

Cool Ravine Critical Environmental Area

Town of New Lebanon, Columbia County, New York

Critical Environmental Areas

New York State law authorizes municipalities to designate Critical Environmental Areas within the municipal boundaries to alert people 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 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 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.

Cool Ravine CEA

A Town of New Lebanon working group, including members of the Town Board, the Conservation Advisory Council, the Climate Smart Communities Task Force, and representative to the Columbia County Environmental Management Council, proposed the establishment of the Cool Ravine Critical Environmental Area.

A “cool ravine” is a narrow ravine with steep, high, rocky walls flanking a rocky stream. The ravine walls are commonly forested with a mixture of hardwoods and conifers, usually including eastern hemlock. The steep ravine walls and conifer canopy create an unusually shady, cool, moist microclimate that often supports plants of more northern affinities or higher elevations, and a cool haven for other plants and animals (Kiviat and Stevens 2001).

The four ravines of the CEA are along tributaries or sub-tributaries to Wyomanock and Kinderhook creeks. The CEA boundaries are drawn at 200 feet beyond the rim of each ravine to encompass the area most important to maintaining the habitat conditions of the ravine. All land in the CEA is in

private ownership and the working group has sought support for the CEA from all landowners. The parcels of the few that declined to support the CEA have been excluded from the CEA.

The purpose of the CEA designation is to help ensure the persistence of the unusual conditions of the coolwater streams and the Cool Ravine habitats, and continue to support the special communities of plants and animals that depend on them.

Significance

Ravines are a common occurrence in New Lebanon and the region in general, but the special habitat that we call a “cool ravine” is rare. These places where air temperatures are markedly cooler than those of the surrounding landscape provide habitat for unusual plants and animals, and may offer critical refuge for wildlife and plants stressed by the advance of global warming. In this region, cool ravines often have plants such as mountain maple, fly honeysuckle, hobblebush, American yew, and red-berried elder—not uncommon in the Adirondacks or in the higher elevations of the Catskills or the Taconics, but rare in lowland areas of the Hudson Valley. Mosses, liverworts, and ferns are often abundant on the moist rocky walls. Because the steepness and rockiness of the ravine walls may have protected some ravines from past logging, some may retain older trees than are found in adjacent forests on gentler slopes.

Northern slimy salamander and small-footed bat may use talus (loose rock) areas of the rocky ravine walls, and northern dusky salamander and perhaps even the regionally rare spring salamander may use the streams and associated seeps of cool ravine habitats. Uncommon birds such as Blackburnian warbler, black-throated green warbler, and winter wren sometimes nest in the trees clinging to the steep walls and forested rims of cool ravines. Barred owl and saw whet owl may use the hemlocks for daytime roosts.

These places are important contributors to regional biological diversity, providing cool, moist habitats for wildlife and plants requiring those conditions. They serve both as longterm habitats that anchor certain populations and as local temporary refuges that allow other organisms to withstand immediate stresses.

Around the world and here in New York, animals and plants have been slowly shifting their geographic distributions in response to the warming climate. Some species shift upslope to higher elevations; some shift northward to cooler latitudes; some shift downslope to moist riparian areas; and some shift locally—a few inches, a few feet, or a few hundred feet—to places with more suitable microclimates. Landscapes with complex topography, and diverse bedrock, soils, and habitats on large, well-connected areas of undeveloped land provide many longterm and temporary habitat and microhabitat options. The ecosystems of complex landscapes are likely to be the most resilient to both ordinary environmental stresses and catastrophic ones brought on by climate change (Anderson et al. 2016). Cool ravines, north-facing slopes, caves, and rock overhangs provide essential cool microhabitats for these purposes.

In addition to generally warmer temperatures, heat waves and droughts are predicted to become more frequent and more severe in New York (Rosenweig et al. 2011, Horton et al. 2014). Heat stress on native plants and animals may eliminate some of the cold-adapted species of plants and animals from our landscapes. Droughts can severely stress aquatic communities of streams and ponds, as well as plants and wildlife in upland and wetland habitats. Droughts can extend the low-flow period of streams, and further stress the fish and other organisms that are already suffering from warmer air and stream temperatures. Higher water temperatures reduce the concentrations of dissolved oxygen—a key habitat component for fish and other aquatic organisms of streams. Alterations to water temperatures have large effects on the fishes, salamanders, turtles, and other biota of streams. The life cycles of many stream invertebrates are closely tied to water temperatures and the seasonal patterns of water temperature fluctuations.

Streams passing through cool ravines benefit from the shady conditions, and many of these ravines have springs issuing from the ravine walls and streambanks which further help to maintain cool streamwater temperatures. All four streams that run through these ravines have been identified by the New York Natural Heritage Program as Areas of Known Importance for their sensitive coldwater stream habitats, and one is classified as a trout spawning stream by the New York State Department of Environmental Conservation. Cool stream temperatures in all these streams also help to maintain the coolwater conditions of the Wyomanock and Kinderhook Creeks, both of which are classified as trout streams in their New Lebanon reaches (Stevens and Graham 2017).

All of the ravines in the CEA are embedded in forested areas of 200+ acres that serve to protect the ravine habitats, in addition to providing other important habitat themselves, and allowing safe movement of plants and animals between larger forest blocks—migrations that may be increasingly important for the persistence of populations in this era of a warming climate. Two ravines are within the Taconic Mountain Significant Biodiversity Area, an area recognized by NYSDEC for its large areas of contiguous, high-quality forests, its support of regionally rare and state-listed rare and uncommon plants and animals, and its importance as a water resource for wetlands, streams, and groundwater of the lowlands to the west (Penhollow et al. 2006).

In addition to their water resource and habitat values, cool ravines are wonderful places to visit. The rushing water, cascades and waterfalls, rocky walls and slopes, and deep shade are dramatic at any time of year and especially inviting in hot weather.

Each of the four candidate ravines has been identified according to physical characteristics, but no biological surveys were conducted prior to the CEA designation, and the land within the CEA boundaries had not been assessed for other kinds of habitats (wetlands, ledges, etc.). Biological surveys should be conducted before new land uses are designed and approved within the CEA, to document any rare species of plants or animals, unusual communities, and other features of conservation concern, so that the new uses can be designed to avoid adverse impacts to the most sensitive areas. General ecological values and sensitivities of many kinds of habitats are described in

the New Lebanon *Natural Resource Conservation Plan* (Stevens and Graham 2017) and the *Natural Resources Inventory for Columbia County* (Stevens and Travis 2018).

Threats

- **Forest alteration:** Disruption of the forest vegetation or disturbance of the forest floor can reduce the capability of the forest to capture rainwater and snowmelt, recharge groundwater, and maintain the soil biota that promotes a healthy and resilient forest community. Minimizing forest disturbance 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.
- **Forest fragmentation** by roads, driveways, yards, utility corridors, and buildings divides the forests into smaller blocks that may be unsuitable for the area-sensitive wildlife species—such as the nesting songbirds of cool ravines—that require large habitat areas and are sensitive to human contact or disturbances. Smaller patches of forest have more forest “edge” habitat with higher light and noise levels and infestations of non-native plant species. 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 ordinarily confined to 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.
- **Cutting of trees and shrubs** during the nesting season (e.g., spring through mid-summer) nesting songbirds, raptors, and other tree-dependent wildlife, and cutting during the period April through October can disrupt roosting bats.
- **Clearing of trees and shrubs** could alter the shade-tolerant plant communities of ravines, cause soil erosion, and lead to elevated temperatures in the habitats of the stream and ravine walls.
- **Compaction and other disturbance of the forest floor** (as by large equipment) can harm amphibians, small mammals, and the diverse community of soil invertebrates and microbes, damage the soil structure, and reduce the capability of the soils to absorb rainwater and snowmelt.
- **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, 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.
- **Infestations of the hemlock woolly adelgid** in the coming years may kill some or all of the hemlocks on the walls and rim of the ravines and dramatically affect the habitat conditions of the ravine.

- **Upstream pollution** of water can harm the stream habitats and aquatic biota of the ravine.
- **Water withdrawals:** Upstream direct water withdrawals from the stream, or over-extraction of groundwater can deplete the streamwater volumes, adversely affect the stream biota, and reduce the water volumes reaching the Wyomanock and Kinderhook creeks.
- **Recreational use** or other kinds of repeated and frequent uses of the ravines can lead to trampling, littering, soil erosion, and noise disturbance to nesting or roosting birds and other wildlife.

Recommendations

Below are recommendations for actions that will help to protect the cool ravine habitats and the benefits they provide to the associated streams and to regional biodiversity. Many of these recommendations can be applied when landowners or town agencies are in the early stages of planning or reviewing new land development within the CEA, or when the town is considering new land use legislation.

Forest and Stream Habitats

- **Minimize disturbance of soils or vegetation** on the ravine walls or rim or within 200 feet of the rim. Leave standing dead trees and downwood in place wherever possible.
- **Maintain a large forested area** around the ravine to help maintain stream water temperatures and flow volumes, protect the ravine walls from erosion, and protect the ravine nesting habitats for birds.
- **Avoid fragmenting large forests** in or near the ravine with new roads, driveways, yards, utility corridors, and other developed features. Locate new development near forest edges and leave the forest interiors intact wherever possible.
- **Limit tree cutting to the period between 1 November and 31 March** to avoid disturbing bats at their summer roosts.
- **Avoid direct disturbance of the stream or stream banks** in or near the ravine.
- **Prevent siltation, warming, and other forms of stream pollution** from upstream or upgradient sources.
- **Avoid or minimize applications of pesticides** in or near the ravines or the streams flowing through the ravines. Those substances (insecticides, herbicides, fungicides, algicides) can harm non-target plants, animals, fungi, and soil microbes that support ecosystem functions.
- **Prevent over-extraction of streamwater or groundwater** upstream or upgradient of the ravine.

Recreation

- **Do not open cool ravines for public uses**, except perhaps to discreetly located, restricted lookout platforms or for infrequent guided tours.
- **Minimize private recreational uses in spring through mid-summer** to avoid disturbing nesting birds.
- **Design access points and trails carefully** to protect streams, streams pools, and the sensitive soils and vegetation of the ravine walls. Limit access to interior ravine areas.

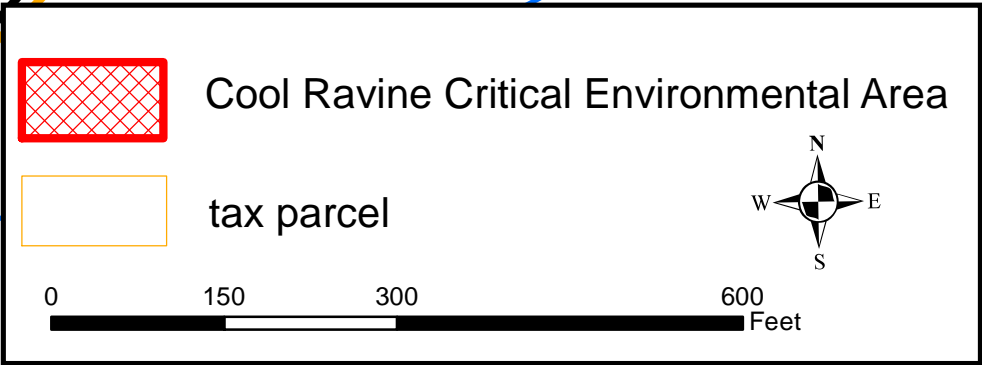
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Hollow Brook Ravine

County Road 9

Brown Lane



The legend box contains the following elements:

- A red hatched rectangle representing the Cool Ravine Critical Environmental Area.
- A yellow outline rectangle representing a tax parcel.
- A north arrow with 'N', 'S', 'E', and 'W' labels.
- A scale bar with markings at 0, 150, 300, and 600 feet.

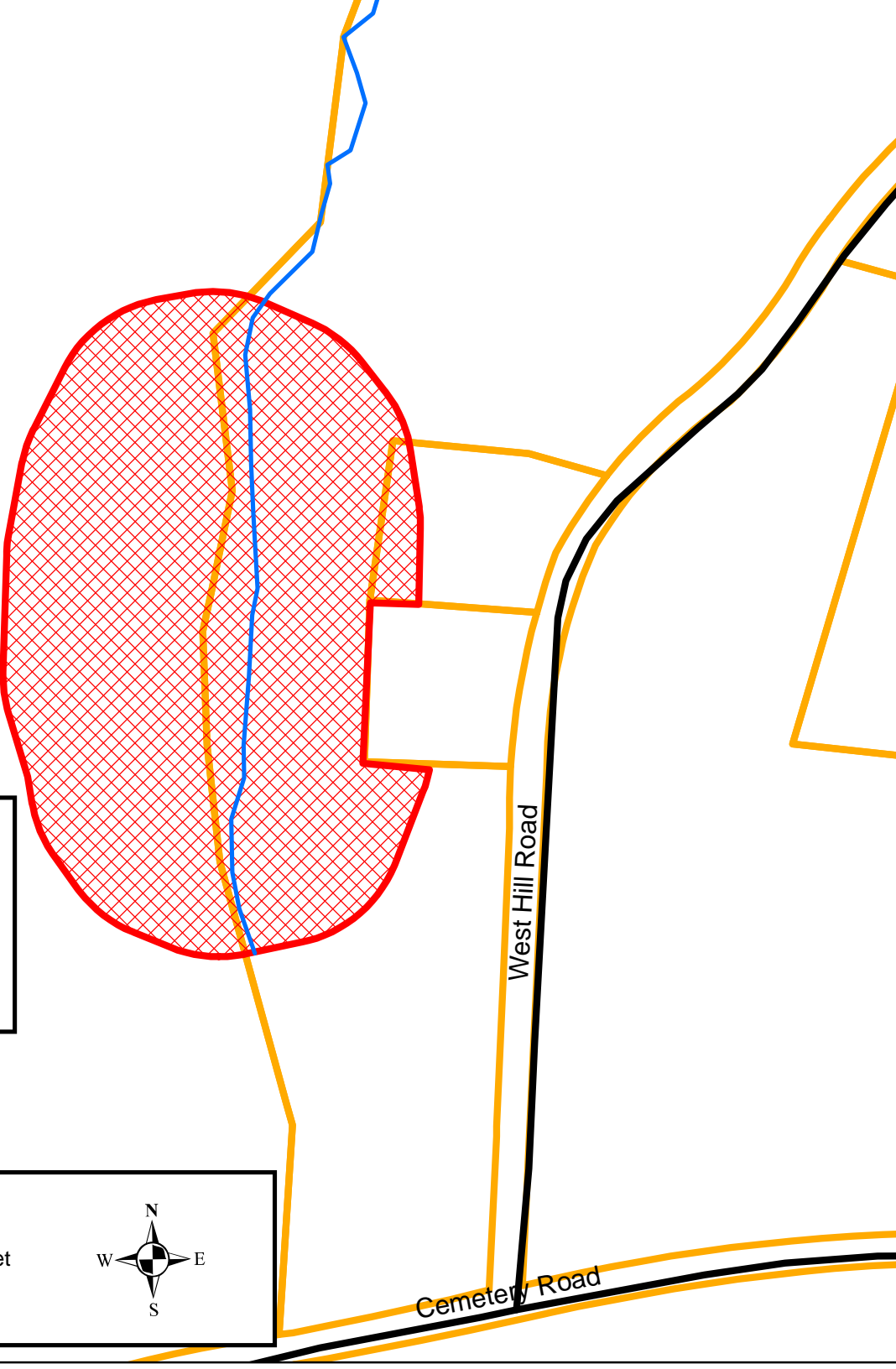
Cool Ravine Critical Environmental Area


tax parcel




0 150 300 600 Feet

West Hill Road Ravine



 Cool Ravine Critical Environmental Area

 tax parcel

0 250 500 1,000 Feet



A scale bar showing 0, 250, 500, and 1,000 feet. To the right is a compass rose with 'N' (North), 'S' (South), 'E' (East), and 'W' (West) directions.

Pool Hill Road & Old Mountain Road Ravines

