

INSIDE
• Planning for Sea Level Rise: the Binnen Kill Study



Chris Graham



News from Hudsonia

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Summer 2021



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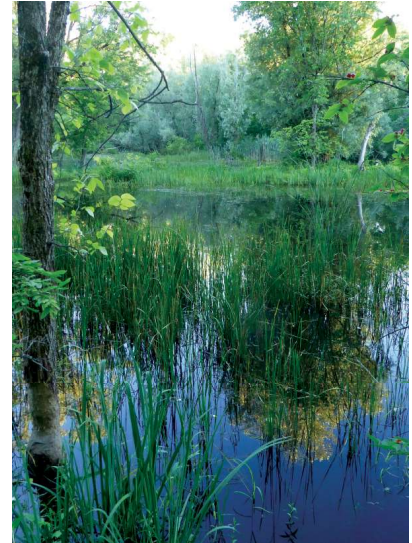


Photo on front cover:
Marsh and open water habitats of a floodplain
pool at the Binnen Kill site. Photo: Chris Graham

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Dear Friends of Hudsonia,

Facing many unknowns in a tumultuous time, we are grateful that your support has allowed us to focus on the conservation needs of vulnerable wildlife in our region, work that has real-world consequences for us all.

For example, partnering with local farms we're finding ways to protect threatened wood turtles from injury by farm equipment. Dog detectives Dia and Fagen, Conservation Dogs working with the New York-New Jersey Trail Conference, sniffed out hard-to-find nesting females, augmenting our radio tracking. It's all paying off. We learned the turtles will feed and bask in streamside habitats with specific kinds of vegetation, reducing dangerous forays onto farm fields, and we're developing recommendations for farmers and other land stewards to manage those habitats in ways that do not disrupt farm operations.

More broadly, we're busy mapping habitats, studying the biodiversity of temporary pools and the ecology of nonnative weeds, teaching municipal agencies how to recognize and protect important natural resources, conducting biological surveys, and providing other technical assistance to inform decisions about conservation and land development. In partnership with the Hudson River Estuary Program we're guiding working groups in Montgomery, New Lebanon, and Woodstock as they draft proposals for Critical Environmental Areas, those with exceptional characteristics deserving special attention during environmental reviews.

Thank you for being our partners as we negotiate intensifying developmental pressure and the protection of the biodiversity that defines our region. We understand there are many worthy causes these days, and ask that you please give as generously as you can to support our crucial work.

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PLANNING FOR SEA LEVEL RISE: The Binnen Kill Study

By Chris Graham and Gretchen Stevens*

Sea level rise due to climate change is an ongoing global phenomenon that translates inland to rising water levels of tidal rivers and streams, including our own Hudson River, the tidal mouths of its tributaries, tidal wetlands in bays and backwaters, and habitats of the river shoreline and floodplain.

Ordinarily, tidal wetlands adapt to gradual changes in sea level by accretion of sediments and by migration of the wetlands in long-term response to changing tidal elevations. "Accretion" refers to the trapping and accumulation of sediments that incrementally raise the elevation of the wetland. As sea level continues to rise in coming decades, the subtidal shallows will be flooded more deeply, the lower parts of mudflats will become subtidal, and the daily high tides will reach beyond today's tidal wetlands into non-tidal shoreline areas. In this way the tidal wetlands will slowly "migrate" landward where the local terrain allows. The rapid pace of sea level rise, however, may outpace the adaptation of some wetland plants and animals, leading to the loss of biota and ecological services.

Scenic Hudson has used computer modeling to project the rates of migration, resilience, and distribution of future Hudson River tidal wetlands under a variety of possible scenarios, dependent on rates of sea level rise and accretion of new sediments (Tabak et al. 2016). Surprisingly, net tidal wetland area in the Hudson River

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* Chris Graham is Hudsonia's field botanist. Gretchen Stevens is director of Hudsonia's Biodiversity Resources Center.

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estuary was projected to increase under all modeled scenarios by the year 2100, but the effects will vary greatly along the river depending on local topography and other shoreline conditions. Where there is vertical ledge, a constructed bulkhead, or a steep gradient, the wetland will be unable to migrate inland at all—the wetland areas that are not accreting sediments fast enough will simply drown without replacement at those locations. Where the shoreward area is on a gentle gradient, the wetland may be able to slowly shift inland with the rising water.

Even where shoreline conditions allow a tidal wetland to migrate inland, however, the development of the wetland community may lag the rise in water level. The complex biological communities that develop over thousands of years cannot necessarily establish anew in a few decades. There is concern that we may lose some rare species that are unable to adapt to the rising water or shift their location quickly enough.

Studying the biota and natural resources of shore zones along the Hudson will allow us to

better understand the dynamics of these areas, provide a baseline with which to compare future changes, and begin to plan conservation efforts that will aid tidal wetland migration. It may also be possible to effect restoration of some of the degraded biological communities along the shore and to maintain habitats for rare species of wildlife and plants.

THE BINNEN KILL STUDY

In 2016, Hudsonia collaborated with biologists Larry Federman and Jason Tesauro and with Louis Berger US on a natural resources study of a large area in the towns of Bethlehem and Coeymans, Albany County. The study area consisted of 794 acres (320 hectares) bordering the Hudson and the lower reach of the Binnen Kill, a tributary to the Hudson. Some of the land parcels in the study area are state-owned and some are privately held, and some of the private lands have conservation easements held by Scenic Hudson.

The Binnen Kill rises west of the NYS Thruway and runs only about 4 miles (6.4 km) before emptying into the Hudson River just south of the I-90 bridge. It experiences twice-daily tides from its mouth at the Hudson upstream for approxi-

mately 1.4 mi (2.3 km). Our study area was a long (~2.7 mi) and somewhat narrow (~0.7 mi), northeast-to-southwest-oriented swath of land bordering the Hudson and straddling the Binnen Kill tributary. The entire area lies on a floodplain of the Binnen Kill and the Hudson, and was in upland hardwood forest, shrublands, meadows, swamps, pools, and tidal and non-tidal marshes. In 2016, some of the meadows were in agricultural use, some were fallow, and some had been unmanaged long enough to develop oldfield vegetation. Interestingly, much of the eastern half of the site had once been part of the Hudson River and three islands—Poplar, Schermerhorn, and Shad—before the deposition of dredge spoils joined the historic islands to each other and the mainland.

The natural resources study was intended to serve as a basis for future management activities that reconcile desires to maintain existing natural processes, preserve rare species, restore degraded habitats, and prepare for inland tidal wetland migration. We surveyed biological and ecological aspects of the site, including habitats, vascular plants (with emphasis on invasive and rare species), reptiles, amphibians, and birds.

HABITATS

We identified and mapped 26 ecologically significant habitats, ranging from open, freshwater-tidal shallows to upland habitats that are rarely reached by tides or storm surges. Aquatic and wetland habitats covered approximately 410 acres (166 ha). About 13% of the site was in tidal habitats, including tidal swamps, marshes, mudflats, and the river channel itself.

Some tidal marshes were dominated by dense thickets of common reed. Upper tidal marshes were often dominated by other tall herbaceous species such as narrow-leaved cattail, river bulrush, or giant bur-reed. Lower tidal marshes were dominated by lower-stature species such as intertidal spatterdock and pickleweed, and often graded into tidal mudflats—gently sloped or level mucky areas along the margins of tidal channels that are unvegetated or support diminutive plants such as the dwarf arrowheads (*Sagittaria*), including several rare species.

Among the non-tidal wetlands were 134 ac (54 ha) of non-tidal or supratidal swamp (i.e., tidally flooded during spring tides or storm



The lower Binnen Kill, with upper tidal marsh on left and lower tidal marsh in the stream channel.
Photo: Chris Graham



Intertidal spatterdock and awl-leaved arrowhead (NYS Rare) on a tidal mudflat at the Binnen Kill site.
Photo: Chris Graham

surges, but not during daily tides). Hardwood swamps at Binnen Kill were variously dominated by green ash, silver maple, eastern cottonwood, white willow, and swamp white oak, and many of the trees were large, towering specimens.

We found eleven intermittent woodland pools (or vernal pools). These are small pools partially or entirely surrounded by forest, typically with no surface water inlet or outlet, and with standing water during fall, winter, and spring that dries up by mid- to late summer during a normal year. Seasonal drying and lack of a stream connection ensure that these pools are fish-free, which means that eggs and larvae of

certain obligate pool-breeding amphibians, such as spotted salamander and wood frog, are more likely to survive. (Extreme high-water events may bring fish into these pools temporarily, but fish populations will not persist as long as the pools dry out between flood events.)

Numerous floodplain pools had deeper and more permanent standing water than the vernal pools, and may support fish. Most of these pools occurred in a band along the eastern side of the study area, and many were hemmed in by tall stands of common reed, giving them a private and secluded feel. American beaver, green

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Painted turtles basking in a floodplain pool at the Binnen Kill site.
Photo: Chris Graham

heron, and probably lots of other wildlife use these pools.

Extensive upland hardwood forests had canopies of some combination of eastern cottonwood, silver maple, sugar maple, box elder, white ash, green ash, black locust, American elm, northern red oak, eastern white pine, and red pine. Those on the east side of the site had impressively large, stately cottonwoods (a fast-growing species), and some had large silver maple or white ash as well.

"Meadow" areas were in cornfields, fallow fields, hayfields, and oldfields. Of these, oldfields—which have been left untilled, uncut, and unmowed for two or more years—are typically the most interesting biologically because of the greater diversity of plants and corresponding diversity of animals. Several of the oldfields were in a matrix of dry, sandy, somewhat prairie-like habitats, and had dense patches of rough dropseed, a prairie grass native to the region. We found two rare sedges—Davis's and Bush's sedges—in these oldfields. Round-fruited sedge, switchgrass, scouring rush, wild marjoram, wild bergamot, white beardtongue, heath aster, Pringle's aster, tall goldenrod, early goldenrod, and smooth goldenrod were other notable species. Many of these and other oldfield plants are rich sources of nectar and pollen for bees and nectar for butterflies and moths.

INVASIVE PLANTS

Non-native, invasive plant species were abundant throughout the site, as would be expected on a site with this history of dredge spoil deposits and agricultural use: for example, Norway maple, Japanese barberry, multiflora rose, oriental bittersweet, autumn-olive, common reed, stiltgrass, garlic-mustard, garden loosestrife, curly pondweed, and Canada thistle. In upland hardwood forests, multiflora rose, Bell's honeysuckle, Japanese barberry, and common buckthorn were dominant components of the understory. Many of the forest canopies and understories were heavily draped with oriental bittersweet. Water-chestnut was notably absent from tidal habitats, but Eurasian watermilfoil was common in tidal channels, and curly pondweed abundant in at least one large floodplain pool. These invasives may be competing with or otherwise affecting native plants and animals of conservation concern.

RARE SPECIES

The Binnen Kill site was a treasure trove of rare plants. In addition to a few regional rarities, at least ten species of state-listed rare plants occur on the site. Several of these specialize in tidal habitats: kidney-leaved mud-plantain (NYS Rare) and awl-leaved arrowhead (NYS Rare) on mudflats and lower tidal marshes, and Delmarva beggar-ticks (NYS Rare) on the upper edges of exposed muddy shores. Muenscher's water nymph (NYS Endangered), a submergent aquatic, is globally rare and endemic to the Hudson River; that is, it occurs in the Hudson and nowhere else on Earth.



We found large populations of two rare sedges at the Binnen Kill site: Davis's sedge (top) and Frank's sedge (bottom). Photos: Chris Graham



A blue-spotted salamander in a seasonally flooded hardwood swamp at the Binnen Kill site. This species breeds in swamps and vernal pools, but spends most of the year in nearby forests. Photo: Chris Graham

Among the diverse sedge flora were four state-listed rare species: Bush's sedge (NYS Rare), Davis's sedge (NYS Threatened), Frank's sedge (NYS Endangered), and red-rooted flatsedge (NYS Rare). Frank's sedge occurred by the hundreds in wet meadows, the largest known population in the state in 2016 (Steve Young, pers. comm.). Davis's sedge seems to be a specialist of supratidal habitats along the Hudson and non-tidal floodplains of other large streams. At the Binnen Kill it occurred in large and small patches in forests and meadows. Bush's sedge occurred in moist oldfields and wet meadows. One of the floodplain pools had a large patch of red-rooted flatsedge (NYS Rare). Regionally-rare plants on the site included Tuckerman's sedge, Sprengel's sedge, sessile-fruited arrowhead, and poke milkweed, among others.

In addition to many common fishes of the tidal habitats, we found silvery minnow, a species of limited distribution in the Hudson which was apparently using the tidal portion of the Binnen Kill for spawning and nursery habitat. The Binnen Kill mouth was also nursery habitat for American eels, which were found in the soft sediments; older eels probably shelter in the wooden and concrete bulkheads along the Hudson River shore, as they have been found to do so elsewhere in the upper estuary.

We found blue-spotted salamander in a large supratidal hardwood swamp, common snapping turtle in interior pools and tidal habitats, and northern map turtle in tidal shallows of the main Hudson River channel and the Binnen Kill mouth.

A breeding pair of American kestrels was observed in the northeastern part of the site, and was probably nesting in a large tree on the Hudson River shore. American black duck was seen in a floodplain pool, and American woodcock in forest and shrubland. Cerulean warbler was also seen at the forest edge on the Hudson shore, and is known to nest nearby at Southern Schodack and Houghtaling islands. Blue-winged warbler and brown thrasher were observed in shrub-sapling thicket, and scarlet tanager and wood thrush in forests. The American eel and all of these birds, reptiles, and amphibians are listed as NYS Species of Greatest Conservation Need (SGCN)—a designation given to species that are known to be rare or declining in the state.

SEA LEVEL RISE AND FUTURE SITE MANAGEMENT

What kinds of land management would help to ensure that rare plants and animals are able to persist here? We don't have all the answers, but a sea level rise and habitat monitoring program could track the tidal water levels and habitat changes and help to predict future effects on rare flora and fauna, and thus inform future management of the site.

The topography of the Binnen Kill site suggests that sea level rise will result in migration of and increase in shallow and intertidal wetland habitat over time. Preserving low-lying uplands on gentle gradients adjacent to tidal wetlands will preserve the potential for this tidal habitat migration. Active restoration of the Hudson River side channel could restore shallow subtidal and intertidal wetland habitat and some of the ecosystem services that were lost when the historic channel was filled. Removing portions of the shoreline bulkhead would allow greater tidal flooding of the shoreline area, but maintaining some segments of the bulkhead would preserve habitat used by American eel and other organisms.

The known rare plant populations may be affected by sea level rise, farming activities, or competition with invasive plant species, in addition to factors such as deer herbivory and ordinary plant succession. The populations of Frank's sedge, Davis's sedge, and red-rooted flatsedge are particularly vulnerable to the rising sea level. Propagation and transfer of plant materials to suitable locations above the projected tidal zone is one strategy for preserving these populations. Another would be thin-layer augmentation of soil elevations to keep the habitat floor a few millimeters above the rising waters.

Other possibilities for habitat restoration and species conservation are numerous. Invasive plants might be removed or managed in select locations where they seem to be competing with rare native species. (*Hudsonia* discourages use of herbicides in favor of repeated, non-toxic, more labor-intensive methods such as digging, pulling, cutting, mowing, grazing, and perhaps torching, where appropriate.) Shrubland habitat could be main-



In New York, kidney-leaved mud-plantain (NYS Rare) is restricted to Hudson River tidal mudflats and shoreline habitats. Photo: Erik Kiviat

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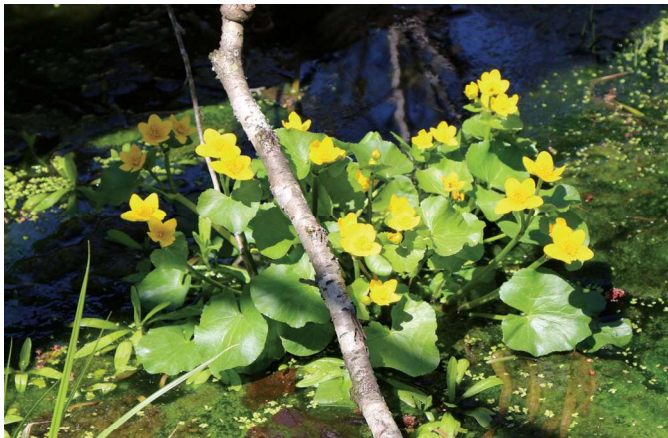
HUDSONIA PROJECT UPDATES, SUMMER 2021

Old Forest at Montgomery Place

We are sampling the vegetation of a 300-year-old hemlock-hardwoods forest, Montgomery Place South Woods, on the Bard College campus in Annandale, New York. This survey repeats studies conducted in 1976 and 2011, and documents changes occurring with the decline and death of hemlock, the dominant tree in the stand, due to insect infestation. Preliminary results suggest a doubling of herb species richness, the appearance of some new nonnative woody plants, and an increase in native tree seedlings and saplings since 2011. (This is a collaboration with Bard College.)

Temporary Pools

Intermittently-flooded, shallow water bodies, some as small as four square meters, can support substantial biodiversity. While scientists and environmentalists study and protect forested pools in which mole salamanders



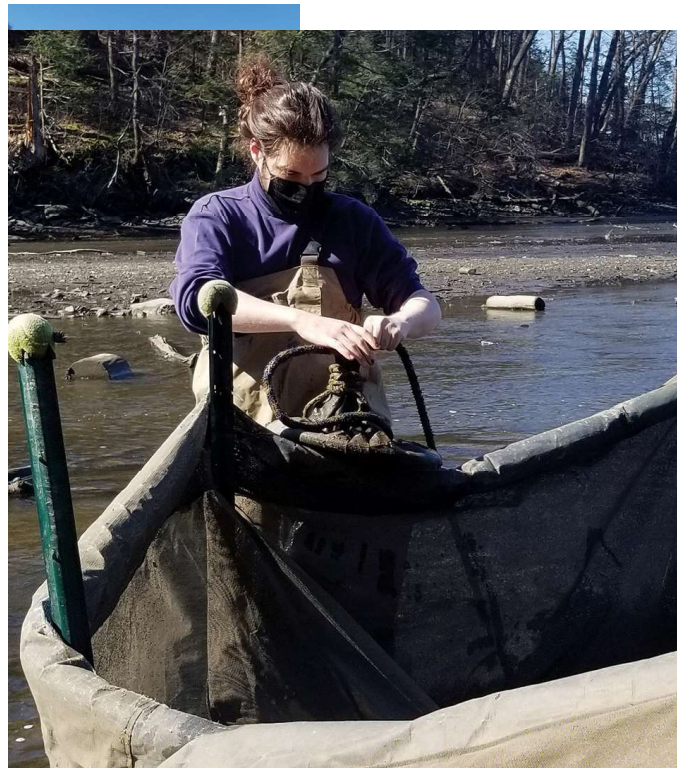
Marsh marigold in a temporary pool at the Farm Hub. Photo: Erik Kiviat



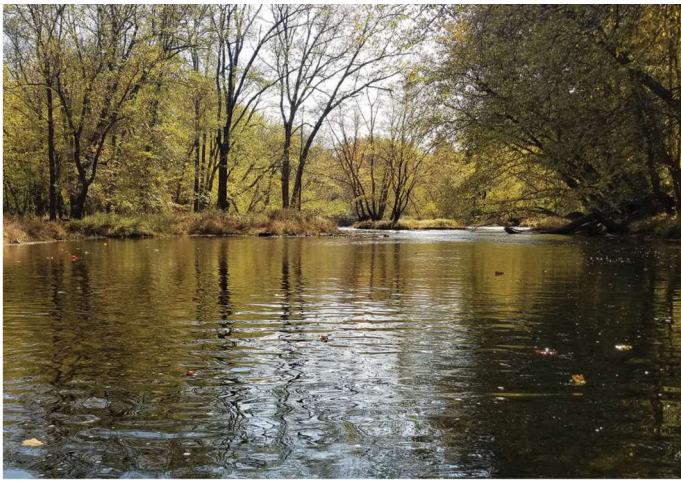
A temporary pool at Bristol Beach State Park. Photo: Erik Kiviat



American eel is only a few inches long at the “glass eel” stage when it arrives here, but can grow to over three feet long before it returns to the ocean to spawn. Photo: Lea Stickle



Intern Ben Harris at the eel fyke net, Tivoli South Bay. Photo: Lea Stickle



Wood turtles use perennial streams year-round, but also venture into nearby habitats for nesting, resting, and foraging in spring through fall. Photo: Lea Stickle



Farm machinery poses a threat to the wood turtle, a “high priority” NYS Species of Greatest Conservation Need, and other terrestrial turtles of the Hudson Valley. Photo: Lea Stickle



Intern Lilly Ballantyne radio-tracking wood turtles near active farmland. Photo: Lea Stickle



Dia is trained to help locate wood turtles at one of our research sites. Photo: Lea Stickle

and other amphibians breed, it is unappreciated that pools in farm fields, abandoned soil mines, and on dirt roads and trails can also be critical for animal life. We are in the second year of research on the invertebrates and chemistry of such temporary pools in Ulster County, New York. A few of the interesting organisms we have found are a dance fly, a horsehair worm, a flatworm, and clam shrimps. (This is a collaboration of Bob Schmidt, Emily White, and Erik Kiviat, with funding from Will Nixon.)

American Eel

Hudsonia continues its collaboration with the Hudson River Estuary Program (NYS Department of Environmental Conservation), the Hudson River National Estuarine Research Reserve, and Bard College to monitor an eel fyke net at the mouth of the Saw Kill in Tivoli South Bay. Each year, the net is checked daily from mid-March to mid-May for glass eels—the young, translucent American eels (*Anguilla rostrata*) that migrate each year from the Sargasso Sea into rivers and streams along the US East Coast. Five Bard College student interns along with Hudsonia staff collected 715 glass eels and released them above the lower Saw Kill dam. Once the eels have grown to maturity over several-to-many years in the Saw Kill system, they will make the long

journey back to their ocean spawning grounds. (Funded by NYSDEC and Bard College.)

Turtles and Agriculture

Hudsonia is in the fourth year of research on the ecological interactions between farming and turtles. We continue to radio-track wood turtles, a species known to be especially at risk of mortality caused by farm equipment. We are working with farmers to test ways of reducing the hazard to turtles without adversely affecting agricultural operations. (Supported by the Hudson Valley Farm Hub in collaboration with the Hawthorne Valley Farmscape Ecology Program.)

Weed Ecology

Throughout Hudsonia’s history we have conducted research and advised land managers about long-present, abundant, nonnative weeds including knotweed, common reed (*Phragmites*), purple loosestrife, and waterchestnut. The current phase of work focuses on synthesizing decades of observations and measurements into scientific publications and man-

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Occurrences of false hellebore, a plant of moist semi-shaded habitats, are rare in the Meadowlands. Photo: Erik Kiviat



Wolf's milk (*Lycogala epidendrum*) resembles tiny puffballs but is actually a slime mold, not a fungus. Photographed here in the Meadowlands, it is widespread in the US, typically occurring on rotting logs. Photo: Erik Kiviat

agement recommendations, and collaborating with other researchers on large-scale analyses. How nonnative plants interact with other nonnative and native organisms is a central thread running through much of the study. We are also interested in the non-habitat ecosystem services provided by weeds. The collection of data about birds nesting in knotweed stands continues – reports are welcome! (Supported by the Derald H. Ruttenberg Foundation.)

Urban Biodiversity

We continue to analyze data and write about the case study of biodiversity in the New Jersey Meadowlands region. A survey of the macrofungi (gilled mushrooms, shelf fungi, puffballs, coral mushrooms, etc.) and slime molds of the study region proceeds with identification assistance from members of the New Jersey Mycological Association and New York Mycological Society. As for other organisms such as lichens and higher plants, an aim of the fungus study is to discern which groups or species do and do not tolerate the urban-industrial environment. This knowledge has applications in the management of other industrial areas, ecological restoration, and environmental planning. (Urban biodiversity work was supported by the Geoffrey C. Hughes Foundation, Will Nixon, and individual donors.)

Wetlands in Novels

Erik began collecting English-language fiction containing wetland imagery 25 years ago as a hobby. Many readers and writers contributed titles and ideas to this study. Analyzing cultural use of wetlands such as this sheds light on the age-old and worldwide duality of the relationship between people and wetlands that is due to the ways in which wetlands provide resources as well as present hazards.

Habitat Mapping

We completed the final phase of the townwide habitat mapping project for the **Town of Pound Ridge** (Westchester County), and the habitat report and map have been incorporated into the recently completed Natural Resource Inventory for the town. The information on significant habitats, rare and uncommon species, and effective conservation measures will help landowners, developers, conservation organizations, and town agencies better understand and protect the places of greatest conservation importance. (Conducted in partnership with the Pound Ridge Conservation Board with funding from Pound Ridge citizens.)

In collaboration with the Hawthorne Valley Farmscape Ecology Program, we completed a study of the land use history and the habitats of the **Fox Hill** site, the northernmost part of the **Overmountain Public Conservation Area** in Ancram (Columbia County), which is owned and managed by the Columbia Land Conservancy. The site has long been used for agriculture, logging, and charcoaling, but is now almost entirely forested. The forests are part of a substantially unfragmented forest of 2000+ acres identified by the NYS Department of Environmental Conservation (NYSDEC) as “regionally significant.” Because of its size, the forest may have special habitat value for the kinds of wildlife that require large habitat areas or safe movement corridors. The Columbia Land Conservancy has extended formal conservation status to much of this large forest corridor through

conservation easements and in-fee CLC ownership. (Funded by the Columbia Land Conservancy through the Farmscape Ecology Program.)

Biodiversity Education

Our Biodiversity Education program helps local land-use decision-makers learn how to recognize and protect important natural resources. Earlier this year we held a three-part webinar series on **Wetlands: Values, Threats, and Protection**, and a webinar on establishing **Critical Environmental Areas** (CEAs), and are now working with volunteers in the towns of Montgomery, New Lebanon, and Woodstock to help identify candidate areas for CEAs in those communities. In collaboration with the Columbia Land Conservancy we co-lead an online workshop to help municipal agencies in Columbia County understand how to use the county's **Natural Resource Inventory** (NRI) during environmental reviews of land development projects. We held a similar workshop about the Greene County NRI—part of the annual Schoharie Creek Watershed Summit organized by the Greene County Soil and Water Conservation District. See the notices on p. 11 for upcoming programs on **Recognizing Habitats** and **Protecting Streams**. In collaboration with ecologist David Hunt, we completed a habitat map and report for the City of Rensselaer, as part of the city's Natural Resource Inventory. We assisted several Hudson Valley towns with information and ideas to inform their revisions of local legislation to better protect biodiversity and water resources. We prepared habitat data gathered over the last 20 years for thirteen **Dutchess County municipalities** for inclusion in a web map being created by Don Meltz's GIS students at Marist College. (These projects are carried out in partnership with the NYSDEC Hudson River Estuary Program and Cornell University Department of Natural Resources with funding from the NYS Environmental Protection Fund.)

Field Guide to Columbia County

Work continues on the **Ecological and Cultural Field Guide to the Habitats of Columbia County**. Co-authored with the Hawthorne Valley Farmscape Ecology Program, the generously illustrated *Field Guide* describes many of the ecological communities in the county, past and present uses of the land, and aspects of people's interactions with the natural world. (Funded primarily by an anonymous donor to the Farmscape Ecology Program.)

Technical Assistance

Hudsonia performed other biodiversity assessments, habitat mapping, and other scientific services related to proposed solar photovoltaic development, soil mining, warehouse construction, road maintenance, aquatic vegetation management, hydropower redevelopment, park planning, wetland restoration, and residential land use in widely spread locations around the Hudson Valley and in neighboring regions. ■

Several publications related to projects outlined above:

- Kiviat, E. 2020. Uses of wetlands in the urban coastal Meadowlands of New Jersey, USA. *Urban Naturalist* (36):1-16.
- Kiviat, E. 2021. Wetland imagery in American novels. *Social Sciences and Humanities Open* 4(1):e100158.
- Kiviat, E., P.G. Davison, R.C. Harris, and S. Dickman. 2021. Novel hepatic and lichen assemblage on *Phragmites* stubble in a Florida freshwater swamp. *Evansia* 38(1):9-14.
- Palmeri, J. and E. Kiviat. 2021. Toxic effects of knotweed (*Polygonum cuspidatum s.l.*) rhizome on the mosses *Atrichum angustatum* and *Thuidium delicatulum*. *Lindbergia* 44:linbg.01131.

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We found common spiked lobelia, ragged fringed orchid, hyssop skullcap (NYS Endangered), and Fernald's sedge (NYS Threatened) at biological assessment sites in Dutchess and Ulster counties. Photos: Chris Graham

tained for species of conservation concern such as brown thrasher and blue-winged warbler. Likewise, upland forests could be maintained or expanded to support cerulean warbler, scarlet tanager, wood thrush, and other forest birds. In some places the introduction of native shrubs to increase understory density would benefit the wood thrush and other songbirds that nest in and/or forage in forest shrubs (Rosenberg et al. 2003).

Extensive meadows and native warm-season grasslands are important habitats for a variety of wildlife species. Over 198 acres of fields occur in adjacent blocks separated by wooded and shrubby hedgerows. The fields could be managed for grassland breeding birds by less-intensive agriculture and removal of hedgerows to form larger blocks of unfragmented meadow habitat. Songbird species such as savannah and vesper sparrows and bobolinks, which require large open meadows for nesting, could benefit from this action. Removing hedgerows may benefit the ground-nesting grassland birds but not the American kestrels (SGCN) that feed on those birds and use trees at field edges as hunting perches. As always, habitat management will favor certain species and disfavor others; even the habitat needs of species of recognized conservation concern sometimes conflict.

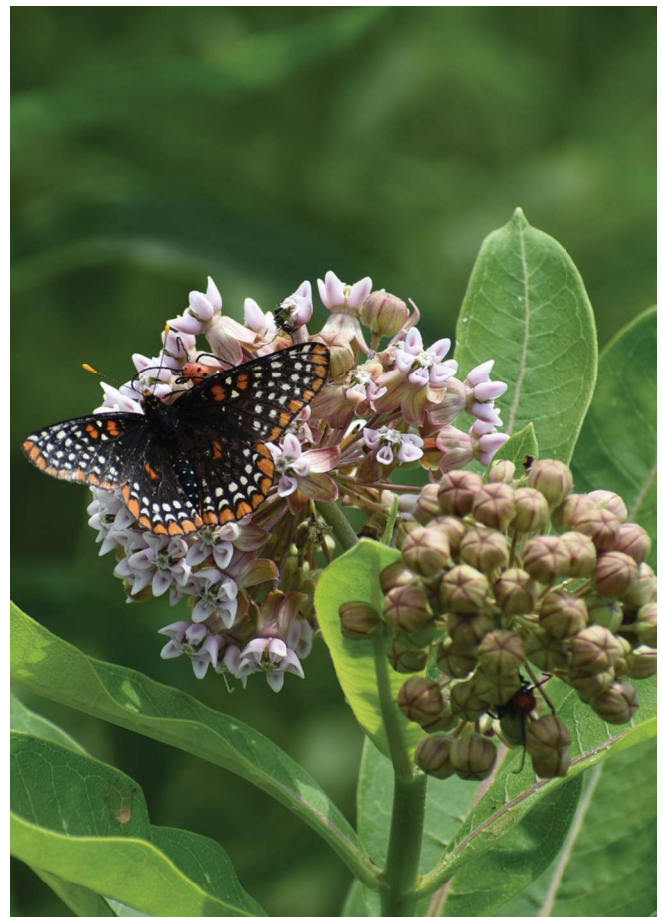
Intermittent woodland pools, floodplain pools, and seasonally flooded swamps on the site are important for blue-spotted salamander, frogs, turtles, fairy shrimp, water birds, and other organisms. Some of the woodland vernal pool habitats are likely to be flooded by rising tidal waters which could introduce fish to the pools—a serious hazard for pool-breeding amphibians and other vernal pool specialists. Extending the functional life of the pools may require temporary interventions such as creating shallow berms to limit exposure to repeated tidal flooding so that pools continue to dry up in summer. Replacing or expanding interior and supratidal pools elsewhere on the site would be a more permanent fix, but just allowing the vernal pools to be flooded more frequently is also a reasonable option, as supratidal pools have their own habitat values for native biodiversity.

Our findings at the Binnen Kill site show that ordinary-seeming places can harbor extraordinary things, such as rare species and a complex array of valuable habitats. Further, our findings indicate the parts of the site that may be most important for conservation—e.g., to allow for wetland migration and to protect rare species—and those areas where future habitat restoration could have the greatest benefit to native species and communities. An overriding concern at the site and a motivating factor for the study is inland wetland migration in response to sea level rise. Engineers with Louis Berger US predict that substantial areas at the Binnen Kill site will experience changes in tidal hydrology over the next 40 years—i.e., more frequent and longer lasting tidal flooding—and our study presents management options for facilitating tidal wetland migration and conserving vulnerable rare plant populations during that migration (Louis Berger US and Hudsonia Ltd. 2017). This kind of project can serve as a model for other such studies along the Hudson and in other estuaries, and as a baseline for next steps, including on-the-ground restoration and conservation actions.

We are grateful to Louis Berger US for inviting Hudsonia to collaborate with them on the Binnen Kill project. We thank Hudsonia collaborators Larry Federman and Jason Tesauro for their surveys of birds and herpetofauna. We also thank Nava Tabak at Scenic Hudson, who helped with maps, landowner contacts, historical data and other information, site reconnaissance, and report review. Dan Ratner graciously allowed field workers access from the north via his farm property, and the Tri-City Yacht Club permitted us to launch paddle craft from the club for access to the southern portion of the study area. Funding for the project was from the Hudson River Estuary Program through the New England Interstate Water Pollution Control Commission.

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A Baltimore checkerspot nectaring on common milkweed. Photo: Lea Stickle

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Recognizing Habitats

11 September 2021

9:00pm – 12:00pm

Woodstock, Ulster County, NY

An outdoor workshop for municipal officials and land trust staff to increase their ability to recognize and evaluate major habitat types. We will discuss ecological values, habitat quality, and issues related to land development and conservation. Certificates for 3 hours of municipal training credit will be available to attendees.

Headwater Streams: Identifying and Protecting an Essential Resource

Webinar Series on 3, 10, and 17 November 2021

3:00pm – 4:30pm each day

Small headwater streams are often unnamed and unmapped, and unprotected by state or federal regulations. Yet these streams support distinctive biological communities, play ecological roles important to the surrounding landscape, and are essential sources of water, organic materials, and organisms for the larger downstream systems. We will discuss the ecological values of small streams; how to identify them remotely and in the field; threats to stream habitats and water quality; the status of state and federal regulatory programs for small streams; and how to extend local protections to these important resources. Certificates for 4.5 hours of municipal training credit will be available to attendees.

The webinars and workshop are conducted in partnership with Cornell University and the NYSDEC Hudson River Estuary Program, and funded by the NYS Environmental Protection Fund. Space is very limited, so early registration is recommended. For further information contact Lea or Gretchen at Hudsonia: 845-758-7053. To register, go to <https://hudsonia.org/programs/biodiversity-resources-center/education/>.

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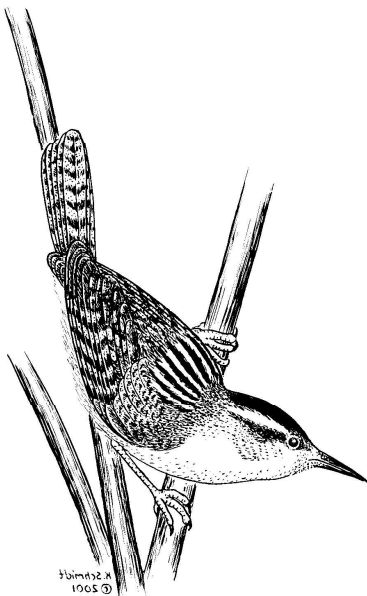


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