

Gretchen Stevens

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News from Hudsonia

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Fall 2022

James Bacon
Attorney at Law



New Paltz, NY
845-419-2338

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 Sunset at Tivoli South Bay, Hudson River,
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PO Box 5000
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Dear Friends of Hudsonia,

In 1988, Erik Kiviat described the sights a Blanding's turtle might have seen in its lifetime, which was then thought to be about 45 years, now believed to be more like 80. The turtle Hudsonia was studying could be alive today, possibly born when the Taconic Parkway was under construction, living through flood and drought, and perhaps seeing beavers return to the suburbanizing landscape.

A relatively new species, as turtles go, Blanding's themselves would have missed the late Cretaceous period. Not so the ancestors of the snapping turtle who were "swimming with the dinosaurs" about 90 million years ago. The characteristics thought to have made turtles and tortoises so resilient are now working against them. Today half the world's turtle species face extinction, including three species here in the Hudson Valley.

In his piece, Erik called on all of us to stick our necks out for turtles. Here you'll find ways to do just that for all species, including how to offset or prevent ecological harm that comes with necessary infrastructure development, and how vigilant citizens can invoke the "hard look" standard to ensure that potential impacts on rare species are properly assessed during environmental reviews.

And guess what? We've reorganized our website! Your support allowed us to build the array of conservation resources you'll find there. Please take a look, read "Time and the Blanding's Turtle" (Summer 1988), and tell your friends.

And please be as generous as you can in supporting our ongoing work in service of the plants and wildlife who share our vibrant landscapes.

Happy Solstice, and thank you! For everything.

Ann Gabler
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REDUCING THE ENVIRONMENTAL IMPACTS OF INFRASTRUCTURE IMPROVEMENT

PART 2

By Erik Kiviat and Gretchen Stevens*

The winter 2021–2022 issue of *News from Hudsonia* contained Part 1 of an article about how the negative ecological impacts of infrastructure improvements could be reduced. The current article is Part 2 and continues our thoughts with discussions of additional elements of infrastructure that are prominent in the Northeast. Readers can call these issues to the attention of their local, state, or federal agency staff who are embarking on the many infrastructure projects that will be underwritten by the federal funding enacted into law early in 2022.

SEWAGE TREATMENT is a critical issue in infrastructure. Many large and small communities still have no or rudimentary sewage treatment that discharges effluent with unacceptable levels of pathogens, nutrients, organic matter, or toxic chemicals such as halogenated hydrocarbons. Many cities have "combined sewer overflows" (CSOs) where heavy rains overwhelm sewage treatment,

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* Erik Kiviat is Hudsonia's executive director. Gretchen Stevens is director of Hudsonia's Biodiversity Resources Center.

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discharging mixtures of stormwater and untreated sewage directly into streams, estuaries, and other water bodies.

Ideas. Establish much higher standards for municipal sewage treatment, and provide state or federal funding to allow small or poorly-heeled communities to achieve those standards. Re-engineer existing sewers and treatment plants to completely separate stormwater and sewage. Widely employ green infrastructure to reduce stormwater runoff from urban and suburban areas and minimize the stress on stormwater infrastructure. Employ reedbed technology that uses marsh plants for nutrient removal or sludge drying.

SOLID WASTE AND RECYCLING. One-third of municipal solid waste (excluding construction and demolition [C&D] debris) is recycled in the US.¹⁰ The bulk of this is paper and cardboard. Much of the non-recycled material ends up in landfills, casual dumps, and litter. Even deposit containers are often discarded rather than returned. Recycling plastics (e.g., styrofoam) and composite materials from packaging and other sources is a stubborn problem; New York State deserves credit for banning most uses of styrofoam as of January 2022, but the plastics problem is still enormous. Solid waste landfills leak toxicants into wetlands, scatter items such as plastic bags across the landscape, and consume large areas of land.

C&D debris is bulky and may contain hazardous substances such as asbestos and PCBs. Demolition debris may be dumped in a nearby wetland or ravine, legally or otherwise. Unused cement and asphalt residues from supply trucks are often disposed of on roadsides at the end of the day.

Ideas. The real environmental cost of manufacturing and disposing of plastics should be paid by plastics manufacturers, which will make plastics too expensive to use unnecessarily for packaging, straws, other disposables, and thousands of other consumer items. Goods can be packaged for sale or shipment in recycled, easily recyclable, materials. Moving away from the “disposable” culture in favor of durable, reusable



Turning C&D waste into aggregate for future construction, Town of Kearny, NJ. Photo © Erik Kiviat

goods will reduce the volume of the solid waste stream and conserve raw materials. Existing landfills will one day be mined to recycle the contents. In the interim, landfill gas can easily be collected and cleaned for use as fuel. Much C&D debris can be recycled (asphalt and concrete for pavement,⁸ wood for mulch, metals for reuse). The Habitat for Humanity Re-store centers for re-use of construction materials, hardware, furniture, and other items, the goods exchanges at some recycling centers, and vari-

ous kinds of thrift stores and free stores provide models for expanded salvage. The 2022 federal infrastructure law addresses small segments of the solid waste and recycling issue; much more is needed at state and local levels.

RENEWABLE ENERGY GENERATION.

Utility-scale wind and solar energy generation require large expanses of land, thus may extensively modify habitats for plants and wildlife. If forest is cleared for energy facilities, the forest



With prior biological assessments, careful siting, and careful construction, utility-scale wind generation facilities can be compatible with agriculture, forestry, and biodiversity conservation. Photo © Erik Kiviat

habitat (and its services sequestering carbon, infiltrating stormwater, moderating summer air temperatures, and improving air quality) is lost, possibly permanently or possibly for a century (30+ years life of facility plus 70+ years for a forest to reestablish and mature). If preexisting meadows or oldfields are used, habitat for winter raptor foraging and summer grassland or shrubland bird breeding may be highly modified in ways that limit breeding habitat to a few common, small bird species (e.g., savannah sparrow in meadows, gray catbird in shrublands). The fencing around solar installations can also interfere with movements of medium-to-large size animals through the arrays. Polarized light pollution from the smooth black solar panels can attract aquatic insects to lay eggs on the panels, and birds to collide with them.⁴ Bats and birds also die in collisions with the blades of wind turbines, a common risk that has proven difficult to monitor and recalcitrant to scientific solutions.^{1,12,13}

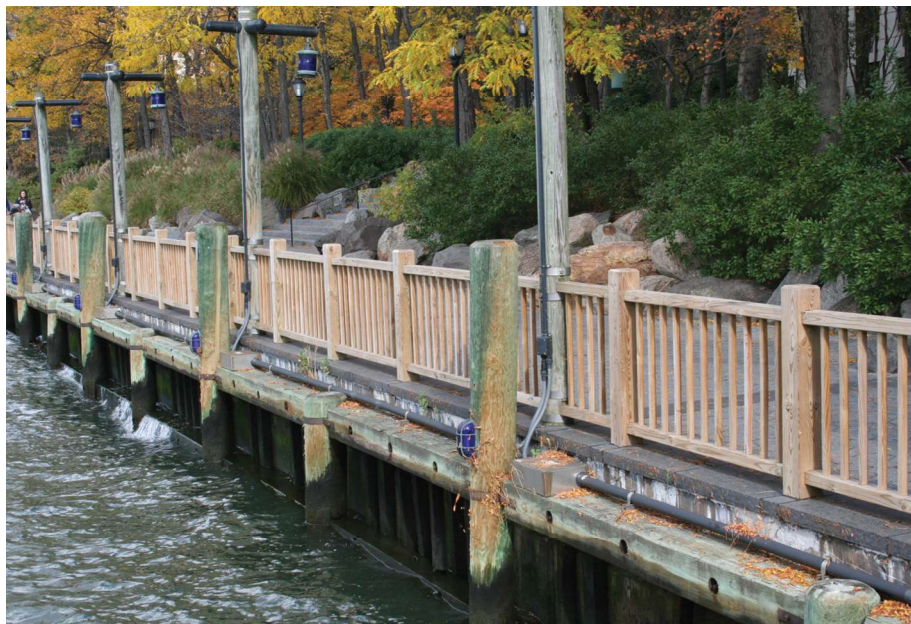
Ideas. Solar panels with reduced attractiveness to insects need to be designed and commercialized. Federal and state initiatives and subsidies and “fast track” policies for renewable energy development should require thorough consideration of habitat and biodiversity issues in siting, designing, constructing, and operating wind and solar farms. Research will find many agri-

cultural and conservation uses that are compatible with renewable energy installations.

NOISE. Most infrastructure improvement involves construction noise. Recent research has found many kinds of adverse impacts to invertebrates, fish, frogs, turtles, amphibians, reptiles, birds, and mammals from anthropogenic sound. Impacts include interference with acoustic communication, increases in stress hormone levels, immune suppression, hearing loss, and behavioral changes. An international review of noise impact studies found “that terrestrial wildlife responses begin at noise levels of approximately 40 dBA, and 20% of papers documented impacts below 50 dBA.”⁹ Fifty dBA is a modest level of noise; home appliances often exceed that level.

Ideas. Plan noisy work for seasons and times of day when less likely to affect animals, and avoid the habitats of sensitive species. Buffer harmful noise generated by highway construction, maintenance, and use, by means of noise barriers composed of vegetation and berms or other structures.

FLOOD PROTECTION AND ADAPTATION TO SEA LEVEL RISE. After stream flooding, which has stricken many developed areas in recent years, streams are often realigned, bulldozed,



Hardened shoreline in Manhattan—an impermanent protection from storm surges and sea level rise.
Photo © Erik Kiviat

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An abandoned, unreclaimed cement quarry in Ulster County has developed biologically interesting habitats that support several rare species. Photo © Erik Kiviat

or confined between berms and levees to reduce local flooding damage to structures and farm fields, but these practices exacerbate flooding and siltation downstream in addition to damaging stream and riparian habitats. Levees and seawalls along coasts separate the aquatic or marine habitat from the inland marshes or floodplains, and are subject to frequent failures as storm intensity increases. Gigantic moveable barriers and other high technology are proposed to stop storm surges from entering urban estuaries such as New York Harbor. A cautionary tale from the Netherlands analyzed 1735 failures of the world-famous Dutch dikes between 1134 and 2006.¹¹ Storm surges have overwhelmed flood defenses in population centers such as New Orleans and the New York City area.

Ideas. Where flood defenses such as dikes, berms, and seawalls must be built, they could include the construction of special habitat types for the benefit of birds, aquatic and estuarine invertebrates, and plants of conservation concern,⁶ and with appropriate allowance for recreational use in some cases. However, the best defense is “avoidance,” that is, keeping or moving structures and infrastructure out of hazard zones.² It has been stated that protection of communities from sea level rise and flooding is a planning, rather than an engineering, issue - in other words, where people live and work on vulnerable landscapes is more important than technological barriers.²

ABANDONED MINES. In the transition from fossil fuels to renewable energy, many oil and gas wells and coal mines will be decommissioned

and the land “reclaimed” to seminatural habitats. The problem in restoration of surface mines revolves around establishing vegetation that will be beneficial to wildlife and other ecosystem services, as well as treating acidic or contaminated leachate and soil from the mines and waste piles.

Ideas. Sometimes it is better not to reclaim/restore, but to leave surface mines as-is if they are determined valuable for biodiversity. Some abandoned coal mines have proven good habitat for birds and dragonflies of conservation concern. Abandoned marble or cement quarries can support rare plants and lichens. The nonnative plants that are often common on mined lands can provide good temporary or even permanent habitat for many birds, insects, and other organisms. More research is needed on “derelict lands” in the US, to enable strategic management, conservation, and reuse.

BROWNFIELDS. Abandoned or contaminated industrial sites are called “brownfields.” Some of the worst sites are on the National Priorities (or Superfund) List for cleanup. The 2022 infrastructure act includes funds for remediating several Superfund sites in New Jersey and New York, for example.

Ideas. It should not be assumed that post-industrial sites are worthless for conservation. Despite the damage, these sites can support diverse flora and fauna, including pollinators and their plant resources, and rare species of wildlife and plants. Moreover, it can be a big win for the public and for

conservation to clean up brownfields and turn them into parks and nature preserves instead of redeveloping them. The concept is known as *Brownfields-to-Greenfields*.³ Brownfield sites should be subjected to thorough, independent biological surveys for, e.g., plants, bees, butterflies, and other taxa depending on the character of the habitats.

AFFORDABLE HOUSING is important and necessary. Large increases in the stock of housing that is affordable for low- and moderate-income households is an essential goal in rural towns as well as cities. But, like any other kind of development project, construction of new affordable housing should be subject to high standards of environmental review and performance. Hudsonia has commented on three affordable housing projects in the Hudson Valley. The planners for one project attempted to avoid consideration of possible noise impacts on a nearby bald eagle nest. The wetland delineations for another project were flawed (a common problem on development sites). Proponents of a third project abruptly clearcut half of the site, including steep slopes, in March and April in contravention of U.S. Fish and Wildlife Service guidelines requiring logging activity to be completed by 31 March to protect the Endangered Indiana bat.⁵

WETLAND MITIGATION. Compensating for destruction of wetland in one place with creation, restoration, enhancement, or preservation of wetland in another place, is called “wetland mitigation” (or “mitigation banking” when one large mitigation site serves several development projects). Most wetland mitigation does not provide all the ecosystem services, including habitat functions, of the destroyed wetland. In one international review of restoration, it was shown that some functions in constructed wetlands take as long as a century or more to rise to the level of function in reference wetlands (relatively undisturbed wetlands for comparison).⁷ Most mitigation, and other ecological restoration, is maintained for only a limited number of years, after which the habitat structure may degrade for the target animal and plant species.

Ideas. Destruction and degradation of wetlands, including their hydrology, soils, and vegetation, should be strictly avoided. Some wetlands can be widely bridged by trails or roads to avoid filling. If it is considered necessary to alter or convert a wetland, effective mitigation generally requires considerable knowledge and expense. Merely digging a hole, planting some wetland plants, and filling the hole with water will not create the complex wetland ecosystem of the destroyed wetland that may have taken millennia to develop. A century-long (or longer) lag in restoration of important wetland functions means a near-term loss of wetland habitat for plants and animals. Monitoring and maintenance of mitigation projects and banks should be continued indefinitely, inasmuch as future failure of mitigation is part of the external costs of infrastructure.

CONCLUSIONS. Building new and improving old infrastructure has many adverse impacts to wildlife, plants, their habitats, and non-habitat ecosystem services. Current science provides solutions to some of these problems, whereas others require research and careful experimentation, or in some cases are intractable. The infusion of federal infrastructure funding provides an unusual opportunity to address some of these issues now.



Wetland mitigation bank in the Kane Natural Area, New Jersey Meadowlands. Chemical removal of *Phragmites* caused the loss of important habitats and an excellent wildlife watching area, and made the marsh more vulnerable to sea level rise. Photo © Erik Kiviat

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A HARD LOOK, OR HARDLY LOOKING

Addressing Rare Species in Environmental Reviews

By Gretchen Stevens*

When local environmental reviews fail to gather the necessary information, they may jeopardize rare species and their habitats, even when those reviews appear to follow state environmental review procedures.

New York State law broadly authorizes local municipalities to regulate land use in the interest of protecting the public welfare. Local zoning and other ordinances provide legal standards for reviewing development proposals and making decisions that balance private property rights with community concerns for environmental quality, public health, and safety.

Proposals for subdivisions and land development projects with potential for significant environmental impacts must go through the New York State Environmental Quality Review (SEQR). This process involves review by a “lead agency,” which is typically the municipal planning board. SEQR requires that applicants and the lead agency complete an Environmental Assessment Form (EAF) to provide basic information about the site and the project (New York Conservation Law, Article 8).

STANDARDS FOR ENVIRONMENTAL REVIEWS

The lead agency is responsible for ensuring that a proposed project complies with local laws and standards, such as for setbacks from parcel boundaries, design of driveways and stormwater management measures, and protection of sensitive natural resources. The agency has great latitude in its decision-making, but is required to “identify] the relevant areas of environmental concern, [take] a hard look at them, and [make] a reasoned elaboration of the basis for its determination.” Court decisions in 1976 and 1979^{4,8} established that standard for environmental reviews and a long history of case law in federal and state courts has affirmed it since then.

For example, a 2008 decision on a Sullivan County case—Kittredge et al. v. Planning Board of the Town of Liberty et al.⁹—invoked the “hard look” standard with reference to potential impacts of a proposed residential subdivision project on endangered or threatened species.

To address questions in the EAF about whether the site supported any endangered or threatened species (or habitats) of plants or animals, the applicant and the Liberty planning board did what many applicants and planning boards do—they relied on letters from the New York Natural Heritage Program (NYNHP) and the New York State Department of Environmental Conservation (DEC).

Those letters stated that there were no records of endangered or threatened species in the vicinity of the proposed subdivision site. *But* the NYNHP letter specifically cautioned that the absence of records did not mean that such species did not exist there—only that (as for most sites) studies of the area

had not been conducted, and that “the information should not be substituted for on-site surveys for rare species.”⁹

This is a very common scenario in environmental reviews of development projects in New York: an inquiry to the NYNHP, the DEC, or the US Fish and Wildlife Service yields no records of rare species at or near the proposed development site, so the applicant and the planning board both assume that no such species are present.

In fact, though, most places have never been surveyed by a biologist or even undergone a habitat assessment, so no one knows if rare species are there or are likely to be there. The DEC and the NYNHP have records of only those rare species occurrences that their staff have observed, that other reliable observers have reported, or that specimens in museums or herbaria have verified.

In the Liberty case, after completion and review of an EAF along with a public hearing, the planning board issued a “negative declaration” of environmental significance and granted approval for the subdivision. Concerned citizens challenged that decision, claiming that the negative declaration violated SEQR because the planning board had not looked beyond the agency letters to see if rare species might actually be present on the site. The plaintiffs were concerned about the potential presence of the bog turtle, which is listed as an endangered species in New York.



The bog turtle, New York's smallest native turtle at 3-4.5 inches (7.6-11.4 cm) carapace length, occupies an unusual kind of habitat that is very vulnerable to effects of land development. Photo © Kristen Bell Travis

Although the NYS Supreme Court upheld the planning board's decision, the NYS Court of Appeals reversed it, stating: “...we agree with petitioners' contention that the Board failed to take the requisite hard look at the effect of the proposed development on wildlife. In fact, there is no record evidence of any meaningful investigation into this area of environmental concern. ... Thus, we find that the Board's...determination that there would be no significant impact on wildlife was arbitrary and capricious and must be vacated.”⁹

MUNICIPAL RESPONSIBILITIES

This decision and others like it have big implications for projects all over the state. The “hard look” requirement applies to many aspects of environmen-

* Gretchen Stevens is director of Hudsonia's Biodiversity Resources Center.

tal reviews in the SEQR process but is routinely ignored when addressing rare species questions. The Liberty planning board's approach—assuming that an absence of rare species records for a site means that rare species are absent—is more the rule than the exception.

Planning boards and other lead agencies are often reluctant to require additional information from applicants for fear of costly and time-consuming challenges, including lawsuits. But they should remember their responsibility for decision-making in the public interest and the obligation to take a hard look at issues of environmental concern. They should also remember that successful challenges can come from concerned citizens as well as developers.

IMPORTANCE OF RARE SPECIES

Why should we even care about rare species?

All species have a role in the ecosystem, even though that role may be unknown to us. The biological diversity that constitutes the web of life includes the invisible, feared, or reviled (yet essential) bacteria, viruses, fungi, beetles, spiders, and slugs, as well as the more charismatic butterflies, birds, turtles, and bobcats. Some species are predators and/or prey; some are scavengers; some are decomposers; some are parasites; some are pollinators; some are dispersers of seeds; some enable seeds to germinate. Some fungi supply nutrients and water to trees, shrubs, and forbs. Some insects keep other insects in check.

The status and condition of biological diversity is a measure of overall ecological integrity. Loss of a species often indicates a degraded environment, and can alert us to needs for protection and restoration before other species or communities are lost. Maintaining the full complement of native biological diversity—that is, those species that would occur here without human agency—helps to maintain the ecosystems that make the world habitable. The loss of one species often triggers the loss of others, sometimes unraveling a whole ecosystem.

Plants, animals, and other organisms become rare for a variety of reasons. Some are near their geographic range limits and exist here at the limits of their environmental tolerances, and may be especially vulnerable to weather extremes and other stresses. Some require habitats that are themselves rare in the region. Many others have declined due to loss or degradation of habitats, often because of our unsustainable uses of land and resources, or other factors such as road mortality or collecting.

Although extinctions are a normal part of life on Earth, there is much evidence that Earth is now undergoing a mass extinction event—apparently driven by human activities—in which species are disappearing at a rate over 1000 times the background extinction rate.⁷ Massive declines of insects and amphibians have been occurring worldwide.^{3,10,11} A recent study found that the populations of vertebrates in the world—both common and rare species—declined by 69 percent from 1970 to 2018.¹ Losses are occurring not only in distant places like the clearcut rainforests of Brazil and Madagascar, and the bleached coral reefs of tropical oceans, but also here in the US Northeast where we are seeing declines of grassland birds, interior forest birds, bats, and rare turtles, among many other groups. Our treatment of land and water right here is part of the problem and can be part of the solution.

RECOMMENDATIONS

How *should* an applicant or planning board learn whether there are rare species on a proposed development site? Rare species surveys are one way to learn, but they can be time-consuming and expensive, and must be carried out by qualified biologists who are specialists in the species or groups in question. (It is preferable for the surveyors to be independent of the applicant and instead retained by the lead agency.) Also, some surveys must span several seasons or years, so may be impractical within the schedules of many development projects.

A workable solution could begin—and in some cases could end—with a habitat assessment. Most rare species are closely associated with one or more habitats or ecological communities that serve the species' various needs for foraging, resting, reproduction, and overwintering. Habitat assessments by qualified biologists can determine whether habitats are present that might support rare species. Such assessments can be conducted quickly and are often less constrained by seasons or temporary environmental conditions.



A fen—the core habitat for the bog turtle in southeastern New York—is often not recognized by non-specialists for its biodiversity values. Photo © Erik Kiviat

If the assessment finds that habitats for rare species are absent, then the project review can proceed on the assumption that the rare species themselves are absent. If habitats suitable for rare species are present, there are two responsible approaches: 1) conduct rare species surveys for the species or groups of species that might use those habitats, or 2) plan the proposed project with the assumption that the rare species are present or may be present in the future. In that case, the applicant would locate and design the project to avoid affecting the habitat areas deemed to be most important to those species.

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HUDSONIA PROJECT UPDATES, FALL 2022

Special Species and Habitats

Wood turtle. We completed our fifth season of study, including four years of radiotracking, at a conventional farm and an organic farm in the Hudson Valley. Our goal is to devise recommendations for reducing the injuries and deaths caused by farm equipment. We are analyzing turtle movement data to understand what environmental factors push turtles out of the riparian buffers and into farm fields, and discussing with farm managers how the risk could be reduced. The wood turtle is listed as Special Concern in New York. (Funded by Hudson Valley Farm Hub.)

American eel. Hudsonia continues its collaboration with the NYSDEC Hudson River Estuary Program, the Hudson River National Estuarine Research Reserve, and Bard College to monitor an eel fyke net at the tidal mouth of the Saw Kill in Tivoli South Bay. The American eel is a NYS Species of Greatest Conservation Need. 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. Three Bard College student interns conducted educational outreach and oversaw the daily monitoring of the net, alongside Hudsonia staff. Volunteers were welcomed back this year, with nearly 100 students and members of the local community participating. Overall we counted 3,408 glass eels, resulting in one of the most active years for eels since monitoring began in 2003 (Funded by NYSDEC and Bard College.)

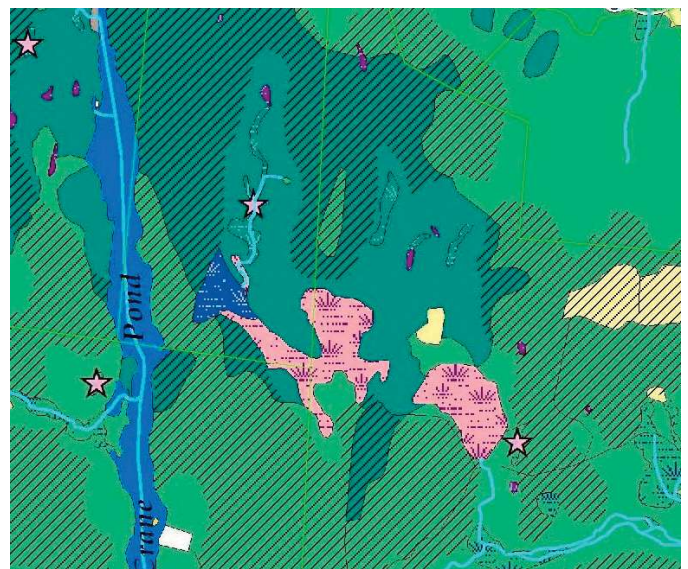
Temporary Pools. In spring and summer 2022 we continued our studies of temporary pools, surveying macroinvertebrates and water chemistry in 20 pools in parks and preserves in Ulster and Dutchess counties. Surprisingly, we found predators in two pools that had evidently crossed short overland distances from permanent water: a crayfish in one pool and the nonnative weatherfish in another. (With Bob Schmidt and Emily White. Supported by Will Nixon.)

Biodiversity Assessments and Biological Surveys

We performed biodiversity assessments, reviewed environmental documents, and provided conservation recommendations for proposed developments, future parks, energy projects, and private estates in the New York towns of **Ancram, Claverack, Cortlandt, Dover, Marlborough, Fallsburgh, Gallatin, Highlands, Mamakating, Pawling, Pound Ridge, Rhinebeck, Rochester, Saugerties, Thompson, Windham, and Woodstock.** Among our findings were rare sedges, diverse moths, butterflies, and dragonflies, clam shrimps, and an unusual robber fly called the gnat ogre (*Holcocephala*).



Bard students checking the fyke net (above) for glass eels (left).
Photos © Lea Stickle



The Hudsonia habitat maps show details that are unavailable on other maps in the public domain. This is a segment from the Town of Dover habitat map.

Habitat Maps

In 2001–2020, Hudsonia created townwide maps of significant habitats for twelve Dutchess County towns and the City of Poughkeepsie, along with reports describing the habitats, their ecological significance, their importance to the human community, and recommendations for conservation. The habitat information is intended to inform townwide and site-specific land use planning, policy-making, land management, and siting, design, and environmental reviews of land development projects. Maps are available for the towns of **Amenia, Beekman, Clinton, Dover, East Fishkill, Hyde Park, North East, Pine Plains, Poughkeepsie** (town & city), **Rhinebeck, Stanford,** and **Washington**. This year Adjunct Professor Don Meltz and his GIS students at Marist College used the habitat map data to create an online, interactive map that puts the habitat data at the public's fingertips. We held a webinar in May to reintroduce the habitat maps and reports to municipal officials, demonstrate how to access the maps through the new web map portal, and discuss some of the ways the information can be used for municipal purposes.



Wood frog egg masses in a temporary pool. Wood frog is among the many animals that depend on the temporary nature of woodland pools. Photo © Chris Graham



Emily White preparing to sample the water chemistry at a temporary pool at Minnewaska State Park. Photo © Erik Kiviat



Rare and uncommon plants found at biodiversity assessment sites: false hop sedge (*Carex lupuliformis*) (left), little club spur orchid (*Platanthera clavellata*) (right). Photos © Chris Graham

We also presented the web map at an in-person workshop in September on Online Mapping Tools for Local Conservation Planning organized by the Cornell Cooperative Extension-Dutchess County and the Dutchess County Planning Federation. (Hudsonia's participation in these programs was carried out in partnership with the NYSDEC Hudson River Estuary Program with funding from the NYS Environmental Protection Fund.)

Biodiversity Education

In June we held a webinar on **Habitat Assessment Guidelines**, and in September held a follow-up field workshop at the Ward Pound Ridge Reservation (Westchester County). The workshop demonstrated how to carry out such an assessment and use the results for identifying areas of a proposed development site that are better suited for development and areas that are best left undisturbed to protect biodiversity and water resources. These events were held in partnership with the NYSDEC Hudson River Estuary Program and funded by the NYS Environmental Protection Fund. A recording of the Habitat Assessment Guidelines webinar and many other webinars on conservation planning, environmental reviews, and other topics related to biodiversity and water resource conservation are at <https://www.hudsonia.org/brcworkshops> and at <https://www.dec.ny.gov/lands/120539>.

Assistance to Municipalities

Natural Resource Inventories. This year we began working with steering committees in the **Town of Kent** (Putnam County) and the **Town of Milan** (Dutchess County) on natural resource inventories (NRIs), to be published in 2023. The NRIs describe the bedrock, soils, groundwater, surface water, habitats, plants and animals of conservation concern, farmland, scenic areas, and resources for public recreation for each town, and provide recommendations for uses and sound stewardship. The purposes of the

Continued on page 10

NRIs are to inform townwide land use planning, environmental reviews of development projects, and land management and conservation initiatives of public agencies, NGOs, and individual landowners. Both of these NRI projects are funded by grants to the towns from the Hudson River Estuary Program with funds from the NYS Environmental Protection Fund.

Critical Environmental Areas. In partnership with the Hudson River Estuary Program, we continued our work with groups in **Montgomery, New Lebanon, and Woodstock** to establish Critical Environmental Areas (CEAs) in their towns, and began work on a CEA project with a team in the **Town of Olive** (Ulster County). The Town of New Lebanon adopted the Warm Springs CEA and the Cool Ravine CEA in June, and the Town of Woodstock adopted the Zena Woods CEA in September.

Conservation Overlay Zone. Also in partnership with the Hudson River Estuary Program, we are working with a planner with GREENPLAN and an attorney with Gordon and Svenson LLP to assist a working group in the **Town of New Paltz** with establishing a conservation overlay zone to help protect biodiversity and water resources in a selected area of the town.

Other Technical Assistance. With the support of the Hudson River Estuary Program, we provided additional technical assistance to municipalities on proposed local legislation for natural resource conservation, identification of local habitats, preparing for open space plans, and training for planning boards. We participated in meetings of the steering committee for updating the **Dutchess County** Natural Resources Inventory, and met with **Greene County** landowners to discuss conservation easements, conservation advisory councils, and Critical Environmental Areas. ■

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Infrastructure continued from page 5

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WHAT YOU CAN DO

Protecting rare species and their habitats requires vigilance. If you are looking for ways to take action on their behalf, you could attend meetings of your municipal planning board, and speak up if reviewers are not taking a “hard look” at the potential effects of development projects on rare species. You could initiate or join municipal efforts (zoning revisions, comprehensive plans, open space plans, community preservation plans) to protect large, well-connected open spaces—forests, meadows, wetlands—that are essential to many of our native wildlife and plants. You could take advantage of the webinars,⁵ workshops, and publications⁶ provided by the Hudson River Estuary Program Conservation and Land Use Program and by Hudsonia²—which offer guidance and materials for local conservation initiatives. And you can manage your own land in ways that promote habitat connectivity, reduce unnecessary disturbance, enhance habitats for pollinators and other insects, and reduce stresses—such as outdoor lights, noise, pesticides—to native wildlife and plants.

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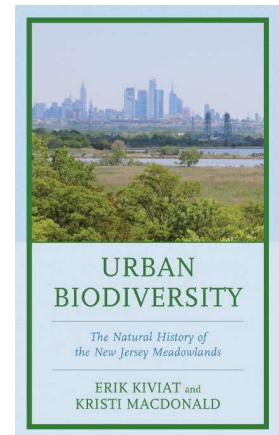
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URBAN BIODIVERSITY

The Natural History of the New Jersey Meadowlands

by Erik Kiviat and Kristi MacDonald

Urban Biodiversity: The Natural History of the New Jersey Meadowlands, by Erik Kiviat and Kristi MacDonald, is out in hardcover and ebook! We hope you will also ask your library to order it. The comprehensive flora and bird lists from the book will be posted on hudsonia.org as well as a discount flyer for personal orders. A companion book on the subject is in preparation.



This book presents a critically important case study of how biodiversity can be studied, monitored, and managed in our increasingly urban world. Kiviat and MacDonald bring to vivid life the habitats and creatures that have survived, and some that have even thrived, in the New Jersey Meadowlands, amidst interstates, suburbs, factories, and malls—and all of the associated environmental damage that comes with them. This will be a critical reference for scientists and land managers interested in the Meadowlands but also an inspiring resource for anyone with an interest in the natural history of urban areas. The sheer scope of the biodiversity identified here is itself a paean to the extraordinary skills of natural historians in the field.

Felicia Keesing, Bard College



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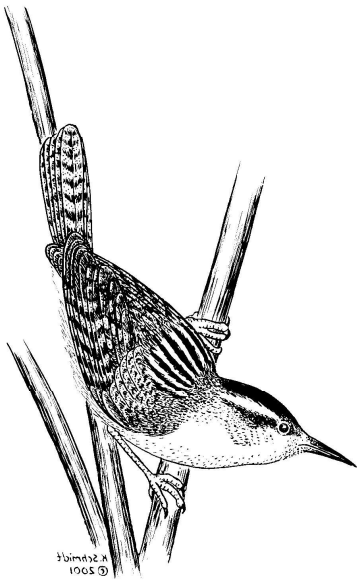


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