

To: Gary S. Bellows, Town of Hurley Supervisor
Town of Hurley Conservation Advisory Council

From: Tanessa Hartwig, Assistant Director for Conservation Ecology, Hudsonia Ltd.
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Re: Habitat mapping

This memorandum accompanies a preliminary large format (1:10,000 scale) habitat map completed for the Town of Hurley, Ulster County, New York. Hudsonia was asked by the Town of Hurley to identify and map ecologically significant habitats in an approximately 1500-acre area south of the Village of Hurley and east of Rt 209 within the Town of Hurley. We used information from maps (topographic, soils, geologic, wetlands, etc.), color infrared stereoscopic aerial photographs and digital orthophotos, and ArcMap 9.2 GIS software to identify and digitally map habitats in the study area. The purpose of this assessment was to provide biodiversity information for the town to use in land use planning. Our findings are illustrated in the large format map, and briefly described below.

Ordinarily, Hudsonia's habitat mapping projects involve field surveys to confirm and correct our remote habitat predictions. Per our 16-Oct-2007 agreement with the Town of Hurley, however, in order to provide low-cost habitat information to the town, we conducted no field work for this project. The map should therefore be considered preliminary and should be used with caution; it may contain incorrectly identified habitats and imprecisely drawn habitat boundaries. Possible unmapped habitats may include, but are not limited to, intermittent woodland pools, intermittent streams, seeps, springs, and crest, ledge, and talus habitats. The map is suitable for general planning purposes, but not for detailed planning or site design.

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Below is a brief description of the study area. In our effort to provide some useful habitat information at low cost to the Town of Hurley, we are not providing detailed descriptions of the habitats and their biodiversity values in this memo, but instead refer readers to Hudsonia's *Biodiversity Assessment Manual for the Hudson River Estuary Corridor* (Kiviat and Stevens 2001). Page numbers given below refer to relevant pages in the *Manual*.

The study area is bounded by the town line on the east and southeast, and Rt. 209 on the west; the north boundary runs generally east from Riverside Park. The northern portions of Twin Lakes and First Lake are in the southeastern part of the study area. The area has rolling topography, which becomes steep east of Twin Lakes. Elevations range from approximately 180 ft in the north (near Rt. 209) to 480 ft on Pink Hill in the southeastern corner (near Dewitt

Mills Rd.). Bedrock in the study area is mapped by Fisher et al. (1970) as limestone and shale. The predominant soils are formed in glacial till and are somewhat to strongly calcareous (calcium-rich). Lucas Avenue bisects the study area from the northeast to the southwest borders, and residential development branches out from Lucas Ave. to the east and west. There are also areas of development in the eastern and western parts of the study area. Land uses in the study area appear to be mostly residential.

UPLAND HABITATS

Upland habitats mapped in the study area included upland conifer forest (forest with more than 75% cover of conifer trees such as eastern hemlock and white pine), upland hardwood forest (forest with more than 75% cover of deciduous trees such as maples, oaks, and hickories), upland mixed forest (forested areas with both hardwood and conifer species, where conifer cover is 25-75% of the canopy), upland meadow (see p. 195 for a description and more information), upland shrubland (shrub-dominated uplands, often in transition between meadow and young forest, but also occurring along utility corridors and in recently cleared areas), cultural areas (significantly altered and intensively managed [e.g., mowed], but not otherwise developed with pavement or structures), and waste ground (p. 217). Upland meadows and shrublands were not common in the study area and small (less than 7 acres and 6 acres, respectively). Cut-leaved evening primrose (*Oenothera laciniata*; NYS Endangered), a plant of open meadows, waste ground, and other non-forested areas, is known from Tilson (Town of Rosendale; Conrad 2003); these habitats should be surveyed for this plant and other rare species during environmental assessments.

Most of the study area was forested. Upland mixed forest and upland hardwood forest were the most common habitat types, comprising 387 and 327 acres in the study area. Upland conifer forest accounted for 175 acres in the study area. There were two large areas of contiguous upland forest – a 378-acre tract west of Lucas Ave. and a 311-acre tract east of Lucas Ave. and south of Dewitt Mills Rd. Large, unfragmented forests are important habitat for many wildlife species of conservation concern, including many forest interior-breeding songbirds and forest-dwelling birds of prey such as sharp-shinned hawk. Forests also provide habitat and travel corridors for amphibians, reptiles, and mammals. There are records of goldenseal (*Hydrastis canadensis*; NYS Threatened) in mature hemlock-northern hardwood forest southwest of Pink Hill in Rosendale (Conrad 2003). Indiana bat (NYS Endangered) and eastern small-footed myotis (NYS Special Concern) both occur in winter hibernacula nearby in Rosendale (Conrad 2003). There is potential for additional hibernacula as well as summer roosts in the study area. Environmental planning and reviews in the study area should include assessments of potential habitat of goldenseal, Indian bat, eastern small-footed myotis, and other rare plants and animals and appropriate conservation measures should be applied if habitat is found.

We mapped 935 acres of potential crest, ledge, and talus habitat (p. 201 and 207), much of it within forested areas. Because of the calcareous nature of the bedrock (Fisher et al. 1970) in the study area, many of these rocky areas may support rare calcicolous (calcium-loving) plants (p. 207). There are records of alpine cliff fern (*Woodsia alpina*; NYS Endangered), a plant of calcareous ledges, nearby in the Town of Marletown (Stein 2006). Crest, ledge, and talus habitats are important for many animals of conservation concern, including several rare snakes and songbirds. Timber rattlesnake (NYS Threatened), for example, is known to occur in Marletown (Stein 2006) and Woodstock and may also be in rocky habitats in the study area. Environmental planning and reviews in the study area should include assessments of the potential occurrence of alpine cliff fern, timber rattlesnake, and other rare plants and animals in and near crest, ledge, and talus habitats, and conservation measures as appropriate.

WETLAND HABITATS

Wetland habitats in the study area included hardwood and shrub swamp (p. 141), mixed forest swamp (forested wetland with 25-75% conifer canopy), intermittent woodland pool (p. 127), marsh (p. 159), and wet meadow (p. 131 and 135). There were two particularly large hardwood swamps west of Lucas Ave. – a 27-acre swamp west of Mountain View Rd. and a 36-acre swamp southwest of Joys Ln. These were part of a larger wetland complex that

included other hardwood and shrub swamps, a mixed forest swamp, an intermittent woodland pool, a marsh, and wet meadows. We mapped another extensive wetland complex adjacent to and north of Twin Lakes and First Lake. This complex included hardwood and shrub swamps, mixed forest swamps, intermittent woodland pools, and wet meadows. Wetland complexes with especially high habitat value include extensive complexes, those with a wide variety of wetland types, and those that have intact upland habitat between the wetlands. Both of these complexes are probably high-quality habitats. Because most of the area has calcareous soils (Tornes 1979), many of the wet meadows in the study area could be calcareous wet meadows (p. 131), which often support rare plants and invertebrates specially adapted to calcium-rich situations.

We also mapped four open water areas (naturally formed ponds and lakes, pools lacking floating or emergent vegetation within marshes and swamps, and ponds that were originally constructed by humans but have since reverted to a more natural state) – Twin Lakes, First Lake, and two smaller (< 3 acres) pools within larger wetlands west of Lucas Ave. - as well as 11 constructed ponds (p. 173). Open water provides habitat for water birds of conservation concern, including American bittern and great blue heron, as well as mammals such as bats and river otter. Adjacent wetland habitats such as marshes and swamps increase the habitat value of open water areas for waterfowl, marsh birds, wading birds, songbirds, and muskrat. Both Twin Lakes and First Lake have associated wetland habitats. Pied-billed grebe (NYS Threatened) occurs in both Marbletown (Stein 2006) and Rosendale (Conrad 2003) and spatterdock damselfly (a rare damselfly) has been found in Marbletown (Stein 2006). Both of these species occur in well-vegetated ponds and could also be in the study area. Twin Lakes and First Lake are also the northernmost of a series of calcareous lakes, one of which is known to support northern cricket frog (NYS Endangered; Conrad 2003). The habitat value of these lakes and associated wetlands and uplands for cricket frog, pied-billed grebe, and other rare species should be assessed on the ground and appropriate conservation measures should be applied if habitat is found.

We mapped intermittent streams (p. 163) throughout the study area. Because they are small and flow only during part of the year, intermittent streams are often ignored in land use planning and environmental reviews. They are, however, important both as habitat for many animals (including rare stream salamanders and rare dragonflies) and as an important source of water for larger streams, ponds, and lakes. The quality, quantity, and timing of intermittent stream flows are critical to the habitat quality of downstream systems.

Habitat fragmentation is among the primary threats to biodiversity worldwide (Davies et al. 2001) and in the Hudson Valley. While some species and habitats may be adequately protected at a relatively small scale, many wide-ranging species, such as black bear, barred owl, and red-shouldered hawk (NYS Special Concern), require large, unbroken blocks of habitat. Many species, such as wood turtle (NYS Special Concern), Jefferson salamander (NYS Special Concern), bobcat, and black bear need to travel among different habitats to satisfy their basic needs for food, water, cover, nesting and nursery areas, and population dispersal. Landscapes that are fragmented by roads, railroads, utility corridors, and developed land limit animal movements and interactions, disrupting patterns of dispersal, reproduction, competition, and predation. Landscapes with interconnected networks of unfragmented habitat, on the other hand, are more likely to support a broad diversity of native species and the ecological processes and disturbance regimes that maintain those species. We mapped two large areas of contiguous habitat in the study area. One was a 417-acre patch east of Lucas Ave. that included Twin Lakes, First Lake, the associated wetland complex, the 311-acre forested area, and extensive crest, ledge, and talus habitat. The other was a 557-acre patch west of Lucas Ave. that included the wetland complex with two large hardwood and shrub swamps and the 378-acre forested area described above. To protect biodiversity in this study area, these two areas deserve special attention in land use planning. Conservation measures may include minimizing intrusions into the interior of these patches, protecting wetlands and streams from siltation and other pollutants, maintaining broad buffer zones along streams, and maintaining broad corridors between habitats of concern.

Section 4 (Using Biodiversity Information in Land Use Planning) of the *Biodiversity Assessment Manual* provides general recommendations for incorporating biodiversity conservation into municipal decision-making. In particular, see the bulleted lists on pages 40 and 41. The Habitat and Species Profiles (Sections 7 and 9) in the *Biodiversity Manual* also include recommendations for conserving many of the habitats mentioned in this report.

For several of the habitats discussed in this report, Hudsonia has developed “Conservation Zones” based on our understanding of the needs of focal species of conservation concern associated with the habitat. We chose species or groups of species that are rare or declining in the region, have large home ranges, specialized habitat needs, or acute sensitivity to disturbance, and used findings in scientific literature to estimate a Conservation Zone for the species or group of concern. If the habitats of these target species are protected, many other rare and common species that occur in the same habitats will also be protected. The table below lists some habitats that occur in the study area, target species, and Conservation Zones, adapted from Hartwig and Stevens (2007):

Priority Habitat	Associated Species or Group of Concern	Priority Conservation Zone	Rationale
Extensive forest	Forest interior-breeding birds	Unfragmented patches of 100+ ac (40+ ha).	Required for moderate to high probability of supporting breeding scarlet tanagers and forest thrushes in a 50-60% forested landscape (Rosenberg et al. 1999, 2003).
Crest/ledge/talus	Snakes of conservation concern	600 ft (190 m) from crest/ledge/talus borders.	A minimum radius of intact habitat needed for foraging snakes (Harding 1997, ME Dept of Inland Fisheries & Wildlife 2003).
Intermittent woodland pool	Pool-breeding amphibians	750 ft (230 m) from pool.	Encompasses minimum non-breeding season foraging, refuge, and wintering habitats and most dispersal routes between pools (Madison 1997, Semlitsch 1998, Calhoun and Klemens 2002).
Wetland complexes	Spotted turtle	400 ft (120 m) beyond outermost wetlands in a complex.	Corresponds to maximum reported distance of spotted turtle nests from the nearest wetland (Joyal et al. 2001).
Intermittent streams	Stream salamanders	At least 160 ft (50 m) on either side of stream.	To protect water quality in streams and most of the upland habitat used by stream salamanders (Saunders et al. 2002, Crawford and Semlitsch 2007).

There are many useful publications that describe some of the tools and techniques available to municipalities for conservation planning, including the *Biodiversity Assessment Manual* (Kiviat and Stevens 2001), Conservation Thresholds for Land-Use Planners (Environmental Law Institute 2003), Local Open Space Planning Guide (NYSDEC and NYSDOS 2004), and Significant Habitats in Selected Areas in the Town of Marbletown (Hartwig and Stevens 2007). In addition, we have enclosed Hudsonia’s Fact Sheets for certain habitats, which include explanations of their biodiversity values, and some conservation guidelines. The preliminary habitat map should not be considered a substitute for onsite biological assessments, but we hope that it will prove useful to the Town of Hurley for both landscape-scale conservation planning and in reviewing site-specific land use proposals.

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