

Biological Resources

The term “biological resources” covers plants, animals, habitats, ecosystems, and landscapes, and includes the interactions with each other and the non-biological components of the environment. Both the biological and physical aspects (climate, sunlight, water, soils, bedrock, etc.) are essential to the habitats and ecosystems that support human communities and the natural world.



Darrow School students Marshal and Abe studying small streams, small wetlands, and ancient forests.
Peg Munves © 2017

There is no detailed map of habitats in New Lebanon, but Figure 11, which shows “land cover” identified from satellite imagery, provides a general picture of the forested and open lands, and some of the wetlands and other land cover features. In 2016-17, the New Lebanon Conservation Advisory Council and students at the Darrow School undertook a project to identify old forests that may never have been cleared for agriculture, and small streams and small wetlands that do not appear on publicly available maps. They used remote analysis of maps and aerial photos along with field visits to identify, verify, and correct their maps.

They have not yet covered the whole town, but Figure 10a—a sample of their work—shows some of the many streams that are omitted from public maps. The CAC’s work will alert town agencies to water resources and biological resources that might otherwise be ignored.

Many of the habitats of the Town of New Lebanon—e.g., deciduous and conifer forests, ledges, ravines, shrublands, meadows, swamps, marshes—are similar in character to those of other parts of Columbia County. General descriptions of these habitat types are in Kiviat and Stevens (2001), and below are some notes on their occurrence in New Lebanon, their ecological significance, and their services to the human community. Some of the plants and animals of these habitats, including rarities, are listed in Appendix B, as well as scientific names of plants mentioned throughout this document. The Research section (<http://hvfarmscape.org/our-research>) of the Hawthorne Valley Farmscape Ecology Program (FEP) website has lists of plants and animals found in their biological studies conducted throughout Columbia County, and an engaging blog describing and illustrating many plants and animals of the region (<https://hvfarmscape.wordpress.com/>).

The habitat profiles below are grouped into “upland habitats” and “streams, ponds, and wetland habitats.” In this context the term “upland” simply means “non-wetland;” it does not refer to elevation. Upland habitats can occur at high and low elevations, including along lowland stream corridors. The term “**wetland**” is used here in the technical sense as defined in the Code of Federal Regulations: “[An area that is] 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” (33 CFR 328.3[c][4]. Like upland habitats, wetlands can occur at any elevation, including hillsides and summits as well as lowland floodplains and basins and anywhere in between.

In the discussions below, plants and animals of statewide or regional conservation concern that have a formal designation as NYS Endangered, NYS Threatened, NYS Species of Special Concern, NYS Species of Greatest Conservation Need, or an Audubon Priority Bird are denoted with a superscript † symbol. The specific rarity ranks are given in Appendix B and explained in Appendix C. Appendix tables B-1, B-3, B-6, and B-8 list some of the rare species of Columbia County and New Lebanon. Scientific names of plants mentioned in the *NRCP* are given in Table B-9.



The black and white warbler nests on the floor of upland deciduous or mixed forests. Moy Wong © 2017

11. Land Cover

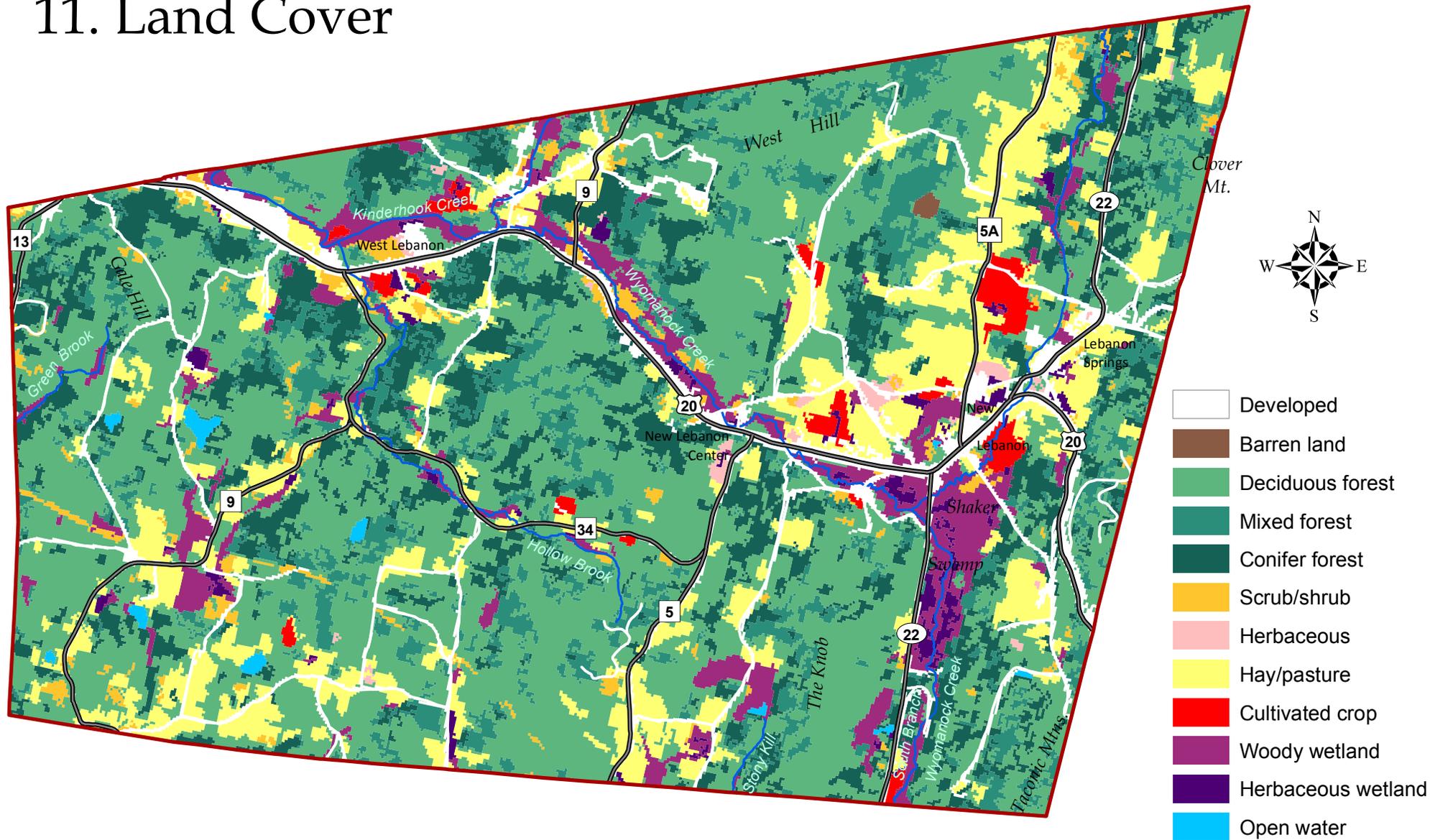
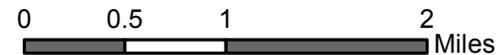


Figure 11. Land cover in the Town of New Lebanon, Columbia County, New York. See Figure 13 for more accurate depiction of non-forested, undeveloped land cover. New Lebanon Natural Resource Conservation Plan, 2017.



DATA SOURCE

Land cover data modified from the 2011 National Land Cover Database (NLCD), a 21-class land cover classification scheme based primarily on Landsat data and mapped at 30-meter resolution. NLCD created by the Multi-Resolution Land Characteristics Consortium (Homer et al. 2015) and available at www.mrlc.gov/nlcd2011.php. Map created by Hudsonia Ltd., Annandale, NY.



Hudsonia Ltd.

Upland Habitats

Upland Forests

Upland forests have provided timber resources to Native Americans and European settlers, and supplied the raw material for construction of most of the early houses, barns, mills, bridges, and other structures in the town. Ensuing generations have continued to manage and harvest timber for domestic and commercial uses.

Upland forests of all kinds provide habitat for a large array of wildlife, including many species of conservation concern. The particular characteristics of the forest—the size and shape of the forest patch, the plant community, the age and sizes of trees, the soil texture and chemistry, the proximity to other habitats, the kinds of past and current human disturbance—will determine how it is used by plants and animals.

Upland hardwood forests provide important nesting habitat for raptors, including red-shouldered hawk,[†] Cooper's hawk[†] sharp-shinned hawk,[†] broad-winged hawk,[†] great horned owl, and barred owl, and many species of songbirds, including warblers, vireos, thrushes, and flycatchers. American woodcock[†] forages and nests in young hardwood forests and shrublands. Acadian flycatcher, wood thrush,[†] cerulean warbler,[†] and scarlet tanager[†] are some of the birds that may require large forest-interior areas to nest successfully and maintain local populations in the long term.



Young sugar maple forest. Claudia Knab-Vispo © 2017

Conifer forests and groves are used by many species of owls for roosting and sometimes nesting. Pine siskin, red-breasted nuthatch, evening grosbeak, purple finch,[†] black-throated green warbler,[†] and blackburnian warbler[†] nest in conifer stands. American woodcock[†] sometimes uses conifer stands for nesting and foraging. Conifer stands also provide important habitat for a variety of mammals, including eastern cottontail, red squirrel, and eastern chipmunk (Bailey and Alexander 1960). Conifer stands provide winter shelter for white-tailed deer and can be especially important for them during periods of deep snow cover.

Mammals such as black bear, bobcat, and fisher require large expanses of forest, even though those animals hunt in, forage in, and travel through many other kinds of habitats. Hardwood trees larger than 5 inches diameter at breast height (dbh)—especially those with loose, platy bark such as shagbark hickory or sugar maple, deeply furrowed bark such as black locust, or dead snags with peeling bark—can be used by Indiana bat and other bats for summer roosting and nursery colonies. Such trees near good foraging sites such as stream corridors or meadows may be especially favorable. Many other small mammals are associated with upland hardwood forests, including eastern chipmunk, southern flying squirrel, and white-footed mouse. Higher densities of small mammals occur in forest areas with abundant logs and other woody debris, and these features are also favored by snakes such as black rat snake and black racer, which hunt widely in upland forests.



Questionmark, a butterfly of forests and forest edges. Conrad Vispo © 2017

While forests of any size can provide important wildlife habitat and ecological services, large forests are especially valuable for **area-sensitive wildlife** species, for maintaining high-quality surface and groundwater supplies, and for local and regional climate moderation. The subdivision of large forested tracts into residential lots acts to fragment the forests, especially when houses are set far apart from one another with long, separate driveways leading deep into the forest interior. This pattern of development divides forests into smaller blocks that are unsuitable for many area-sensitive wildlife species that require large habitat areas and are sensitive to human contact or disturbances.

Fragmentation of forests into smaller blocks increases the area of forest “edge” habitat with higher light and noise levels and often facilitates invasion by non-native plant species and by predators such as raccoons and domestic cats. Fragmentation makes the deep interior forest areas newly accessible to nest predators and to nest parasites (such as the brown-headed cowbird) whose activities are

ordinarily confined to forest edges. Roads and other developed areas dividing forests can furthermore act as significant barriers to wildlife movement, and many animals avoid breeding near human activities. The various “edge effects” of human disturbance (from roads, residential areas, and other development) may reach well over 330 feet into forest patches. Fragmentation likewise reduces the habitat value of large meadows and many other habitat types.

Figure 12 shows the large forest areas in New Lebanon, and the “**matrix forest**” and “**linkage zones**” identified by models developed by The Nature Conservancy and the New York Natural Heritage Program. Matrix forests are contiguous forest areas whose large size and intact condition allow them to support ecological processes and viable large-forest communities of plants and animals that cannot necessarily persist in smaller or poorer-quality forests. The linkage zones contain the forest blocks that may provide the best avenue of connectivity for the populations of plants and animals of the matrix forests; that is, the parts of the landscape that are most permeable to safe and efficient movement of migrating organisms between forest blocks. Some of these zones may be “stepping stone” patches, or stream corridors, and others may be broad areas of undeveloped land (NYNHP 2017). The matrix forests and linkage zones may become even more important with the warming climate, as plants and wildlife are forced to shift their ranges northward.

Area-sensitive wildlife need large, unfragmented forests to sustain local populations.

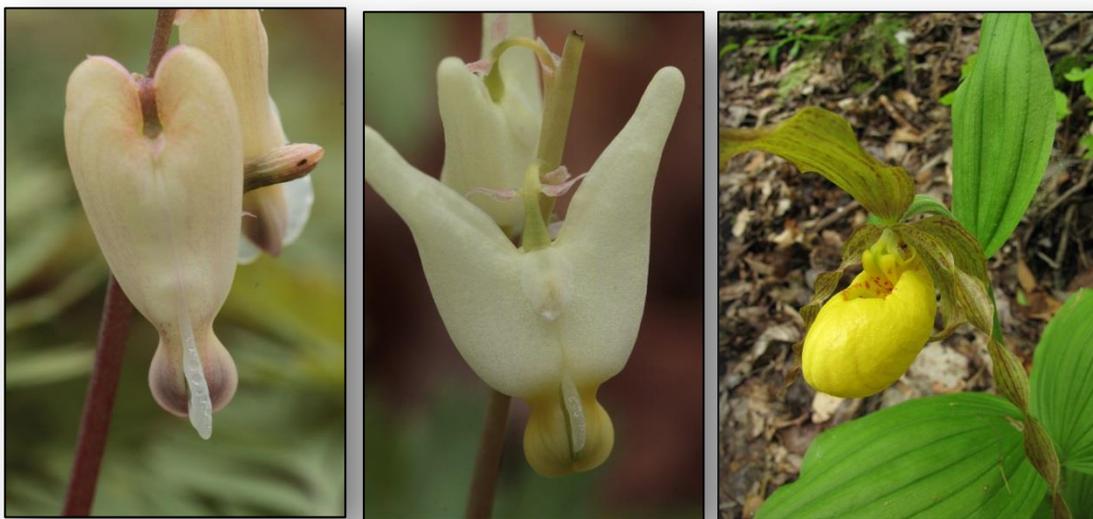
The forest patches shown in Figure 12 are classified by size to indicate one aspect of their potential significance. While small forests may also have significant value for biodiversity, water resources, and climate moderation, large forest patches are more likely to support an array of area-sensitive plants and animals whose populations cannot necessarily persist in smaller patches where they are subject to more disturbance from edge effects and human activities. Large forests are also likely to contain an array of forest communities as well as other embedded habitat types such as swamps, intermittent woodland pools, seeps, and ledges. Maintaining intact large forests will help to maintain the landscape connectivity between these communities and habitats, allowing safe movement of wildlife for their daily, seasonal, and longer-term migrations. For purposes of townwide planning and policy-making, as well as land management decisions on single land parcels, knowledge of the relative forest size can help prioritize areas for conservation.

In addition to their tremendous value for wildlife, forests are the most effective type of land cover for sustaining clean and abundant surface water (streams, lakes, ponds, and wetlands) and groundwater. Forests with intact canopy, understory, ground vegetation, and floors promote infiltration of precipitation to the organic duff and soils (Bormann et al. 1969, Likens et al. 1970, Bormann et al. 1974, Wilder and Kiviat 2008), and may be the best insurance for maintaining groundwater quality and quantity, for reducing rapid runoff and soil erosion, and for maintaining flow volumes, temperatures, water quality, and habitat quality in streams.

Because forests also provide long-term storage of large amounts of carbon in above-ground and below-ground biomass, maintaining and restoring forests can help to offset some of the carbon emissions of human activities. Forests help to moderate local and regional air temperatures and the water temperatures of streams and wetlands. Forests and other intact habitats in floodplains and adjacent areas help to accommodate the increasing frequency and magnitude of flood events. Carbon sequestration, wildlife habitats, local temperature moderation, water conservation, and flood resiliency, as well as biodiversity, should be among the factors considered when the town is assessing sites, landscapes, and potential conservation actions.

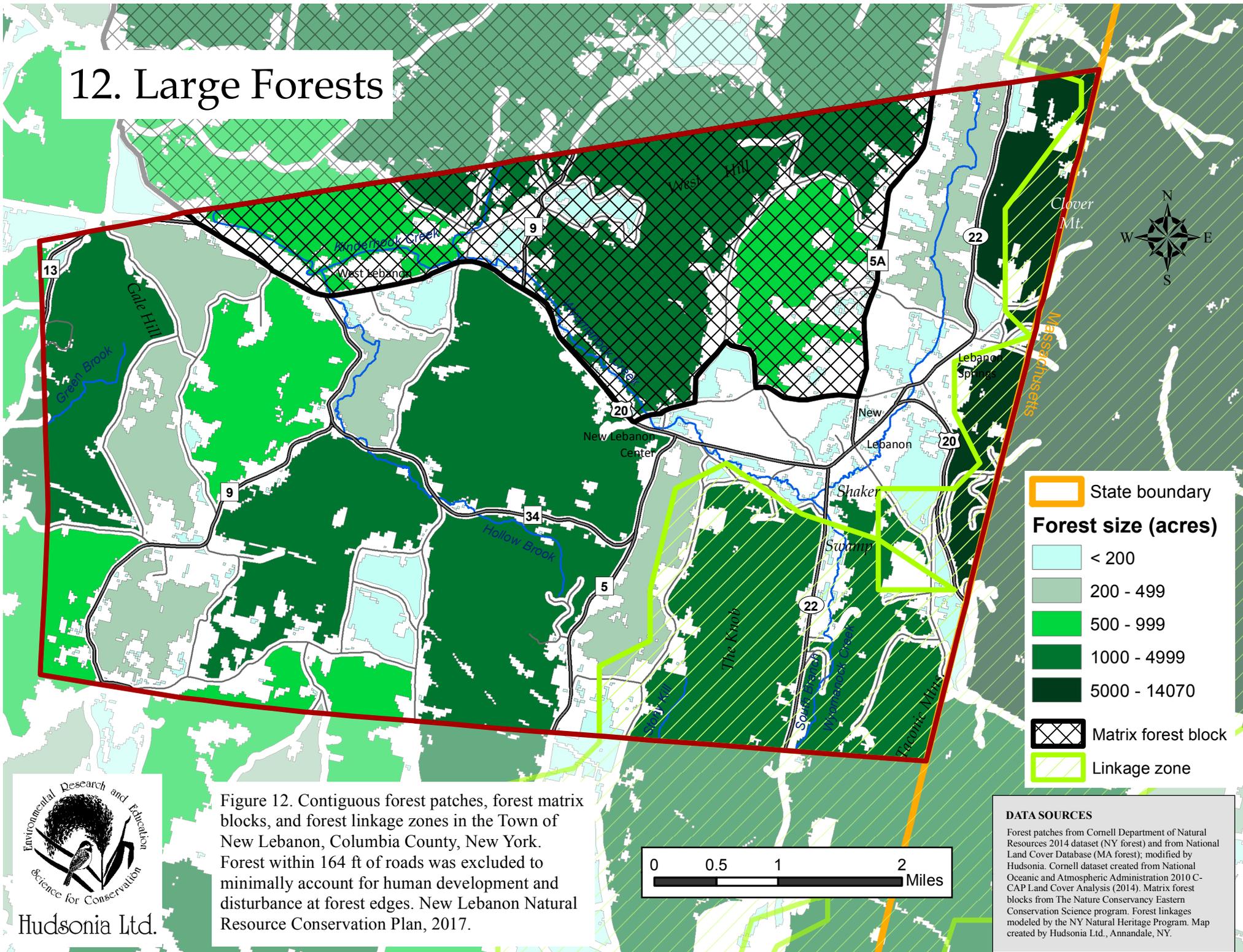
Hardwood deciduous trees predominate in the upland forests of New Lebanon, but forests of eastern hemlock and eastern white pine and mixed conifer and deciduous forests are well-represented throughout the town. Some of the large stands of white pine along parts of the Wyomanock and smaller streams may even be remnants of the “heavy forests of pine” that greeted the early European settlers (Ellis 1878). But most of the now-forested areas were cleared for agriculture in the late 1700s and early 1800s, and remained open well into the 20th century. Forests of very old trees are rare in the town, but large old trees are still common along old stonewalls, old hedgerows, and old roadways. Today over 70% of the town is forested, several patches of unfragmented forests exceed 1000 acres, and one patch that extends beyond the town boundaries exceeds 5000 acres (Figure 12).

Common tree species in New Lebanon upland forests include oaks (red, black, white, chestnut), maples (red, sugar), hickories (shagbark, pignut, bitternut), white ash, hop-hornbeam, American beech, black cherry, black birch, basswood, white pine, and eastern hemlock; less common are striped maple, white birch, yellow birch, and others. Common shrubs are witch-hazel, maple-leaf viburnum, spicebush, and serviceberry; and herbaceous plants on the forest floor are trout-lily,



Squirrel-corn, Dutchman's breeches, and yellow lady's-slipper are three uncommon plants of rich forests. Conrad Vispo © 2017

12. Large Forests



State boundary

Forest size (acres)

- < 200
- 200 - 499
- 500 - 999
- 1000 - 4999
- 5000 - 14070

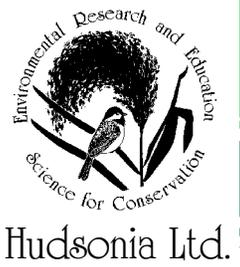
Matrix forest block

Linkage zone

DATA SOURCES

Forest patches from Cornell Department of Natural Resources 2014 dataset (NY forest) and from National Land Cover Database (MA forest), modified by Hudsonia. Cornell dataset created from National Oceanic and Atmospheric Administration 2010 C-CAP Land Cover Analysis (2014). Matrix forest blocks from The Nature Conservancy Eastern Conservation Science program. Forest linkages modeled by the NY Natural Heritage Program. Map created by Hudsonia Ltd., Annandale, NY.

Figure 12. Contiguous forest patches, forest matrix blocks, and forest linkage zones in the Town of New Lebanon, Columbia County, New York. Forest within 164 ft of roads was excluded to minimally account for human development and disturbance at forest edges. New Lebanon Natural Resource Conservation Plan, 2017.



Canada mayflower, starflower, white snakeroot, and white wood aster. Some forests or forest edges have non-native shrubs and forbs such as Bell's honeysuckle, common buckthorn, Oriental bittersweet, multiflora rose, winged euonymus (burning-bush), and garlic-mustard.

The calcium-rich soils in parts of New Lebanon support “**rich forest**” communities with many plants that are uncommon in the region, such as maidenhair fern, American ginseng, may-apple, blue cohosh, and leatherwood, and including abundant “**spring ephemeral**” wildflowers—those that bloom early before the leafy tree canopy has fully developed—such as bloodroot, hepatica, spring

New Lebanon’s “rich forests” have abundant spring ephemeral wildflowers.

beauty, squirrel-corn, cut-leaved and two-leaved toothworts, and wild ginger. Spring ephemerals are becoming rarer in the region due to the convergence of multiple factors such as over-grazing by deer, disruption of forest soils by humans

and by non-native earthworms, competition from non-native plants, and the warming climate (Barbour 2004, Gezon et al. 2016). Table B-1 (Appendix B) lists some of the plants and animals of conservation concern that are known to occur in New Lebanon forests, as well as those that occur in other forests of the region and may also occur here.

The Farmscape Ecology Program uses the term “**ancient forest**” to refer to forest areas that may never have been cleared for agriculture and other purposes, even though they may have been grazed or selectively cut for firewood or timber. Apparently because of their less-disturbed soils, ancient forests sometimes support an array of plants that are absent or rare in younger forests. For example, in Columbia County these forests tend to have significantly more eastern hemlock, yellow birch, chestnut oak, American chestnut, basswood, and witch-hazel, and forest herbs such as American ginseng, American spikenard, beechdrops, bush-honeysuckle, Canada violet, gaywings, and Dutchman’s breeches. These old forest areas are scarce

and declining due to land development (Vispo and Knab-Vispo 2012), but deserve conservation attention due to their unusual ecology and their support of many plant species that are themselves becoming rare in the region.

Loss of ancient forests may lead to the disappearance of rare species not found in younger forests.

Shrubland

Upland shrubland is a common habitat on abandoned farmland, in utility corridors, in cleared, burned, or blowdown forest areas, and in rocky areas with shallow soils. It is often a transitional habitat stage between upland meadow and young forest. Shrubland plant communities vary according to soils, age, past land uses, and recent management, but they often share many of the plant species of oldfields (see below), with plants such as Kentucky bluegrass, sweet vernal grass, timothy, bentgrass, pointed broom sedge, clovers, wild madder, common milkweed, spotted knapweed, goldenrods (early, wrinkle-leaved, grass-leaved), and yarrow, along with shrubs such as gray dogwood, meadowsweet, steplebush, multiflora rose, and autumn-olive.

Shrublands are used by many kinds of wildlife, including butterflies, bees, dragonflies, small mammals and their larger mammal predators such as fox and coyote, songbirds, turtles, and snakes. The complex habitat and microhabitat structure and diverse herbaceous (non-woody) communities often support diverse and abundant spiders, ground beetles, ants, and other invertebrates. Many species of conservation concern are known to use shrubland habitats in the region, including butterflies such as dusted skipper, † Leonard's skipper, and cobweb skipper (all regionally rare or scarce), nesting songbirds such as golden-winged warbler, † blue-winged warbler, † and American woodcock, † and mammals such as the New England cottontail. †

The latter species—very similar in appearance to the eastern cottontail (the common non-native species)—is our only native cottontail, but its populations have declined dramatically in the Northeast in recent decades. It seems to prefer large areas of shrubland with dense shrub thickets that provide protection from predators. New Lebanon is within the historic range of New England cottontail, and it is not known if the species occurs here today. The DEC is attempting to locate extant populations in the region and works with landowners in southeastern New York to develop and enhance shrubland habitats for this rabbit. For landowners interested in supporting the New England cottontail, the DEC website has information on managing shrublands especially for this rare and vulnerable species.



American robin (eggs and nestlings above) is well-adapted to human-settled landscapes. Moy Wong © 2017

Upland Meadow

The term “upland meadow” can include row cropfields, hayfields, pasture, and oldfields. Of these, cropfields have perhaps the least habitat value for native plants and animals, although even cropfields are used by rodents, nesting turtles, foraging snakes and songbirds, nesting killdeer, pollinating insects, and a host of other kinds of wildlife. Cropfields can act as ecological traps however, attracting animals that are then harmed or killed by farm equipment, pesticides, and other hazards. Hayfields, pastures, and oldfields, because of less frequent and less intensive disturbance, are more likely to support plants and animals of conservation concern.

Hayfields and pastures typically have non-native grasses and forbs such as Kentucky bluegrass, timothy, orchard grass, smooth brome, bentgrasses, clovers, vetches, wild madder, yarrow, and Queen Ann’s lace. Oldfields often have very diverse vegetation including species of pastures and hayfields along with many other such as broom sedge, common milkweed, knapweeds, asters, and goldenrods.



Oldfields become valuable habitats for butterflies, moths, bees, other insects, small mammals, and many other kinds of wildlife. Claudia Knab-Vispo © 2017

The ecological values of meadow habitats can differ widely according to the types of vegetation present and the disturbance histories (e.g. tilling, mowing, grazing, pesticide applications). Large (e.g., ≥ 10 acres) hayfields or pastures dominated by grasses, for example, may support grassland-breeding birds (depending on the mowing schedule or intensity of grazing) and many other kinds of wildlife, while intensively cultivated cropfields have comparatively little wildlife habitat value. Undisturbed meadows develop diverse plant communities of grasses, **forbs**, and shrubs and support an array of wildlife, including invertebrates, some frog species, reptiles, mammals, and birds. Meadows with shallow, nutrient-poor soils (especially common in mid-slope locations) often support a higher abundance and diversity of native, warm-season grasses and other native plants (Vispo & Knab-Vispo 2012). It is

13. Meadows

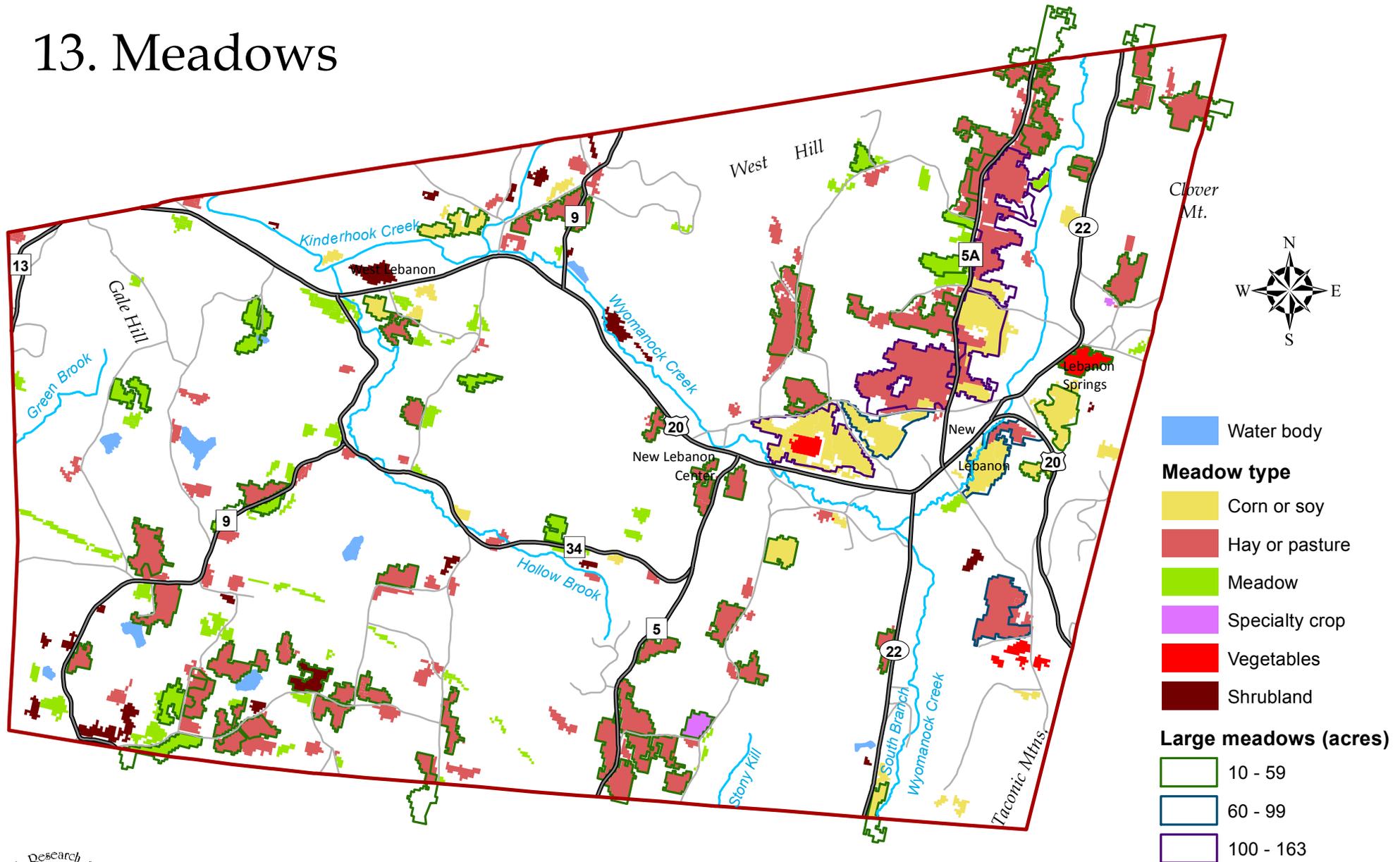


Figure 13. Uses and sizes of meadow, crop, and shrubland areas in the Town of New Lebanon, Columbia County, New York. New Lebanon Natural Resource Conservation Plan, 2017.

DATA SOURCE

Meadow, crop, and shrubland areas extracted from the 2011 National Land Cover Database (NLCD). (See Figure 11.) Land use data from field observations by New Lebanon Conservation Advisory Council, 2017. See Figure 2 for roads, streams, and waterbodies. Map created by Hudsonia Ltd., Annandale, NY.



for both present and potential ecological values that we consider all types of meadow habitat to be ecologically significant.

There are many statewide and regionally rare plants of oldfield habitats, including spring avens, purple milkwort, and late purple aster which are known to occur in New Lebanon (see Table B-1). Several species of rare butterflies, such as Aphrodite fritillary, meadow fritillary, dusted skipper,[†] Leonard's skipper, swarthy skipper, and striped hairstreak use upland meadows that support their particular host plants (see Table B-2). Upland meadows can be used for nesting by wood turtle,[†] spotted turtle,[†] box turtle,[†] painted turtle, and snapping turtle.[†] Wild turkeys forage on invertebrates and seeds in upland and wet meadows. Upland meadows often have large populations of small mammals (e.g., meadow vole) and can be important hunting grounds for their predators—raptors, foxes, and eastern coyote.

Grassland-breeding birds such as northern harrier,[†] grasshopper sparrow,[†] vesper sparrow,[†] savannah sparrow, eastern meadowlark,[†] and bobolink[†] use large meadows for nesting and foraging. Although bobolink or eastern meadowlark can nest successfully in a ten-acre meadow, other grassland species require meadows of 25, 50, or 100+ acres to maintain longterm breeding populations. Each species has its own requirements and preferences for vegetation type and structure (e.g., grasses vs. forbs, short or tall, dense or sparse, tolerance for shrubs, etc.), and sensitivity to the surrounding landscape. The grassland bird species nest on or near the ground and are sensitive to nest predators and nest parasites. The deep interior areas of large meadows provide some protection from those disturbances. Mowing or heavy grazing in spring or early summer is also likely to destroy nests or nestlings.

Upland meadows occur in all parts of New Lebanon, and large meadows are especially concentrated along County Route 5A and Cemetery Road (Figure 13).

Cool Ravine

The term “cool ravine” refers to a rare kind of ravine with very high, very steep rocky walls narrowly flanking a rocky stream that runs through the ravine bottom. New Lebanon has many ravines along its intermittent and perennial streams, but only a few cool ravines—a rare habitat in the town and the region.

Cool ravines may offer refuge to plants and animals stressed by the warming climate.

The walls of a cool ravine are typically forested with a mixture of hardwoods and eastern hemlock. The physical and biological structure of this habitat creates an unusually shady, cool, moist microclimate that often supports plants of more northern affinities, such as striped maple, mountain maple, Canada yew, yellow birch, red-berried elder, American spikenard, and hobblebush. Bryophyte cover (mosses and liverworts) is often

extensive. Ferns such as ebony spleenwort, walking fern, and purple-stemmed cliffbrake may be present if the rocks are calcareous. Stream salamanders such as northern dusky and northern two-lined salamander are likely to use cool ravine habitats, and spring salamander is a possibility. Slimy salamander may use the rocky ravine wall areas, and other terrestrial-breeding salamanders may be abundant there and in the surrounding forest. Rare and uncommon birds such as winter wren, Acadian flycatcher, blackburnian warbler,[†] and black-throated green warbler[†] sometimes breed in these habitats. Mammals may include woodland jumping mouse and southern redback vole, and small-footed bat[†] may roost in **talus** on the ravine walls.

New Lebanon has at least three cool ravines, and perhaps more that are yet undiscovered. These habitats 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 organisms stressed by the warming climate in the coming decades.

Ledge and Talus

In this document we use the term “ledge” for bedrock exposed at the ground surface, and “talus” for the fields of loose rock that often accumulate below steep ledges and cliffs. Some ledge and talus habitats support well-developed forests, while others have only sparse, patchy, and stunted vegetation. Ledge and talus habitats sometimes appear to be harsh and inhospitable, but they can support an extraordinary diversity of uncommon and rare plants and animals. Some species, such as wall-rue, smooth cliffbrake, purple-stemmed cliffbrake, and northern slimy salamander are found only in and near such rocky places in the region. The communities and species that occur at any particular location are determined by many factors, including bedrock type, outcrop size, aspect,

exposure, slope, elevation, biotic influences, and kinds and intensity of human disturbance.



Moss-covered calcareous ledge with walking fern, regionally uncommon. Claudiã Knab-Vispo © 2017

The rock chemistry helps to determine the kinds of biological communities that develop in these habitats. For example, ledge and talus of calcareous (calcium-rich) bedrock may have trees such as American basswood and butternut; shrubs such as bladdernut, American prickly-ash, and Japanese barberry; and

herbs such as wild columbine, ebony spleenwort, maidenhair spleenwort, maidenhair fern, and fragile fern. They can support diverse and abundant land snails and numerous rare plant species, such as walking fern, pale corydalis, and American ginseng. More acidic ledges and talus may have trees such as red oak, chestnut oak, eastern hemlock; shrubs such as lowbush blueberries, chokeberries, and scrub oak; and herbs such as Pennsylvania sedge, little bluestem, common hairgrass, bristly sarsaparilla, and rock polypody. Rare plants of non-calcareous ledges in the region (not yet known from New Lebanon) include mountain spleenwort, clustered sedge, and slender knotweed.

Ledge and talus areas often support rare and uncommon plants and animals

Northern hairstreak[†] (butterfly) occurs with oak species which are host plants for its larvae, and olive hairstreak occurs on open ledges with its host eastern red cedar. Rocky habitats with larger fissures, cavities, and exposed ledges may provide shelter, den, and basking habitat for black rat snake, black racer, and other snakes of conservation concern. Northern slimy salamander occurs in wooded ledge and talus areas. Breeding birds of these habitats include Blackburnian warbler,[†] worm-eating warbler[†], and cerulean warbler.[†] Turkey vulture sometimes nests in ledge and talus habitats. Porcupine and bobcat use ledge and talus for denning. Southern red-backed vole is found in some rocky areas, and eastern small-footed bat[†] roosts in talus habitat. Most of the ledgy areas in New Lebanon are on the steep forested slopes of the Taconic hills, The Knob, West Hill, Gale Hill, and other steep hillsides.

Gravel Mines

Numerous rare plant species—such as rattlebox, slender pinweed, field dodder, and slender knotweed—have been found in gravel mines in the region, and rare lichens and mosses may also occur in abandoned mines. Variegated horsetail and violet bush-clover (both regionally rare) occur in a New Lebanon gravel mine. Spotted turtle[†] and wood turtle[†] may use these habitats for foraging or nesting. Bank swallow and belted kingfisher sometimes nest in the stable walls of active or inactive portions of soil mines.

Bare, gravelly, or otherwise open areas provide nesting grounds for spotted sandpiper, killdeer, and possibly whip-poor-will[†] or common nighthawk.



Bank swallows sometimes establish nesting colonies in the walls of a gravel mine. Conrad Vispo © 2017

The biodiversity values of an abandoned gravel pit typically increase for a period of a few years after mining has ceased when vegetation remains relatively sparse. Over time as the former gravel pit becomes more vegetated and eventually reforested, these areas lose some of the unusual habitat values distinctive to gravel pits and become more similar to surrounding forests. Areas known to support a rare species or serve as an important turtle nesting habitat may need to be actively managed to maintain the sparse vegetation and substantially bare soil often required by these species.

Streams, Ponds, and Wetlands

Streams, Floodplains, and Riparian Corridors

The Wyomanock Creek, so named by the Mahicans, rises in Stephentown and enters New Lebanon near NYS Route 22 at the northeastern corner of the town, flows south to the hamlets of Lebanon Springs and New Lebanon, and then northwest to join Kinderhook Creek in West Lebanon. A large tributary—the Wyomanock South Branch—begins in the Taconic hills in Canaan, NY, and Richmond, MA, flows north through the Shaker Swamp, and joins the Wyomanock mainstem in the New Lebanon hamlet. The Wyomanock drains most of the eastern half of the town (Figure 9), and its entire watershed is approximately 9.5 square miles. It is fed by many of the spring-fed streams running off the Taconic hills, as well as other tributaries west of the New Lebanon hamlet.



Wyomanock Creek. Conrad Vispo © 2017

Kinderhook Creek rises in a valley in the Taconic hills in Hancock, MA, winds southwest through Stephentown, and dips only briefly into New Lebanon in the vicinity of the West Lebanon hamlet. From there it re-enters Stephentown for a short distance, and then flows generally west and southwest through the Town of Nassau and then Columbia County towns until joining Stockport Creek in the Town of Stockport, whence it enters the Hudson River. The entire length is 49 miles, and the entire watershed is 329 square miles, including all of the Town of New Lebanon.

Wyomanock Creek, Kinderhook Creek, Black River, several of their tributaries and several of the Stony Kill tributaries are classified as trout streams in their New Lebanon reaches, and the mainstems are classified as trout spawning streams (Figure 16). These designations are given to streams that have the clear, clean, cool water required by brown trout, brook trout,[†] slimy sculpin, and other coldwater fishes that do not thrive in warmer, more turbid, or more polluted streams. A

“trout spawning” designation indicates that the streams also have the coarse-textured, unsilted substrates needed for trout spawning and nursery habitat. Figure 16 shows the streams segments where wild native trout have been found in DEC fish surveys and the corridors identified as “Important Areas” for maintaining the habitats for coldwater stream organisms.

Trout streams are a disappearing resource in the Hudson Valley due to water pollution, stream-bed siltation, removal of forest canopies in the stream corridors, altered stream flows, and other consequences of human activities. The degradation of streams coincides with the decline of wild-reproducing populations of brook trout[†] and other organisms of high-quality coldwater streams. Brown trout (non-native) are stocked annually by the DEC in the Kinderhook Creek mainstem. They compete with brook trout for habitat and food resources, and may interfere with the growth of slimy sculpin, another fish of coldwater streams (Zimmerman and Vondracek 2007).

Clean, coldwater streams are no longer common in the region, due to siltation, loss of streamside shade, and water pollution.



Slimy sculpin, found in Kinderhook Creek, is a fish of clean, cool streams.
Conrad Vispo © 2017

Wood turtle[†] uses perennial streams with deep pools and recumbent logs, undercut banks, or muskrat or beaver burrows. It is known to use parts of Kinderhook Creek, and is also likely in parts of the Wyomanock and other perennial streams of New Lebanon. Perennial streams and their **riparian** zones, including gravel bars, provide nesting or foraging habitat for many species of birds, such as spotted sandpiper, belted kingfisher,[†] tree swallow, bank swallow, winter wren, Louisiana waterthrush,[†] great blue heron, American black duck,[†] and green heron. Red-shouldered hawk[†] and cerulean warbler[†] nest in areas with riparian forests, especially those with

extensive stands of mature trees. Many bat species, including Indiana bat,[†] northern long-eared bat, and eastern small-footed bat, use perennial stream corridors for foraging. Muskrat, beaver, mink, and river otter are some of the mammals that regularly use riparian corridors.

Intermittent streams, which generally flow only during certain times of the year or after rains or snowmelt, are the headwaters of most perennial streams, and are significant water sources for lakes, ponds, and many kinds of wetlands. The condition of intermittent streams therefore directly influences the water quantity and quality of those waterbodies and wetlands. Intermittent streams provide **microhabitats** not present in perennial streams, supply aquatic organisms and organic drift to downstream reaches, and can be important local water sources for wildlife (Meyer et al. 2007). Their loss or degradation in a portion of the landscape can affect the presence and behavior of

wildlife populations over a large area (Lowe and Likens 2005). Although intermittent streams have been little studied by biologists, they have been found to support rich aquatic invertebrate communities. Both perennial and intermittent streams provide breeding, larval, and adult habitat for northern dusky salamander, Allegheny dusky salamander, northern spring salamander, and northern two-lined salamander.

Intermittent streams provide valuable habitat and resources to wildlife and to downstream waterbodies

Streams of all kinds and sizes are greatly influenced by the condition of their **watersheds** (the land area that drains to the stream)—the topography, the land cover, the character of the soils and bedrock, and the kinds of land uses. They are also influenced by the condition of the stream corridor itself—the floodplain and the larger riparian corridor.

The “**floodplain**” is the area bordering a stream that is subject to flooding. Some streamside areas flood annually or more frequently, and some flood only in the largest storms or snowmelt events. Floodplains at some locations are just a few feet wide, and elsewhere are a half-mile wide or wider, depending on the local topography. Figure 14 illustrates the extent of the 100-year flood zone in New Lebanon identified by the Federal Emergency Management Agency (FEMA); this is the zone that, according to estimates based on historical flood records, has a 1% chance of flooding in any given year.

In all cases the floodplain serves critical roles in the stream ecology and flow dynamics. A well-vegetated floodplain helps to stabilize the streambank and reduce stream channel erosion, moderate stream water temperatures, and trap and remove sediment and pollutants from runoff and floodwaters. Characteristics of the topography, soils, and vegetation at any particular location govern the effectiveness of the streamside and floodplain habitats for providing these services. Well-vegetated floodplains also provide important habitat for terrestrial plants and animals, and contribute woody debris and other organic detritus to the habitat structure and food base for stream organisms (Wenger 1999). Many rare plants occur on streambanks and floodplains in the region, such as cattail sedge, Davis’ sedge, and goldenseal.

The environmental conditions of riparian corridors and floodplains strongly influence stream ecology and floodflows.

The “**riparian corridor**” can be loosely defined as the zone along a stream that includes the stream, stream banks, floodplain, and adjacent areas, but it can be delineated differently according to local conservation concerns. Intact riparian areas tend to have high species diversity and high biological productivity. Many species of animals depend on riparian areas in some way for their survival (Hubbard 1977, McCormick 1978).

Floodplains and riparian corridors support many different kinds of habitats, including wetland and non-wetland forests, shrubland, meadows, and ledges. Forested floodplains and corridors tend to be

the most effective at providing the stream protection and habitat services outlined above. In a study of floodplain forests in Columbia and Dutchess counties in 2007-2009, the Farmscape Ecology Program found a great diversity of plant and animal species, including many rarities, and many that are closely tied to the forested floodplain habitats. They found that “ancient” floodplain forests—that is, those that may never have been cleared—are a rare occurrence in the two counties, had a significantly higher diversity of native herbaceous plants than recently reforested floodplains, and had significantly lower densities of invasive shrubs. They concluded that ancient floodplain forest remnants are ecologically unusual, potentially irreplaceable, and deserve high priority for conservation, especially the larger examples of such forests (Knab-Vispo and Vispo 2010). Kinderhook Creek and Wyomanock Creek have several sizable areas of floodplain forest in New Lebanon, including some areas of “ancient” floodplain forest (Figure 15).

The Nature Conservancy developed the concept of the **Active River Area** to help describe the physical and ecological processes that drive and sustain a stream, and can inform stream protection strategies. The ARA includes five major components:

- material contribution zones, which regularly contribute organic and inorganic (e.g., sediments, water) material to streams;
- meander belts—the lateral areas within which the channel migrates over time;
- floodplains—the streamside areas that flood regularly or episodically;
- riparian wetlands;
- terraces—former floodplains that may still flood in the largest flood events.



Floodplain forests help to maintain cool streamwater temperatures, provide organic materials to the stream food web and habitat structure, and attenuate floodflows. Conrad Vispo © 2017

14. Active River Areas and FEMA Flood Zones

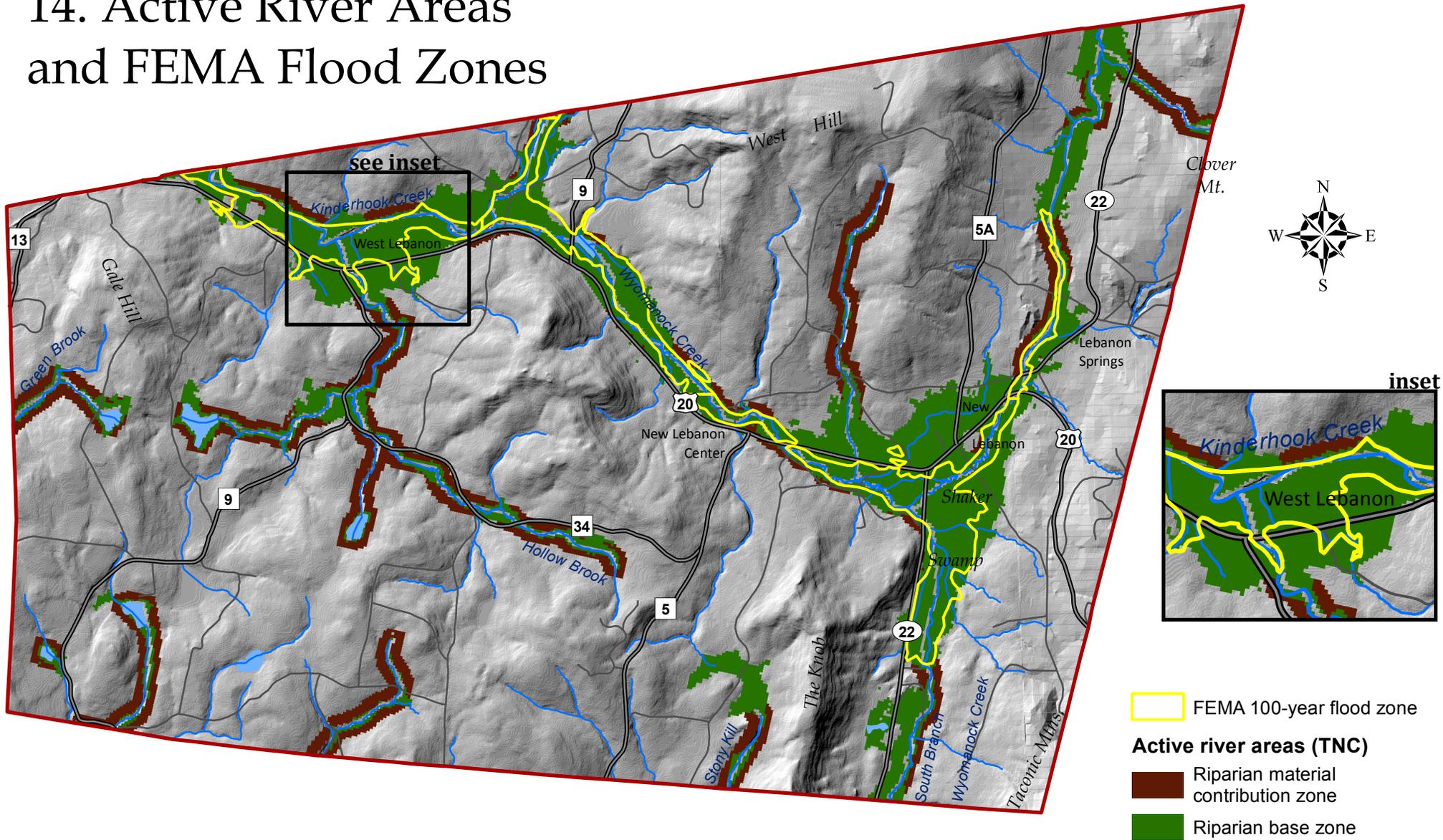


Figure 14. Active River Areas (ARA) and FEMA-designated flood zones in the Town of New Lebanon, Columbia County, New York. Inset shows close-up of ARA zones. FEMA 500-year flood zones were not available for New Lebanon. New Lebanon Natural Resource Conservation Plan, 2017.

DATA SOURCES

Flood zones from the Federal Emergency Management Agency. Active River Areas developed by The Nature Conservancy. See Figure 2 for relief-shading, roads, streams, and waterbodies. Map created by Hudsonia Ltd., Annandale, NY.



15. Floodplain Forests

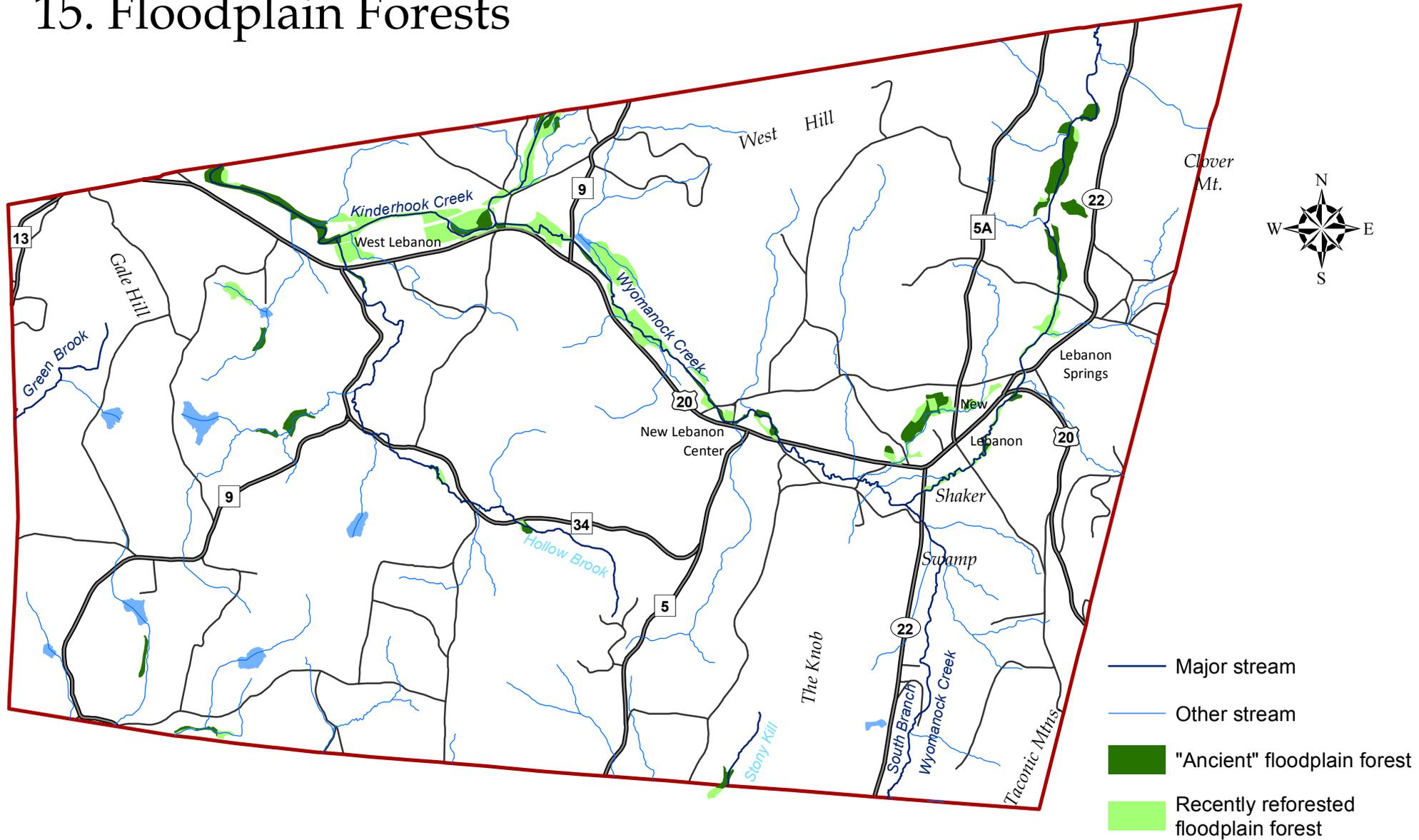
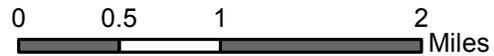


Figure 15. Floodplain forests in the Town of New Lebanon, Columbia County, New York. Wetland (swamp) forests on floodplains are not included. New Lebanon Natural Resource Conservation Plan, 2017.



- Major stream
- Other stream
- "Ancient" floodplain forest
- Recently reforested floodplain forest

DATA SOURCES
 Floodplain forests from the Hawthorne Valley Farmscape Ecology Program (Knab-Vispo and Vispo 2010). See Figure 2 for roads, streams, and waterbodies. Map created by Hudsonia Ltd., Annandale, NY.

The contributions of these five components encompass the major processes influencing the stream—system hydrology, sediment transport, processing and transport of organic materials, and key biotic interactions (Smith et al. 2008)—useful concepts when considering effective measures for stream conservation. Figure 14 shows the Active River Areas in the larger streams of New Lebanon and their relationship to the 100-year floodplain as mapped by FEMA. Sections below offer ideas for protecting the habitats of streams, floodplains, riparian corridors, and Active River Areas.

Ponds and Lakes

Here are profiled some of the biological aspects of constructed and natural open-water ponds and lakes. Open-water areas of natural wetlands are included in description of those wetlands, below.

The yards of many New Lebanon residences have constructed ponds built for the visual appeal, for recreation, or for fire control, and many farms have ponds built for watering livestock or for crop irrigation. Another reason often given for constructing an artificial pond is “for wildlife habitat.” While most backyard and farm ponds in New Lebanon are small—e.g., ≤ 2 acres—there are several much larger ponds or lakes—e.g., 10, 14, and 20 acres—constructed by excavation and/or damming of small streams.

The wildlife habitat values of constructed ponds—and especially the intensively managed ornamental ponds—do not ordinarily justify altering streams or intact wetland or upland habitats to create them. In most cases, the loss of ecological and wildlife habitat functions of the pre-existing natural habitats far outweigh any habitat value gained in the artificially-created environments. The habitat values of these ponds—large and small—vary depending on factors such as the character of the surrounding landscape, the extent of human disturbance, and degree of infestation by non-native species.



Juvenile (red eft) stage (left) and adult stage (right) of the red-spotted newt. In the juvenile/sub-adult stages, the red efts are entirely terrestrial in upland forests. The adults are aquatic residents of permanent ponds. Moy Wong and Conrad Vispo © 2017

In general, the habitat values are higher when ponds have undeveloped, unmanicured shorelines, are relatively undisturbed by human activities, have more native vascular plant vegetation, and are embedded within an area of intact habitat. Many constructed ponds, however, are not adequately buffered by undisturbed vegetation and soils, so they are vulnerable to the adverse impacts of agricultural runoff, septic leachate, pesticide or fertilizer runoff from lawns and gardens, and lights, noise, and other disturbances from nearby human activity. We expect that many maintained as ornamental ponds are treated with herbicides and perhaps other toxins, or contain introduced fish such as non-native grass carp and various game and forage fishes. Constructed ponds may nonetheless serve as potential habitat for a variety of common and rare species, so care should be taken to minimize those impacts. Ponds that were originally constructed by humans but have since reverted to a more natural state (e.g., allowed to revegetate, and become surrounded by unmanaged vegetation) can develop habitat values similar to natural ponds and wetlands.

The habitat values of *natural* open water areas are often greater than those of constructed ponds, since the areas tend to be less intensively managed, less disturbed by other human activities, and surrounded by undeveloped land. Open water areas can be important habitat for many common species, including invertebrates, fishes, frogs, turtles, waterfowl, muskrat, beaver, and bats. Open water areas sometimes support submerged aquatic vegetation that can provide important habitat for aquatic invertebrates and fish. Spotted turtle[†] uses ponds and lakes during both drought and non-drought periods, and wood turtle may overwinter and mate in open water areas. Wood duck, American black duck,[†] pied-billed grebe,[†] osprey,[†] bald eagle,[†] American bittern,[†] and great blue heron may use open water areas as foraging habitat. Bats, mink, and river otter also forage at open water habitats.

Emergent and submerged vegetation and unmanicured edges are likely to enhance the wildlife habitat values of a pond.

Springs and Seeps

Springs and seeps—places where groundwater discharges to the ground surface—are common on forested hillsides throughout New Lebanon. They often occur at the origin of a stream and at many places along the stream's length. They occur at the edges of and in the interiors of wetlands and ponds, as well as in upland (non-wetland) areas. Springs and seeps originating from deep groundwater sources flow more or less continuously and emerge at a fairly constant temperature, creating an environment at the surface that is cooler in summer and warmer in winter than the surroundings. For this reason, seeps and springs sometimes support aquatic species that are ordinarily found at more northern or more southern latitudes. The habitats created at particular springs and seeps are determined in part by the **hydroperiod** and the chemistry of the soils and bedrock through which the groundwater flows before discharging.

Springs and seeps help maintain stream flows and maintain the cool water temperature of streams—an important habitat characteristic for certain rare and declining fishes, amphibians, and other

aquatic organisms. Springs and seeps also serve as water sources for animals during droughts and in winters when other water sources are frozen.

Herbaceous plant diversity may be higher in seeps than in surrounding upland forest (Morley & Calhoun 2009). Golden saxifrage is an uncommon plant more-or-less restricted to springs and groundwater-fed wetlands and streams. Northern dusky salamander and spring salamander use springs and cool streams. A few rare invertebrates are restricted to springs, and gray petaltail[†] and tiger spiketail[†] are two rare dragonflies found in seeps elsewhere in the region. Springs emanating from calcareous bedrock or calcium-rich surficial deposits sometimes support an abundant and diverse snail fauna.



Cynthia Creech (CAC) and Gretchen Stevens (Hudsonia) at a forested seep in central New Lebanon. David Farren © 2017

Intermittent Woodland Pool

An **intermittent woodland pool** is a small wetland partially or entirely surrounded by forest, typically with no surface water inlet or outlet (or an ephemeral one), and with standing water during fall, winter, and spring that dries up by mid- to late summer during a normal year. This habitat is a forest subset of the widely recognized “**vernal pool**” habitat which may occur in forested or open settings. Seasonal drying and the lack of stream connection ensure that these pools do not support fish, which are major predators on amphibian eggs and larvae. Intermittent woodland pools provide critical breeding and nursery habitat for a special group of amphibians—wood frog, Jefferson salamander, and spotted salamander—that require these fish-free habitats for successful reproduction. (Although marbled salamander, which also breeds in woodland pools, is not known to occur as far north as New Lebanon, climate warming could allow it to move into this region.) The surrounding forest supplies the pool with organic detritus—the base of the pool’s food web—and is the essential habitat for adult pool-breeding amphibians during the non-breeding season. These pools are also used by other amphibians such as spring peeper, blue-spotted salamander[†] and four-toed salamander.[†] Despite the small size of intermittent woodland pools, those that hold water

Intermittent woodland pools and the surrounding forests comprise the critical habitat complex for pool-breeding amphibians.

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through early summer can support amphibian diversity equal to or higher than that of much larger wetlands (Semlitsch and Bodie 1998, Semlitsch 2000).

Reptiles such as wood turtle,[†] spotted turtle,[†] and eastern ribbon snake[†] use intermittent woodland pools for foraging, rehydrating, and resting. Wood duck, mallard, and American black duck[†] use intermittent woodland pools for foraging, nesting, and brood-rearing, and a variety of other waterfowl and wading birds forage in these pools. The invertebrate communities of these pools can be rich, and include organisms such as fingernail clams and fairy shrimp whose life cycles depend on the seasonal drying. Springtime physa is a regionally rare snail associated with intermittent woodland pools. Clam shrimp occur in intermittent woodland pools and other temporary pools. The invertebrates provide abundant food for songbirds, such as yellow warbler, common yellowthroat, northern waterthrush, and other wildlife. Large and small mammals use these pools for foraging and as water sources. False hop sedge (NYS Threatened) and other rare plants occur in intermittent woodland pools elsewhere in Columbia County and could occur here in New Lebanon.

New Lebanon has few intermittent woodland pools compared to many other Columbia County towns. Most do not appear on federal or state wetland maps, and some occurrences may be unknown even to landowners, but the CAC is conducting field investigations to identify and map the woodland pools and small streams wherever possible.



Vernal pools support many animals that depend on both the temporary water in winter and spring, and drying-up in summer. Claudia Knab-Vispo © 2017

Swamp

“Swamp” is an ecologists’ term for a wetland dominated by woody vegetation—i.e., trees or shrubs. There are many forested and shrub swamps around New Lebanon; the largest are concentrated in the Wyomanock and Kinderhook creek valleys (called “woody wetlands” in Figure 11). Swamps are very variable in their plant composition, vegetation structure, and hydrology.



Marsh-marigold and brome-like sedge, typical plants of New Lebanon’s hardwood swamps. Claudia Knab-Vispo © 2017

Swamps are important to a wide variety of birds, mammals, amphibians, reptiles, and invertebrates, especially when they are contiguous with other wetland types or embedded within large areas of upland forest. Hardwood and shrub swamps along the floodplains of clear, low-gradient streams can be an important component of wood turtle[†] habitat. Other turtles such as spotted turtle[†] and box turtle[†] frequently use swamps in a variety of settings for summer foraging, drought refuge, overwintering, and travel corridors. Pools within swamps are used by several pool-breeding amphibian species, and are the primary breeding habitat of blue-spotted salamander.[†] Four-toed salamander,[†] somewhat uncommon in the region, uses swamps with rocks or abundant, moss-covered, downed wood or woody hummocks. Eastern ribbon snake[†] forages for frogs in swamps. Red-shouldered hawk,[†] barred owl, great blue heron, wood duck, American black duck,[†] and Canada warbler[†] nest in hardwood swamps.

In New Lebanon, large areas of forested and shrub swamps occur along the Wyomanock Creek mainstem and South Branch (including Shaker Swamp), along Kinderhook Creek and on a tributary to Hollow Brook in New Britain (Figure 11). Small swamps are here and there throughout the town.

In 2007-2012 the Farmscape Ecology Program conducted a biological survey of the Shaker Swamp, a 250-acre wetland complex on the Wyomanock South Branch and mainstem. The “swamp”

includes areas of marsh and wet meadow in addition to hardwood and mixed forest swamp and shrub swamp. Island and shoreline areas include upland hardwood, mixed, and conifer forest, and calcareous cliffs and boulders. The wetland is in a broad valley underlain by marble bedrock (figures 5 and 10), and the plant communities reflect the calcium-rich nature of the water and soils. FEP found several uncommon plant communities in the wetland, including an area of red maple/black ash swamp. In and near the wetland they observed (among many other organisms) mink, fisher, bobcat, and beaver, several rare and uncommon butterflies and dragonflies, and many uncommon plants of calcareous habitats. Details of their findings are in *Shaker Swamp: A Preliminary Ecological Description* (Knab-Vispo and Vispo 2012), a report to the Shaker Swamp Conservancy.

Marsh

A “**marsh**” is a wetland that has standing water for most or all of the growing season and is dominated by herbaceous (non-woody) vegetation. Marshes often occur at the fringes of deeper water bodies (e.g., lakes and ponds), or in close association with other wetland habitats such as wet meadows or swamps. The edges of marshes, where standing water is less permanent, often grade into wet meadows. Cattails, tussock sedge, common reed, arrow arum, broad-leaved arrowhead, water-plantain, and purple loosestrife are some typical emergent marsh plants in this region. Some marshes are dominated by floating-leaved plants such as pond-lilies, water-shield, and duckweeds.

Several rare plant species are known from marshes in the region, and the diverse plant communities of some marshes provide habitat for butterflies such as the Baltimore checkerspot, monarch, and northern pearly eye. Marshes are also important habitats for reptiles and amphibians, including northern water snake, eastern painted turtle, snapping turtle, spotted turtle,[†] green frog, pickerel frog, and spring peeper, among others. Numerous bird species, including marsh wren, American bittern,[†] least bittern,[†] great blue heron, American black duck,[†] and wood duck use marshes for nesting or as nursery habitat. Pied-billed grebe also nests in this habitat where it occurs adjacent to open water areas. Many raptors, wading birds, and mammals use marshes for foraging.

In New Lebanon, marshes occur within larger wetlands such as the Shaker Swamp, in beaver ponds, here and there at the edges of other wetlands and along streams.

Wet Meadow

A “**wet meadow**” is a wetland dominated by herbaceous (non-woody) vegetation and lacking standing water for most of the year. Its period of inundation is longer than that of an upland meadow, but shorter than that of a marsh. Some wet meadows are dominated by purple loosestrife, common reed, reed canary-grass, or tussock sedge, while others have a diverse mixture of wetland grasses, sedges, forbs, and scattered shrubs. Bluejoint, mannagrasses, woolgrass, soft rush, blue flag, sensitive fern, and marsh fern are some typical plants of wet meadows.

Wet meadows with diverse plant communities may have rich invertebrate faunas. Blue flag and certain sedges and grasses of wet meadows are larval food plants for a number of regionally-rare butterflies. Wet meadows provide foraging habitat for spotted turtle,[†] smooth green snake, American woodcock,[†] American bittern[†] and Virginia rail.[†] Wet meadows that are part of extensive meadow areas (both upland and wetland) may be especially important to species of grassland-breeding birds. Large and small mammals use wet meadows and a variety of other meadow habitats for foraging.

Wet meadows are widely distributed in New Lebanon, in hayfields, pastures, and oldfields, and at the edges of marshes, swamps, and other wetlands. Many are small, and most (whether small or large) do not appear on state or federal wetland maps.

Circumneutral Bog Lake

A “circumneutral bog lake” is a spring-fed, calcareous water body that commonly supports vegetation of both acidic bogs and calcareous marshes (Kiviat and Stevens 2001). These lakes typically have a deep organic substrate, mats of floating vegetation, drifting peat rafts (that sink in winter and rise to the surface in spring), and abundant submerged and floating-leaved plants such as bladderworts, pondweeds, fragrant pond-lily, and watershield.

Peat mats of circumneutral bog lakes often have bog plant communities with extensive carpets of *Sphagnum* mosses, leatherleaf, cranberries, pitcher-plant, and sundew. Shoreline areas may support cattails, purple loosestrife, water-willow, alder, buttonbush, and leatherleaf. The lakes may have shrubby or forested swamps, calcareous wet meadows, and/or fens at their margins.



Rose pogonia, Loesel's twayblade (orchids) and the insectivorous round-leaved sundew, uncommon plants in New Lebanon's circumneutral bog lake. Conrad Vispo and Claudia Knab-Vispo © 2017

In New Lebanon we know of just one circumneutral bog lake, in the vicinity of The Knob, but there may be others yet undiscovered. This is a rare habitat type in the region and is known to support many rare and uncommon species of plants and animals, including rare sedges, orchids, and submerged aquatic plants. In New Lebanon we know of Loesel's twayblade,[†] hiddenfruit bladderwort,[†] and large cranberry (all rare in Columbia County) in this habitat. Animals of conservation concern associated with circumneutral bog lakes include eastern ribbon snake,[†] spotted turtle,[†] blue-spotted salamander,[†] marsh wren,[†] and river otter. These habitats have also been found to support diverse communities of mollusks, dragonflies, and damselflies. In Dutchess, Ulster, and Orange counties, circumneutral bog lakes are the core habitat for the northern cricket frog (NYS Endangered). The species is not known to occur north of Dutchess County, but could move northward into suitable habitats in the coming decades in response to a warming climate.

Special Habitat Areas

Significant Biodiversity Areas

The DEC identified twenty-two “Significant Biodiversity Areas” (SBAs) throughout the ten counties of the Hudson River estuary corridor. One of these, the Taconic Ridge SBA (Figure 16), runs along the eastern border of Rensselaer, Columbia, and Dutchess counties, and is notable for its large areas of contiguous, high-quality forests. These forests, which extend into Connecticut, Massachusetts, and Vermont, support numerous species of regionally rare and state-listed rare and uncommon plants and animals, and are a primary recharge area for the wetlands and streams of the lowlands to the west (Penhollow et al. 2006). The large forests provide wintering and breeding habitat for diverse songbirds and raptors and the ridge serves as an important bird migration corridor.

This SBA is by no means the only significant area for biodiversity in New Lebanon, but it has been recognized for especially high concentrations of important, unusual, and vulnerable biological features.

Areas of Known Importance

The New York Natural Heritage Program (NYNHP) has identified “Areas of Known Importance” for biodiversity throughout the state. These are areas deemed to be important for the continued persistence of rare plants, rare animals, and significant ecosystems, identified through analysis of known occurrences of exemplary ecological communities or rare species, their life histories and habitats, and the physical and hydrological features of the landscape. The Town of New Lebanon has two of these areas—the beech-maple mesic forest on the The Knob, and the sensitive coldwater stream habitats supporting wild native brook trout (Figure 16).

Although beech-maple forests are not uncommon in the region, this is an especially high-quality example of the community type. The mapped areas for coldwater streams (Figure 16) include wild brook trout locations identified in DEC fish surveys since 1980, and corridors along associated

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stream and waterbody segments and streamside areas most likely to affect the quality of the stream habitat. Most of the mapped areas have no public fishing rights, however, and many are unsuitable for recreational trout fishing due to small fish populations and small fish size.

The identification of Significant Biodiversity Areas and Areas of Known Importance is intended to guide conservation planning, environmental reviews of land development projects, and other land use decision-making, but neither of these designations has any regulatory power. The purpose of the designation is to alert landowners, developers, municipal agencies, and other land use decision-makers to the importance of these areas to unusual biological features, and the potential for impacts to rare species and rare communities, so that the most sensitive areas can be protected.

When new land uses are contemplated in or near an SBA or an Area of Known Importance, people are encouraged to contact the NYNHP to learn more about the particular elements of concern in the vicinity. These areas are not to be interpreted, however, as the only areas of conservation concern, or the only areas where rare species may occur. Many parts of the landscape have never been surveyed for exemplary habitats or rare species, so no one knows the other places where these elements might occur. For these reasons, the Important Areas or SBA maps should never be used as substitutes for onsite habitat assessments or rare species surveys where such studies are warranted. Nonetheless, the maps are a useful depiction of areas of known importance for rare plants and animals.



Wet meadow/marsh at an abandoned beaver pond, Gilson property.
Peq Munves © 2017

16. Special Biological Resources

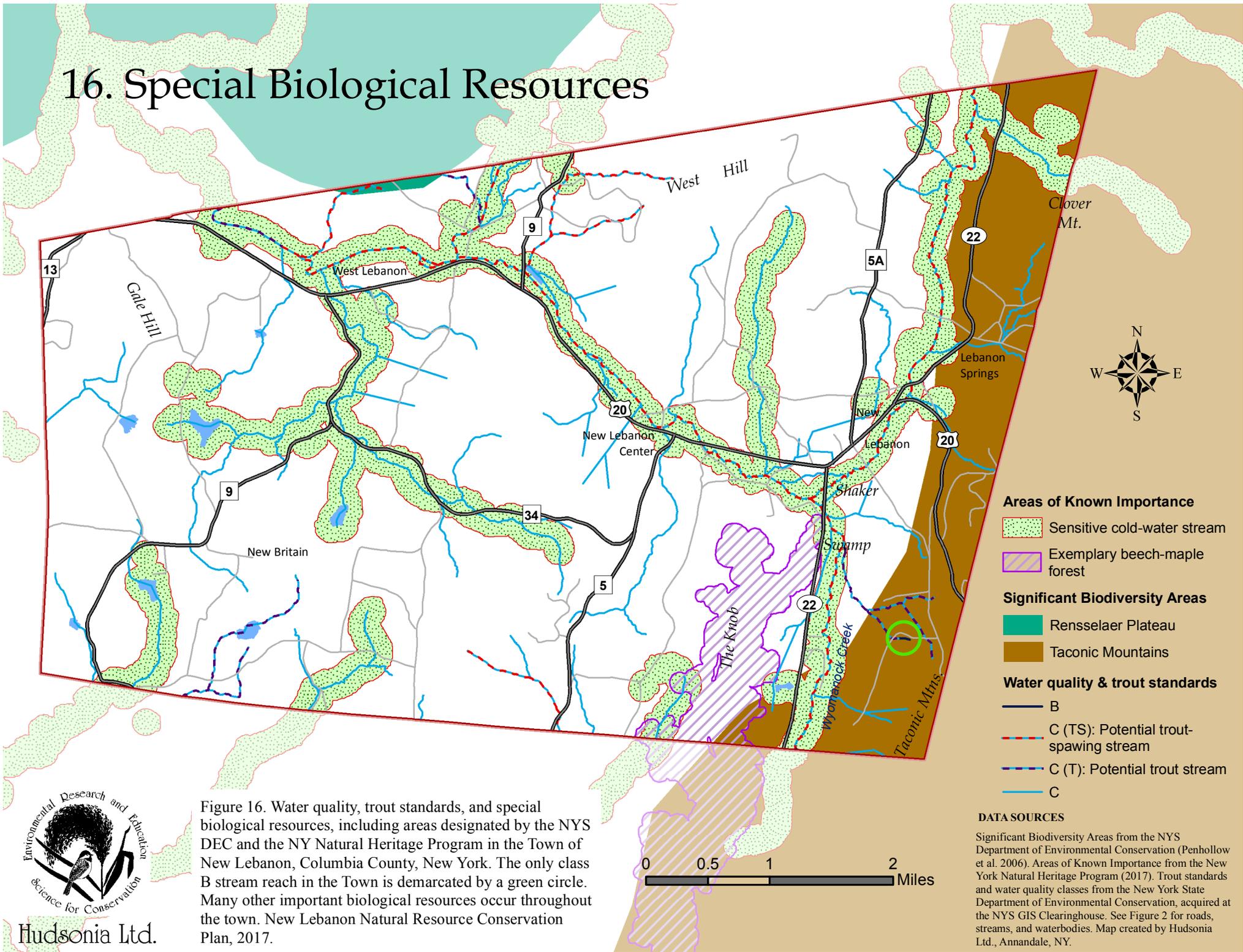


Figure 16. Water quality, trout standards, and special biological resources, including areas designated by the NYS DEC and the NY Natural Heritage Program in the Town of New Lebanon, Columbia County, New York. The only class B stream reach in the Town is demarcated by a green circle. Many other important biological resources occur throughout the town. New Lebanon Natural Resource Conservation Plan, 2017.



Conservation of Biological Resources

Protecting large contiguous areas of undeveloped land will protect the habitats of area-sensitive wildlife species that require large habitat patches to fulfill their life history needs, and will also protect the array of natural communities in each area, even those of which we are yet unaware.

We encourage the town to identify all ecologically significant habitats or communities (such as calcareous and acidic ledges, upland deciduous forests, upland shrublands, conifer swamps, intermittent woodland pools, circumneutral bog lakes, intermittent streams), as well as habitats and habitat complexes critical to particular plant and animal species of conservation concern. Once such areas have been identified, either townwide or on a particular site, landowners and town agencies will be better equipped to consider the sensitivities of those areas in the design of new land uses.

Protecting habitats and habitat complexes critical to particular plant and animal species of conservation concern will provide an umbrella for many other species using the same habitats and landscapes. For example, for the wood turtle, a broad (e.g., 3000-ft wide) zone centered on low-gradient perennial streams with undeveloped riparian zones would encompass most of the turtle's summer migrations for foraging and nesting (Fowle 2001), and would also cover the habitat areas used by a host of other wildlife of stream corridors. While the entire zone need not be set aside for conservation, proposed land development in that zone could be designed to maintain broad connectivity between the stream and the various other habitats used by the turtle.

For pool-breeding amphibians, such as wood frog, and Jefferson and spotted salamander, maintaining large areas of surrounding forest and intact forested connections between clusters of intermittent woodland pools (within 1,500-ft of each other) would help to protect local populations. These animals need to move safely between critical breeding, foraging, and overwintering habitats and need safe routes between pools to facilitate population dispersal and genetic exchange. Such habitat complexes also provide habitat for many other forest and pool wildlife species. Proposed land development in that zone could be designed to maintain broad connectivity between pools and the forest. For the black racer (snake) contiguous habitats within a 1.5-mile radius around forested and open ledges would encompass much of the snake's denning, breeding, and basking areas, as well as critical areas for foraging and dispersal migrations (Todd 2000). The design of proposed land development within that zone could accommodate broad connections between the ledges and the other habitats likely to be used by the snake.

The conservation of large forests will help to protect habitat for plants and animals of conservation concern, maintain habitat connectivity, facilitate species' movement in a changing climate, protect groundwater and surface water resources, promote and maintain high levels of carbon sequestration, and preserve scenic viewsheds. The forests of the Taconic Hills have been recognized for their

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3global significance, but are threatened with loss and fragmentation from residential sprawl development and other disruptive uses.

According to The Nature Conservancy's analysis (Figure 12), New Lebanon is part of a significant landscape corridor connecting large parts of the Northeast. These areas may be especially important, both as large contiguous habitat areas and also as movement corridors for wildlife. Other corridors are evident on figures 11 and 12 that may be equally significant for wildlife on a regional scale.

The general measures for biological resource conservation (next page) are based on some of the ideas explained above, and these basic principles:

- Many wildlife species of conservation concern require habitat complexes to fulfill their life needs.
- Large, intact, well-connected land areas representing all elevational gradients and significant land forms (such as hill summits, side slopes, ravines, high- and low-elevation valleys), bedrock types, and hydrological conditions will help to conserve landscapes, ecosystems, habitats, and species of conservation concern.
- Large, intact, well-connected land areas provide the greatest opportunities for adaptations and safe migration of wildlife and plants to new habitat areas as climate change renders their traditional habitats unsuitable.
- Working lands (e.g., forests for timber harvest, meadows for agriculture) are most viable in large blocks instead of small patches.
- Broad buffer zones of undisturbed soils and vegetation help to protect sensitive areas from the adverse effects of human activities.



May-apple is an uncommon plant of forests and forest edges on calcium-rich soils. This large patch was at the Darrow School. David Farren © 2017

GENERAL MEASURES FOR BIOLOGICAL RESOURCE CONSERVATION

- For townwide planning, consider ways to protect areas **representing all significant landforms** and the full array of elevations, bedrock geology, and surficial geology that occur in New Lebanon.
- **Direct human uses toward the least sensitive areas**, and minimize alteration of natural features, including vegetation, soils, bedrock, and waterways.
- Protect habitat areas in **large, broad configurations** wherever possible, with broad connections to other habitat areas.
- Maintain and restore **landscape connectivity** between large habitat areas wherever possible.
- **Avoid fragmentation of large forest patches** by roads, driveways, clearings, and other disturbances that open the forest canopy.
- **Avoid fragmentation of large meadow and contiguous farmland** by roads, driveways, or other non-farm uses.
- **Maintain broad buffer zones** of undisturbed vegetation and soils around ecologically sensitive areas.
- **Protect habitat complexes for species of conservation concern** wherever possible.
- **Minimize impervious surfaces** and design new land uses (and retrofit existing uses wherever possible) to ensure that surface runoff of precipitation and snowmelt does not exceed pre-development patterns and volumes of runoff.
- **Concentrate new development along existing roads**; discourage construction of new roads in undeveloped areas.
- In working forests, **employ sustainable forestry practices that promote tree species diversity and structural diversity**, protect soils from erosion, and protect streams from direct disturbance or siltation.
- **Employ sustainable agricultural practices that build living soils and conserve water.**
- **Where possible, promote wildlife-friendly agricultural practices**, such as late mowing to accommodate ground-nesting grassland birds, leaving unmowed strips and fallow rotations to support pollinators and other invertebrates, and minimizing applications of pesticides and fertilizers.
- **Consider environmental concerns early in the planning process** for new development projects, and incorporate conservation principles into the choice of development sites, site design, stormwater management, and construction practices.

Farmland Resources

Farming in New Lebanon

Much of the New Lebanon landscape had already been opened up for pasture, grain production, and other agriculture, but the sheep boom of the early 1800s spurred the opening of more land on the steep hillsides and high elevations that were unsuitable for other kinds of agriculture. By 1835 much of the formerly forested land in the region had been cleared—a pattern widespread throughout the Hudson Valley and New England (Vispo 2014). Although the Albany-to-Boston stage road and other roads facilitated commerce between New Lebanon and nearby towns, starting in 1852 the railroad with stations in the hamlets of West Lebanon, New Lebanon, and Lebanon Springs greatly improved the marketing and transport of agricultural and other products to distant places (Ellis 1878).

Dairy farming was prominent in the Hudson Valley region through much of the 20th century, but was declining by the 1980s (Vispo 2014). Nearly 1,000 head of Jerseys (more than 400 at Fairweather Farm, 150 at Shaker View Farm, 120 at Tom Benson's farm, 115 at a Chittenden farm in Stephentown, a huge herd at High Lawn Farm in Lee, MA) were milked in the region as late as the 1990s, in aggregate the largest Jersey concentration in the eastern US at a time when most dairy farms had switched to Holsteins (Barbara Benson, pers. comm. to David Farren).



Pasture and Taconic ridge viewed from Cemetery Road. Cynthia Creech © 2017

Natural Resources - Farmland

But no Jerseys are milked today in New Lebanon, and no commercial dairy farms remain in the town. Beef, sheep, pigs, hay, silage, and vegetables are now the primary forms of commercial agriculture in the town. Honey and maple syrup are also produced. Meat, eggs, and produce are sold at on-farm and remote farm stands, and to nearby and distant restaurants, including those in New York City.

Many of the farms operate, wholly or in part, on a Community Supported Agriculture (CSA) model, in which CSA members pay an annual fee—or in some cases contribute labor—for a share of the anticipated harvest. Each member then receives shares of produce at intervals during the growing season. The members thus provide the farmer with up-front capital and share some of the inherent risks, and the farmer has funds to purchase seed, feed, soil amendments, equipment, fuel, and other necessities long before realizing any income from farm products each year.

At least seven CSAs were operating in New Lebanon in 2017, selling vegetables, herbs, flowers, eggs, and meat. In addition, many New Lebanon households have a vegetable garden, fruit trees, goats, sheep, or chickens that provide produce, meat, and eggs largely for domestic use or small-scale retail.

Community Supported Agriculture is now a prominent part of New Lebanon's agriculture.

Figure 17 shows the extent of Prime Farmland Soils and Farmland Soils of Statewide Importance throughout the town, based on the soils map in Case (1989). Prime Farmland Soils are those that have the “best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is also available for these uses.” Those soils have “the soil quality, growing season, and moisture supply needed to produce economically sustained high yields of crops when treated and managed according to acceptable farming methods, including water management” (Soil Survey Division Staff 1993). Farmland Soils of Statewide Importance include soils “that are nearly prime farmland and that... produce high yields of crops when treated or managed according to acceptable farming methods” (NRCS, no date).

The *Town of New Lebanon Comprehensive Plan* (2005) recognizes that the town’s “agricultural heritage and farmland vistas are central to [the town’s] identity” and asserts that the town intends to “encourage preservation of prime agricultural lands and the promotion of environmentally sensitive management and use of agricultural resources,” and “[e]ncourage the preservation of existing farms and open farmlands, and the creation of new economically viable farms.”

Protecting areas of New Lebanon with the best farmland soils will help to preserve the town’s ability to produce high-quality local food, and will support the local economy in numerous ways. Active farmland is an important part of New Lebanon’s scenic landscapes that attract visitors and businesses, as well as New Lebanon residents. Farm produce sold at farm stands, farmers markets, and local stores and restaurants supports both farmers and local businesses.

Farmland and Biodiversity

The longterm viability of farm enterprises these days depends in part on regional, national, and international market forces, but also—importantly—on productive land, on efficient operations, on crops and livestock well-suited to the location, and on “sustainable” practices that build living soils, conserve and protect water resources, and support local ecosystems.

Many farm practices can improve habitats for rare and vulnerable wildlife and native plants, while maintaining or improving farm productivity and efficiency. Some of these practices, for example, relate to mowing and grazing schedules, patterns, and techniques to improve habitat for butterflies, bees, nesting birds, and nesting turtles; or land management for water and soil conservation; or management of field borders to improve pollination, reduce pest problems, and support wildlife; or least-toxic or non-toxic pest management techniques.

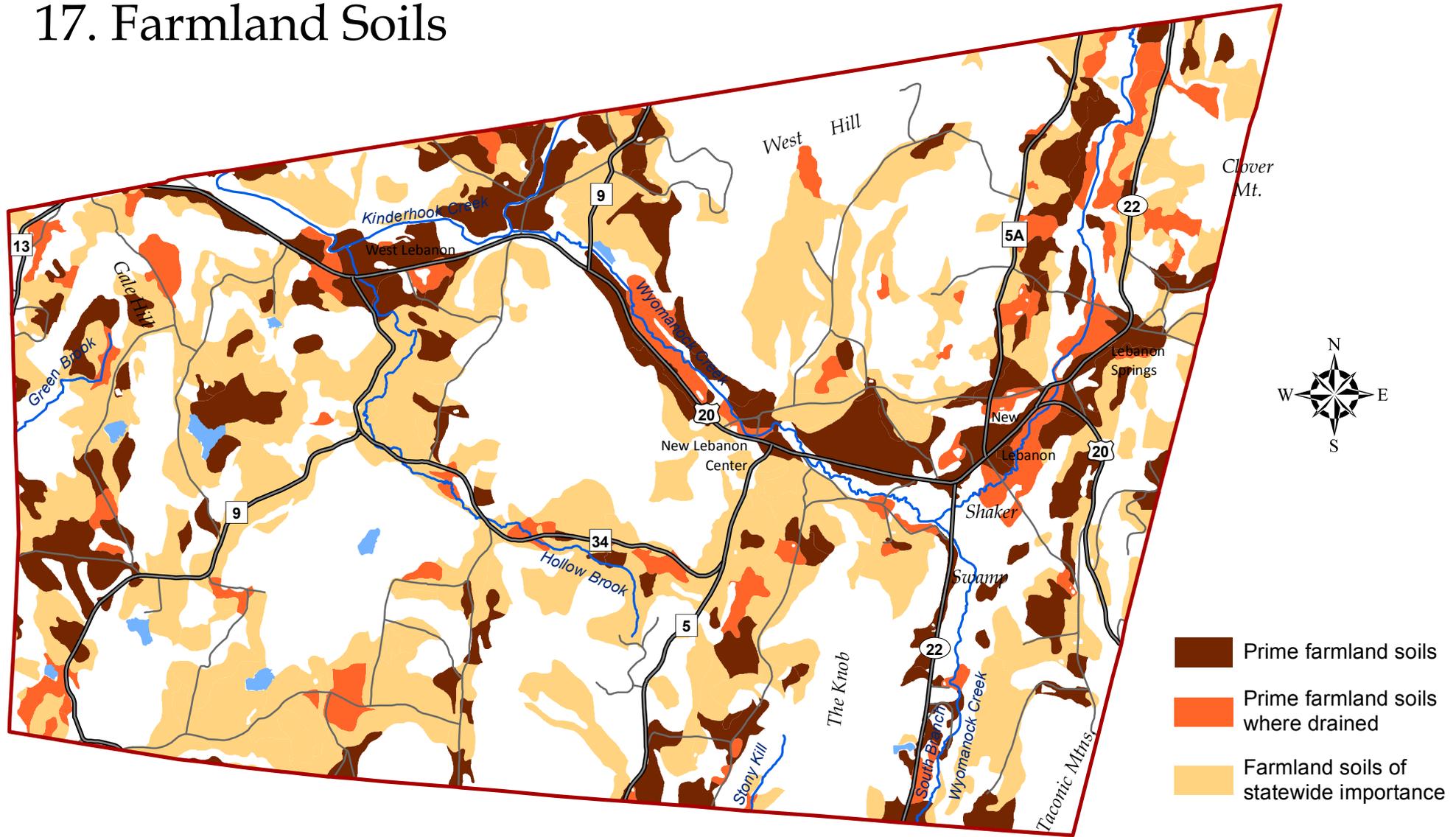
Integrating farm practices with local habitats and native plants and animals can provide benefits to farm productivity and to ecosystems.

Maintaining intact habitat areas and building living soils in cropland areas can reduce agricultural pests and foster populations of native insects that are beneficial to agricultural crops, including pollinators and insect predators. Reducing tillage can improve soil health, reduce the need for artificial soil amendments, and reduce soil loss due to erosion. With the growing interest in agroecology, there is now considerable literature on agricultural practices that support local ecosystems and native biological diversity, and use ecological processes and interactions to boost farmland productivity (e.g., Shepherd et al. 2003, NRCS 2010, Mader et al. 2011, Hatfield et al. 2012, Travis 2013, 2014, Xerces Society 2014).



Hayfield and forest edge viewed from McGrath Hill Road. Craig Westcott © 2017

17. Farmland Soils



- Prime farmland soils
- Prime farmland soils where drained
- Farmland soils of statewide importance

Figure 17. Farmland soils in the Town of New Lebanon, Columbia County, New York. New Lebanon Natural Resource Conservation Plan, 2017.

DATA SOURCES
 Soils data and categories from USDA Natural Resources Conservation Service. See Figure 2 for roads, streams, and waterbodies. Map created by Hudsonia Ltd., Annandale, NY.



18. Priority Agricultural Lands

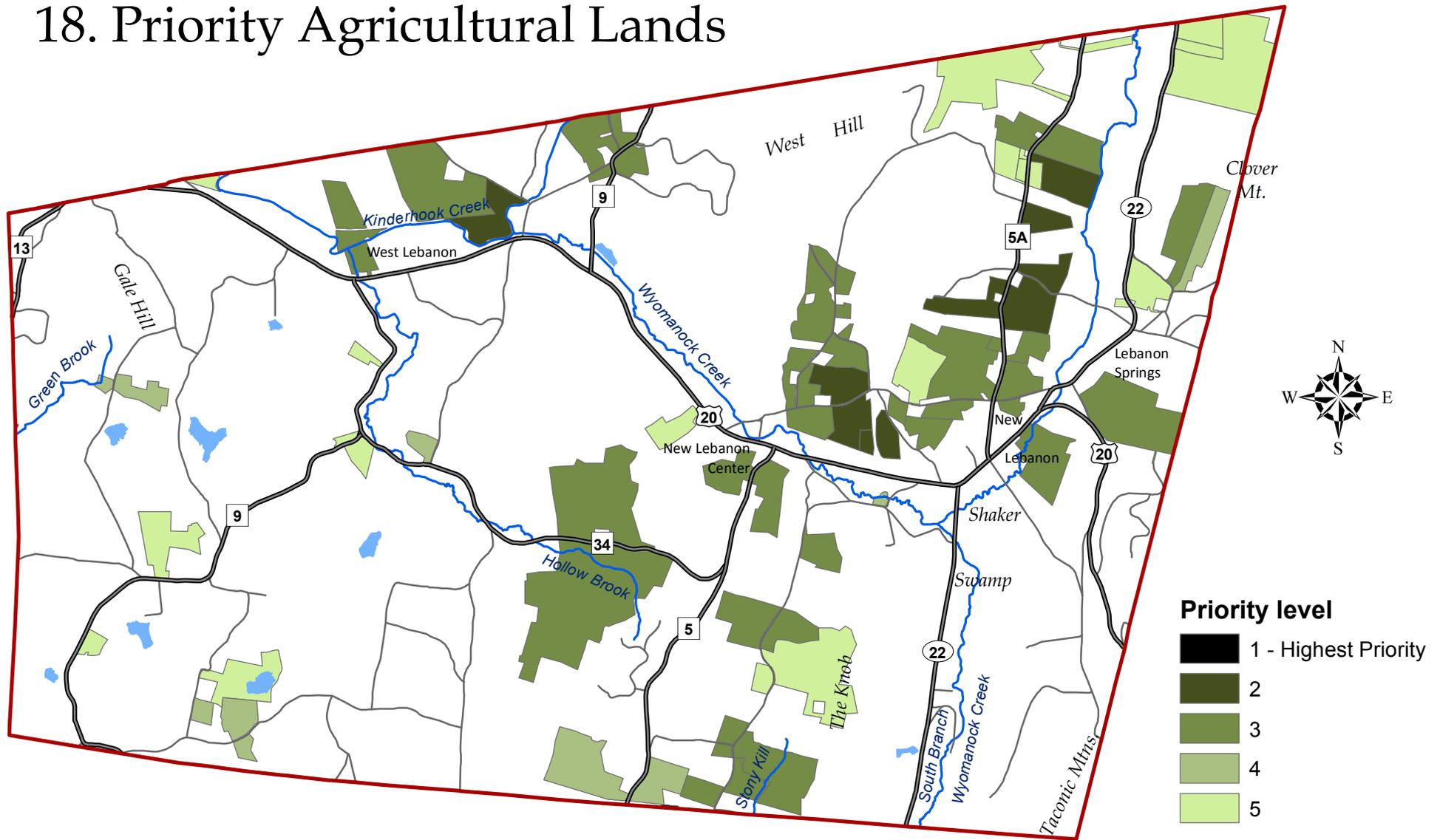
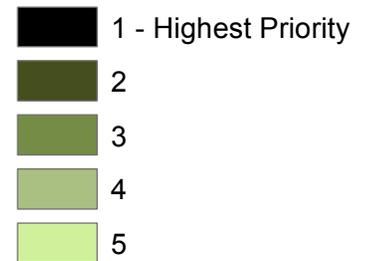


Figure 18. Priority agricultural lands in the Town of New Lebanon, Columbia County, New York. Lands identified through a Land Evaluation and Site Assessment System (LESA). No level-1 priority lands occur in New Lebanon. New Lebanon Natural Resource Conservation Plan, 2017.

Priority level



DATA SOURCES

Priority agricultural lands from a Land Evaluation and Site Assessment (LESA) adapted for Columbia County by the County Agricultural and Farmland Protection Board and mapped by Don Meltz Planning and GIS (AFPB 2013). Original LESA created by USDA Natural Resource Conservation Service. See Figure 2 for roads, streams, and waterbodies. Map created by Hudsonia Ltd., Annandale, NY.



Columbia County Farmland Protection Plan

In 2013 the Columbia County Agriculture and Farmland Protection Board (AFPB) published the *Columbia County Farmland Protection Plan* (AFPB 2013). The Plan was based in part on input from the public and a survey of agricultural producers on the current state of farming in Columbia County, an assessment of the future of farming, and an evaluation of a range of farmland protection tools. The Plan established that there is a strong commitment to agriculture in the county, and an understanding of the importance of farming to the county’s economy, community and civic engagement, land stewardship, scenic values, and quality of life for county residents, and an intention to take advantage of the “extensive, high quality farmland, a vibrant farm community, substantial farm-support infrastructure, ready access to markets and a deep historical and cultural connection to a rural way of life.”

The Plan concluded that the county’s vision of a thriving agricultural economy can be accomplished by:

- providing technical assistance for existing and emerging agricultural production,
- engaging in agriculture-focused economic development including infrastructure support,
- developing a strategy and toolkit for protecting farmland, and
- educating and encouraging youth to enter into agricultural production and educating non-farm residents on agricultural needs and practices.

Whatever means are used to promote agriculture in the county, a fundamental need is the protection of high quality farmland and its continued availability for agricultural production. With limited financial resources for conservation, protection efforts should be directed toward farms and lands that have the greatest potential for successful agriculture over the long term. In order to identify those lands, the AFPB developed a Land Evaluation and Site Assessment tool (LESA) that can be used by the county and municipalities “to rate the agricultural importance of lands and to identify and prioritize lands that should be protected from conversion to non-agricultural uses.”

The LESA evaluation looks at soil capabilities and other criteria related to the continued viability of farming (e.g., commitment of current farmers, status of surrounding lands, local conversion pressure), as well as open space, known biodiversity importance, and scenic or historic values, and uses a weighted point system to rate and prioritize parcels for protection (AFPB 2013).

The AFPB developed a working LESA model for Columbia County and municipalities to identify the agricultural lands most important and eligible for conservation action. The results of a county-wide LESA analysis are depicted in the Agricultural Land Protection Priority map of the county plan, and the New Lebanon portion of that map is presented here as Figure 18. (Note that the map shows whole parcels, including areas that are not farmed.) It shows several New Lebanon parcels as “high priority” on the countywide scale. At the townwide scale, however, New Lebanon farmers and other citizens might want to develop different criteria for ranking local priorities. As the town considers various ways to support farms and protect farmland, the LESA analysis can be used to

focus local efforts where they might be most effective. The section below on Achieving Conservation Goals discusses various tools and partners that can assist in these efforts.

Conservation of Farmland Resources

The town recognizes the many benefits of agriculture for local food security, for contributions to the local economy, for the scenic benefits that farmland imparts to the town, for the habitat values of active, fallow, and abandoned farmland, and for the cultural benefits that a working landscape offers to residents and visitors. The viability of local agriculture in New Lebanon and the region, however, is threatened by a difficult agricultural economy, rising property values, and competition for prime farmland from development interests.

Farmers are the active stewards of the hayfields, pastures, and cropland (Figure 13) that comprise much of the open (unforested) land in New Lebanon. With their daily lives and livelihoods so closely tied to the land, farmers tend to be highly attuned to and knowledgeable about the natural resources on which their farm enterprises depend, and continue to be the key players in determining the condition and conservation status of their land.

Some basic ideas and principles for farmland conservation are the following:

- Adopting municipal programs and policies to support and assist farmers can help them withstand the vagaries of weather and markets.
- While some kinds of agriculture can be carried out on small plots, others require large contiguous blocks to be economically worthwhile.
- Keeping the best farmland soils free of structures and pavement will help to preserve the potential for local agriculture.
- Intact habitats in the vicinity of farms can provide critical and irreplaceable services and resources (such as climate moderation, water, flood attenuation, and habitat for pollinators) to farm enterprises.
- Farm practices that conserve water, build living soils, and accommodate native pollinators, other insects, and other native organisms may be more resilient to environmental stresses (e.g., insect pests, drought, excessive heat) than conventional practices that rely on artificial inputs of water, petroleum-based fertilizers, and pesticides.

GENERAL MEASURES FOR FARMLAND CONSERVATION

MUNICIPAL ACTIONS

- Adopt **farm-friendly policies** and programs; for example, lowering tax assessments for active farmland; allowing density bonuses for cluster designs that permanently protect farmland; assisting farmers with grant acquisition, and promoting local markets for agricultural products, including uses by restaurants and institutions such as schools.
- Revise the Use Table (205 Sect 2 of the Zoning Law) to **allow wind turbines** for on-farm electricity use.
- Require that new subdivisions and development sites be designed in ways that **preserve the areas of best farmland soils intact and unfragmented** as much as possible.
- **Appoint farmers** to serve on the Planning Board, Zoning Board of Appeals, Zoning Rewrite Committee, and other town commissions dealing with land use policy and regulations.
- Establish a **Community Preservation Fund** to protect important agricultural lands, funded through grants, donations, budget appropriations, bond allocations, and a real estate transfer tax (through the Community Preservation Act).
- **Promote local markets for agricultural products**, including uses by restaurants and institutions such as schools.

FARMERS' ACTIONS

- **Join municipal agencies and commissions** (Planning Board, Zoning Board of Appeals, Zoning Rewrite Committee, etc.) dealing with land use policy and regulations.
- Where possible, **shift tilled land in floodplains to other uses** (such as pastures, hayfields, or perennial crops) more resilient to flooding.
- Adopt farm practices that **conserve water, prevent soil erosion and soil loss, and build living soils.**
- **Minimize applications of fertilizers and pesticides**, and especially in the more sensitive areas such as floodplain fields and near wetlands and streams.
- **Maintain cover crops and thatch** to reduce soil loss during heavy precipitation or flood events.
- **Maintain intact habitats** in and near hayfields, cropland, orchards, and pastures where possible, and adopt farm practices (such as mowing schedules and patterns) that accommodate the needs of native pollinators, birds, and other wildlife.

Scenic Resources

Scenic resources are landscape patterns and features that are visually appealing and help to define the character of a community or region. Beyond aesthetic value, scenic resources can help connect people to the land, foster an appreciation of the natural landscape, distinguish one community from its neighbors, display the natural resources of an area, and promote the economic benefits associated with tourism and recreation. The visual landscape is widely recognized as a primary driver of local economies, acting as a magnet not only for recreation and tourism and the businesses that support visitors to the town, but also for residents and unrelated businesses that have been drawn to and captivated by the area.

The scenic quality of the town and the region is intimately tied to the other resources addressed in this conservation plan—the physiography, water resources, biological communities, farmland, and recreational resources. Many scenic areas are associated with other resources of concern, such as large forests, farmland, streams, and ponds. Scenic areas that are visible to the public from roads, public lands, parks, and trails are of special importance to the town. This *Plan* identifies some of the areas of scenic significance, and considers those in establishing overall conservation priorities.

In a survey and public meetings held during the preparation of the *New Lebanon Comprehensive Plan* (2005), respondents identified the scenic views and the visual character of the town among their highest concerns. Consequently, among the goals detailed in the *Comprehensive Plan* is to “[p]rotect and enhance the natural scenic vistas and the publicly visible aspects of the man-made environment, in keeping with the Town’s rural and “small town character” and the objectives include “[preserving] scenic vistas of the area’s natural beauty including vistas of woodlands, fields, ridgelines, hillsides, hilltops and valleys.”

The town’s rural character consists not only of the visible landscape from public spaces, but also the ecological condition of the land, and the land uses such as farming, logging, and mining that directly depend on the land and have shaped the culture and character of the area and the town for over 200 years. These land-dependent uses tie the community to the land, and make the town more than a mere bedroom and retirement community with lovely views. This *NRCP* encourages the continuation of working landscapes and land-dependent uses that employ sustainable practices and protect sensitive biological, water, and scenic resources.

The scenic landscape is closely tied to the quality of the forests, farmland, streams, and ponds.

In 2006, following one of the directives in the 2005 *Comprehensive Plan*, Karen Ross identified and documented several places around New Lebanon that provide examples of particularly scenic views along County routes 5 and 5A, and US Route 20 and NYS Route 22, and in 2017 the CAC identified additional scenic views .

Natural Resources - Scenic

In 2015-2016 the Columbia Land Conservancy and the Hawthorne Valley Farmscape Ecology Program asked people to identify special outdoor places, including those of particular scenic value throughout the county. The places identified in that survey, also shown in Figure 20, include historic landscapes of the Mt Lebanon Shaker community, views of farmland and rolling hills along County Route 9, and a view of Meizinger Lake at the Hand Hollow Public Conservation Area. The locations of scenic places identified in these surveys are noted in Figure 19 and described in Table 2 and some of the views are illustrated in Figure 20.

Scenic areas occur in many other places in the town where there are pastures, cropfields, meadows, marshes, streams, ponds, and open and forested hills. We encourage the town to identify other areas of scenic importance that should be considered in land use planning and decisions, and added to future updates of this document.



Western view from The Abode of the Message. Claudia Knab-Vispo © 2017

New Lebanon's historic sites, such as the Shaker community on Mt Lebanon, the warm spring, and the Cemetery of the Evergreens, are central to the town's identity and culture. For reasons of historic fidelity, the landscape settings of historic sites can be an important component of the present-day experience. Thus, the visual appearance of the *viewshed* of an historic farm or dwelling, for example, may be a worthwhile consideration in addition to the historic fidelity of the farm property itself or the historic house and yard. The town could identify and map the places and landscapes that seem especially important for this purpose, so that future land use planning and decisions can take these landscapes into account.

Natural Resources - Scenic

Protection of scenic areas is often very compatible with and, indeed, dependent on protection of natural habitats, water resources, and farmland, but where they are incompatible, visual concerns should not necessarily take precedence over conservation of other resources. For example, it is often tempting to site a new house deep inside a forest so that the house is invisible from public roadways. The adverse ecological effects of forest fragmentation, however, and the harm to water resources often caused by long driveways, may outweigh the visual harm of a house visible from a road. From a biodiversity standpoint, building a new house close to an existing road and close to other existing development is often the much better choice because it minimizes habitat fragmentation and confines the ecological “edge effects” of human uses (caused by lights, noise, pets, polluted runoff, etc.) to a smaller area.



Autumn colors are a seasonal pleasure for New Lebanon residents, and also draw visitors to the region. David Farren © 2017

Table 2. Scenic locations along public roads in New Lebanon, identified by Karen Ross (2006) and Conservation Advisory Council (2017). Map codes refer to locations depicted in figures 19 and 20.

Map Code	Location	Description
A	County Rt 5, 1.6 mi south of jct with US Rt 20	North and northeast views of Lebanon Valley and Taconic hills, into Stephentown. Meadows and forest in foreground and distance. (Karen Ross)
B	West St (County Rt 5A), 0.3 mi north of jct with US Rt 20	Views (north and southeast) of nearby West Hill and distant Taconic ridgeline. (Karen Ross)
C	West St (County Rt 5A), 0.4 mi north of Cemetery Rd	Nearly panoramic views, with barns, cornfield, horse pasture, forested hills and ridgeline. (Karen Ross)
D	West St (County Rt 5A), 0.9 mi north of NYS Rt 22	Eastern and southeastern views of meadows and Taconic Ridge. (Karen Ross)
E	NYS Rt 22, north of jct with Old Post Rd for 1.1 mi	Views to the west, northwest, and north of meadows, hills, and ridgeline. (Karen Ross)
F	US Rt 20, 0.2 mi east of jct with NYS Rt 22	Nearly panoramic views of meadows, pasture, barns, stream, forested ridge, distant mountains. View to southeast marred by billboards. (Karen Ross)
G	US Rt 20, 0.5 mi east of jct with NYS Rt 22	Westward views of forests and meadows on Temple Hill. Barns in middle ground. Several houses on hillside. Cemetery of the Evergreens. (Karen Ross)
H	US Rt 20, 2.6 mi east of jct with NYS Rt 22	Vistas to west, northwest, and north of ca. 3-15 miles of New Lebanon forested hills and farmland, and distant views of Helderbergs and Rensselaer Plateau. Eastern gateway to Lebanon Valley. (Karen Ross)
I	NYS Rt 22 and Churchill Rd	View to east of Shaker Swamp. (Moy Wong)
J	Canaan Rd, 1.2 mi south of US Rt 20	View to southwest of meadow and forested hills. (Moy Wong)
K	Canaan Rd and Stone House Rd	View to west across meadow (fall-planted hemp) and wooded hills. (Cynthia Creech)

(continued)

Natural Resources - Scenic

Table 2. (cont.)

Map Code	Location	Description
L	Canaan Rd and Stone House Rd	View of meadow through hedgerow (Moy Wong)
M	Canaan Rd at town line	View to northwest across meadow to wooded hills.(Moy Wong)
N	Rockledge and Deer Ridge rds	View to south of planted hedgerow, meadow, and distant hills. (Moy Wong)
O	Kelly Rd ca. 0.25 mi east of McGrath Hill Rd	View south of meadow, barn, and wooded hills. (Moy Wong)
P	Schoolhouse Rd, 0.3 mi north of Hand Hollow Rd	View northwest across sloping meadow to wooded hills (Moy Wong)
Q	Hand Hollow Rd and County Rt 9	View north across mowed and unmowed meadows. (Moy Wong)



Looking north from County Route 5. Moy Wong © 2017

19. Scenic Resources

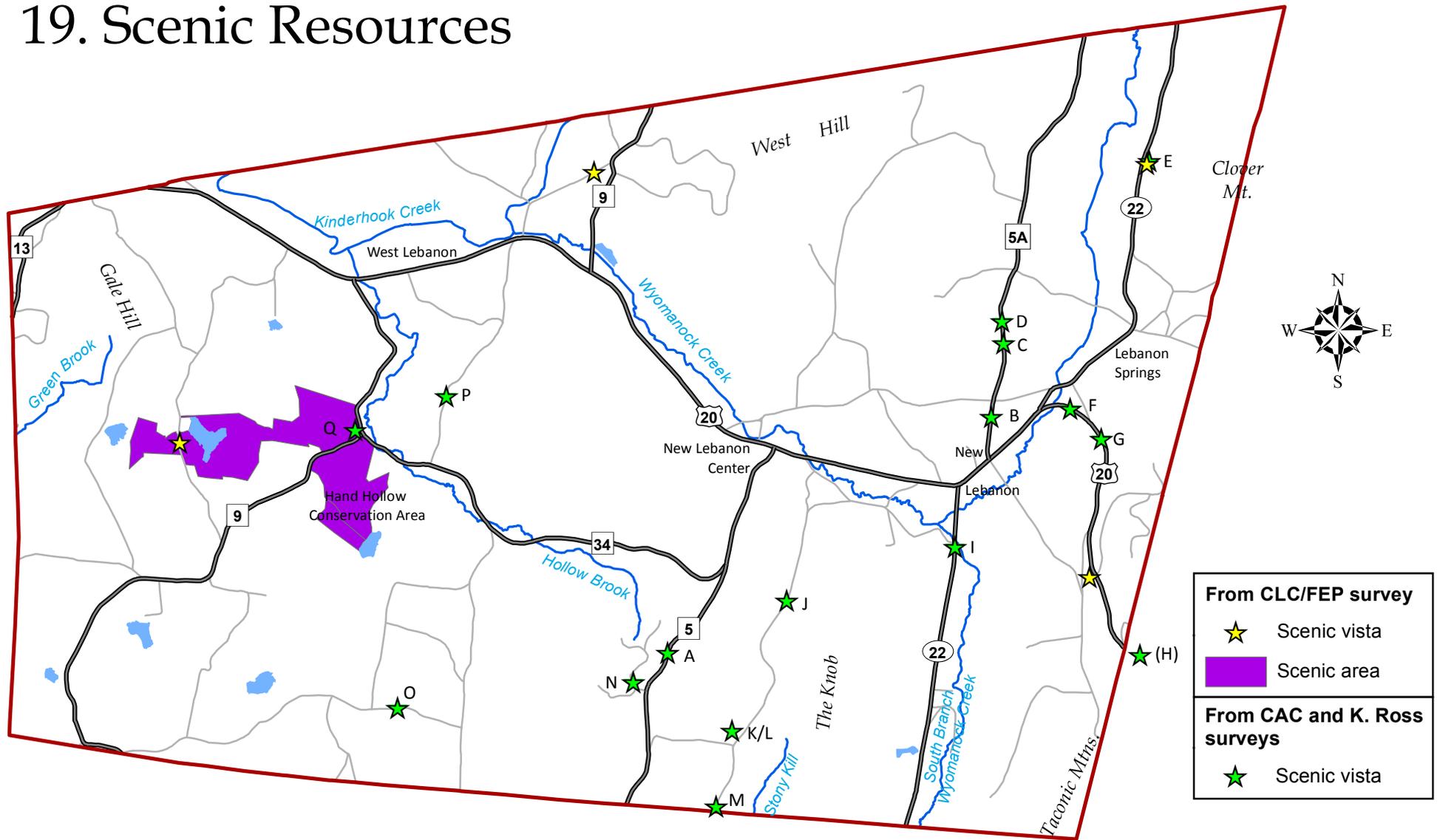


Figure 19. A few scenic locations in the Town of New Lebanon, Columbia County, New York. Letter codes (A,B,C, etc.) correspond to locations described in Table 2. New Lebanon Natural Resource Conservation Plan, 2017.



DATA SOURCE

Scenic locations identified by participants in a Columbia Land Conservancy/Farmscape Ecology Program survey (2015-16), and preliminary scenic survey by Karen Ross (2006) and the New Lebanon Conservation Advisory Council (2017). See Figure 2 for roads, streams, and waterbodies. Map created by Hudsonia Ltd., Annandale, NY.





A. Views of Lebanon Valley and Taconic hills, from County Route 5, fall 2006. Karen Ross © 2017.



B. Views of West Hill and Taconic ridge-line, from County Route 5A, fall 2006. Karen Ross © 2017.



C. Barns, cornfield, forested hills, and ridgeline, from County Route 5A, fall 2006. Karen Ross © 2017.



D. View toward Taconic ridge, from County Route 5A, fall 2006. Karen Ross © 2017.

Figure 20. A few scenic locations along public roads. Locations are described in Table 2. New Lebanon Natural Resource Conservation Plan, 2017.

(continued)

Figure 20 (cont.)



E. Meadows, hills, and ridgeline from NYS Route 22, fall 2006. Karen Ross © 2017.



F. Meadow, barn, forested ridge from US Route 20, fall 2006. Karen Ross © 2017.



G. West view of forests and meadow on Temple Hill from US Route 20, fall 2006. Karen Ross © 2017.



H. New Lebanon forested hills, and distant views of Helderbergs and Rensselaer Plateau, fall 2006. Karen Ross © 2017.

(continued)

Figure 20 (cont.)



I. Shaker Swamp from NYS Rt 22, fall 2017. Moy Wong © 2017.



J. Southwest view from Canaan Rd of meadow and forested hills, fall 2017. Moy Wong © 2017.



K. Meadow of fall-planted hemp off Canaan Rd, fall 2017. Cynthia Creech © 2017.



L. Western view of meadow from Canaan Rd, fall 2017. Moy Wong © 2017.

(continued)

Figure 20 (cont.)



M. Northwestern view of meadow and wooded hills from Canaan Rd, fall 2017. Moy Wong © 2017.



N. Southern view of meadow and distant hills from Rockledge Rd, fall 2017. Moy Wong © 2017.



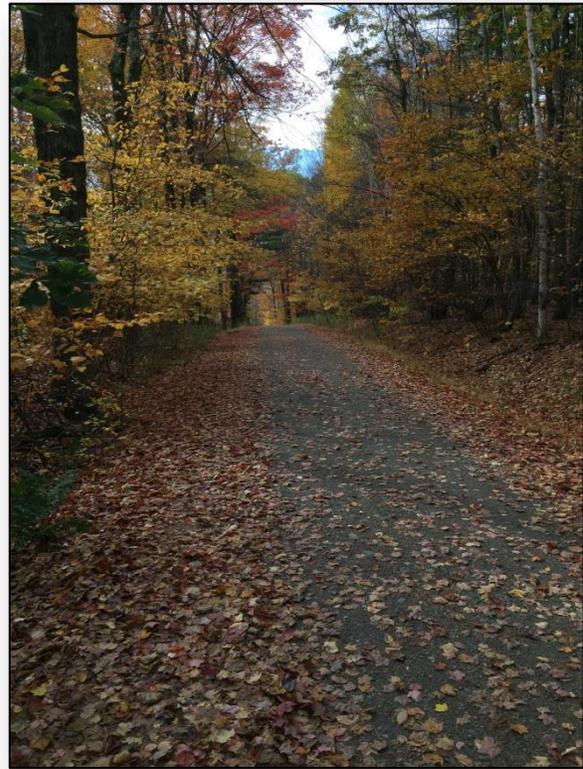
O. Meadow, barn, and wooded hills from Kelly Rd, fall 2017. Moy Wong © 2017.



P. Hillside meadow and wooded hills from Schoolhouse Rd, fall 2017. Moy Wong © 2017.

Conservation of Scenic Resources

The scenic character of the town is intimately tied to the other resources described in this *Plan*—the hills and valleys, streams and ponds, forests and farmland. The town recognizes that the beauty of the New Lebanon landscape is fundamental to the town’s identity, and that maintaining scenic vistas will benefit New Lebanon residents, businesses, and visitors. The most scenic areas, however, still have no formal protection despite the documented public interest in the visual landscape. Completion of a scenic inventory, as called for in the *Comprehensive Plan*, will help to foster a proprietary interest among landowners, and could be the first step toward establishing policies to protect areas of exceptional importance. Figure 19 gives a very incomplete picture of areas of scenic importance in the town.



Pine Ridge Place. David Faren © 2017

GENERAL MEASURES FOR SCENIC RESOURCE CONSERVATION

- **Complete an inventory and map** of scenic resources throughout the town.
- When reviewing site plans and subdivision proposals, and the location and design of any new structure or new land use in the town, **consider the impacts on the entire viewshed** of those features.
- **Maintain intact natural areas and farmland visible from public roads and public-access lands** wherever possible.
- **Maintain intact (undeveloped) hilltops and sideslopes** wherever possible.
- **Minimize outdoor lighting**, and design any necessary outdoor lighting to minimize visibility of lights in nearby habitat areas and offsite areas throughout the viewshed.
- Develop town policies that **support working landscapes and land-dependent uses** (e.g., farming, logging, recreation) that employ sustainable practices.
- Adopt environmental review standards that consider impacts on scenic resources.

Recreation Resources

Outdoor recreation is an essential part of family and community life in New Lebanon. Local recreation opportunities improve the daily lives of residents, attract visitors, and benefit local businesses, and can strengthen people’s connections to and appreciation for the land. Public recreational opportunities tied to the natural landscape can help to spur economic development and, if designed carefully, have relatively low environmental impacts. The kinds of public outdoor recreation best suited to New Lebanon are those that take advantage of natural landscapes and cultural features while protecting intact the resources of conservation concern.

Many of the large and small land parcels in New Lebanon are posted against trespassing, so most private lands are inaccessible for walking, hiking, biking, skiing, motor sports, hunting, or other recreational uses without landowner permission. The public-access recreation areas in the town are briefly described below, and their locations are shown in Figure 21.

Corkscrew Rail Trail

The Corkscrew Rail Trail is an unpaved trail that generally follows the old rail bed of the Corkscrew Division of the Rutland Railroad. The rail line carried passengers, milk, freight, and mail until 1952, when it was abandoned and the right-of-way conveyed to adjacent landowners. The Corkscrew Rail Trail Association, formed in 2014, negotiated agreements with landowners and in 2015 opened the first segment of the trail to the public. It runs 2.5 miles through Stephentown and northeastern New Lebanon, following the Wyomanock Creek for part of its length. The trail is open for hiking, bicycling, horseback riding, skiing, and snowmobiling. The Association hopes to establish agreements with additional landowners and extend the trail north and south (<http://www.corkscrewrailtrail.org/>)

Hand Hollow Public Conservation Area

The Hand Hollow PCA is a 433-acre area owned and managed by the Columbia Land Conservancy. It is open to the public for hiking, skiing, and picnicking, and for fishing and hunting by permit from the CLC. It has 2.8 miles of hiking trails that run past active beaver ponds, through forests and meadows, and along streams and the lake.

Hand Hollow State Forest

Hand Hollow State Forest, established in 2014, is a mostly wooded property adjacent to the Hand Hollow Public Conservation Area and bordering the 10-acre Spiegelberg Lake. Through collaboration with the Open Space Institute, the State Forest will soon nearly double in size with the addition of large adjacent properties (not shown on Figure 21). The State Forest land is open to the public for hiking, biking, picnicking, horseback riding, primitive camping, skiing, hunting, fishing, trapping, non-motorized boating, and snowmobiling.

Natural Resources –Recreation

Shatford Memorial Park

Shatford Memorial Park is a ca. 20-acre parcel owned by the Town of New Lebanon and developed primarily for public recreation and public events. It has a playground, three baseball fields, two tennis courts, a basketball court, a pavilion, and other open lands for public uses.

Shaker Swamp

The Shaker Swamp Conservancy has recently purchased a 39-acre parcel (not shown on Figure 21) that will allow parking and public access to the wetland. The Conservancy plans to install an information kiosk and build a boardwalk and trail that may connect with trails on adjacent properties.

Fishing

Many of New Lebanon's streams support brown trout and brook trout. Those that have been classified by the DEC as trout streams are shown in Figure 16. Brown trout (non-native) are stocked annually in Kinderhook Creek by the DEC, and some also reproduce in the wild. Brook trout (native) have also been stocked in the past. Although the brook trout of our streams also reproduce in the wild, most have likely descended from hatchery stock (Bob Schmidt, pers. comm.). Figure 21 shows the areas along Kinderhook and Wyomanock creeks with Public Fishing Rights—places where permanent easements have been purchased by the DEC from willing landowners to provide anglers fishing access from the banks (usually within a 33-foot strip). Many other informal locations are used for fishing and other stream-associated recreation from bridges and roadsides of public roads, and from private lands with permission of landowners.

Landowners also stock fish in private ponds. This requires a state permit, and all hatcheries and vendors must certify that their fish have passed state inspection for pathogens. Many of the stocked fish are of non-native species.

Hunting

Hunting is allowed on the Hand Hollow Public Conservation Area by permit from the Columbia Land Conservancy, and at the Hand Hollow State Forest. Hunting elsewhere in New Lebanon is only by permission from individual landowners.

Motor Sports

Snowmobiling and other ATV use are permitted at the Hand Hollow State Forest. Use on other properties is by permission of the landowners. Motorized watercraft are prohibited on Meizinger Lake and Spiegelberg Lake. Because of the contributions to noise, water pollution, and air pollution, damage to soils, and disturbance to wildlife, motorized recreation is often discouraged in ecologically sensitive areas.

Natural Resources –Recreation

Walking and Biking

Paved and unpaved public roads throughout the town are available for biking and walking (and skiing before they are plowed), but the experience is comfortable only on those with little automobile traffic. Certain roads could be improved for foot and bike travel by expanding shoulders or delineating bike or walking zones. New York’s Complete Streets program (see below) offers many ideas that could be implemented incrementally on roads where other construction or restoration work is underway.

Complete Streets

One way to expand recreation opportunities in New Lebanon, while simultaneously making the roads and hamlets safer for all users, is to adopt a “Complete Streets” program for transportation projects. The New York State Complete Streets program, authorized under Chapter 398 of the Laws of New York, requires that any transportation projects receiving state and federal funding must be designed with consideration of the convenience, mobility, and safety of users of all ages and abilities, including bicyclists, pedestrians, people with disabilities, riders on public transportation, as well as motorists. Although the law applies only to projects using federal and state funds, local governments are also encouraged to consider these principles for locally funded projects. Street design features may include, but are not limited to: sidewalks, paved shoulders suitable for use by bicyclists, lane striping, bicycle lanes, “share the road” signage, crosswalks, pedestrian control signals, bus pull-outs, curb cuts, raised crosswalks and ramps and traffic calming measures.

The purpose of the Complete Streets program is to promote a “cleaner, greener transportation system,” promote the health benefits of non-motorized travel, create safer conditions for all users, relieve traffic congestion, and reduce auto-related air pollution. In New Lebanon’s hamlets, well-marked pedestrian crossings, accessible curb cuts, and street trees can improve the safety and comfort of users. On the town’s rural roads, wide shoulders can improve the safety and comfort of pedestrians and bicyclists, as well as motorists. More information on Complete Streets can be obtained at www.dot.ny.gov/programs/completestreets.

Expanding Recreational Resources

The town recognizes that expanding opportunities for outdoor recreation will benefit New Lebanon residents, businesses, and visitors. Projects that protect, enhance, or expand opportunities to engage the public, especially children, in outdoor activities, and expand local and regional hiking, multi-purpose trails, and the rail trail deserve special attention. All new trails and other recreational features should be located and designed to minimize impacts on intact habitats, wildlife, and water resources.

GENERAL MEASURES FOR EXPANDING RECREATIONAL RESOURCES

- Promote the **extension of the Corkscrew Rail Trail** through agreements with willing landowners.
- Adopt the **Complete Streets** approach to enhancing the quality and safety of New Lebanon's roads for biking, walking, and other uses.
- Develop additional **public access sites for fishing** on New Lebanon's streams.
- Collaborate with the Shaker Swamp Conservancy in efforts to develop **public access to Shaker Swamp**.

Alfred B. Haacker © 2013



After being hunted to near-extinction in the 19th century, white-tailed deer populations have exploded in the 20th and 21st centuries due to removal of top predators, reduced hunting pressure, and human land uses. Moy Wong © 2017

21. Recreation Resources

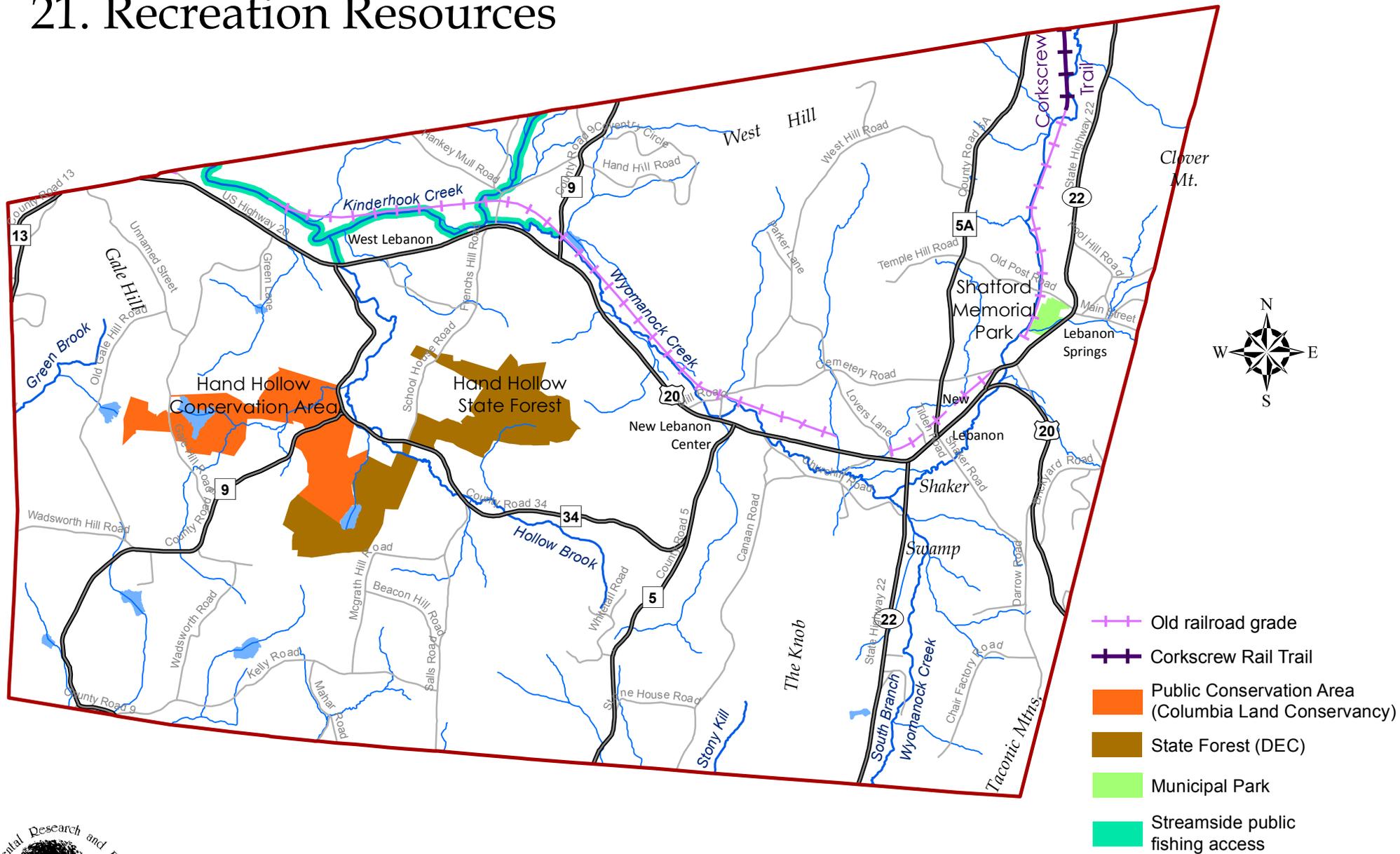


Figure 21. Public recreation resources in the Town of New Lebanon, Columbia County, New York. New Lebanon Natural Resource Conservation Plan, 2017.

