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- Conservation Ecology Is about Human Footprints
- Habitat Mapping in the Hudson Valley

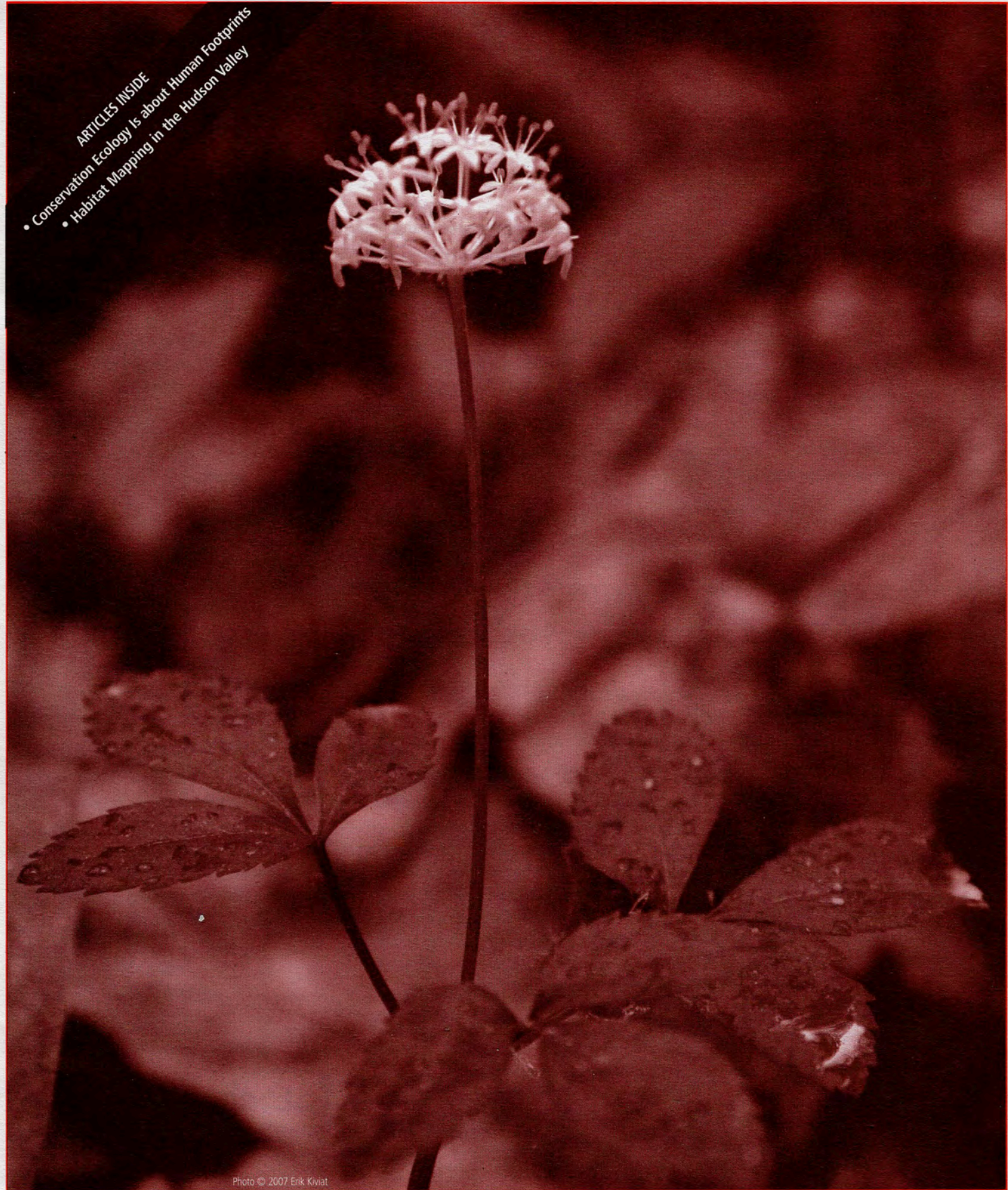


Photo © 2007 Erik Kiviat



# News from Hudsonia

Volume 21, Number 2

Fall 2007

# INSIDE HUDSONIA

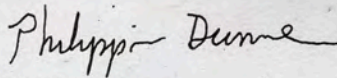
Dear Friends and Colleagues,

We've had a lively and fruitful year studying biological resources in the Hackensack Meadowlands (NJ); conducting rare species surveys and other biological assessments in Putnam, Ulster, Orange, and Dutchess counties (NY); mapping significant habitats in the towns of Marbletown, Northeast, Poughkeepsie, and Rhinebeck; providing technical assistance to individuals and organizations in Columbia, Dutchess, Greene, Orange, Putnam, Ulster, and Westchester counties, and training community leaders in biodiversity assessment techniques in the entire ten-county Hudson Valley region.

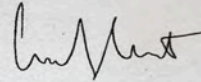
In June we celebrated Erik Kiviat's 60<sup>th</sup> birthday, and we are very grateful to all who made special donations to Hudsonia in his honor. We are delighted to welcome Megan Dundas (Acting Administrator) and Andrew Meyer (Biodiversity Educator) to our staff this year, and Samantha Kappagoda, David Mordecai, and Jane Sokolow to our Board of Directors. We said farewell and thank you to Felicia Keesing for her service on the Board; she will continue to assist us as a member of the Advisory Board.

We look forward to extending our habitat mapping program to new towns, and expanding our conservation ecology research and education programs in 2008. Thank you for your interest and contributions over the years. We hope you will continue to support our efforts in 2008.

Best wishes for the winter season.



Philippa Dunne  
Chair, Board of Directors



Erik Kiviat  
Executive Director

This issue of *News From Hudsonia* is dedicated to Dr. Ted Stiles, a naturalist, research biologist, teacher, and conservationist who died in March. He taught at Rutgers for 35 years, where he studied seed dispersal and plant/animal interactions, and led efforts to permanently protect thousands of acres in northern New Jersey. Ted's fascination with the natural world and zeal for on-the-ground conservation was an inspiration to many, including Hudsonia biologist Kristen Bell, his niece.

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## CONSERVATION ECOLOGY IS ABOUT HUMAN FOOTPRINTS

By Erik Kiviat\*

When did you last think about where your drinking water, wood flooring, pharmaceuticals, and aesthetic inspiration come from, and how your own activities influence those sources? Biodiversity and ecosystem services give us necessary food, clean water, clean air, fuel, and materials of all kinds that support our day-to-day lives, not to mention the exquisite beauty of a mist-blanketed marsh at dawn, the startling crimson of a cardinal-flower, and the delicate translucent wing of a damselfly.

Couples on an ark are not enough—to carry on the essential work of ecosystems we need populations of native wild organisms that can sustain themselves indefinitely. Conservation ecology

*To carry on the essential work of ecosystems  
we need populations of native wild organisms*

works to maintain those viable populations, especially of rare or declining organisms (plants, animals, fungi, etc.), by understanding ecological relationships and reducing immediate and long-term threats.

Arguably the ultimate cause of most environmental problems is people: too many of us, each with too large an environmental (energy, food, consumer goods, etc.) footprint, and with our footprints in the wrong places. Much of Hudsonia's work focuses on the third factor.

"Footprint in the wrong place" refers to where we site our homes, stores, roads, town centers, mines, parks, nature reserves, trails, wells, sewage treatment, gardens, windmills, transfer stations, dumps.... There is great excitement these days about improved technology in "green" homes that can help us use less of resources such as water and petroleum. But planners, landowners, and developers often forget that even our greenest facilities can be extremely damaging if they are built in locations where they compete with crucial parts of nature.

For example, just hiding houses or other structures inside the forest edge, as some planners recommend, does not protect biodiversity and ecosystem function unless the house site is selected with regard to the habitats and complexes of habitats used by the rare, declining, or vulnerable species of the area. A "green" building can still cause a local extinction if it is in a critical habitat such as the middle of a large meadow or forest, the top of a rocky ridge, or near an intermittent woodland pool. A few years ago at a single school property in Dutchess

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\* Executive Director, Hudsonia Ltd.

County a building was built on the only spot where I have ever seen **Jack-O'Lantern** (*Omphalotus olearius* = *Clitocybe illudens*), a spectacular, large, clustered orange mushroom. Another construction project on the same site resulted in removal of trees around a rock ledge supporting the rare **walking fern**, and a parking lot was built on fill in a wetland supporting a rare sedge and an **American woodcock** courtship area. (Lest an orange mushroom be considered only a novelty, it should be noted that half a century ago Jack-O'Lantern was found to produce an antibiotic that inhibited several common pathogenic bacteria.)

It takes experience reading the biological landscape to recognize the most sensitive areas, and know where (and where not) to put our land development footprint. At Hudsonia we find that the right approach to conservation ecology can help to solve practical problems and expand scientific knowledge simultaneously.

As many of our readers know, a long-term study of the **Blanding's turtle** and its environment is the flagship project of Hudsonia's conservation ecology program. Our understanding of how Blanding's turtles, a Threatened species in New York, use the landscape and how use varies from year to year has allowed us to map potential habitat complexes, provide technical assistance to developers and citizens' groups, help park managers conserve habitat while providing recreation opportunities, and teach municipal officials and nonprofit staff to map, assess, and conserve biodiversity in their own communities. The lessons from studying a turtle apply to many other mobile animals that use complexes of habitats spread across the changing landscape—among them many butterflies, migratory fishes, songbirds, and predatory mammals.

In 1996–97 we worked with the Arlington Central School District and the State Department of Environmental Conservation to design and implement a Blanding's turtle

ing areas adjoining their traditional natural habitats. Although proportional yields of live hatchlings declined over the first three years, a ten-year record shows no such

### *The lessons from studying a turtle apply to many other mobile animals*

habitat creation project to offset the destruction of a small wetland for expansion of school facilities. Thousands of wetland mitigation projects are built around the country each year, but very few are scientifically designed to provide habitat for a rare animal species and then followed with long-term study of the results. We have now monitored turtle activities, water levels, soils, and vegetation for twelve years at the Arlington site, and have been fascinated to discover how our long-term data have contradicted some of our short-term findings. Adult Blanding's turtles quickly began to use the created wetlands and new nest-

trend (Figure 1). Our 12 years of data have also revealed use of habitats previously unknown to be used by the turtles. The weather extremes that occur every few years, for example, provoke surprising responses in the turtles' habitat use, and this is essential information for designing an effective conservation plan for a Threatened species. The project has brought home to us the importance of long-term and spatially extensive monitoring which may reveal different patterns over different time periods and areas.

The most important finding from our study is that Blanding's turtles move—a

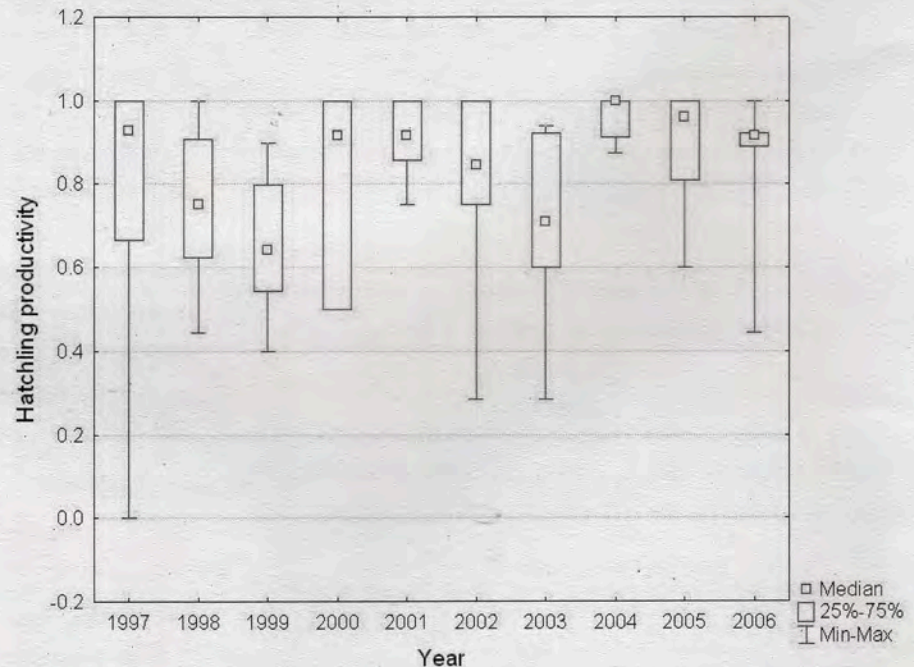


Figure 1. Blanding's turtle hatchling productivity (proportion of eggs producing live hatchlings) over 10 years on a habitat creation site.



Two nodding flowers of the pitcher plant (*Sarracenia purpurea*), an uncommon plant of acidic bogs and (rarely) fens in the Hudson Valley (photographed in central New York). Photo © 2007 Erik Kiviat

lot: from wetland to wetland in response to water levels and temperatures, between wetlands and uplands to nest or to wait out summer droughts, from one nesting area to another as vegetation changes. Short-term movements of 100–1000 meters (i.e., up to

Hudsonia's conservation ecology research is wide-ranging. For example, we have a special interest in the Endangered **bog turtle**, and the vegetation, soils, and land uses of its habitats in the northeastern states. Planners and regulators need better

*A rare species can disappear in a flash without dogged research, monitoring, and protection.*

two-thirds of a mile) are common, and frequently cross property lines. Our improved understanding of how this species uses the landscape under different conditions and in different aspects of its life history has allowed us to map potential habitat complexes for Blanding's turtles elsewhere in the county, and design guidelines for protecting this Threatened species on private lands, parks, and development sites.

methods for reducing land use impacts (sediment and nutrient additions, changes in groundwater flows) on bog turtle habitats. We have studied the geographic and ecological distribution of **eastern prickly-pear** cactus on warm dry slopes and summits near the Hudson River. This odd plant is threatened by concentrated recreation, construction of ridgetop homes, and closing of the forest canopy. We study the visually

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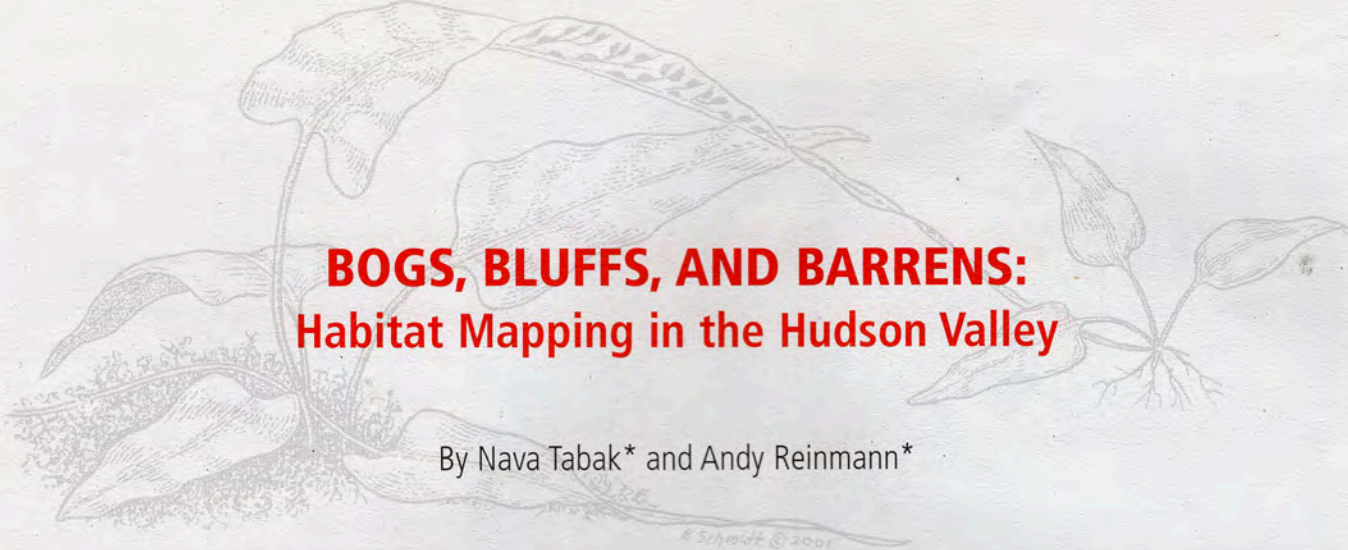
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## BOGS, BLUFFS, AND BARRENS: Habitat Mapping in the Hudson Valley

By Nava Tabak\* and Andy Reinmann\*

It's not every day that biologists find themselves standing in a fen, an unusual type of wetland that occurs only where calcium-rich groundwater emerges at the ground surface. That's why we were thrilled when we found fens almost every day during our habitat mapping field work in the Town of Amenia in 2006. Fens support a distinctive plant community with species such as porcupine sedge, shrubby cinquefoil, and the jewel-like grass-of-Parnassus with its

delicate, green-veined white flower. Although known to provide habitat for many rare species of plants and animals, including the Endangered bog turtle, fens ordinarily go unrecognized by landowners and others who might be in a position to protect them.

Concurrently, we were finding an impressive array of habitats in Rhinebeck—32 types in all, the most of any of the towns we have mapped thus far. In addition to many of the same habitats found farther inland, Rhinebeck has several kinds of upland and wetland habitats that have been shaped by the Hudson River itself. Habitats on and near the river are used by the Threatened bald eagle, the regionally rare map turtle, the charismatic harbor seal, marsh birds, and several plant species of conservation concern. Another waterbody to leave its mark on the Rhinebeck landscape was the ancient glacial Lake Albany, whose extensive deposits of clayey sediments gave rise to the clayey silt loam soils of this part of the Hudson River corridor. The erodible nature of these soils is evident in the deeply dissected landscape of the clay bluff and ravine habitat complexes bordering the river. The wet clay meadows on the flat post-agricultural land above the bluffs have an unusual plant community, and in Rhinebeck are known to support a rare species of clam shrimp known from only a few locations in the world.

Our work in the towns of Amenia and Rhinebeck was part of the ongoing habitat mapping program of Hudsonia's **Biodiversity Resources Center**. Hudsonia biologists identify and map ecologically important habitats in the region, and provide the information to landowners, planning boards, land trusts, and others involved in land use planning and decision-making. We hope that the ready availability of habitat information will aid in the protection of plants, animals, and natural communities of conservation concern, and the ecological processes and landscapes that allow them to persist.



Grass-of-Parnassus (*Parnassia glauca*), an indicator plant of fens.

Photo © 2007 Nava Tabak

\* Andy Reinmann and Nava Tabak are Hudsonia Biologists.

The Amenia project, completed in December 2006, was part of a larger project sponsored by the Dutchess Land Conservancy and funded by the Millbrook Tribute Garden and the Dyson Foundation to identify and map habitats throughout five towns in northeastern Dutchess County. The Town of Rhinebeck combined forces with the Dyson Foundation to fund the Rhinebeck mapping work, which we presented to the town in the summer of 2007. We will soon be completing habitat mapping projects in the towns of Poughkeepsie, Northeast, and Marletown, and in past years we have produced townwide habitat maps for East Fishkill, Stanford, and Washington. (The Marilyn Milton Simpson Charitable Trust and the NYSDEC Hudson River Estuary Program have been the other major funders for these projects.) The maps and reports given to the towns provide a body of biodiversity information, heretofore unavailable, that can be used to guide new development and other land uses in ways that protect the most sensitive areas.

In every town we discovered biological treasures that were rare, striking, or simply unexpected. In many of the towns we found large areas of unfragmented habitat, including forested areas exceeding 1,000 acres. The **oak-heath barrens** in Stanford and Fishkill, and **exposed, rocky ridgetops** in Amenia can provide important habitat for rare reptiles, amphibians, butterflies, and plants. An **acidic bog lake** in East Fishkill, a **tamarack swamp** in Marletown, and the cool ravines of Amenia and Northeast can provide a home for many species commonly found farther north; and the astonishing 83 **fens** that we identified in Amenia were a promising find for the bog turtle. Numerous **intermittent woodland pools**—small, seasonally-flooded pools surrounded by forest—were mapped in every town and Rhinebeck boasted an extraordinary 192. These important wetlands provide crucial breeding and nursery habitat for a special group of amphibians including wood frog, Jefferson salamander, marbled salamander, and spotted salamander. The **circum-neutral bog lakes** of Northeast, Amenia, Stanford, Washington, and East Fishkill were as biologically interesting as they were beautiful. These are shallow, spring-fed waterbodies in the vicinity of calcium-rich bedrock that support plant communities of both alkaline and acidic environments, and can provide critical habitat for the northern cricket frog, listed as endangered in New York. We have found **buttonbush pools** and **kettle shrub pools** in Northeast, Rhinebeck, Amenia, Stanford, Washington, and East Fishkill. In western Dutchess County, these wetlands provide core habitat for the Threatened Blanding's turtle.

As biologists we enjoy finding unusual habitats and rare species, but our ongoing mapping efforts are motivated by a larger goal: to

provide information that can be used to conserve the region's remaining biodiversity resources. Our habitat maps are good visual tools for understanding the extent and distribution of important habitat types and their relationship to other parts of the landscape. The accompanying reports provide information on the areas of greatest ecological significance, recommendations for conservation, and instructions on how to use the maps for site-specific or town-wide planning. These documents can help towns and landowners develop conservation goals, policies, and practices to protect the biological resources of greatest concern, while serving the social, cultural, and economic needs of the human community.

Biological diversity is at the foundation of, not only the unsurpassed beauty of our landscapes, but also the very ecosystems on which the human community depends, providing drinkable water, breathable air, pollinators for our crops and for native plants, living soils, carbon sequestration, climate moderation, and thousands of other services and resources essential to our lives. Degradation and loss of habitats are the driving forces behind the alarming global decline in biodiversity, but we believe that with the knowledge of where important habitats occur and a commitment to their conservation we can begin to reverse this dismal trend. ■

## Operation Habitat

### The Philip and Amanda Duff Dunne Fund

We regularly receive inquiries from people who want to support our efforts to identify and protect the habitats of rare and endangered species. In response to these inquiries, and to honor her parents and their enthusiasm for protection of imperiled wildlife, Hudsonia Board Chair Philippa Dunne has established **Operation Habitat**, a designated fund within Hudsonia to support our conservation science work.

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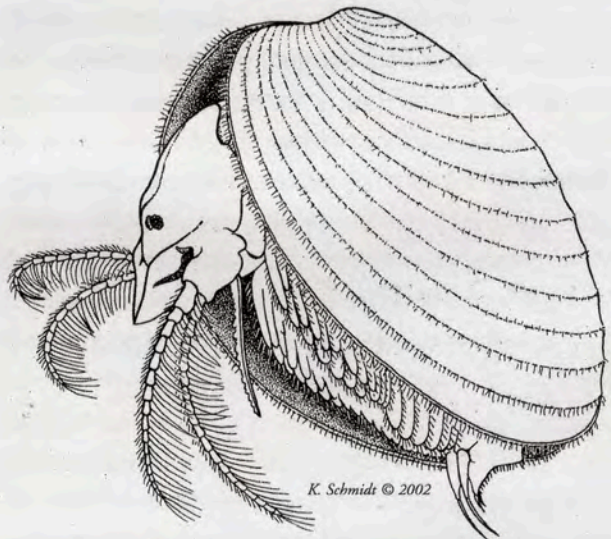


stunning **goldenclub** in the Hudson's freshwater tidal wetlands; some populations have been buried under material dredged from the shipping channel and others are affected by deer grazing. We are documenting the occurrence of the fairy-like phantom crane fly in limy wetlands. **Phantom crane flies** are common in certain habitats but their ecological tolerances and requirements are unknown. We are analyzing the ambivalent habitat affinities of the vulnerable **cerulean warbler** which breeds alike in mountain forests, in lowland forests with large trees, and in dredge spoil forests on the Hudson River. For unknown reasons cerulean warblers are doing better in southeastern New York than in most other parts of their breeding range, where populations have declined severely.

Parasites are commonly thought repugnant but make up perhaps half of the known species of organisms and are a significant component of ecosystem function. Dodders are small vines that parasitize other plants. Of the several dodder species in the northeastern states, one is quite common but most are rare. Several years ago we worked with the New York State Office of Parks, Recreation and Historic Preservation to protect **five-angled field dodder**, a rare species of weedy dry areas. During the capping of an old landfill, a population of the dodder was dug up with its host plants, stored in an old gravel pit, then replaced on the final landfill cover. Some was also left in the gravel pit and the dodder has thrived in both places. Salvaging the dodder added little to the cost of the landfill closure and saved the largest population of this rare species that we have seen.

Most invertebrates receive little attention in conservation research and planning. One of the Northeast's rarest and most intriguing invertebrates is a species of **clam shrimp** (quarter-inch-long crustaceans with clam-like shells) called *Caenestheriella gynecia*. This species is known only from long-lasting rain puddles on

dirt roads and all-terrain vehicle trails at a dozen localities in Massachusetts, New York, New Jersey, Pennsylvania, and Ohio. As a strange species in a strange habitat, *C. gynecia* has existed beneath the biodiversity radar in New Jersey and New York where we have discovered four populations in the past 15 years (three populations in the Hudson Valley near the river, and one in the Hackensack Meadowlands of New Jersey). Two Hudson Valley populations may have been lost to recent residential construction, one is in a park that offers opportunities for conservation and management, and the Meadowlands population is vulnerable to potential impacts of infrastructure management and the side effects of ecological restoration. The clam shrimp teaches us that rare species worthy of conservation can be restricted to artificial habitats, small species can be charismatic, official listing programs are incomplete, and a rare species can disappear in a flash without dogged research, monitoring, and protection.



The clam shrimp *Caenestheriella gynecia* is known from only a few locations in the world, including Ulster and Dutchess counties, NY, and Bergen County, NJ.



Phantom crane fly © K. Schmidt 2001

These species and many other rare or vulnerable animals, plants, and fungi may need a "right place" to survive or thrive in our region, and may be in trouble because of human activities in the "wrong place." Or because of activities that are too intensive, poorly-timed, or with unnecessarily large impacts on water, soils, or vegetation. To help protect the species, habitats, and landscapes of conservation concern, perhaps we can learn to walk lightly, even barefoot, to help us sense the environment and make our ecological footprints fewer, smaller, and in the right places. ■



## HUDSONIA'S TECHNICAL ASSISTANCE PROGRAM

Hudsonia routinely conducts biodiversity assessments and provides other technical assistance on a fee basis to municipalities, consulting firms, NGOs, and individuals on the bog turtle and Blanding's turtle, other rare animals and plants, wetland ecology, stream ecology, and invasive plants. Contact Erik Kiviat at 845-758-7273 or [kiviat@bard.edu](mailto:kiviat@bard.edu) to make arrangements for these services.

### SPECIAL THANKS

- To Daniel Spinelli at **All Rent on Rt 55 in La Grange** for mowing equipment for maintenance and management of the Blanding's turtle nesting habitat at our research site.
- To the Arlington High School Environmental Club for their help with turtle slide repair.
- To Meg Maisch's Junior and Senior classes from Rondout High School for their help weeding the Blanding's turtle nesting areas.
- To Walt and Jane Daniels for donating a digital camera and two-way radios for tracking turtles and volunteers.
- To **small packages, inc.** ([www.smallpackages.com](http://www.smallpackages.com)) for hosting our website free of charge and for providing other technical assistance.

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