with species such as cinnamon ferns, royal fern, skunk cabbage, and a variety of sedges. There were two forested communities with solid herbaceous layers of tussock sedge and skunk cabbage, described separately below.

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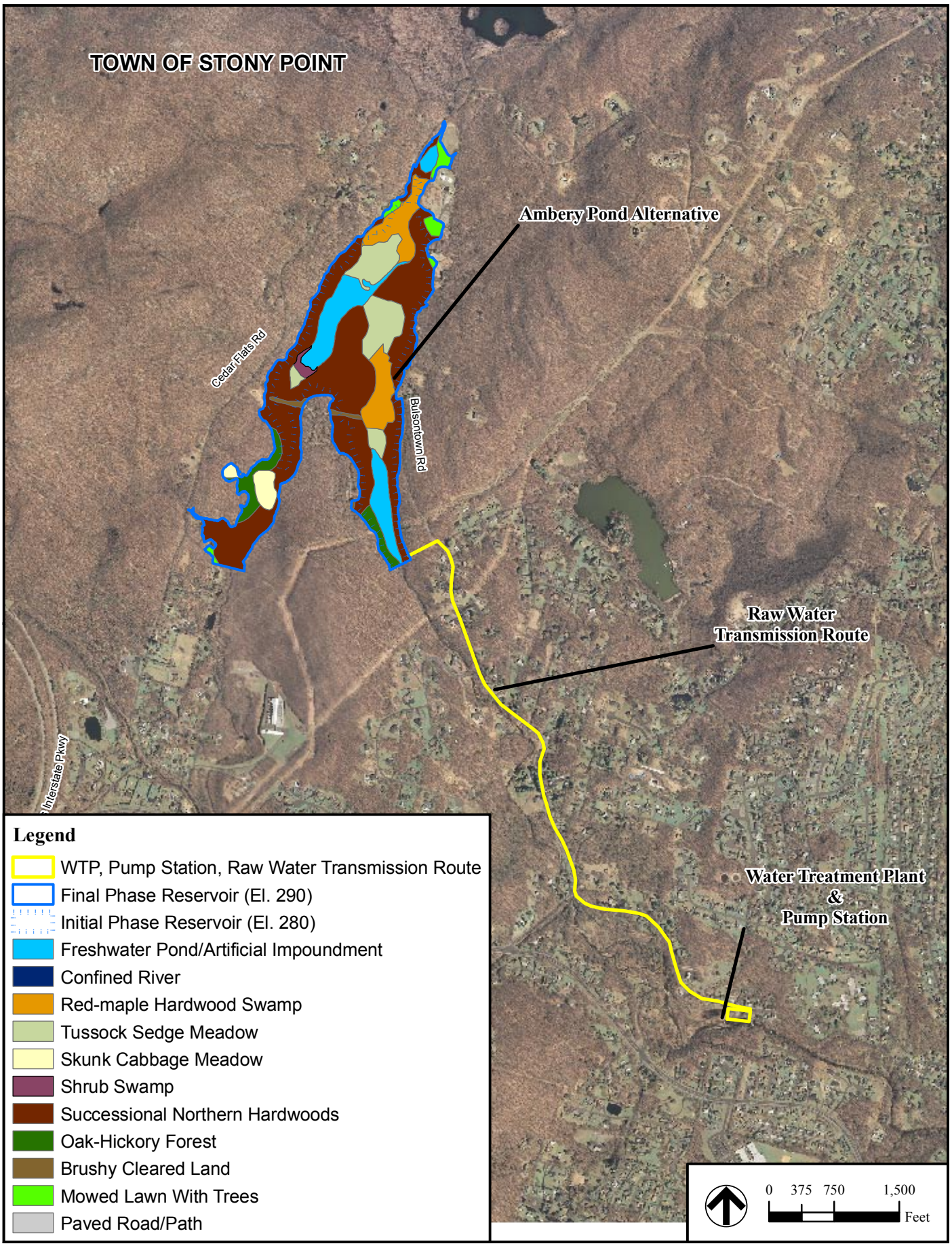

Figure 18.1-6

Ambrey Pond Reservoir Alternative Ecological Communities

- Tussock sedge meadow. This wetland community is mostly located on the eastern side of Upper Ambrey Pond resulting from what appears to be overflow from the pond and occasionally from flooding. This sedge community is approximately 12 acre. The area receives runoff from the pond via an overflow structure and surface water from adjacent areas. The community is dominated by almost a monoculture of tussock sedge. Other herbaceous plants are present; however, including other sedges, meadow sweet and alder in the shrub layer. There are scattered trees, mostly red maple, and green ash but a relatively sparse canopy.
- Skunk-cabbage meadow. This wetland community is located south of the Upper Ambrey Pond along the small tributary that flows north into Upper Ambrey Pond. The community is fed by overland flow and overflow from the pond tributary. This skunk-cabbage meadow community is approximately 3 acres. The community is dominated by almost a monoculture of skunk-cabbage. Other herbaceous plants, such as sphagnum moss, can be found amongst the skunk-cabbage. The community may be a rich sloping fen. These are small, gentle sloping, wetlands with shallow peat deposits, on a sloped depression. They are fed with small springs or groundwater seepage. More information would need to be collected to confirm this classification. There are scattered trees, mostly red maple, and green ash but a relatively sparse canopy.
- Palustrine shrub swamp. This wetland community is located at the southern edge of Upper Ambrey Pond and along in the vicinity of Lower Ambrey Pond. These are dominated with buttonbush in areas along the edge of the ponds and willow, alder, and polygonum. Shrub swamp makes up approximately 1 acre.
- Successional northern hardwoods. Most of the upland parts of the study area are characterized by this early successional tree/shrub vegetative community. This community consists of trees and shrubs dominated by big tooth aspens, paper birch, and black locusts of various ages. Shrubby undergrowth consists mostly of multiflora rose, Japanese barberry and vines such as poison ivy. Successional northern hardwoods make up approximately 63 acres.
- Oak-hickory tree forest. The entire site shows signs of past disturbance of various degrees. The most mature forest areas would be characterized as an oak-hickory forest. These forests are found in the upland, well-drained sites of the study area from the ponds and tributaries. It is found on ridgetops and upper slopes of the Benson's Point area. The tree canopy is dominated by red oaks, white oak and black oak of various ages. Mixed with the dominant oaks are pignut, shagbark hickory and white ash. Shrubby undergrowth consists mostly of maple leaf viburnum, multiflora rose and vines such as poison ivy. Oak-hickory tree forest makes up approximately 5 acres.
- Human-dominated terrestrial habitats. Areas of mowed lawns with trees, brushy cleared land, and paved roads and paths comprise approximately 4 acres of the total site.

Wildlife

Wildlife presence within the Ambrey Pond Reservoir Alternative area was examined through literature searches of readily available databases, past studies and research on wildlife occurrence within and near the study area, and through a site visit of the Ambrey Pond area. Rare, special concern, threatened and endangered species are discussed in the following section.

The Ambrey Pond area was visited on May 16, 2008 to: (1) confirm the presence of existing habitat types and determine the potential for wildlife to use these areas; and (2) to record direct observations of wildlife on and near the site. Data sources, such as the NYSDEC's New York Breeding Bird Atlas and New York Herp Atlas and survey data, as well as site-specific data collected during the preparation of the prior Ambrey Pond DEIS (1979) and a subsequent site assessment (ASA 2005), were used to determine potential wildlife use of the Ambrey Pond area.

Direct observation of wildlife individuals and sign (i.e., tracks, scat, etc.) during the one-day site visit resulted in the confirmation of 69 species (12 species of mammals, 48 birds, 2 reptiles, and 7 amphibians) in or near the Ambrey Pond area; as described by taxonomic group below. Existing ecological communities present are relatively unfragmented with varying levels of disturbance and/or modification described above. Despite past disturbance and habitat modification, the site supports a variety of wildlife, as would be expected in a varied landscape adjacent to large, contiguous natural areas (i.e., Harriman State Park, Hudson River).

Mammals

According to a Harriman – Bear Mountain State Park database, approximately 41 mammal species would be expected to occur in the relatively undeveloped Hudson Highlands to the north and west of the Ambrey Pond area (see Table 18.1-5). While this list is more representative of larger contiguous tracts of forest and wetland habitat assemblages, many of the mammal species listed may occur in the study area.

Table 18.1-5
Hudson Highland Mammals and Potential Presence in the Ambrey Pond Reservoir Area

Common Name	Scientific Name	Observations (C) and Possible (P) Reservoir
Virginia opossum	Didelphis virginiana	P*
Masked shrew	Sorex cinerus	P*
Northern short-tailed shrew	Blarina brevicauda	P*
Smoky shrews	Sorexfumeus	P
Moles (3 spp. possible)	Species not determined	P
Bats (6 spp. possible)	Species not determined	P
Eastern cottontail	Sylvilagus floridanus	C*
Woodchuck	Marmota monax	C*
Eastern chipmunk	Tamias striatus	C*
Eastern gray squirrel	Sciurus carolinensis	C*
Southern flying squirrel	Glaucomys volans	P
Woodland jumping mouse	Napaeozapus insignis	P

Table 18.1-5 cont'd
Hudson Highland Mammals and Potential Presence in the Ambrey Pond Reservoir Area

Common Name	Scientific Name	Observations (C) and Possible (P) Reservoir
Meadow jumping mouse	Zapus hudsonius	P
White-footed mouse	Peromyscus leucopus	P*
Meadow vole	Microtus pennsylvanicus	P*
Boreal redback vole	Clethrionomys gapperi	P*
Pine vole	M. pinetorum	P
Muskrat	Ondatra zibethica	C*
Norway rat	Rattus norvegicus	P
American beaver	Castor canadensis	C
Porcupine	Erethizon dorsatum	P
Coyote	Canis latrans	P
Fox (2 spp. possible)	Species not determined	C
Black bear	Ursus americanus	C
Raccoon	Procyon lotor	C*
Fisher	Martes pennanti	P
Long-tail weasel	Mustela frenata	P
Short-tail weasel	Mustela erminea	P
Mink	Mustela vison	P
River otter	Lutra canadensis	C
Striped skunk	Mephitis mephitis	P
Bobcat	Lynx rufus	P
Whitetail deer	Odocoileus virginianus	C*

Notes: C - Confirmed on site by HDR
C* - Confirmed on site by HDR and others
P - Possible on site
P* - Found in Ambrey Pond area during preparation of 1979 DEIS

Eastern cottontail, woodchuck, eastern chipmunk, eastern gray squirrel, muskrat, and white-tailed deer were all observed within the area during the site visit. Raccoon, fox, coyote, black bear, and river otter were also identified by evidence/sign of their past presence (tracks, tree cuttings, and scats). Other, more secretive or nocturnal mammals, such as opossum, house mouse, Norway rat, striped skunk, mink, weasels, and other common species of shrews, mice, voles, moles and bats are expected to use the Ambrey Pond area for foraging, breeding, overwintering, and migration.

Birds

Results from the New York Breeding Bird Atlas (1980-1985, 2000-2005) indicate that breeding activity for approximately 96 species of birds has been recorded for Atlas Block #5756B, which includes Ambrey Pond and the surrounding area. Table 18.1-6 presents a list of bird species observed during two NYSDEC Breeding Bird Atlas periods and other studies (e.g., 1979 DEIS). Many of the bird species listed in Table 18.1-6 may be expected to nest within the Ambrey Pond area. Based on the diversity of wetland and upland habitat present within the Ambrey Pond area,

it is likely that many of these bird species would use the site for reproduction and foraging during the breeding season (i.e., waterfowl, raptors, woodpeckers, various songbirds); during spring and fall migratory movements (i.e., neotropical migrants such as wood warblers and tanagers); and for overwintering (i.e., various sparrow species). Nesting and foraging habitat is present for many forest interior species (e.g., yellow-billed cuckoo, hairy woodpecker, pileated woodpecker, great-crested flycatcher and rose-breasted grosbeak), species that are common within edge habitats (e.g., eastern towhee, American goldfinch, northern cardinal, gray catbird and downy woodpecker), and wetland or aquatic species (e.g., spotted and solitary sandpipers, green heron, mallard, belted kingfisher, and red-winged blackbird).

Table 18.1-6
New York Breeding Bird Atlas Results And Potential Birds in the Ambrey Pond Reservoir Area

Common Name	Scientific Name	Breeding Bird Atlas Block		Observed on Site	Comment Status
		2000-05	1980-85		
Great Blue Heron*	*Ardea herodias*			X	
Green Heron	*Butorides virescens*	X	X	X	
Turkey Vulture*	*Cathartes aura*	X	X	X	
Canada Goose*	*Branta canadensis*	X	X	X	Game Species
Wood Duck	*Aix sponsa*	X	X	X	Game Species
Mallard*	*Anas platyrhynchos*	X		X	Game Species
Sharp-shinned Hawk*					
Red-shouldered Hawk	*Buteo lineatus*		X		Special Concern
Broad-winged Hawk	*Buteo platypterus*		X		
Red-tailed Hawk*	*Buteo jamaicensis*	X	X	X	
American Kestrel	*Falco sparverius*		X		
Northern Bobwhite	*Colinus virginianus*		X		
Wild Turkey	*Meleagris gallopavo*				Game Species
Ring-necked Pheasant	*Phasianus colchicus*		X		Game Species
Ruffed Grouse*	*Bonasa umbellus*		X		Game Species
Killdeer	*Charadrius vociferus*			X	
Spotted Sandpiper	*Actitis macularia*	X	X	X	
Solitary Sandpiper	*Tringa solitaria*			X	
American Woodcock*	*Philohela minor*		X		
Rock Pigeon	*Columba livia*	X	X		Unprotected
Mourning Dove*	*Zenaida macroura*	X	X		
Yellow-billed Cuckoo	*Coccyzus americanus*	X	X		

Table 18.1-6
New York Breeding Bird Atlas Results And Potential Birds in the Ambrey Pond Reservoir Area

Common Name	Scientific Name	Breeding Bird Atlas Block		Observed on Site	Comment Status
		2000-05	1980-85		
Black-billed Cuckoo	*Coccyzus erythropthalmus*	X	X		
Eastern Screech-owl	*Otus asio*	X			
Great Horned Owl*	*Bubo virginianus*	X			
Whip-poor-will	*Caprimulgus vociferus*	X			Special Concern
Chimney Swift	*Chaetura pelagica*	X	X		
Belted Kingfisher	*Ceryle alcyon*	X	X	X	
Ruby-throated Hummingbird	*Archilochus colubris*	X			
Red-bellied Woodpecker	*Melanerpes carolinus*	X	X	X	
Downy Woodpecker*	*Picoides pubescens*	X	X	X	
Hairy Woodpecker	*Picoides villosus*	X	X		
Pileated Woodpecker	*Dryocopus pileatus*	X	X	X	
Northern Flicker*	*Colaptes auratus*	X	X	X	
Eastern Wood-Pewee	*Contopus virens*	X	X	X	
Acadian Flycatcher	*Empidonax virescens*		X		
Willow Flycatcher	*Empidonax traillii*	X			
Least Flycatcher*	*Empidonax minimus*				
Eastern Phoebe*	*Sayornis phoebe*	X	X		
Great Crested Flycatcher	*Myiarchus crinitus*	X	X		
Eastern Kingbird	*Tyrannus tyrannus*	X	X	X	
Blue-headed Vireo*	*Vireo solitarius*		X		
Yellow-throated Vireo	*Vireo flavifrons*		X		
Philadelphia Vireo*	*Vireo philadelphicus*				
Warbling Vireo	*Vireo gilvus*	X	X		
Red-eyed Vireo	*Vireo olivaceus*	X	X	X	
Blue Jay*	*Cyanocitta cristata*	X	X	X	
American Crow*	*Corvus brachyrhynchos*	X	X	X	Game Species
Fish Crow	*Corvus ossifragus*	X	X		

Table 18.1-6
New York Breeding Bird Atlas Results And Potential Birds in the Ambrey Pond Reservoir Area

Common Name	Scientific Name	Breeding Bird Atlas Block		Observed on Site	Comment Status
		2000-05	1980-85		
Common Raven	*Corvus corax*	X			
Tree Swallow	*Tachycineta bicolor*	X	X	X	
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	X	X	X	
Bank Swallow	*Riparia riparia*	X			
Barn Swallow	*Hirundo rustica*	X	X	X	
Black-capped Chickadee*	*Poecile atricapillus*	X	X	X	
Tufted Titmouse*	*Baeolophus bicolor*	X	X	X	
White-breasted Nuthatch*	*Sitta carolinensis*	X	X	X	
Carolina Wren	*Thryothorus ludovicianus*	X	X	X	
House Wren	*Troglodytes aedon*	X	X		
Winter Wren*	*Troglodytes troglodytes*				
Ruby-crowned Kinglet*	*Regulus calendula*				
Blue-gray Gnatcatcher	*Polioptila caerulea*	X	X	X	
Eastern Bluebird	*Sialia sialis*		X		
Veery*	*Catharus fuscescens*	X	X	X	
Wood Thrush*	*Hylocichla mustelina*	X	X	X	
Swainson's Thrush*	*Catharus ustulatus*				
American Robin*	*Turdus migratorius*	X	X	X	
Gray Catbird*	*Dumetella carolinensis*	X	X	X	
Northern Mockingbird	*Mimus polyglottos*	X	X		
Brown Thrasher	*Toxostoma rufum*	X	X		
European Starling*	*Sturnus vulgaris*	X	X	X	Not Protected
Cedar Waxwing	*Bombycilla cedrorum*	X	X		
Blue-winged Warbler	*Vermivora pinus*		X	X	
Golden-winged Warbler	*Vermivora chrysoptera*		X		Special Concern
Yellow Warbler	*Dendroica petechia*	X	X	X	
Black-throated Green Warbler	*Dendroica virens*	X		X	

Table 18.1-6
New York Breeding Bird Atlas Results And Potential Birds in the Ambrey Pond Reservoir Area

Common Name	Scientific Name	Breeding Bird Atlas Block		Observed on Site	Comment Status
		2000-05	1980-85		
Black-and-white Warbler	*Mniotilta varia*	X	X	X	
Chestnut-sided Warbler	*Dendroica pensylvanica*		X		
Yellow-rumped Warbler*	*Dendroica coronata*				
Black-throated Blue Warbler*	*Dendroica caerulescens*			?	
Prairie Warbler	*Dendroica discolor*		X		
Cerulean Warbler	*Dendroica cerulea*		X		Special Concern
American Redstart	*Setophaga ruticilla*	X	X	X	
Worm-eating Warbler	*Helmitheros vermivorus*		X		
Ovenbird	*Seiurus aurocapilla*	X	X		
Northern Waterthrush	*Seiurus noveboracensis*			X	
Louisiana Waterthrush	*Seiurus motacilla*	X	X		
Common Yellowthroat	*Geothlypis trichas*		X	X	
Hooded Warbler	*Wilsonia citrina*		X		
Canada Warbler*	*Wilsonia canadensis*		X		
Scarlet Tanager	*Piranga olivacea*	X	X		
Eastern Towhee*	*Pipilo erythrophthalmus*	X	X	X	
Chipping Sparrow*	*Spizella passerina*	X	X		
Field Sparrow	*Spizella pusilla*		X		
Song Sparrow*	*Melospiza melodia*	X	X	X	
Swamp Sparrow*	*Melospiza georgiana*	X	X	X	
White-throated Sparrow*	*Zonotrichia albicollis*				
Fox Sparrow*					
Dark-eyed Junco*	*Junco hyemalis*				
Northern Cardinal*	*Cardinalis cardinalis*	X	X	X	
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	X	X		
Indigo Bunting	*Passerina cyanea*	X	X		
Red-winged Blackbird*	*Agelaius phoeniceus*	X	X	X	
Rusty Blackbird*	*Euphagus carolinus*				

Table 18.1-6
New York Breeding Bird Atlas Results And Potential Birds in the Ambrey Pond Reservoir Area

Common Name	Scientific Name	Breeding Bird Atlas Block		Observed on Site	Comment Status
		2000-05	1980-85		
Common Grackle	*Quiscalus quiscula*	X	X	X	
Brown-headed Cowbird	*Molothrus ater*	X	X	X	
Orchard Oriole	*Icterus spurius*		X		
Baltimore Oriole	*Icterus galbula*	X	X		
Purple Finch*	*Carpodacus purpureus*	X			
House Finch	*Carpodacus mexicanus*	X	X		
Pine Siskin	*Carduelis pinus*	X			
American Goldfinch*	*Carduelis tristis*	X	X	X	
House Sparrow*	*Passer domesticus*	X	X		Not Protected
Total		74	85	48	
Total Confirmed		40	58		
Total Probable		21	20		
Total Possible		13	7		

Notes:
* - Species observed during preparation of 1979 DEIS
X – Observed
Source: New York State Breeding Bird Atlas Program Block #5756B (Years 1980-1985 and 2000-2005)

Human activities modified some habitats once present in the Ambrey Pond area. Wetlands created through impoundments and open terrestrial habitats created through agriculture and residential development have increased the amount of edge, open-water or marsh habitat available to bird species, potentially altering the species composition of the area.

Reptiles and Amphibians

According to the New York Herp Atlas (1990-2000) and through on-site observations, approximately 42 species of reptiles and amphibians would be expected to use the Ambrey Pond area. Although the New York Herp Atlas results included a survey area much larger than the Ambrey Pond area alone (i.e., areas within the entire Thiells and Popolopen Lake USGS Quadrangles), suitable habitat exists in the vicinity of the Ambrey Pond area to support a similar diversity of turtles, snakes, frogs and salamanders. Table 18.1-7 lists reptiles and amphibians that occur within the area of the Thiells and Popolopen Lake USGS Quadrangles that have the potential to occur in the Ambrey Pond area.

Painted turtles, American toads, wood, green, and pickerel frogs were observed during the one-day site visit in the Ambrey Pond area. Several common species, such as northern redback salamander, common garter snake, northern water snake, and black rat snakes also have the potential to occur within the area.

Table 18.1-7
New York Herp Atlas Results and Potential Herp Presence in the Ambrey Pond Reservoir Area

Common Name	Scientific Name	Observations © and Possible (P) Reservoir
Salamanders		
Marbled Salamander (SC)	*Ambystoma opacum*	C – B
Jefferson Salamander (SC)	*Ambystoma jeffersonianum*	P
Blue-spotted Salamander (SC)	*Ambystoma laterale*	P
Spotted Salamander	*Ambystoma maculatum*	P
Red-spotted Newt	*Notophthalmus v. viridescens*	P*
Northern Redback Salamander	*Plethodon c. cinereus*	C*
Northern Slimy Salamander	*Plethodon glutinosus*	P
Four-toed Salamander	*Hemidactylium scutatum*	P*
Northern Spring Salamander	*Gyrinophilus p. porphyriticus*	P
Northern Red Salamander	*Pseudotriton r. ruber*	P
Northern Two-lined Salamander	*Eurycea bislineata*	P
Frogs		
Eastern American Toad	*Bufo a. americanus*	C* - B
Fowler's Toad	*Bufo fowleri*	P
Gray Treefrog	*Hyla versicolor*	C – B
Northern Spring Peeper	*Pseudacris c. crucifer*	P
Bullfrog	*Rana catesbeiana*	P
Green Frog	*Rana clamitans melanota*	C
Wood Frog	*Rana sylvatica*	C* - B
Northern Leopard Frog	*Rana pipiens*	P
Southern Leopard Frog (SC)	*Rana sphenocephala utricularius*	P
Pickerel Frog	*Rana palustris*	C*
Turtles		
Common Snapping Turtle	*Chelydra s. serpentina*	P
Common Musk Turtle	*Sternotherus odoratus*	P
Spotted Turtle (SC)	*Clemmys guttata*	P*
Wood Turtle (SC)	*Clemmys insculpta*	P
Eastern Box Turtle (SC)	*Terrapene c. carolina*	P*
Red-eared Slider	*Trachemys scripta elegans*	P
Painted Turtle	*Chrysemys picta*	C*
Lizards		
Five-lined Skink	*Eumeces fasciatus*	P
Snakes		
Northern Water Snake	*Nerodia s. sipedon*	P
Northern Brown Snake	*Storeria d. dekayi*	P
Northern Redbelly Snake	*Storeria o. occipitomaculata*	P
Common Garter Snake	*Thamnophis sirtalis*	C*

Table 18.1-7 (cont'd)
New York Herp Atlas Results and Potential Herp Presence in the Ambrey Pond Reservoir Area

Common Name	Scientific Name	Observations © and Possible (P) Reservoir
Eastern Ribbon Snake	*Thamnophis sauritus*	P
Eastern Hognose Snake (SC)	*Heterodon platirhinos*	P
Northern Ringneck Snake	*Diadophis punctatus edwardsii*	P
Eastern Worm Snake (SC)	*Carphophis a. amoenus*	P
Northern Black Racer	*Coluber c. constrictor*	P
Black Rat Snake	*Elaphe o. obsoleta*	P*
Eastern Milk Snake	*Lampropeltis t. triangulum*	P
Northern Copperhead	*Agkistrodon contortrix mokasen*	P
Timber Rattlesnake (T)	*Crotalus horridus*	P

Notes:
B – Breeding
C - Confirmed on site by HDR
C* - Confirmed on site by HDR and others
P - Possible on site
P* - Found in Ambrey Pond area during preparation of 1979 DEIS
Source: 1990-2000 New York HERP Atlas Program Thiells and Popolopen Lake USGS Quadrangles

Rare, Special Concern, Threatened and Endangered Species

Table 18.1-8 presents a list of rare, special concern, threatened and endangered species identified for the Ambrey Pond area by the NYNHP and USFWS.

Table 18.1-8
Federal and NY State Endangered, Threatened, and Special Concern Species With The Potential To Occur In The Ambrey Pond Reservoir Area

Species	Status	Comments
Mammals		
Allegheny Woodrat	NY-Endangered	Identified in NYNHP file search. No potential on-site habitat; not expected to occur on site; probably extirpated from this area of New York State
Indiana Bat	Federal and NY-Endangered	The New York NHP file search did not indicate the Indiana bat was documented in this area; the USFWS file search results have not been received (may include this species)
Small–footed Bat	NY-Special Concern	Potential Foraging Habitat Present – No Hibernacula Present
Birds		
Cerulean Warbler	NY-Special Concern	Potential Nesting – Identified during 1980-1985 Breeding Bird Atlas/Visitor during Migration-Foraging
Red-shouldered Hawk	NY-Special Concern	Potential Nesting – Identified during 1980-1985 Breeding Bird Atlas/Occasional Visitor - Foraging
Cooper's Hawk	NY-Special Concern	Potential Nesting/Occasional Visitor - Foraging

Table 18.1-8
Federal and NY State Endangered, Threatened, and Special Concern Species With The Potential To Occur In The Ambrey Pond Reservoir Area

Species	Status	Comments
Sharp-shinned Hawk	NY-Special Concern	Identified on Site during the preparation of the 1979 DEIS - Potential nesting/Occasional Visitor - Foraging
Whip-poor-will	NY-Special Concern	Potential Nesting – Identified during 2000-2005 Breeding Bird Atlas/Occasional Visitor - Foraging
Golden-winged Warbler	NY-Special Concern	Potential Nesting – Identified during 1980-1985 Breeding Bird Atlas/Occasional Visitor - Foraging
Reptiles and Amphibians		
Timber Rattlesnake*	NY-Threatened	Identified in New York NHP File Search – Foraging Habitat
Spotted Turtle*	NY-Special Concern	Identified on Site during the preparation of the 1979 DEIS - Potential Habitat Present
Bog Turtle	Federal – Threatened NY - Endangered	USFWS lists this species as potentially occurring in Rockland County.
Wood Turtle*	NY-Special Concern	Not Identified on Site - Potential Habitat Present
Eastern Box Turtle*	NY-Special Concern	Identified on site during the preparation of the 1979 DEIS - Potential Habitat Present
Eastern Worm Snake*	NY-Special Concern	Not Identified on Site - Potential Habitat Present
Eastern Hog-nosed Snake*	NY-Special Concern	Not Identified on Site - Potential Habitat Present
Jefferson Salamander*	NY-Special Concern	Not Identified on Site - Potential Habitat Present
Blue-spotted Salamander*	NY-Special Concern	Not Identified on Site -Potential Habitat Present
Marbled Salamander*	NY-Special Concern	Present during 2008 Site Visit - Confirmed Breeding – Identified in Thiells and Popolopen Lake USGS Map Area During 1990 – 2000 Herp Atlas Program
Southern Leopard Frog*	NY-Special Concern	Not Identified on Site - Potential Habitat Present
Fishes		
Atlantic Sturgeon	Federal – Candidate Species	Although the USFWS lists this species as potentially occurring in Rockland County, it would be expected to occur in the Hudson River only. Habitat not present at project site.
Shortnose Sturgeon	Federal and NY – Endangered	Although the USFWS lists this species as potentially occurring in Rockland County, it would be expected to occur in the Hudson River only. Habitat not present at project site.
Plants		
Small whorled Pogonia	Federal – Threatened NY - Historical	USFWS lists this species as potentially occurring in Rockland County. Habitat is potentially present within the project site.

Note: * Identified in Thiells and/or Popolopen Lake USGS Quadrangle Map Area during the 1990 – 2000 Herp Atlas Program
Sources: NYNHP Letter, USFWS Website – Listed Species By County as of December 2006

While an offical response to a letter request for federally listed species is pending from the US Fish and Wildlife Service (USFWS), USFWS lists the federally threatened or endangered species for Rockland County, NY (USFWS 2008). The list includes one plant (small whorled pogonia), one reptile (bog turtle), one mammal (Indiana bat), and two fish (Atlantic and shortnose sturgeon) species. Bald eagle has recently been delisted, and is no longer protected under the Endangered Species Act, but is listed as threatened by the NYSDEC. Both Atlantic and shortnose sturgeon populations would be restricted to the Hudson River. Therefore, habitat for these species would not be present within the Ambrey Pond area.

Based on existing habitat and known current and former distributions of small whorled pogonia and Indiana bat, an evaluation of the potential presence of these species within the Ambrey Pond area would be warranted prior to any land disturbance associated with the Ambrey Pond Reservoir Alternative. This evaluation would be conducted in coordination with the NYSDEC and the USFWS.

In response to a request for information regarding sensitive species within the Ambrey Pond area, the New York Natural Heritage Program (NYNHP) indicated the potential presence of two vertebrates (Allegheny woodrat and timber rattlesnake) and one ecological community (unique chestnut oak forest); no plant species were identified (NYNHP 2008). In addition to the species listed by NYNHP, other New York State listed species have been recorded in the Ambrey Pond area, including mammals (small-footed bat); birds (whip-poor-will, golden-winged warbler, cerulean warbler, red-shouldered hawk, Cooper's hawk, and sharp-shinned hawk); and reptiles and amphibians (marbled salamander, southern leopard frog, Jefferson salamander, blue-spotted salamanders, spotted turtle, wood turtle, eastern box turtle, hognose snake, and eastern worm snake). Several of these species have been observed during recent or past site visits within the Ambrey Pond area (i.e., marbled salamanders, sharp-shinned hawk, spotted turtle and eastern box turtle), and are thus expected to be present. None of the other NY special concern species are known to have been identified on the Ambrey Pond Reservoir Alternative area.

Currently, the chestnut oak community persists beyond the Ambrey Pond Reservoir Alternative area. Consequently, it is assumed that the chestnut oak forest is not found on the portion of the site that would be inundated by the reservoir and therefore, the Ambrey Pond Reservoir Alternative would not result in significant adverse impacts to this community type. Prior to construction activities, additional field work would be required to verify that this community type does not occur within the area to be flooded by this alternative, and to determine whether inundation of adjacent areas to would alter hydrologic or soil conditions crucial to the persistence of chestnut oak communities outside the Ambrey Pond Reservoir Alternative site.

The Ambrey Pond area is near several known timber rattlesnake den sites. The Ambrey Pond site does not appear to contain substantial den or basking habitat, but does appear to offer suitable timber rattlesnake foraging habitat. A site previously occupied by the endangered Allegheny woodrat was identified adjacent to the Ambrey Pond area. There has been no recent documentation that this site is currently occupied by woodrats.

The following sections provide a detailed discussion of the endangered or threatened species, or species of special concern, with the potential to occur within the Ambrey Pond Reservoir Alternative area. In terms of federal and state rare, special concern, threatened and endangered species, the Ambrey Pond Reservoir Alternative would not likely have significant adverse impacts on any listed species, as discussed below.

Endangered Wildlife Species

Indiana Bat – The Indiana Bat is a small flying mammal endemic to the central portion of the United States, from Vermont to Illinois, Missouri, and Arkansas. Its range extends south as far as Alabama and northern Florida. In New York, it is a year-round resident hibernating in tight clusters with other Indiana bats in mines and caves with suitable conditions (moisture and temperature) from late September-October to April-early May. Its winter distribution appears limited to eight known hibernacula in Albany, Essex, Warren, Jefferson, Onondaga, and Ulster Counties (Hicks and Novak 2002). Upon leaving their hibernacula, individuals disperse widely to roosting and foraging habitats. The nearest known hibernacula are in Ulster County north of the Ambrey Pond area. The Ambrey Pond Reservoir Alternative area would be well within range of this species when dispersing from this hibernacula. In spring, Indiana bats (males and females) disperse from their hibernacula and some move hundreds of miles to summer foraging areas where they feed solely on flying insects. Indiana bats roost under the loose bark or fractures of dead trees, in fractures or cracks of live trees, under the bark of live shagbark hickory and in bark crevices of black locust trees (NYSDEC/USFWS 2006). Roost trees are more often on or near the forest edge. Those that occur in the forest interior usually have some increased solar exposure (e.g., forest opening adjacent to the roost tree). The gravid females often congregate in maternity/nursery colonies in forested habitat where the roost site is warmed by solar heating. Some maternity colonies may contain from 50 to 100 females and the females appear to utilize the same general roosting area (within a few miles) each year. A single young is born to each female around late June and can fly within a month. The adults and their young return to the same hibernacula in late summer. In late August or early September, Indiana bats swarm at the entrance of selected caves or mines and mate. The females store sperm and their eggs are fertilized the following spring. Some Indiana bats hibernating at hibernaculas in Ulster County were equipped with transmitters and found to disperse to summer range primarily in Orange County west of the Hudson Highlands and in the southwest quarter of Dutchess County, New York (NYSDEC/ USFWS 2006).

Allegheny Woodrat – This small rodent is predominantly found in remote rocky habitats, such as cliffs, boulder fields and caves. The typical woodrat diet includes leaves, berries, nuts and fungi. Allegheny woodrats were common throughout New York as far north as Albany as recently as the mid 1960's. It is important to note that, by the 1970's, the species was in noticeable decline within New York State, potentially due to the reduction of forested habitat due to development, the reduction of American chestnut populations (believed to be a major food source of woodrats), and a parasite (*Balyisascaris procyonis*) commonly contracted from the consumption of undigested seeds found in raccoon feces (Pennsylvania Game Commision 2008). As a result, it is believed that the Allegheny Woodrat may be extirpated from New York State.

Small whorled pogonia – Small whorled pogonia are found in acidic soils, slopes of 8 to 22 percent, in dry to mesic second-growth, deciduous or deciduous-coniferous forests in second-or third-growth successional stages; typically with light to moderate leaf litter, an open herb layer (occasionally dense ferns), moderate to light shrub layer, and relatively open canopy.[1]

[1]See http://www.natureserve.org/explorer/servlet/NatureServe?searchName=ISOTRIA+MEDEOLOIDES, and http://www.centerforplantconservation.org/ASP/CPC_ViewProfile.asp?CPCNum=2350#Distribution

The Ambrey Pond Reservoir Alternative would not be expected to result in significant adverse impacts to endangered wildlife species. No caves, mines or other rocky habitats capable of supporting Allegheny woodrats or hibernating Indiana bats are present on-site; however, targeted surveys for these species would be required to assess potential impacts of the proposed project. Post-construction, the reservoir would potentially provide additional foraging and roosting habitat for Indiana bat, and the remaining live and dead trees along and near the shoreline surrounding the reservoir would also provide some potential foraging and roosting habitat.

The Ambrey Pond Reservoir Alternative may also have an impact on small whorled pogonia populations, if any exist in the project area. Targeted surveys for this species conducted prior to construction activities, and in consultation with USFWS and NYSDEC, would be required to adequately assess potential impacts of the proposed project on small whorled pogonia.

Threatened Wildlife Species

Bald Eagle – The Bald Eagle is a large raptor that preys primarily on fish. It would, on occasion, also feed on waterfowl, medium sized mammals, and carrion. Bald Eagles were nearly extirpated from North America in the 1960s and 1970s as a result of DDT use. Populations in New York are now recovering and the lower Hudson River valley has become an increasingly favored wintering location. During this period, eagles generally congregate along the shore of the Hudson River where the open waters throughout most of the winter provide access to a supply of fish. Bald eagles would occasionally congregate along the shores of Rockland's inland lakes and reservoirs until the surface freezes over entirely.

The Ambrey Pond Reservoir Alternative has the potential to positively impact the state-listed threatened bald eagle, which overwinter along inland lake shores during the winter.

Timber Rattlesnake – Timber Rattlesnakes generally emerge from their overwintering dens in late April at which time they are lethargic and do not venture far from the den site. As temperatures warm, they disperse, migrating as far as 4.5 miles from the den for feeding. They generally prefer rugged terrain within deciduous forests. Gravid females seek open, rocky ledges gestation sites while non-gravid females and males prefer cooler, thicker woods. Females generally give birth in late August to mid-September. By November the snakes have typically returned to their den sites.

The Ambrey Pond area is within the home range of known timber rattlesnake dens, and individuals have been observed near the Ambrey Pond area. While the Ambrey Pond Reservoir Alternative has the potential to result in the loss of possible breeding and foraging habitat for the timber rattlesnake, the loss of these areas would not be expected to result in significant adverse impacts to regional populations of this species. Suitable breeding habitat (i.e., rugged terrain in deciduous forest habitat) does not appear to be as prevalent within the project site as in adjacent state park lands. Similar foraging habitat also exists for foraging timber rattlesnakes in adjacent areas. Additional consultation with the USFWS and NYSDEC will be conducted with respect to this species prior to the initiation of any construction activities.

Special Concern Species

Small-footed Bat – Relatively little is known about this small, insectivorous bat. It is found in small numbers throughout the northeastern United States. During the summer they roost in small clusters in buildings, towers, hollow trees, under loose tree bark, in cliff crevices, and beneath bridges. During the winter they move into caves and abandoned mines.

Cooper's Hawk – Cooper's Hawk is a medium sized predator of deciduous, mixed, and coniferous forests. It feeds principally on medium sized birds such as starlings, robins, and jays. Most breeding occurs in forests of northern United States and southern Canada but on rare occasions it would nest in the forested areas of Rockland County. Cooper's Hawk is commonly seen during spring and fall migration, however, some individuals would overwinter in Rockland County. During the winter it is often found in close proximity to residential areas with bird feeders.

Sharp-shinned Hawk – Like the Cooper's Hawk, the Sharp-shinned Hawk is a forest hunter. Associated with its smaller size, it focuses on smaller prey than the Cooper's, usually small birds, insects, and small mammals. Sharp-shinned Hawks breed from Maritime Canada to Alaska; it is an uncommon breeder in Rockland County.

Whip-poor-will – The whip-poor-will is a medium sized, nocturnal bird that specializes in feeding on night-insects. It typically inhabits dry, open woodlands with little underbrush, usually deciduous forests but occasionally mixed coniferous forests. This species breeds throughout most of the eastern United States as well as portions of southern Canada, southwestern US, Mexico, and into Central America. It builds no nest, but instead lays its eggs on leaf litter directly on the forest floor. Whip-poor-will were common breeders in Rockland county until at least the early 1940s. Thereafter, there numbers declined substantially. Major threats in the eastern US are from fire suppression (with attendant growth of underbrush), forest fragmentation, and gypsy moth control. This species may have declined along with numerous other species in Rockland County from the DDT spraying for gypsy moth in 1957 (Deed 1979).

In the 2000-2005 Breeding Bird Atlas the species was listed as a probable breeder from block 5756B, the block that includes the Ambrey Pond area. At least one bird was heard calling in the vicinity of Camp Addison Boyce on more than one occasion during breeding season. An additional observation was recorded near Tomkins Lake several days prior to the Ambrey Pond report (report was filed with NYSDEC Atlas 2000 committee). Based on these records, whip-poor-wills have the potential to breed in the Ambrey Pond area.

Golden-winged Warbler – This neotropical migrant occurs seasonally in Rockland County and is a confirmed breeder in appropriate habitats. Golden-winged Warblers specializes in early successional habitats, such as old fields, power line corridors, stream borders, alder and spruce/tamarack bogs, for nesting. These habitats generally do not last long until they are replaced by later successional vegetation. Blue-winged Warbler, which prefer the later stages of succession, frequently move into the area and would hybridize with the Golden-winged Warbler.

In the 1980-1985 NYSDEC Breeding Bird Atlas, Golden-winged Warbler was observed on several occasions and was considered a possible breeder in Block 5756B (the block including Ambrey Pond). It was not observed in the block during the 2000-2005 survey but is known from several surrounding blocks. Based on the recent site visit, a small amount of early successional habitat still exists but no golden-winged warbler were observed.

Cerulean Warbler – Like the golden-winged warbler, the Cerulean warbler is a neotropical migrant that occurs seasonally in Rockland County. Unlike the Golden-winged, the Cerulean prefers mature deciduous trees and an open understory, such as wet bottomlands and dry slopes. Cerulean populations are declining precipitously from a series of threats, including loss of mature deciduous forest, especially along stream valleys, fragmentation of remaining forests,

loss of key tree species due to disease, and nest parasitism by Brown-headed Cowbird, human disturbances in their South American wintering habitat.

In the 1980-1985 NYSDEC Breeding Bird Atlas, Cerulean warbler was observed on several occasions and was considered a possible breeder in Block 5756B (the block including Ambrey Pond). It was not observed in the block during the 2000-2005 survey. The closest known breeding site is at Doodletown, Bear Mountain State Park, less than 3 miles to the northeast.

Eastern Box Turtle – The eastern box turtle was once common in the deciduous forests throughout Rockland County. In recent years, it has become scarce likely due to development. The box turtle is a terrestrial species of open woodlands, pastures, marshy meadows, borders of woodland swamps, and other wet areas. During warmer periods they seek shade or aestivate under leaf litter. The diet includes berries, mushrooms, and a variety of invertebrates. Egg laying typically takes place during May to July with hatchlings spending most of their time under forest debris. During winter, they may burrow into loose soil, sand, leaf litter, mud or seek refuge in natural holes or burrows of other animals.

Spotted Turtle – spotted turtles use a variety of habitats including vernal pools, forested uplands, wet meadows, wetlands and ponds. They prefer shallow clear waters with soft substrates. Spotted turtles hibernate in root crevices, muskrat burrows, beaver lodges and burrows, holes, and other situations providing wet conditions with cover and freeze protection. They nest in sedge tussocks, sphagnum moss, loamy soils in areas with exposure to sun. Nesting habitat may be several hundred meters from their aquatic habitat or hibernacula (Gibbs et. al. 2007).

Wood Turtle – The wood turtle requires both terrestrial and aquatic habitats. During spring and fall, wood turtles spend considerable time in wetland habitats. They prefer clear, moving waters with gravel or hard bottom but occasionally they can be found in other areas such as swamps and bogs. During the summer, terrestrial areas are used more extensively. Hibernation usually occurs in flowing streams, creeks, and non-freezing water bodies from November through March. Like box turtles, they feed on berries, mushrooms, and a variety of invertebrates.

Eastern Worm Snake – Eastern worm snakes are a secretive species of moist forests where they are often found near streams, under debris, or in leaf litter. They also occur in drier forests. Because they are small and susceptible to water loss, they select wet habitats and burrow into the soil during the hotter months. Females lay eggs in rotting logs and stumps or in accumulations of woody material during late June to early July. Hatching occurs in August or early September.

Eastern Hog-nosed Snake – Eastern hog-nosed snakes occur on hillsides with open deciduous forest and fields preferring well drained sandy and loamy soils (Gibbs et. al. 2007). They occasionally occur in and around marshes and forested bottomlands. Their preferred prey are toads. Females lay eggs in loose soil or rotting wood during June or early July. Eggs hatch by late September or October. They hibernate in small mammal burrows, under rocky areas and under old decaying stumps and logs.

Marbled Salamander – The marbled salamander is a largely fossorial species found in damp woodlands through most of the eastern United States, including Long Island and southeastern New York. It is, however, relatively uncommon in New York. Unlike other members of its family, the marbled salamander breeds only in dried up pools, ponds, and ditches. The females

lay their eggs in the fall, placing them under fallen leaves. The eggs then hatch after the ponds refill in the spring. This strategy reduces predation by ensuring a fishless environment.

Jefferson Salamander – The Jefferson Salamander is also a fossorial species found in large tracts of upland deciduous and mixed forest with stumps and logs (Gibbs et. al. 2007). They use subsurface habitat traveling through small mammal burrows and other tunnels and crevices in the soil as well as crevices and open areas under and in logs and stumps. In late winter (around March) they breed in temporary pools and semi- permanent wetlands within or near forests.

Blue-spotted Salamander – The blue-spotted salamander is similar to the Jefferson salamander preferring slightly moister deciduous and mixed forest providing temporary pools as well as cover (stumps and logs); these habitats often include floodplains (Gibbs et. al. 2007). They are primarily fossorial and breed during early spring (March to April) in temporary pools and seasonally flooded wetlands/floodplains within or near forests.

Southern Leopard Frog – Southern leopard frog is an aquatic species found in permanent and semi-permanent wetlands. During the summer, they prefer vegetated and weedy areas with shade often away from water. Breeding occurs within the period of March to June in shallow water and the hatched larvae use dense vegetation as cover (Gibbs et. al. 2007).

Suitable habitat for several special concern species exists within the Ambrey Pond area. Forest habitat supporting Cooper's and sharp-shinned hawks, and cerulean and golden-winged warblers is present within the Ambrey Pond area. Heterogeneous forest-wetland habitat assemblages required by spotted, wood and eastern box turtles, eastern hog-nosed and eastern wood snakes, marbled, Jefferson, and blue-spotted salamanders, and southern leopard frog suggest that each species has the potential to be present within upland and marsh habitats of the Ambrey Pond area. Flooding would remove habitats required by these species for reproduction and foraging, result in direct mortality of individuals if flooding of overwintering habitat occurs during periods of seasonal inactivity (i.e., hibernation, torpor), and have the potential to result in increased predation of amphibian larvae and adults by open-water fish species (i.e., bass, pickerel).

As noted above, many of the mammal and bird species of special concern are mobile and would be expected emigrate to suitable habitats available nearby, particularly within the nearby Harriman-Bear Mountain State Parks, if the reservoir is flooded incrementally as planned. The loss of some individuals of these species unable to find suitable available habitat nearby would not be expected to result in significant adverse impacts to populations of these species. However, the Ambrey Pond Reservoir Alternative has the potential to result in unavoidable adverse impacts to less mobile reptile and amphibian species of special concern discussed above. Additional consultation with NYSDEC will be conducted with respect to these species prior to the initiation of any construction activities.

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