Hudsonia
a nonprofit institute

PO Box 5000, Annandale, NY 12504-5000
Phone: (845) 758-7053
Fax: (845) 758-7033

RECOMMENDATIONS FOR POSSIBLE REVISIONS TO CRITICAL ENVIRONMENTAL AREAS, TOWN OF STANFORD

Gretchen Stevens
26 March 2025

A Critical Environmental Area (CEA) is a geographic area with exceptional character with respect to one or more of the following:

- a benefit or threat to human health;
- a natural setting such as fish and wildlife habitat, forest and vegetation, open space, and areas of important aesthetic or scenic quality;
- an inherent ecological, geological, or hydrological sensitivity that may be adversely affected by any change (6 NYCRR 617.14[g]).

A CEA is identified and delineated by the municipality and adopted by the municipal legislative body, and then registered with the State of New York. The CEA designation carries no land use restrictions, but simply raises awareness about the important features contained within the CEA—such as wildlife habitat, water resources, unusual landforms, or scenic vistas—and requires consideration of potential impacts to the quality of those features when a major new land use or other action (such as new legislation) is contemplated.

The Town of Stanford has six CEAs that were established in 1987 and 1992: Bontecou Lake, Buttercup Farm, Millbrook Meadows, Ryder Pond/Cagney Marsh, Snake Hill, and Upper Wappinger (Figure 1).

Among the recommendations in the 2023 Stanford Comprehensive Plan are to:

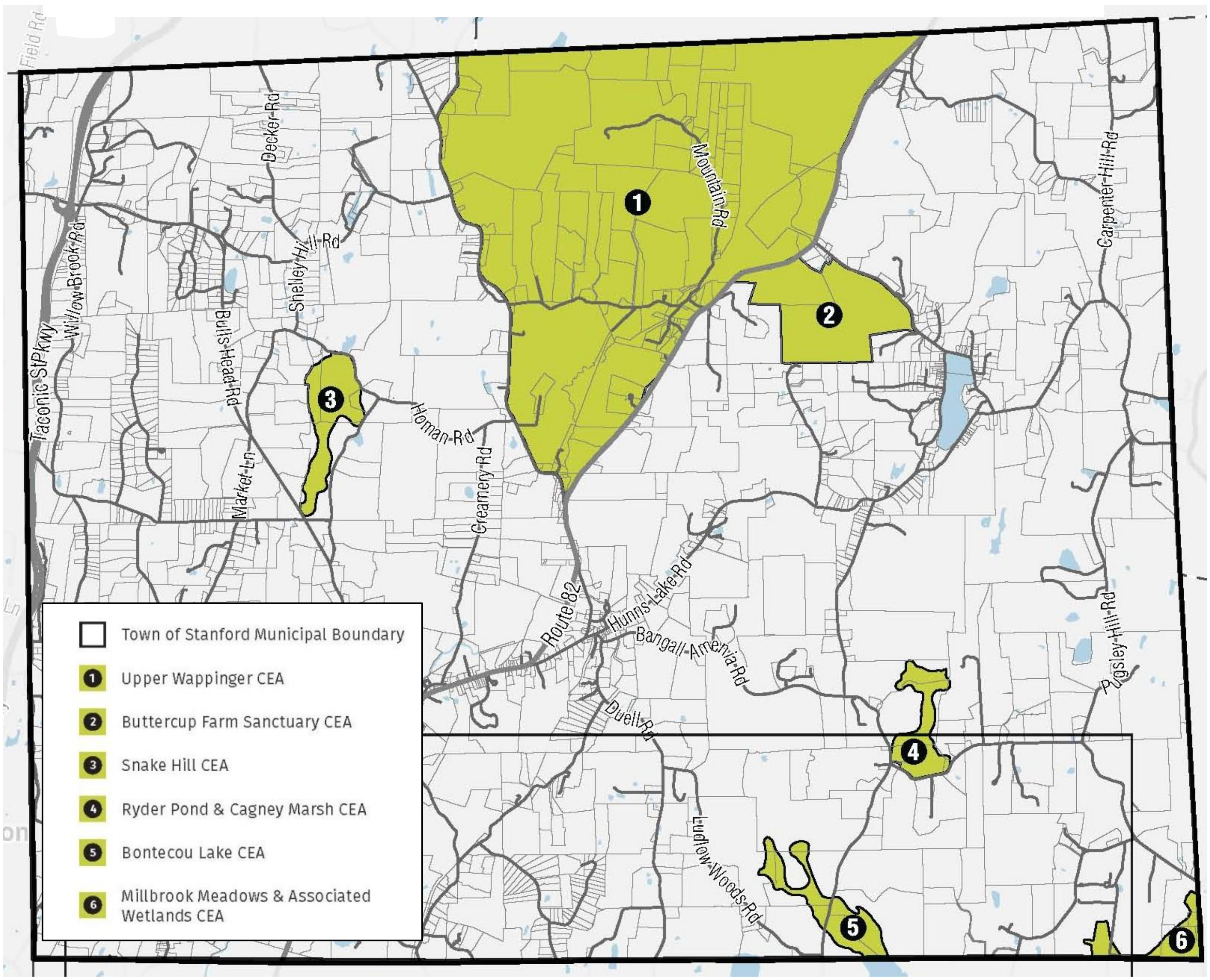
- "Consider expanding several existing CEA's including Snake Hill and Millbrook Meadow to include the surrounding Priority Conservation Areas identified by Hudsonia, Ltd;
- Consider designating additional CEAs including: Shaw Pond, Stanford Wildlife Preserve, Whitlock Preserve, the Town Landfill area, and once determined, the potential wellhead protection area (see chapter 6, page 117);…"

At the request of the Stanford Conservation Advisory Council, Hudsonia has reviewed three of Stanford's existing CEAs, and five of the Priority Conservation Areas (PCAs) that were delineated and described by Hudsonia in the report titled *Significant Habitats in the Town of Stanford, Dutchess County, New York* (Bell et al. 2005). We did not look at the Stanford Wildlife Preserve, the Whitlock Preserve or the town landfill site as they were not in the vicinities of the Priority Conservation Areas.

We reviewed the CEA and PCA boundaries and habitats, changes in the landscape, and new information about species, habitats, and conservation status of the land. Below are descriptions of the land areas and explanations of our recommendations, which include maintaining the existing configuration of one CEA (Ryder Pond/Cagney Marsh), expanding two others (Millbrook Meadows, Snake Hill), and creating one new CEA (Lower Wappinger Creek). The habitats mentioned below are described in the Hudsonia *Significant Habitats* report (Bell et al. 2005).

If the town decides to move ahead with one or more of the recommended changes, a "justification" document must be prepared for each new or altered CEA, and each CEA must be individually adopted by the town and registered with New York State. The descriptions, threats, and recommendations sections, below, for the Millbrook Marsh, Snake Hill, and Lower Wappinger Creek CEAs are designed to be easily extracted from this report to create a justification document for each CEA.

Figure 1. Existing Critical Environmental Areas (CEAs) in the Town of Stanford, as shown in the 2023 Stanford Comprehensive Plan.



RYDER POND/CAGNEY MARSH CEA

Ryder Pond and Cagney Marsh are state-regulated wetlands MB-7 and PP-46 in the Wappinger Creek drainage. The Ryder Pond and Cagney Marsh Critical Environmental Area was established in 1987 to draw attention to the valuable waterfowl habitat provided by the two wetlands. The CEA is approximately 116 acres delineated around the two wetlands and a narrow forested corridor between them (Figure 2).

Ryder Pond (42 ac) is a circumneutral bog lake, a rare habitat in the region. Circumneutral bog lakes sometimes support uncommon and rare species of plants and animals (see Bell et al. 2005 for a general description). The lakes are fed in part by springs, and are quite sensitive to water pollution and other kinds of disturbance. Pied-billed grebe, king rail, American bittern, and wood duck are known to use Ryder Pond, and bald eagle has nested there. All are New York State Species of Greatest Conservation Need. Cagney Marsh (24 acres), which may also be a circumneutral bog lake, is bordered by a marsh and hardwood swamp at the eastern end.

The Ryder Pond Priority Conservation Area (PCA) encompasses the entire CEA, most but not all of the entire watersheds of the two wetlands, and areas north, east, and west that include forests, hayfields, cropfields, at least two vernal pools, and several other small wetlands (Figure 2). The forests and wetlands of the PCA provide potential habitat for waterfowl, wading birds, river otter, Blanding's turtle (NYS Threatened), spotted turtle (NYS Special Concern), northern cricket frog (NYS Endangered), and pool-breeding amphibians. The north and south forests have large areas of "core" forest—those areas that are more than 300 feet from the forest edge which are likely to serve the needs of forest-interior wildlife. Two small streams flow north to join (offsite) a tributary to Hunns Lake Creek.

Nearly all of the existing Ryder Pond/Cagney Marsh CEA, the Ryder Pond PCA, and the watersheds of the two wetlands are on properties with conservation easements held by the Dutchess Land Conservancy (Figure 2). This is part of an area of over 12,000 contiguous acres of land with DLC conservation easements and also including the ca. 1250-acre Jesse and Gayle Bontecou Wildlife Conservation Preserve which is owned by the DLC and has a conservation easement held by the Scenic Hudson Land Trust. Although we do not know the requirements and restrictions of the easements, we assume that they provide significant protections to the land in perpetuity. Adding a CEA designation may have little practical effect on the treatment of land that is already substantially conserved. For that reason, we recommend keeping the Ryder Pond/Cagney Marsh CEA in its current configuration.

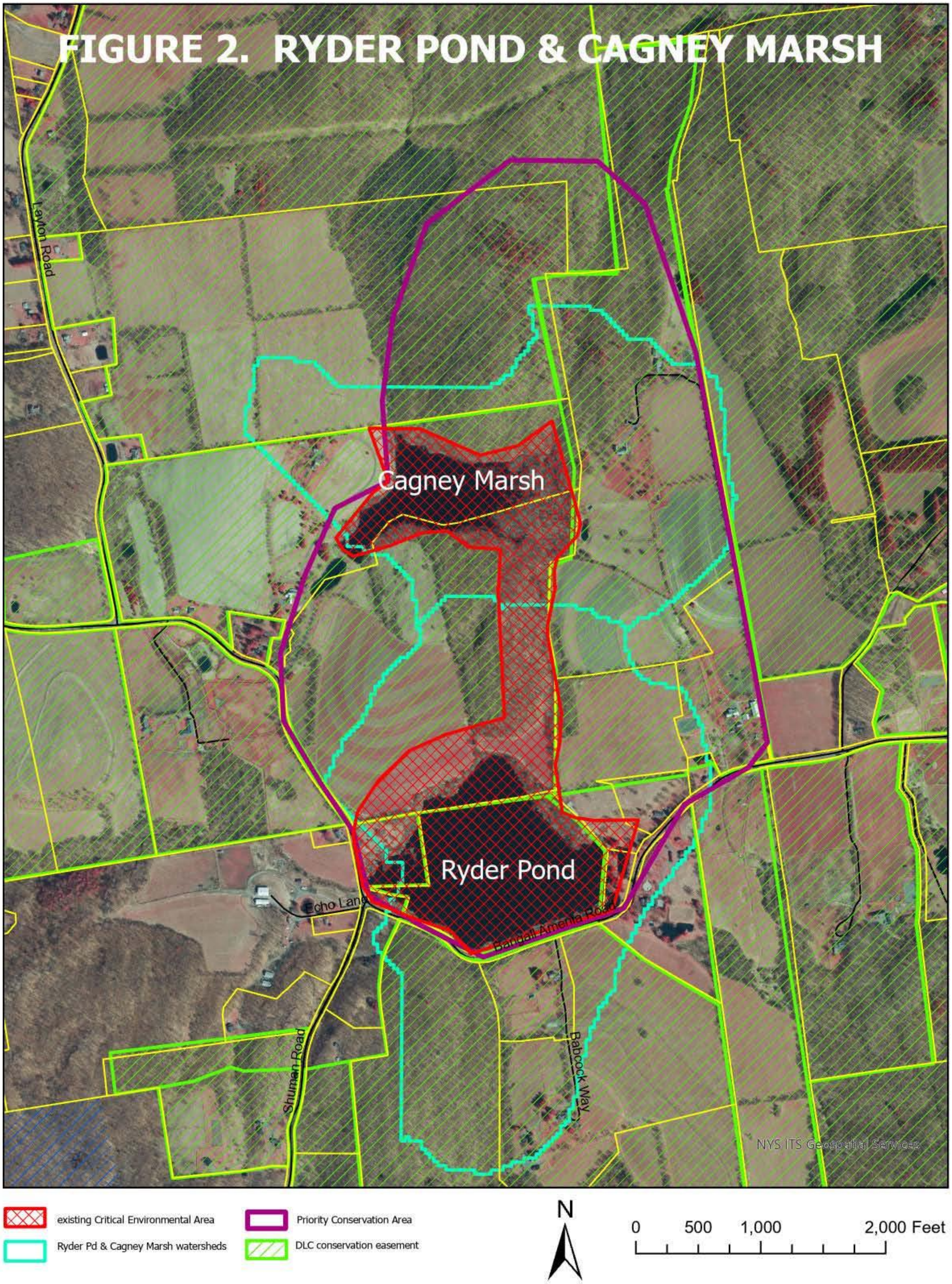


FIGURE 2. RYDER POND & CAGNEY MARSH

MILLBROOK MEADOWS CEA

Description

The Millbrook Meadows Critical Environmental Area was established in 1987 to draw attention to the Millbrook Marsh, a large wetland in the Wassaic Creek drainage that straddles the boundary between the towns of Stanford and Washington. The CEA is delineated fairly closely around the perimeter of the Stanford portion of the wetland in the vicinity of the Millbrook School in the southeast corner of the town. The CEA includes marsh, wet meadow, calcareous wet meadow, fen, and hardwood swamp and also has upland meadow and forest areas that serve as a buffer zone for the wetland.

The Stanford portions of Millbrook Marsh are part of state-regulated wetlands AM-6 and AM-31. The wetland has been identified as an Area of Known Importance for rare wetland animals by the New York Natural Heritage Program. There are historical records of the regionally-rare bronze copper, Dion skipper, and common moorhen, and American bittern (NYS Special Concern), and all may still occur there. Brook trout are known to use perennial streams of the wetland, and the Wassaic Creek and a tributary flowing through the marsh have been designated "trout waters" and "trout spawning waters" by NYSDEC. Spotted turtle and wood turtle are known to occur in and near Millbrook Marsh.

The Millbrook Marsh Priority Conservation Area (PCA) identified in Bell et al. (2005) encompasses the entire Millbrook Meadows CEA and additional areas of wetland, stream, forest, and meadow extending west nearly to Leavitt Road and north about 1.1 miles from the Washington town boundary. The PCA is also adjacent to a "Millbrook Marsh Priority Conservation Area" delineated in the Town of Washington by Hudsonia (Bell and Stevens 2006).

The watershed of the Millbrook Marsh is immense—11 square miles (29 km^2). Although we would be inclined to recommend that the entire watershed of an important wetland be included in a CEA, the size of this watershed makes that impractical in this case. Large areas of land near the existing CEA and within the Millbrook Marsh watershed are in parcels with DLC conservation easements, and are part of over 12,000-acre area of contiguous lands with DLC conservation easements. Including those already-conserved areas within an expanded CEA would probably have little or no practical value. We recommend a modest expansion of the CEA that encompasses areas of forests and streams adjacent to the existing CEA that are not on eased land parcels. These areas may have a large influence on the wetland and stream habitats of the Millbrook Marsh in addition to significant habitat values in their own right. The recommended expansion area (Figure 3) was drawn to exclude the most intensively developed areas of the Millbrook School.

Much of the forest of the western lobe of the proposed expansion area is "core" forest—that is, a forest area more than 300 feet from the forest edge. The upland and swamp forests of the western lobe provide valuable habitat themselves and also help to protect the tributary stream, designated a trout spawning stream by NYSDEC. That designation indicates that the stream may have the cool, clear, well-oxygenated water and the unsilted, gravelly substrate that trout require for successful reproduction. If the stream is used by wood turtle, the forests and meadows of the western lobe may provide foraging and nesting habitat for the turtles. A small intermittent woodland pool in the western lobe may support pool-breeding amphibians for which the upland forest would provide year-round habitat outside of the breeding season.

Threats

- **Habitat fragmentation:** Dividing large, contiguous areas of unfragmented habitat into smaller areas by roads, driveways, yards, utility corridors, and other such features disrupts the movement patterns of wildlife, introduces barriers and lethal and sub-lethal hazards for migrating animals, eliminates suitable habitat for area-sensitive wildlife, and increases the potential for infestations of non-native invasive plant species. Fragmenting features are hazardous to many kinds of wildlife, including turtles such as the Blanding's turtle, spotted turtle, and wood turtle that need to move between wetlands, streams and uplands to reach foraging, nesting, resting, drought refuge, and overwintering habitats.
- **Forest fragmentation** by roads, driveways, yards, utility corridors, and buildings divides the forests into smaller blocks that may be unsuitable for area-sensitive wildlife species—such as nesting songbirds of forest interiors and mammals that require large habitat areas and are sensitive to human contact or disturbances. Fragmentation of core forests makes the (formerly) deep interior forest areas newly accessible to songbird nest predators (such as raccoons and domestic cats) and to brood parasites (such as the brown-headed cowbird) whose activities are more concentrated in open areas and forest edges. Roads and other developed areas dividing forests can also act as significant barriers and hazards to wildlife movement, and many animals avoid breeding near human activities. Forests in the vicinity of intermittent woodland pools (vernal pools) are an essential part of the habitat complex required by pool-breeding amphibians that use the pools for breeding and nursery habitat but spend the rest of their lives in the surrounding forest. Roads, driveways, and other fragmenting features pose barriers and lethal hazards to those amphibians during their seasonal migrations between breeding and non-breeding habitats.
- **Forest loss:** Intact forests promote groundwater recharge, supply clean water to streams and wetlands, and provide high-quality habitats for wildlife, in addition to storing large amounts of carbon in the vegetation and soils and helping to moderate local air temperatures. Clearing of forests reduces those functions and services. Clearing of forests along streambanks and at the perimeters of wetlands and ponds reduces shade and often leads to increased water temperatures and streambank erosion. Clearing in floodplains may also reduce the capability of the floodplain to absorb and slow floodwaters.
- **Compaction and other disturbance of the forest floor** (as by large equipment) damages the soil structure, and reduces the capability of the soils to absorb rainwater and snowmelt. It can also harm amphibians, small mammals, and the diverse soil invertebrates and microbes that support a healthy and resilient forest community.
- **Cutting of trees and shrubs** during the nesting season (e.g., spring through mid-summer) disrupts the activities of nesting songbirds, raptors, and other tree-dependent wildlife, and cutting trees during the period April through October can disrupt roosting bats.
- **Meadow management:** The habitat values of meadows depend in part on their size and shape and on how they are managed. Intensive cultivation of crops, although sometimes important for economically successful agriculture, significantly reduces the habitat values for native wildlife and plants. The timing of hayfield mowing has large consequences for grassland breeding birds,

pollinating insects, and other wildlife. Use of fertilizers and pesticides can pollute soils and groundwater as well as nearby wetlands and streams.

- **Loss or degradation of streams**: Small streams provide valuable aquatic habitats that are not duplicated by larger streams, and are also important sources of water, organic materials, and organisms for larger downstream waters. Loss or degradation of small streams can mean significant losses for local biodiversity. Disruption of stream flows, channelizing, pollution, or siltation of streams from roads, driveways, yards, or agricultural uses can render them unsuitable for trout, wood turtle, salamanders, and many other stream organisms. Pollution can arrive in streams as direct discharge or in sheet or channelized runoff from agricultural fields or lawns carrying fertilizers and pesticides that degrade the quality of water and habitats, and harm non-target plants, animals, fungi, and soil microbes that support ecosystem functions. Culverts that are perched above the stream substrate can disrupt the upstream and downstream movement of aquatic animals.
- **Impervious surfaces**: Roads, driveways, parking lots, roofs, and other impervious surfaces (including compacted soils) prevent infiltration of rainwater and snowmelt to the soils and lead to rapid runoff of surface water, soil erosion, siltation of streams, elevated stream water temperatures, and reduced groundwater recharge. Impervious surfaces are often sources of contamination of surface water or groundwater—e.g., from de-icing salts, petroleum hydrocarbons, and heavy metals.
- **Water withdrawals**: Direct water withdrawals from a stream, or over-extraction of groundwater can deplete water volumes of streams and wetlands, and adversely affect the wetland and stream biota which depend on normal seasonal volumes and flow patterns.

Recommendations

Below are recommendations for actions that would help to protect the habitats of an expanded Millbrook Meadows CEA and the benefits they provide to the ecosystem and to the human community. Many of these recommendations can be applied when landowners or town agencies are in the early stages of planning or reviewing new land uses or land development within the CEA, or when the town is considering new land use legislation.

- **Avoid fragmenting complexes of upland and wetland habitats** to protect habitat for area-sensitive species and protect safe travelways for wildlife. If new development is planned, **locate driveways and structures at edges instead of interiors of habitat areas.**
- **Avoid fragmenting large forests** with new roads, driveways, yards, utility corridors, and other developed features. Maintain a large area of forest around the intermittent woodland pool in the western lobe.
- **Locate any new development distant from streams and at the edges of forests or meadows** (instead of the interiors) to protect the stream habitats and water quality and to keep the terrestrial habitat interiors intact as much as possible.
- **Maintain forests** with undisturbed forest vegetation and forest floors as much as possible.

- **Explore meadow management techniques** that support native wildlife, such as grassland breeding birds (for large meadows), insects, and small mammals.
- **Avoid or minimize disturbance of soils and vegetation** within 200 feet of a stream, woodland pool, or wetland to help maintain cool water temperatures, reduce pollution, prevent erosion, protect wildlife habitat, and shield wildlife from human activities.
- **Avoid or minimize applications of de-icing salts, fertilizers, and pesticides** throughout the CEA to avoid pollution of soils, wetlands, ponds, streams, and groundwater.
- **Prevent over-extraction of streamwater or groundwater**.

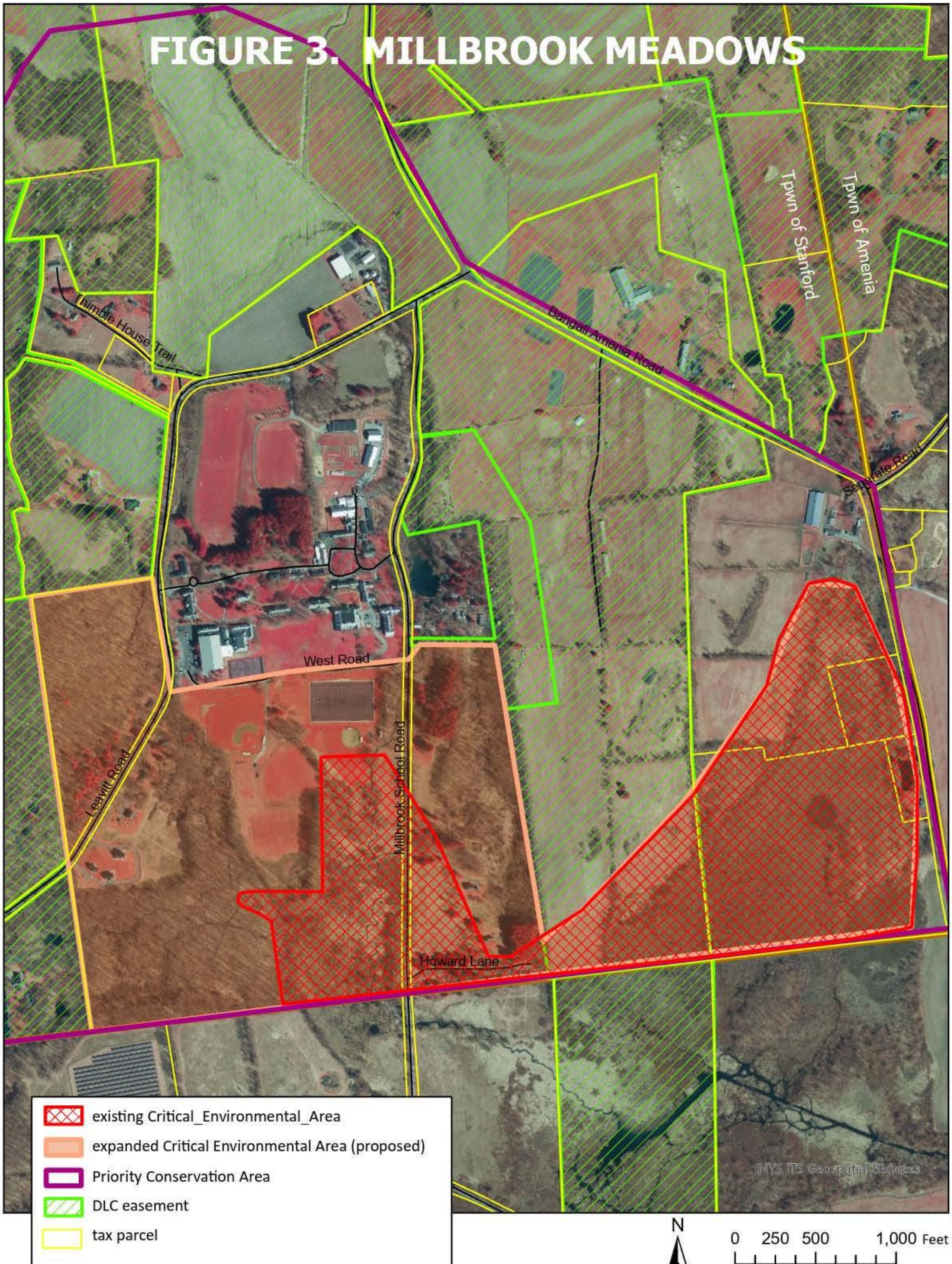


FIGURE 3. MILLBROOK MEADOWS
Thimble House Trail
Bangall Amenia Road
Tpwn of Stanford
Tpwn of Amenia
Separate Road
West Road
Leavitt Road
Millbrook School Road
Howard Lane
NYS ITS Geospatial Services
existing Critical_Environmental_Area
expanded Critical Environmental Area (proposed)
Priority Conservation Area
DLC easement
tax parcel
N
0 250 500 1,000 Feet

SNAKE HILL CEA

The Snake Hill CEA was designated in 1987 because of the known occurrence of rare plants and rare animal communities in the vicinity. At ca. 154 acres, the CEA encompasses Snake Hill—a north-south-oriented ridge—and lowland areas west, east, and south of the ridge (Figure 4). Snake Hill is forested. The two state-regulated wetlands (PP-53 and PP-56) that flank both sides of the hill are complexes of hardwood swamps and wet meadows drained by south-flowing streams. The larger of the streams is dammed to form a 1.3-acre constructed pond south of the hill. Below the pond, the stream flows in a dug channel through a large hayfield and is joined by two other small streams before flowing through a wet meadow/hardwood swamp complex at the south end of the CEA. The mainstem of this stream network—an unnamed tributary to Wappinger Creek—is classified as a trout spawning stream by NYSDEC and has a floodplain of variable width that reaches over 500 feet in places. One of the two smaller streams issues at the above-ground "resurgence" of water captured in a "swallow hole" located ca. 950 ft (290 m)to the northeast, east of Bowen Road (outside the CEA). A swallow hole is a geologists' term for a place where surface water drops underground into a limestone solution cavity, and the resurgence is where it re-emerges at the ground surface.

The Homan-Bowen Road Priority Conservation Area (PCA) identified by Hudsonia in the *Significant Habitats* report (Bell et al. 2005) encompasses most of the Snake Hill CEA (Figure 4) and a much larger adjacent area. The PCA includes land running south ca. 2.7 miles from the Cold Spring Road/Shelley Hill Road junction, and bounded on the east by Cold Spring and Creamery roads, on the west by a portion of Shelley Hill Road; much of the western boundary lies somewhat east of Shelley Hill and Bulls Head roads.

The PCA encompasses two large areas of roadless forest, five buttonbush pools, at least 45 intermittent woodland pools (vernal pools) and isolated swamps, in addition to red cedar woodlands, shrublands, oldfields, and hayfields and other active farmland. The ecological values of these kinds of habitats are described in the *Significant Habitats* report. The PCA also includes the swallow hole (described above) that feeds one of the streams in the existing Snake Hill CEA.

Just south of Homan Road is a large area of shrubland (50+ acre) that may be suitable habitat for the New England cottontail (NYS High Priority Species of Greatest Conservation Need) now or in the future. The buttonbush pools, woodland pools, and other wetlands embedded within large contiguous habitat areas of the PCA are potentially good habitat for the Blanding's turtle (NYS Threatened). The setting of the vernal pools and isolated swamps within the large forests suggest excellent habitat for pool-breeding amphibians. Wood turtle, spotted turtle, Jefferson salamander (all are NYS Species of Greatest Conservation Need) and spotted salamander have all been found within the PCA.

Most of the Homan-Bowen Road PCA is within a NYNHP-designated Area of Known Importance for a rare wetland animal. Most of the PCA also lies within the Stissing Mountain section of the NYSDEC-designated Dutchess County Wetlands Significant Biodiversity Area (SBA). The SBA is an area of diverse upland forests and major wetland complexes that are significant for breeding waterfowl, rare turtles, and rare plants, and provide important habitat for a variety of other reptile, amphibian, and bird species. The SBA contains the highest diversity of turtles in New York State (Penhollow et al. 2006). Unconsolidated aquifers and important groundwater recharge areas underlie parts of the Snake Hill CEA and the Homan-Bowen Road PCA (Dutchess County Department of Planning and Development 2024). In an analysis conducted by the New York Natural Heritage Program, the large forest north of Homan Road ranks in the top 95th-99th percentile of all Hudson Valley forests based on remote indicators of size, fragmentation, connectivity, stressors, habitat value, and carbon sequestration (https://www.nynhp.org/projects/hudson-valley-forest-patches/).

The Homan-Bowen Road PCA was coarsely drawn in 2005 to encompass the two large forests, the adjacent meadows, many embedded and nearby wetlands, and many small streams. We recommend expanding the existing Snake Hill CEA to match the extent shown in Figure 4. The boundaries of the expanded CEA recommendation are drawn to include all of the existing CEA and most of the PCA, but adjusted to exclude the most intensively developed land parcels and to capture some adjacent forest and wetland habitat areas. The land area within the recommended boundary is slightly smaller than the original PCA but contains all the special features described above.

Threats

- **Habitat fragmentation:** Dividing large, contiguous areas of unfragmented habitat into smaller areas by roads, driveways, yards, utility corridors, and other such features disrupts the movement patterns of wildlife, introduces barriers and hazards for migrating animals, eliminates suitable habitat for area-sensitive wildlife, and increases the potential for infestations of non-native invasive plant species. Those kinds of fragmenting features are especially hazardous to turtles, including the Blanding's turtle (NYS Threatened), spotted turtle (NYS Special Concern), and wood turtle (NYS Species of Greatest Conservation Need [SGCN]) that need to move between wetlands, streams and uplands to reach foraging, nesting, resting, drought refuge, and overwintering habitats.
- **Forest fragmentation** by roads, driveways, yards, utility corridors, and buildings divides the forests into smaller blocks that may be unsuitable for area-sensitive wildlife species—such as nesting songbirds and large mammals that require large habitat areas and are sensitive to human contact or disturbances. Forest fragmentation makes the (formerly) deep interior forest areas newly accessible to songbird nest predators (such as raccoons and domestic cats) and to brood parasites (such as the brown-headed cowbird) whose activities are more concentrated in open areas and forest edges. Roads and other developed areas dividing forests can also act as significant barriers and hazards to wildlife movement, and many animals avoid breeding near human activities. Forests in the vicinity of intermittent woodland pools (vernal pools) are an essential part of the habitat complex required by pool-breeding amphibians that use the pools for breeding and nursery habitat but spend the rest of their lives in the surrounding forest. Roads, driveways, and other fragmenting features pose barriers and lethal hazards to those amphibians during their seasonal migrations between breeding and non-breeding habitats.
- **Forest loss:** Intact forests promote groundwater recharge, supply clean water to streams and wetlands, and provide high-quality habitats for wildlife, in addition to storing large amounts of carbon in the vegetation and soils and helping to moderate local air temperatures. Clearing of forests reduces those functions and services. Clearing of forests along streambanks and at the

perimeters of wetlands and ponds reduces shade and often leads to increased water temperatures and streambank erosion. Clearing in floodplains may also reduce the capability of the floodplain to absorb and slow floodwaters.

- **Compaction and other disturbance of the forest floor** (as by large equipment) damages the soil structure, and reduces the capability of the soils to absorb rainwater and snowmelt. It can also harm amphibians, small mammals, and the diverse soil invertebrates and microbes that support a healthy and resilient forest community.
- **Cutting of trees and shrubs** during the nesting season (e.g., spring through mid-summer) disrupts the activities of nesting songbirds, raptors, and other tree-dependent wildlife, and cutting trees during the period April through October can disrupt roosting bats.
- **Loss of red cedar woodlands:** Red cedar woodland is an uncommon habitat type in the region, occurring mainly in areas with calcareous soils. These woodlands provide nesting, roosting, and foraging habitats for numerous species of raptors and songbirds, nesting habitat for turtles of conservation concern—Blanding's turtle, wood turtle, spotted turtle, and eastern box turtle (SGCN)—and habitat for several species of rare plants.
- **Loss of shrubland** through development, cutting, or natural transition to forest may deplete habitat for shrubland birds of conservation concern, for nesting turtles, for meadow insects, and for small mammals and their predators. The loss of large shrublands with dense shrub thickets can mean the loss of safe habitat for the New England cottontail.
- **Loss of hayfield and oldfield**: Loss of large hayfields ($\geq$ 10 acres) can deplete the local populations of grassland breeding birds such as bobolink and eastern meadowlark (both are NYS Species of Greatest Conservation Need). Loss of oldfields reduces nesting habitat for turtles, hunting habitat for dragonflies and damselflies, larval food, nectar, and pollen sources for insects, habitat for small mammals and their predators (e.g., eastern coyote, foxes, raptors), and habitat for a host of other wildlife of meadows (see the *Significant Habitats* report).
- **Meadow management**: The habitat values of meadows depend in part on their size and shape and on how they are managed. Intensive cultivation of crops, although sometimes important for economically successful agriculture, significantly reduces the habitat values for native wildlife and plants. Hayfield mowing schedules can have large consequences for grassland breeding birds, for pollinating insects, and for other wildlife. Use of fertilizers and pesticides can pollute soils and groundwater as well as nearby wetlands and streams.
- **Degradation of streams**: Small streams provide valuable aquatic habitats that are not duplicated by larger streams, and are important sources of water, organic materials, and organisms for larger downstream waters. Loss or degradation of small streams can mean significant losses for local biodiversity. Disruption of stream flows, channelizing, pollution, or siltation of streams from roads, driveways, yards, or agricultural uses can render them unsuitable for trout, wood turtle, salamanders, and many other stream organisms. Pollution can arrive in streams as direct discharge or in sheet or channelized runoff from agricultural fields or lawns carrying fertilizers and pesticides that degrade the quality of water and habitats, and harm non-target plants, animals, fungi, and soil

microbes that support ecosystem functions. Culverts that are perched above the stream substrate can disrupt the upstream and downstream movement of aquatic animals.

- **Impervious surfaces**: Roads, driveways, parking lots, roofs, and other impervious surfaces (including compacted soils) prevent infiltration of rainwater and snowmelt to the soils; can lead to rapid runoff of surface water, soil erosion, siltation of streams, elevated stream water temperatures, and reduced groundwater recharge; and are often sources of contamination of surface water or groundwater—e.g., from de-icing salts, petroleum hydrocarbons, and heavy metals.
- **Water withdrawals**: Direct water withdrawals from a stream, or over-extraction of groundwater can deplete water volumes of streams and wetlands, and adversely affect the wetland and stream biota which depend on normal seasonal volumes and flow patterns.

Recommendations

Below are recommendations for actions that will help to protect the habitats of an expanded Snake Hill CEA, and the benefits they provide to the ecosystem and to the human community. Many of these recommendations can be applied when landowners or town agencies are in the early stages of planning or reviewing new land uses or land development within the CEA, or when the town is considering new land use legislation.

- **Avoid fragmenting large complexes of upland and wetland habitats** to protect safe travelways for wildlife.
- **Avoid fragmenting large forests** with new roads, driveways, yards, utility corridors, and other developed features. Maintain large areas of forest around each of the intermittent woodland pools, and forested connections between pools.
- **Locate any new development distant from streams and at the edges of forests or meadows** (instead of the interiors) to protect the stream habitats and water quality and to leave the terrestrial habitat interiors intact as much as possible.
- **Maintain forests** with undisturbed forest vegetation and forest floors wherever possible.
- **Avoid or minimize disturbance of soils and vegetation** within 200 feet of a stream, woodland pool, wetland, or pond edge to help maintain cool water temperatures and volumes, prevent erosion, and protect wildlife habitat.
- Design and install any new culverts to **maintain upstream and downstream aquatic connectivity.**
- **Consider managing the large shrubland areas for New England cottontail** by encouraging the development of shrub thickets.
- **Consider managing oldfields to promote habitat for pollinators, other insects, small mammals, and other wildlife**.

- **For large meadows ($\geq$ 10 acres), explore meadow management techniques** that allow profitable agricultural production while also supporting native wildlife, including grassland breeding birds.
- **Avoid or minimize applications of de-icing salts, fertilizers, and pesticides** throughout the CEA to prevent pollution of soils, wetlands, ponds, streams, and groundwater.
- **Prevent over-extraction of streamwater or groundwater**.

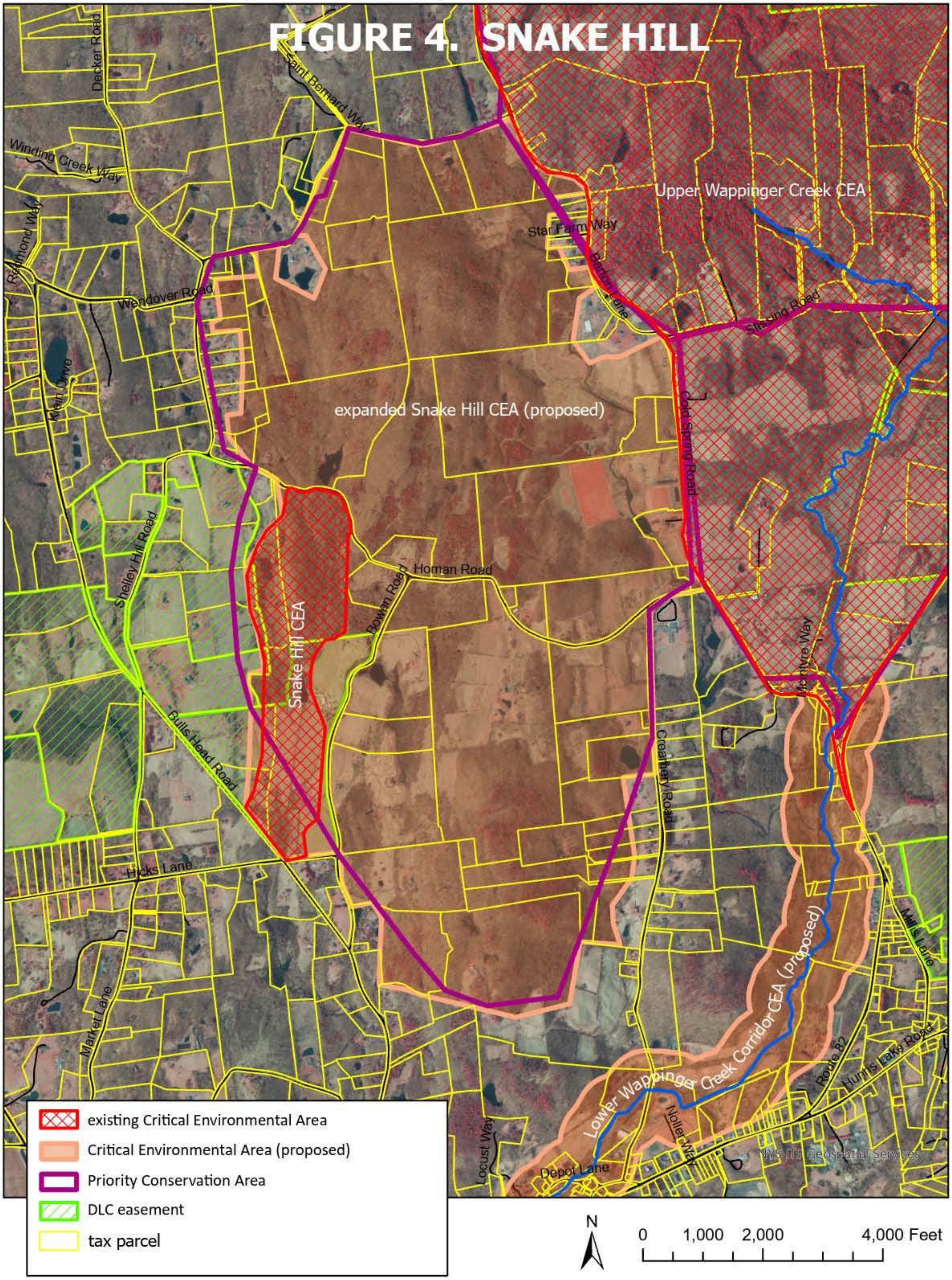


FIGURE 4. SNAKE HILL
Decker Road
Saint Bernard Way
Winding Creek Way
Redmond Way
Wendover Road
Klein Drive
Star Farm Way
Barton Lane
Stissing Road
Upper Wappinger Creek CEA
expanded Snake Hill CEA (proposed)
Cold Spring Road
Homan Road
Bowen Road
Shelley Hill Road
Snake Hill CEA
Bulls Head Road
Creamery Road
McIntyre Way
Hicks Lane
Market Lane
Locust Way
Depot Lane
Noller Way
Lower Wappinger Creek Corridor CEA (proposed)
Route 82
Hunns Lake Road
Mills Lane
NYS ITS Geospatial Services
existing Critical Environmental Area
Critical Environmental Area (proposed)
Priority Conservation Area
DLC easement
tax parcel
N
0 1,000 2,000 4,000 Feet

LOWER WAPPINGER CREEK CORRIDOR CEA

Description

The Wappinger Creek Corridor Priority Conservation Area delineated by Hudsonia in the *Significant Habitats* report (Bell et al. 2005) is a ca. 1400-foot-wide corridor along the creek (Figure 5) which is the largest stream in the Town of Stanford and an important tributary of the Hudson River. The creek rises in Pine Plains and runs northeast to southwest through the Town of Stanford. Maintaining the quantity and quality of water in the creek's Stanford reach is important not only for the ecosystems of the town, but also for all downstream reaches.

NYSDEC has designated most of the Wappinger Creek in Stanford a trout spawning stream because of the cool, clear, well-oxygenated water and unsilted substrate that trout need for spawning and nursery habitat. Also, the New York Natural Heritage Program (NYNHP) has designated a corridor along most of the reach north of Stanfordville as an Area of Known Importance for Coldwater Stream Habitats. Coldwater streams support brook trout and other fish species that are sensitive to the low-oxygen conditions caused by thermal pollution. The NYNHP has also identified the entire Stanford reach of the Wappinger as an Area of Known Importance for migratory fishes. American eel, a NYS High Priority Species of Greatest Conservation Need, occurs here, where it spends several-to-many years until reaching reproductive maturity when it migrates back to the ocean to spawn.

Much of the Wappinger Creek corridor is underlain by an unconsolidated aquifer, an area where groundwater is stored in sand and gravel deposits. The water in such aquifers is typically abundant and easily accessible for domestic wells, but may also be especially susceptible to contamination from activities on the surface because the coarse sands and gravels are less effective at filtering than are the finer mineral deposits in other parts of the landscape. The coarse deposits also make these aquifer areas especially important for replenishing groundwater from rainwater and snowmelt. Measures to promote groundwater recharge and protect groundwater from contamination are important everywhere, but particularly in areas overlying unconsolidated aquifers.

Streams and stream corridors are essential components of regional ecosystems, and are part of the scenic landscapes so loved by the people of Stanford. The very substantial floodplain of Wappinger Creek and associated wetlands act to absorb floodwaters and attenuate downstream flooding. Clean-water streams like the Wappinger have diverse and abundant invertebrates—stoneflies, mayflies, dragonflies, mollusks, crayfish—that support the fishes, salamanders, turtles, and the rest of the aquatic and semi-aquatic community, as well as the terrestrial animals that use streams intermittently. Streams are essential habitat areas for American beaver, river otter, and American mink. Many bat species forage over stream corridors, ponds, and wetlands, where flying insects are often abundant. The forests bordering streams provide important habitat for many other plants and animals. Intact habitat areas along streams also offer safe movement corridors for wildlife.

The existing Upper Wappinger Creek CEA encompasses the Wappinger Creek watershed above Cold Spring Road. The proposed Lower Wappinger Creek Corridor CEA covers just the stream corridor below Cold Spring Road. The recommended 1400-ft-wide CEA corridor along the creek could help protect the unconsolidated aquifer, the stream water quality, the in-stream and riparian habitats, and adjacent habitat areas used by stream-associated wildlife.

Threats

- **Tree removal**: Maintaining intact forests is usually the best way to promote groundwater recharge, supply clean water to streams, and maintain high-quality habitats for wildlife, along with the many ecosystem services that forests provide to the human community. Clearing of forests along streambanks and at the perimeters of wetlands and pond reduces shade and often leads to increased water temperatures and streambank erosion. Clearing in floodplains may also reduce the capability of the floodplain to absorb and slow floodwaters.
- **Cutting of trees and shrubs** during the nesting season (e.g., spring through mid-summer) disrupts the activities of nesting songbirds, raptors, and other tree-dependent wildlife, and cutting during the period April through October can disrupt roosting bats.
- **Impervious surfaces**: Roads, driveways, parking lots, roofs, and other impervious surfaces (including compacted soils) prevent infiltration of rainwater and snowmelt to the soils; can lead to rapid runoff of surface water, soil erosion, siltation of streams, elevated stream water temperatures, and reduced groundwater recharge; and are often sources of contamination of surface water or groundwater—e.g., from de-icing salts, petroleum hydrocarbons, and heavy metals.
- **Other forms of pollution** can arrive in streams as direct discharge or in sheet or channelized runoff from agricultural fields or lawns carrying fertilizers and pesticides that degrade the quality of water and habitats, and harm non-target plants, animals, fungi, and soil microbes that support ecosystem functions.
- **Aquatic barriers**: Culverts and bridges that are under-sized or incorrectly installed can lead to upstream flooding, damage to roads and other infrastructure, and fragmentation of stream habitats, creating barriers to upstream and downstream movement of aquatic organisms.
- **Water withdrawals**: Direct water withdrawals from the stream, or over-extraction of groundwater can deplete the stream water volumes and adversely affect the stream biota which depend on normal seasonal volumes and flow patterns.

Recommendations

Below are recommendations for actions that will help to protect the Wappinger Creek and its tributaries, groundwater, and riparian habitats, and the benefits they provide to the human community and to wildlife. Many of these recommendations can be applied when landowners or town agencies are in the early stages of planning or reviewing new land uses or land development within the CEA, or when the town is considering new land use legislation.

- **Avoid direct disturbance of streams and streambanks, or pond shores**.
- **Maintain broad buffers of undisturbed soils and vegetation along streams.**
- **Maintain intact forests** wherever possible. Minimize disturbance of soils and vegetation in stream corridors, and especially within 200 feet of a stream edge to help maintain cool water temperatures and water volumes, prevent erosion, and protect wildlife habitat.
- **Avoid fragmenting large forests** in and near the stream corridors with new roads, driveways, yards, utility corridors, and other developed features. Locate new development distant from streams and near forest edges to leave the forest interiors intact as much as possible.
- **Prevent siltation, warming, and other forms of stream pollution.**
- **Avoid or minimize applications of de-icing salts, fertilizers, and pesticides**.
- **Prevent over-extraction of streamwater or groundwater**.
- **Design, replace, retrofit, and maintain culverts and bridges** on the Wappinger Creek and tributaries to maintain stream habitat continuity and to accommodate water volumes from 500-year runoff events. Guidance for design and installation of culverts and bridges is at https://dec.ny.gov/sites/default/files/2024-01/brdgclvrtguidance.pdf.
- **If recreational access points and trails are provided, locate and design them carefully** to protect streams, stream pools, streambanks, wetlands, and the sensitive soils, vegetation, and wildlife of the stream corridors.

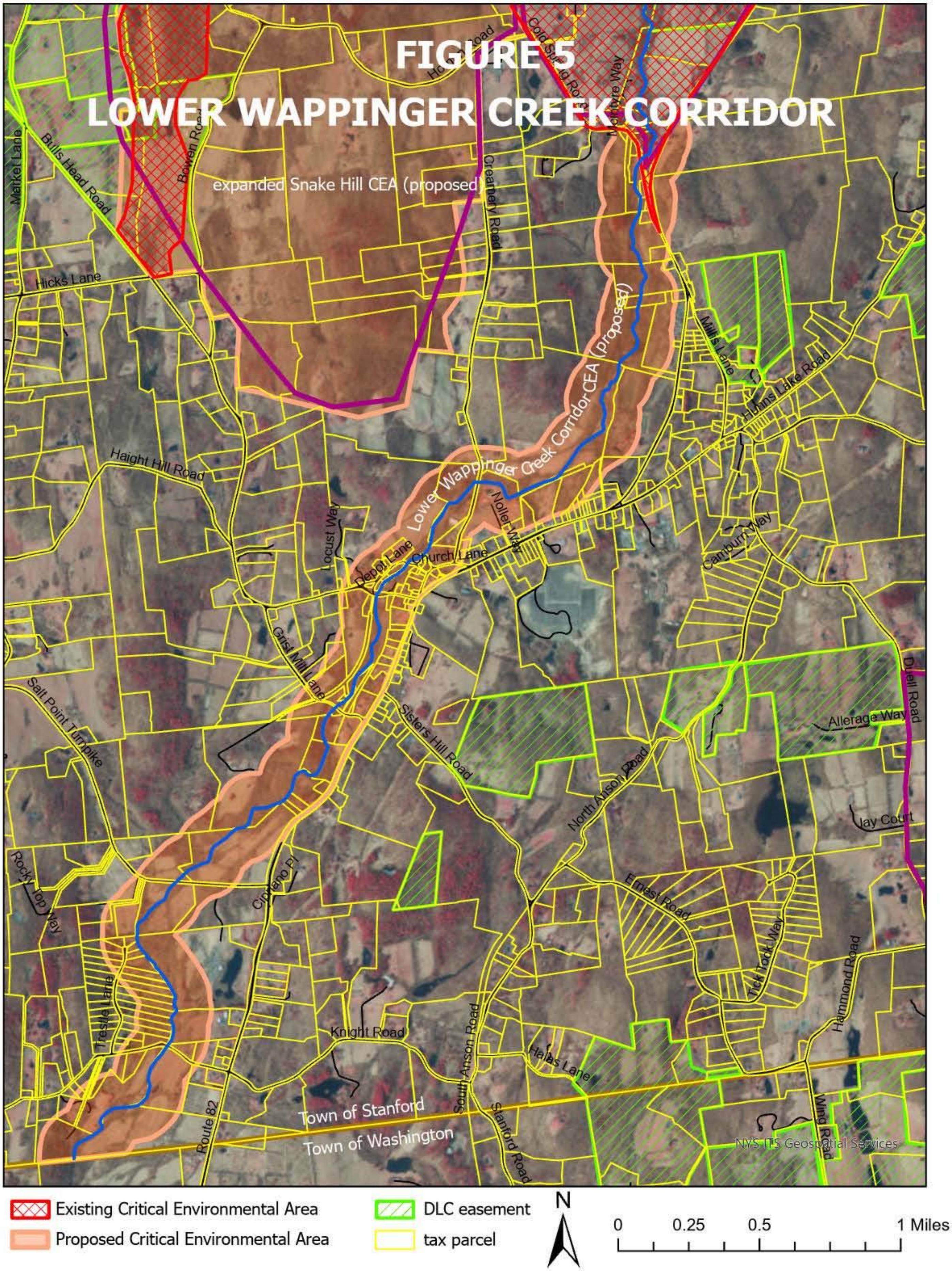


FIGURE 5
LOWER WAPPINGER CREEK CORRIDOR
expanded Snake Hill CEA (proposed)
Lower Wappinger Creek Corridor CEA (proposed)
Markel Lane
Bulls Head Road
Bowen Road
Creamery Road
McIntyre Way
Hicks Lane
Mills Lane
Hunns Lake Road
Haight Hill Road
Noller Way
Locust Way
Depot Lane
Church Lane
Camburn Way
Grist Mill Lane
Salt Point Turnpike
Sisters Hill Road
Allerage Way
Duell Road
North Anson Road
Jay Court
Rocky Top Way
Cipriano Pl
Ernest Road
Tick Tock Way
Tresila Lane
Hammond Road
Knight Road
South Anson Road
Halas Lane
Route 82
Stanford Road
Wing Road
Town of Stanford
Town of Washington
NYS ITS Geospatial Services
Existing Critical Environmental Area
Proposed Critical Environmental Area
DLC easement
tax parcel
N
0
0.25
0.5
1 Miles

SHAW POND

We examined Shaw Pond and vicinity to see if it merits designation of a new CEA. Shaw Pond is a 60-acre circumneutral bog lake that straddles the boundary between Stanford and Washington. The Shaw Pond Priority Conservation Area delineated by Hudsonia (Bell et al. 2005) encompasses the Stanford portion of the lake and adjacent wetlands and extends north ca. 1.3 miles between Duell Road and Ludlow Woods Road to their junction. The PCA includes large areas of upland hardwood forest and upland meadows, smaller areas of calcareous hardwood swamp, and a buttonbush pool (Figure 6). The PCA is also adjacent to a Shaw Pond PCA identified in the Town of Washington by Hudsonia (Bell and Stevens 2006). The Stanford PCA encompasses and borders parts of the Jesse and Gayle Bontecou Wildlife Conservation Preserve, which includes all of Shaw Pond itself.

A circumneutral bog lake is a rare kind of habitat that sometimes support uncommon and rare species of plants and animals (see Bell et al. 2005 for a general description). Circumneutral bog lakes are fed in part by springs, and are quite sensitive to water pollution and other kinds of disturbance. Shaw Pond is likely to support many breeding and migrating waterfowl species. Pied-billed grebe (NYS Species of Greatest Conservation Need) and wood duck are known to occur here, and red shouldered hawk (Species of Greatest Conservation Need) and sharp-shinned hawk have been observed in the vicinity. Regionally-rare plants at Shaw Pond include northern pipewort, olive-fruited spikerush, and marsh bellflower (Bevan Zientek 2024). A calcareous hardwood swamp extends north from the pond. Streams originating within the PCA flow west and northwest to join a tributary to Wappinger Creek.

A 2.5-acre buttonbush pool near Ludlow Woods Road is mostly surrounded by upland meadow and forest, with a residential yard at the north end. Buttonbush pools have a habitat structure and plant community similar to those typical of kettle shrub pools, the core habitat of Blanding's turtle in this region, but occur outside of glacial outwash terrain. Wood turtle, spotted turtle, Blanding's turtle, painted turtle, and snapping turtle might use the buttonbush pool and Shaw Pond, and all would also need unshaded upland areas for nesting. Some of those turtles would also use other nearby upland and wetland habitats for foraging, resting, and drought refuge.

We would have recommended a CEA that omits the northern part of the PCA and includes just the Stanford portion of the Shaw Pond watershed plus an adjacent area of forests and meadows that borders the Bontecou Preserve property. Land uses within the watershed are likely to affect the quantity and quality of surface water and groundwater entering Shaw Pond and the wetland habitat quality. The nearby upland forest, swamp, and meadow habitats provide a buffer to the watershed area and additional habitat options for wildlife that use a complex of wetland and upland habitats. The adjacent Bontecou Preserve is part of an area of contiguous protected land of over 12,000 acres. Maintaining habitat connectivity of the Shaw Pond area with all of that protected land would enhance the ecological value of both the pond and the protected areas.

We find, however, that nearly all of this potential CEA is within land parcels with conservation easements held by the Dutchess Land Conservancy (Figure 6) or are part of the Bontecou Preserve with an easement held by the Scenic Hudson Land Trust. We do not know the specific requirements or restrictions in those easements, but expect that significant land protections are imposed in perpetuity, so a CEA designation seems to be superfluous. For that reason, we do not recommend establishing a new CEA at Shaw Pond.

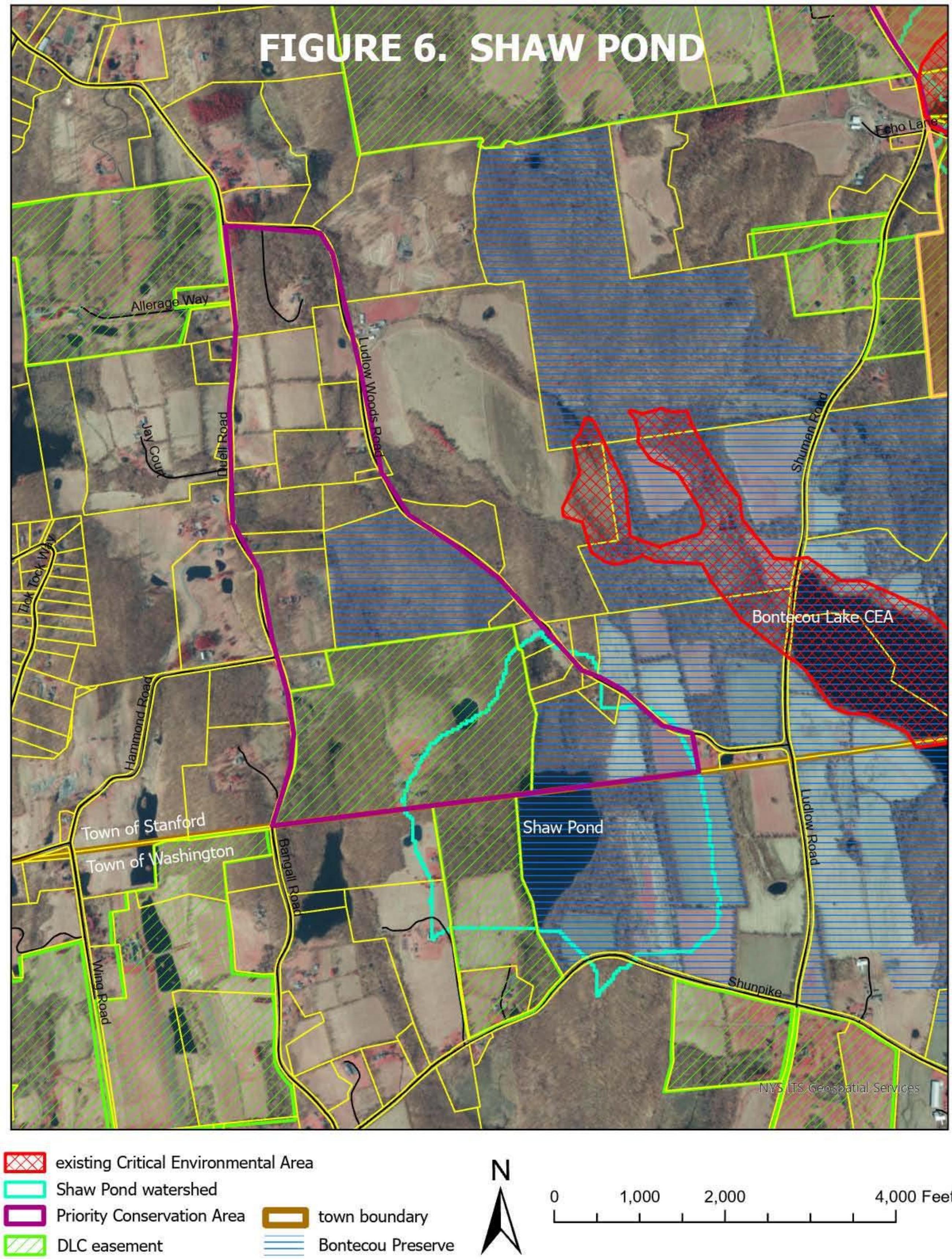


FIGURE 6. SHAW POND

SUMMARY

Upon reviewing the land areas of three existing Critical Environmental Areas, five Priority Conservation Areas, and the present-day conservation status of the land, we recommend that the Ryder Pond/Cagney Marsh CEA remain in its current configuration, the Millbrook Meadows CEA be slightly expanded, the Snake Hill CEA be significantly expanded, and a new CEA be established for the Wappinger Creek corridor south of the Upper Wappinger CEA.

- Our rationale for not expanding the **Ryder Pond/Cagney Marsh CEA** is that the watersheds of the two wetlands and adjacent habitats are almost entirely on land parcels with conservation easements, so an expanded CEA seems unnecessary.
- Similarly, much of the land within the Millbrook Marsh PCA has conservation easements, so our recommendation is to expand the existing **Millbrook Meadows CEA** just enough to encompass adjacent forests and streams that help to protect the Millbrook Marsh but are on uneased parcels.
- The existing **Snake Hill CEA** lies adjacent to an area of large, unfragmented forests, large meadows, many vernal pools, buttonbush pools, other wetlands, and streams, and it overlies an unconsolidated aquifer. Expanding the CEA to encompass this extraordinarily rich area would ensure that consideration of the habitat values, water resource values, and landscape connectivity will be part of future land use decisions.
- A new CEA in the **Lower Wappinger Creek Corridor** would draw attention to the great importance of the stream, its tributaries, and riparian habitats Stanford ecosystems and to downstream areas.
- Most of the land parcels in the watershed of **Shaw Pond** and the near vicinity have conservation easements held by the Dutchess Land Conservancy or the Scenic Hudson Land Trust, so a new Shaw Pond CEA seems unnecessary.

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