Zena Woods Critical Environmental Area

Town of Woodstock, Ulster County, New York

A Proposal

Critical Environmental Areas

New York State law authorizes municipalities to designate Critical Environmental Areas within the municipal boundaries to call attention to places that deserve special attention in the course of land use planning, regulatory reviews of development projects, and decisions about development and conservation.

A Critical Environmental Area (CEA) is defined as 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;
- agricultural, social, cultural, historic, archeological, recreational, or educational values; or
- an inherent ecological, geological, or hydrological sensitivity that may be adversely affected by any change (6 NYCRR 617.14[g]).

A CEA is 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 important wildlife habitat or 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 is contemplated.

Proposed Zena Woods CEA

A Town of Woodstock working group, including members of the Town Board, Planning Board, and Environmental Commission, and staff of the Woodstock Land Conservancy, proposes the establishment of the Zena Woods Critical Environmental Area.

This area encompasses the large forests east of John Joy Road and Zena Road and includes the Bluestone Wild Forest (Figure 1). These are the largest lowland forest areas in the town, and are part of a much larger forest extending north, south, and east into the towns of Saugerties and Ulster and beyond. The total area of the proposed CEA is approximately 2290 acres (3.6 square mile) and includes upland forests, shrublands, meadows, forested swamps, vernal pools, ponds, marshes, other wetlands, many small streams, and a segment of the Sawkill. The CEA designation is in recognition of the importance of this area for the ecological services to the human community, valuable habitats for wildlife and plants, and support of local ecosystems. The proposed CEA would further the town goals set forth in the 2018 Comprehensive Plan to strengthen protections for natural resources, reduce habitat fragmentation, and promote conservation of land and water for climate resilience.

Ownership

Most of the land in the proposed CEA is in private ownership. Exceptions are the land parcels that constitute the Bluestone Wild Forest, owned by NYSDEC; three adjacent parcels owned by the Town of Woodstock, and the land surrounding the Kingston reservoirs owned by the City of Kingston.

Significance

Ecological Services

- **Surface water and groundwater**: Forests are the most effective kind of land cover for maintaining clean and abundant groundwater and surface water (streams, lakes, ponds, and wetlands) (Wilder and Kiviat 2008).
    - Forests with intact canopy, understory, ground vegetation, and forest floors promote the infiltration of precipitation into the soil and may be the best insurance for **maintaining groundwater quality and quantity, for reducing rapid runoff and soil erosion, and for maintaining flow volumes, cool temperatures, water quality, bank stability, and habitat quality in streams**. Forests bordering streams help to keep the streams cool, and supply them with organic material for the aquatic food web and structural material (downed logs, branches, leaves) to diversify the instream habitats.
    - Forested watersheds and floodplains help to **absorb and dampen floodflows**, **thus aiding flood resiliency** for local and downstream areas.
    - The forests of the Zena Woods help to protect the water quality, water volumes, and habitat quality of the **Sawkill**, and provide a forested corridor for over 8,000 feet of the stream where it winds through unprotected land.
    - The forests also help to protect the quality and quantity of water feeding the **unconsolidated aquifer** that underlies this part of town.
- **Carbon storage**: Forests are great repositories of stored carbon in the vegetation, the organic duff on the forest floor, and the soils (Lu et al. 2013).
- **Air pollution and air temperatures**: Forests also absorb air pollution and help to moderate local air temperatures—services of increasing importance with the warming climate.
- **Scenic views and recreation**: Forests are an important component of Woodstock's scenic landscapes, and provide a destination and haven for recreation and rest.

Habitats

Forests provide important habitats for a wide array of plants and wildlife—turtles, snakes, salamanders, songbirds, raptors, large and small mammals, and invertebrates that use the live and dead vegetation and the duff, rocks, and soils of the forest floor for shelter, food, and other life needs.

- **Large forests**: Large forests are especially important for "area-sensitive" wildlife species that have large territories or large home ranges, and for wildlife and plants that do best in the special habitat conditions of deep forest interiors. Large forests are also especially valuable for wildlife and plants seeking new microhabitats or cooler areas in response to climate change.
- **Movement corridors**: The area proposed for the Zena Woods CEA is part of a large **south-to-north habitat corridor** through Ulster County that may serve as a conduit for plants and animals forced to shift northward to find cooler habitats in the warming climate. Although south-to-north corridors on protected land are widespread at the higher elevations, protected lowland corridors are rare in the town and the region, so this corridor deserves special attention in considerations of land development and conservation.
- **Forest condition**: The forests of the proposed CEA score very highly—among the region's top 10%—in the Forest Condition Index (developed by the NYSDEC and the New York Natural Heritage Program), based on forest condition, connectivity, habitat, and other ecosystem values.
- **Climate resilience**: In an analysis conducted by The Nature Conservancy, much of the forest of the Zena Woods and extending beyond the town boundary is ranked "above average" or "far above average" for climate resilience, based on geological and topographical complexity and the connectedness of habitats (Anderson et al. 2016).
- **Vernal pools and other wetlands**: Embedded in the Zena Woods forests are many small wetlands, including at least 20 vernal pools. These are small, isolated wetlands that hold standing water in winter and spring but dry up at some time during the summer. Vernal pools support numerous aquatic invertebrate species with special adaptations to the seasonal drying, and are also the critical breeding habitat for a group of amphibians that use the pools for breeding for a brief period in the spring, but spend the rest of the year in surrounding forests, sometimes moving long distances from the pools. The forests provide shade and organic detritus (leaves, twigs, branches) that are fundamental to the pools' food webs and the structural features required by many pool organisms. The pool/forest habitat complex is essential to the persistence of local populations of wood frog, Jefferson salamander, spotted salamander, and marbled salamander and, in turn, the salamanders and frogs are significant contributors to the forest food web. Jefferson and marbled salamanders are listed as NYS Species of Greatest Conservation Need. The many other wetlands in the proposed CEA (hardwood swamps, mixed forest swamps, marshes, wet meadows) are also important habitats and contributors to local biodiversity.
- **Sawkill**: Zena Woods contains a nearly two-mile segment of the Sawkill, a 20-mile-long perennial stream that rises high in the Catskills, winds through the eastern half of Woodstock, and ultimately flows into the Esopus Creek in the Town of Ulster. Portions of the Sawkill and several tributaries

within the Zena Woods have been classified by NYSDEC as trout streams, indicating that they have the clear, cool water that trout species require.

- **Small streams**: The Zena Woods has many small intermittent and perennial streams. Most drain to the Sawkill but the northernmost drain to Plattekill Creek and two southern (unnamed) streams drain to Onteora Lake. The condition of these small streams influences the water quantity and quality of those larger waterbodies. These small streams are important components of the ecological landscape, providing microhabitats not present in larger streams, supplying aquatic organisms and organic drift to downstream reaches, and providing local water sources for wildlife. Their loss or degradation in a portion of the landscape can affect the presence and behavior of wildlife populations over a large area.
- **Bat roosts**: The part of Zena Woods that is south of the Sawkill has been identified by the New York Natural Heritage Program as important summer foraging habitat for the Indiana bat (NYS Endangered) and the northern long-eared bat (NYS Threatened). These are two of the bat species whose populations have been decimated by the white nose syndrome, a fungal disease that affects bat species that overwinter in New York caves. Indiana bat and northern long-eared bat forage in open and forested areas and roost beneath platy bark or in crevices or cavities in live or dead trees.
- **Rare damselfly**: The lyre-tipped spreadwing, a rare damselfly, has been found in the Bluestone Wild Forest, and could occur in marshy ponds and other unforested wetlands elsewhere in the proposed CEA.

More information about the general ecological values and sensitivities of habitats are described in the Woodstock Natural Resources Inventory (Woodstock Environmental Commission 2020).

Threats

The ecological services and wildlife habitat values of the Zena Woods may be threatened directly and indirectly by certain kinds of land uses and by the stresses imposed by the changing climate.

- **Forest alteration**: Disruption of the forest vegetation or disturbance of the forest floor can reduce the capability of the forest to recharge groundwater, capture rainwater and snowmelt, and maintain the soil biota that promotes a healthy and resilient forest community. Minimizing forest disturbance is often the best way to maintain high-quality habitats for wildlife, and maintain the many ecosystem services that forests provide to the human community.
- **Habitat fragmentation**: "Habitat fragmentation" is the process by which a large habitat area is divided into smaller patches that are isolated from each other. Typical fragmenting features are roads, driveways, utility corridors, walls, and fences. Habitat fragmentation is among the most pervasive effects of human land uses and is one of the primary causes of local and regional losses of native biodiversity. The species most affected by fragmentation are those that depend on large habitat areas or the special conditions of habitat interiors, or those that need to move between different kinds of habitats to fulfill their life needs (e.g., Gibbs 1998, Glennon and Kretser 2005,

McClure et al. 2013). Habitat fragmentation also occurs in streams, where dams and poorly-designed or improperly-installed culverts similarly separate the downstream from the upstream segments, and thus disrupt the movements of fish and other aquatic organisms seeking different stream habitats to meet their daily or seasonal needs.) Fragmentation can degrade habitats of all kinds, including large meadows, but in the Zena Woods the large forests, the forest/vernal pool complexes, and the small streams are the features most vulnerable to fragmentation.

Fragmentation of forests into smaller blocks increases the area of forest "edge" habitat where there are higher light and noise levels and drier conditions, and where invasion by non-native plant species and by predators such as raccoons and domestic cats is more likely. Fragmentation makes the formerly deep interior forest areas newly accessible to songbird nest predators and brood parasites (such as the brown-headed cowbird) whose activities are ordinarily confined to open areas and forest edges. Artificial lights, noise, roaming pets, and polluted runoff are just a few of the disturbances that can extend far outside of residential yards and driveways.

- **Reduction of structural complexity**: The term "structural complexity" refers to the horizontal diversity (variable tree spacing, occasional gaps, and patches of different types and growth habits of trees, shrubs, and herbs), and vertical diversity (variable tree heights, crown types, crown depths, variable shrub layers), and diverse ground-level structure (downwood, fine and coarse woody material, rocks, and variable microtopography). Structural complexity is an important contributor to the habitat values of the forest and the likely resilience of the forest ecosystem to both normal and extreme stresses such as fires, floods, droughts, heat waves, and diseases. An unmanaged, unmanipulated forest is likely to develop and maintain a high level of structural complexity on its own, but human interventions often have the intentional or unintentional effect of creating uniformity in one or more aspects of the forest structure. This introduced uniformity may significantly reduce the resilience of the forest ecosystem.
- **Poor timber harvest practices**: Truck roads, skid trails, and log landings that are poorly sited, designed, and maintained can cause soil erosion and siltation of streams and wetlands, and unnecessarily harm forest soils. High-grading—the selective harvesting of only the trees with the highest market value—reduces both the future market value of the remaining timber and the ecological value of the forest community. Timber harvest in spring, summer, or fall can harm roosting bats, nesting birds, salamanders, turtles, and other wildlife.

- **Vernal pool disruptions**: Roads, driveways, and yards can be hazardous to pool-breeding amphibians in their migrations between upland forest and vernal pool habitats and between pools. Excavating a pool to create a more permanent pond destroys the special habitat conditions required by vernal pool organisms. Creating lawn or other unforested areas around a vernal pool can reduce the shade and the organic material that feeds the pool, and create hazards for amphibians and other animals that need to move between the pool and upland forest habitats. Runoff reaching the vernal pools from lawns, driveways, and roads can pollute the pools with fertilizers, pesticides, heavy metals, de-icing chemicals, and petroleum hydrocarbons, and harm

the biological communities of the pools. Other kinds of wetlands in the Zena Woods are subject to similar threats.

- **Stream disruptions**: The many small streams within the Zena Woods are vulnerable to installations of dams and inadequately-sized or poorly installed culverts. Dams are an obvious impediment to the movements of organisms up and down the stream, but culverts that are suspended above the stream bottom present similar barriers. Also, culverts that are improperly sized can disrupt natural flow patterns, creating upstream impoundments and increasing downstream velocities, often leading to streambed scouring and bank erosion, as well as damage to bridges, roads, and other infrastructure. These are widespread causes of degraded stream habitats that have led to the loss of whole populations of fish unable to navigate the barriers or tolerate the habitat alterations. Hardening streambanks—as from riprap or concrete—can increase downstream flooding and streambank erosion and create a barrier to animals moving between the stream and riparian habitats.
- **Water withdrawals**: Most of our streams and wetlands are fed in part by groundwater. Excessive withdrawals of streamwater or groundwater, as from private or public wells, can deplete the water available to sustain those waterbodies and the plants and animals that depend on them. Excessive withdrawals can be especially harmful during extended droughts.

Recommendations

Below are recommendations for actions that will help preserve the important ecological services and habitat values of the area. Many of these can be applied at the planning stages when landowners or town agencies are considering new land uses or new development features within the Zena Woods Critical Environmental Area.

- **Minimize disturbance** of forest trees, shrubs, herbs, and the forest floor. Leave standing snags and downwood in place wherever possible.
- **Promote structural complexity** in the forests—best accomplished by leaving the forest unmanaged in most cases.
- **Follow Best Management Practices for timber harvests** to protect forest soils, streams, wetlands, the forest ecological community, and the market value of future of harvests. These may include, for example, avoiding steep slopes, wetlands, streams, and seeps; maintaining broad buffer zones along streams and around wetlands and other sensitive areas; preserving trees of diverse ages and species composition; and employing soil stabilization measures including regrading and reseeding roads and staging areas immediately upon completion of harvest.
- **Limit forest cutting to the period between 1 November and 31 March** to avoid disturbing bats at their summer roosts.

- **Avoid or minimize forest fragmentation**. Locate new development (e.g., houses, driveways) near forest edges and leave the forest interiors intact wherever possible.
- **Maintain connectivity** with forested areas outside the Woodstock town boundary.
- **Maintain broad forested corridors** along the Sawkill and along the many small streams.
- **Maintain broad forested areas around and between vernal pools**.
- **Keep the vernal pools, other wetlands, and small streams intact**. Do not alter the stream channels or excavate the wetlands to create more permanent ponds. Avoid excessive water withdrawals and avoid altering the volumes or patterns of runoff from surrounding areas so that the hydroperiods (duration, timing, and volumes of standing or flowing water) of wetlands and streams are maintained. Prevent contaminated runoff from lawns, gardens, driveways, or roads from reaching wetlands and streams.
- Do not construct buildings or walls within the floodplains of streams, and do not harden or channelize streams. Plan any new projects with the flood potential in mind, and **create no structures or land alterations that would obstruct or concentrate flood flows**. A primary service of floodplains is storage and attenuation of floodwaters.
- Design and install any **new culverts** and retrofit existing ones to **maintain the continuity of stream gradients and substrates**, and to **accommodate storms of 500-year intensity** in anticipation of more severe storms in coming decades.
- Revise the Woodstock zoning ordinance to **provide greater protections for vernal pools**, other small wetlands, and streams to preserve habitat connectivity among wetland complexes—such as groups of vernal pools within a forested matrix. New regulations could expand buffer zones, prohibit excavation, and prohibit altering patterns of runoff reaching the wetlands and streams.
- Revise the Woodstock zoning ordinance to **provide protections against habitat fragmentation and other degradation of habitats and water resources** in the Zena Woods as outlined above.

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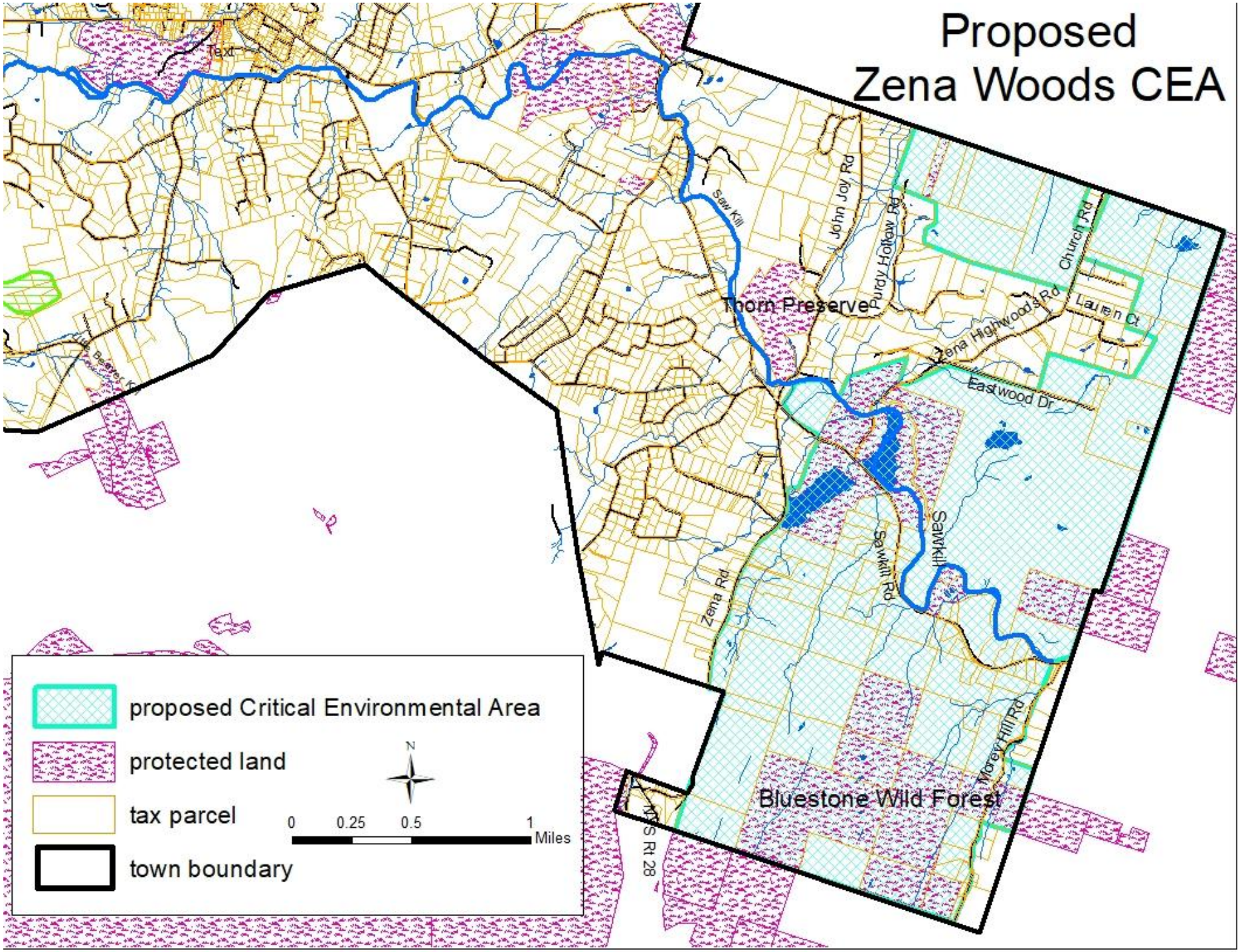
Proposed
Zena Woods CEA
Saw Kill
John Joy Rd
Purdy Hollow Rd
Church Rd
Thorn Preserve
Zena Highwoods Rd
Lauren Ct
Eastwood Dr
Sawkill
Sawkill Rd
Zena Rd
Morey Hill Rd
Bluestone Wild Forest
NYS Rt 28
proposed Critical Environmental Area
protected land
tax parcel
town boundary
N
0
0.25
0.5
1
Miles