



# News from Hudsonia

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## Hudson Valley Prehistory: Artifacts and Ecofacts

By Christopher Lindner\*

In 2001, Hudsonia is conducting several archaeology projects in Columbia and Dutchess counties to advance the understanding of prehistoric times, the eleven millennia before 1609 when Henry Hudson's *Half Moon* sailed up the stream then known as the River of the Mountains. In addition to the more durable stone and pottery artifacts left by prehistoric people, we also study "ecofacts" — the remains of plants and animals from ancient campsites — which offer data about past cultural adaptations. Still, the most frequently found traces of prehistoric encampments are fragments of stone modified by human activity.

### SOME HUDSON RIVER PREHISTORY

Roughly 11,000 years ago, at quarries along the river near the present-day city of Hudson, the earliest Native Americans mined flint from rocky ridges. This high quality "chert" (in geological terms) is lustrous green, red, or black. Until only a few hundred years ago the chert moved in Native hands throughout the region, where other workable stone deposits, mostly duller gray and brown, occurred as well. In Dutchess County there were chert quarries north of Rhinebeck.

The soils and climate of the Hudson Valley were similar to those of southern New England and the Mid-Atlantic region, and so brought about similar cultural adaptations. Evidence to date indicates subsistence based on land mammals, especially the white-tailed deer, until around 1,500 years ago when people developed a second dietary focus on migratory fish in spring. Using Robert Funk's<sup>7</sup> excavations and analyses, Audrey Reifler and I performed a species identification analysis of a collection of bone refuse, and mapped the distribution of sturgeon remains.<sup>13</sup> This research focused on the "Tufano site" along the river near Nutten Hook, where a high concentration of hand-sized flint blades, thought to be for butchering the massive fish, had been found in pits adjacent to one of the valley's few known prehistoric cemeteries.

The timing and degree of dependence on plants in various sub-regions of the Northeast is debated among archaeologists. Between

1,000 and 600 years ago, the Iroquoian people to the west developed a heavy dependence on farming of maize, beans, and squash. A paucity of evidence for maize cultivation in the Hudson Valley suggests little dependence on farming during that period. Recent discoveries and improved technology for dating ecofacts, however, may change our notions of early horticulture in the region.

One of my research interests is the nine centuries around 2,000 years ago, for which archaeologists have recognized a dearth of sites in the Hudson Valley and elsewhere in the Northeast, compared to the previous three millennia.<sup>12</sup> Although people were certainly present in this period, occupied sites were not abundant in the usual landscape settings. Occupation debris has been found, however, deeply buried by flood deposits in the river bottomlands. As during the seven previous millennia, people doubtless gathered wild plants, hunted, and fished in accord with seasonal abundance. They probably burned the forest periodically to clear undergrowth, facilitate travel, and improve berry picking. Still, many questions remain unanswered about the apparent temporary population decline in the Northeast during this mysterious interval.

### 2001 PROJECTS

Among Hudsonia's current projects is an inventory of prehistoric sites throughout Columbia and Dutchess counties. We are drawing on museum records, published and unpublished research reports, and the knowledge of local residents and avocational archaeologists to study the distribution of sites. In addition to augmenting the archaeological record, the purpose of this study is to identify areas needing archaeological exploration in advance of transportation projects. I encourage anyone with observations of prehistoric artifacts in the two-county area to contact me and register their discoveries. Next winter, we will invite

\* Hudsonia's Staff Archaeologist, and Archaeologist-in-Residence at Bard College, Annandale, New York 12504.



The distribution of side-notched and narrow stemmed points in the Hudson Valley reflects a period of seasonal migrations around 4,500 years ago, as people moved cyclically between warm-season, waterside camps and cold-sheltered, backcountry camps.



Broad points and fishtail points appear to have been in use around 3,000 years ago when people were concentrated more along the river. The earliest durable containers in the region — soft soapstone bowls and hard ceramic pots without much decoration — date from this period.



Pentagonal and thin triangular points dominated the projectile style around 1,000 years ago. In addition to foraging for wild foods, some people of the region cultivated crops during this period, and some produced pottery with more elaborate decorations than had their forbears. Four centuries ago, the people of the Hudson Valley called themselves Lenape and Mohican.

*Silhouettes approximately 2/3 actual size*

These silhouettes of projectile points, from the "Deer Terrace site" on the border of Dutchess and Columbia counties, illustrate the temporal framework for human habitation of the Northeast, as developed by Robert E. Funk<sup>7</sup> and William A. Ritchie,<sup>14,15</sup> former State Archaeologists of New York. Through the location and analysis of artifacts, we learn

that the earliest people of the region, around 11,000 years ago, traveled long distances in search of stone for the tools they used to procure food and to make clothing from hides. "Ecofacts" — including the remains of fish and wild plants — give evidence of dependence upon varied biological resources for subsistence.

Hudson Valley residents to a public meeting to have their artifacts evaluated, and to learn more about our research.

Over the last dozen years, more than 160 college and high school students have participated in hands-on archaeology at "Grouse Bluff," a promontory above the Tivoli Bays in Red Hook. This summer the Bard Archaeology Field School will excavate the area around a bed of burnt rocks, roughly 30 cm (1 foot) below ground surface, possibly used 3,000 years ago for roasting fish. In the laboratory, we are now conducting "flotation" on soil samples from the Grouse Bluff site: dissolving sediments in water and removing botanical remains that float, such as burnt shells of nuts and seeds. With these ecofacts we can reconstruct the environs of the camp and infer the diet of its inhabitants at various times over the last 7,000 years. Mary Burns and Audrey Reifler, former and current students of Bard's Graduate School of Environmental Studies, are sifting through the sediments from several prehistoric cooking pits and examining the residues under the microscope to identify plant species that may

have been used for food or medicine.

This year, we will also prepare a report on the "Spicebush site," another prehistoric camp location at the Tivoli Bays. Here, high school and college students in the Bard Archaeology Field School discovered a fire pit containing pottery with decorations from around the time of the earliest known cultivation of plants in the Hudson Valley, at least 1,000 years ago. The Greenway Trail passes close by Spicebush and Grouse Bluff, affording ideal educational opportunities for the public. Also this year, along the river in Columbia County, we will conduct test excavations at two areas where public trails have been proposed, to determine the presence of archaeological sites and the potential need for their protection.

In another current project, we will attempt to stabilize a prehistoric campsite on state-owned Magdalen Island, west of Tivoli North Bay. Mary Burns<sup>3</sup> found that important ecofacts and artifacts still remain despite decades of looting by hobbyist collectors and curio-seekers. Unscientific digging has left the site full of craters. The goal of our project is to map

the disturbances and then refill the pits to keep archaeological materials from falling out of place. Loss of precise location renders artifacts much less meaningful.

While great scientific benefit can come from citizen participation in projects such as these, tremendous loss may also occur if artifacts are taken from sites without documenting their exact locations and notifying an archaeologist of their discovery. By demonstrating active conservation of cultural resources, we hope to dissuade relic hunters from stealing the Hudson's Native heritage.

Children are often keen on archaeology. The Bard Archaeology web pages (<http://inside.bard.edu/archaeology>) have delightful pictures and stories from some of the nearly 1,000 fourth-graders from Red Hook who have visited Grouse Bluff. The children helped college students dig and measure, finding projectile points, flint drill tips, pottery, and soapstone bowl fragments, along with abundant fire-cracked rock from prehistoric hearths. The fourth-graders studied rough stone tools and performed

laboratory experiments using tool replicas to crack and shell nuts, which was the children's work of the Lenape and Mohicans. There are plans for expanding student archaeology programs in schools throughout Dutchess and Columbia counties.

We are preparing a brochure for elementary and middle school students — *Hidden Heritage: Prehistoric Campsites in the Hudson Valley*<sup>11</sup> — that will interest and inform adults as well. The brochure will accompany a newly refurbished traveling exhibit of artifacts and photographs from the Hudson Valley. Dozens of schools, public libraries, and historical societies around the middle Hudson Valley have used the traveling exhibit over the past decade. The brochure and exhibit can be requested through the author.

These projects are designed to advance knowledge about prehistoric people through scientific investigation and community involvement. A wealth of resources is available to readers interested in further study of our local prehistoric heritage. Robert Funk<sup>8</sup> has compared prehistoric use of the Tivoli Bays estuary environment with that of the Susquehanna River near Oneonta, and the Atlantic coast at Fishers Island. A 1992 issue (Volume 9) of the *Hudson Valley Regional Review* contains several other articles on Tivoli Bays archaeology.<sup>4, 10, 16</sup> These are also available on-line in the Bard Archaeology web pages: <http://inside.bard.edu/archaeology>. Other useful texts available in public libraries and some bookstores, include Herbert Kraft's<sup>9</sup> prehistory and history of the Delaware (or "Lenape" in their language), who lived between the middle Hudson and Chesapeake Bay. John Bierhorst<sup>1, 2</sup> provides scholarship on the folklore of the Lenape, and many exciting Lenape stories. Shirley Dunn<sup>5, 6</sup> offers historical information on the Mohicans, who lived from Catskill Creek and the Roeliff-Jansen Kill to Lake Champlain.

Our 2001 archaeology projects are supported by several state and federal agencies that have recognized the importance of archaeology in understanding the environment: as funding administrator, the New York State (NYS) Department of Transportation; as government sponsor, the Greenway Con-

servancy for the Hudson River Valley; and as providers of matching funds, Hudsonia and the NYS Department of Environmental Conservation through the Hudson River National Estuarine Research Reserve. Four-fifths of the funding comes through the NYS Transportation Enhancement Program, a diverse array of projects funded by the federal Intermodal Surface Transportation Efficiency Act (ISTEA).

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# Estuarine Reptiles and Amphibians, Revisited

by Erik Kiviat\*

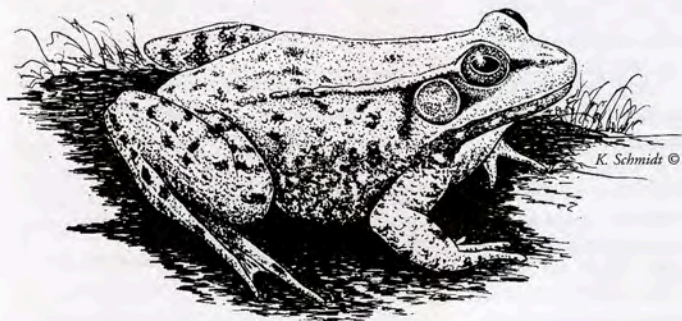
Amphibians and reptiles ("herps" in biological slang) are thought not to thrive in tidal wetlands. Herpetologists, however, have conducted few studies of tidal wetland herps in the northeastern states, perhaps because these habitats are challenging to work in and often do not yield an exciting diversity of species. After many years of observing herps in Hudson River wetlands (especially Tivoli Bays), I have been puzzled by the low diversity of species, and the low population densities (excepting snapping turtles). Diversity and density of herps seem to be higher at Jug Bay Wetland Sanctuary on the tidal Patuxent River in Maryland, where habitats resemble those in Tivoli Bays but the climate is significantly milder. I felt that a next step in understanding herpetofaunas of tidal wetlands would be to study an estuary with a climate similar to that of the Hudson. Studying a single estuary (or any other system) can create a misleading picture, unless that estuary is known to be representative of other estuaries in the region.

Last year, Hudsonia and the Science Center of Connecticut undertook a study of herps in marshes in the Connecticut River estuary in May, June, and July. The study was designed to compare herps in three kinds of vegetation: cattail stands, common reed stands, and stands of mixed vegetation dominated by neither cattail nor reed. We used three sampling techniques: cover object surveys, visual encounter surveys, and frog call counts. In cover object surveys, we looked under rocks, logs, and other objects 3 meters (measured on the ground surface) either side of the Mean High Water shoreline. At the same time we watched for animals that were not concealed beneath objects (visual encounter surveys). Both kinds of surveys were standardized by distance. We conducted call counts by listening for frog calls for a 10 minute period before we disturbed each survey area. Call counts were ranked for each species, according to the numbers of frogs calling. We sampled the forested shoreline adjacent to cattail and reed stands ("onshore") by means of cover object surveys, visual encounter surveys, and call counts. We sampled stands of cattail, reed, and mixed vege-

tation in the marsh interior ("offshore") by means of visual encounter surveys and call counts. Sampling was conducted in six freshwater tidal marshes; listed from north to south, they are Chapman Pond, Selden Neck, Pratt Cove, Post Cove, Lieutenant River, and Lord Cove.

We found very few reptiles and amphibians. Much to our surprise, there were no animals at all beneath more than 300 cover objects on 14 complete, 90 m, surveys. Of 42 call counts, only 4 (all offshore) yielded any calling frogs (green frog and bullfrog). Only 7 of 43 complete (one hour) visual encounter surveys detected herps. These 7 surveys yielded a total of 10 individuals of four species: spring peeper, green frog, pickerel frog, and snapping turtle. Offshore we saw 0.27 animals on average per one-hour survey. There were more animals seen per survey in mixed vegetation than in either reed or cattail, but the differences were not statistically significant, nor were there any significant differences by season or stage of tide. It was a cool, wet spring, but air, water, and soil temperatures were in ranges that should not have greatly limited amphibian or reptile activity. Air and water temperatures were not correlated with numbers of animals seen. During the season and in the portions of the marshes where we sampled, salinity was not high enough to limit herp activity — the water was fresh. Despite very low numbers of herps recorded on our counts, in combined quantitative and casual observations in 2000 and previously, 19 species were found in and at the edges of the tidal marshes we studied: 5 salamander species, 7 frogs, 4 turtles, and 3 snakes. One marsh alone (Selden Neck) produced 14 species.

What explains this picture of moderate richness of species but very low population densities? Some of the herps were seen in habitats we did not sample quantitatively; for example, we found several species, including spotted turtle, and breeding spotted salamander and American toad, in a wet meadow of the groundwater discharge zone at the landward edge of one of the marshes. On a sandbar at the entrance to the same marsh we found a wood turtle, the first record of this species in tidal habitat in Connecticut. In our attempt to quantitatively compare different kinds of vegetation, we often had to shoehorn our samples into small patches. We might have gained a more representative view of the herp community and a larger sample size if we had simply run random transects across the marshes and recorded our results according to the vegetation encountered. Yet the generally low densities of herps in tidal marshes seem to be real in the Connecticut River — as well as in the Hudson River. Tidal fluctuation in the lower elevations of the marshes is apparently unfavorable to many species. Higher elevations where quiet water stands may be good habitats for herps. Other factors may also be at play, including predators, pollution,



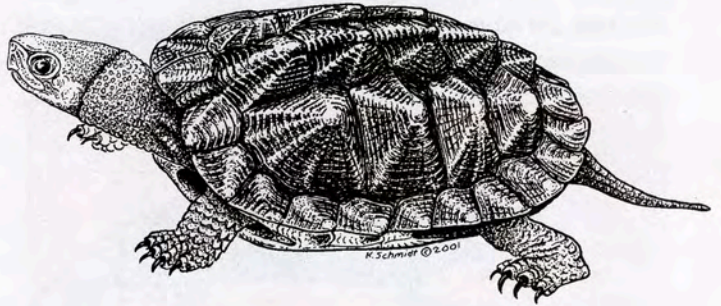
Green frog  
*Rana clamitans*

\* Executive Director, Hudsonia Ltd.

and weather extremes (see *News from Hudsonia* 12[2-3] and 13[3]). Because of the low population densities, more intensive survey methods would be required to detect differences between the Connecticut and the Hudson. Likewise, differences in herp use of common reed stands compared to other plant communities would be challenging to quantify. Low densities require large numbers of samples to characterize differences in a statistically meaningful way.

We want to continue studying amphibians and reptiles in northeastern tidal wetlands. If we stopped right now, however, what are the implications of our findings? From a basic science viewpoint, we have data supporting the idea that most herp species do poorly in exposed, "high energy" aquatic habitats like open tidal marshes, swift streams, and exposed lake shores. These sparse populations of common species might teach us about environmental limitations on rare species. From a management viewpoint, certain tidal wetland habitats are still quite important to herps. This seems to include quiet, higher elevation, intertidal or supratidal pools and wet meadows, as well as wooded habitats that are affected by the higher high tides. Plans for protection and restoration of tidal wetlands in fresh or slightly brackish reaches of tidal rivers should consider the functions of these habitats for herps. Lastly, field scientists should not shun places (and times) where it is difficult to get answers to our questions. We need to know more about the world's biota in estuaries, in dense vegetation, and where numbers are small.

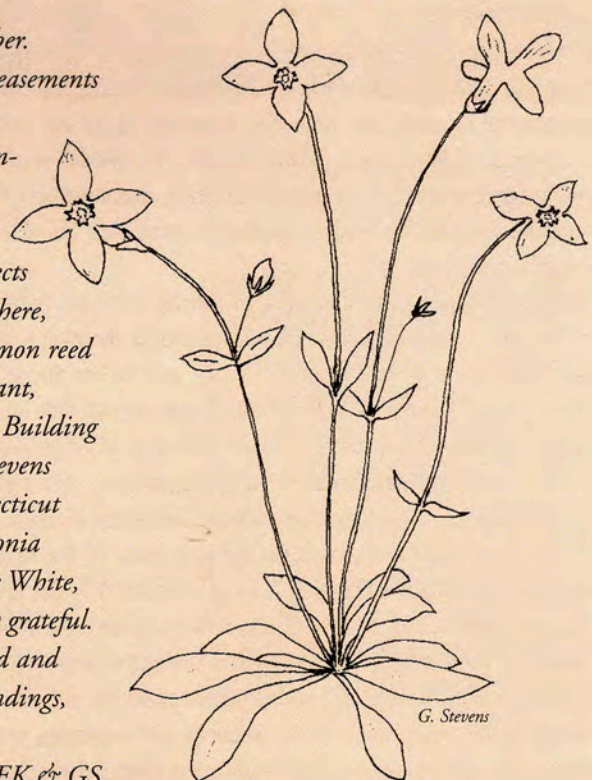
The research reported here was funded by a grant from the Long Island Sound License Plate Program to the Science Center of Connecticut and to Hudsonia. Hank Gruner and I were co-principal investigators; field work was conducted principally by Sandi Weiss and Dennis Quinn. Much of Hudsonia's research is focused in and near the Hudson Valley region; we also conduct studies in other regions where our expertise is applicable and the results will improve knowledge of the biota, ecosystems, and conservation science in the northeastern states.



Wood turtle  
*Clemmys insculpta*

*Mary-Alice White, of Salisbury, Connecticut, died in December. Mary-Alice was instrumental in the creation of conservation easements on multiple adjoining land parcels to create the Moore Brook Sanctuary in Salisbury, and was active in many other environmental and cultural projects in the region. Several years ago Mary-Alice invited Hudsonia to work with volunteers from the Salisbury Association to set up biological monitoring projects at Moore Brook. We have participated in a variety of efforts there, including a long-term study to monitor the expansion of common reed colonies in the wet meadows, a population survey of a rare plant, and creation of a herbarium which is housed at the Academy Building in Salisbury. Mary-Alice and Hudsonia Botanist Gretchen Stevens co-authored a book on the wildflowers of northwestern Connecticut and adjoining areas, which will be published this year. Hudsonia has benefited in many ways from the generosity of Mary-Alice White, her family, and the Salisbury Association, and we are extremely grateful. We continue to collaborate with local volunteers to understand and protect the biological diversity of Moore Brook and its surroundings, but without Mary-Alice, it doesn't feel quite the same.*

—EK & GS



## Biodiversity Assessment Manual

At long last, the *Biodiversity Assessment Manual for the Hudson River Estuary Corridor* will be published this spring. The *Manual* describes 38 habitats of special ecological significance in the region, instructs readers in identifying and protecting those habitats, and provides some general guidance in incorporating biodiversity protection into land use planning. Co-authored by Hudsonia's Erik Kiviati and Gretchen Stevens, the *Manual* is written both for biologists working in the region, and for non-biologists involved with land use planning and decision-making. We are making 200 copies of the *Manual* available free of charge to Conservation Advisory Councils, land trusts, libraries, and educational institutions. The *Manual* will be available to other non-profit organization, town and village agencies, and students for \$45, and to for-profit businesses, and city and state agencies for \$100. To order your copy, contact Dwane Decker at 845-758-7023 or via e-mail at [decker@bard.edu](mailto:decker@bard.edu).



Marbled salamander  
*Ambystoma opacum*

## Biodiversity Assessment Projects

With the support of a generous grant from the Marilyn Milton Simpson Family Trusts, Hudsonia is conducting a town-wide assessment of biodiversity resources in the Town of East Fishkill, Dutchess County. After extensive map analysis and field investigations, Botanist Gretchen Stevens and AmeriCorps member Eben Broadbent will produce town-wide Geographic Information System (GIS) maps of ecologically significant habitats, along with a report describing the habitats, the species of conservation concern that could occur there, and some conservation measures that would help to protect the habitats. The maps and report will aid the Conservation Advisory Council, the Planning Board, and the Town Board with their long-term planning, and their environmental reviews of proposed development and conservation projects.

Also this year, Hudsonia will be helping other communities of the Hudson Valley to identify significant habitats, so that this information can be made available to local landowners and incorporated into public land use planning. We are seeking up to five communities, each with local volunteers willing to undertake map analysis and field verification for a large scale biodiversity assessment. Carina Bandle, Hudsonia's Biodiversity Educator, will guide the volunteers through the assessment process, and help communities interpret the information for local land use decision-making. The New York State Department of Environmental Conservation is making \$1000 available to each participating community to help defray the costs of resource materials, equipment, and other miscellaneous expenses associated with the biodiversity assessments. Contact Carina, 845-758-0971, for more information.

## Two Decades of Hudsonia

Hudsonia emerged in 1981 from my discussions with co-founders Bob Schmidt and Jim Stapleton. Our mutual interests revolved around the natural history of the Hudson Valley and interdisciplinary solutions to environmental problems. We were also concerned about our careers and the range of employment options available. We decided to create an institution characterized by scientific accuracy, responsiveness, flexibility, and intellectual freedom; Hudsonia came into being as a nonprofit organization.

We cleared early hurdles that included defining a mission (research and education in support of environmental solutions), choosing a name (suggestions included "Half Moon," "Sedge," and "White Sucker"\*), designing a logo (created by Suzanne Blatter and me, with little inkling of future controversy over common reed!), finding an office (initially in a vacant room in the Bard College Biology Department), and starting *News from Hudsonia* (featuring Kathy Schmidt's exquisite illustrations). Hudsonia's first major project was the planning study for the Hudson River National Estuarine Research Reserve, completed in the fall of 1982. There followed 13 years of occasional large projects punctuated by periods of small projects and little income. During this time Hudsonia became known in scientific and environmental circles for our work on recycling apple waste, Hudson River wetlands and tributaries, waterchestnut, Blanding's turtle, and biodiversity assessment. Our geographic reach gradually spread from the Hudson River estuary to the rest of New

York, southern New England, New Jersey, and Maryland. For the last 6 years Hudsonia has been involved in a cascade of research, technical assistance, and education that has ranged into new subjects including wetland restoration, mosquito monitoring, and archaeology.

We celebrate our 20th anniversary this October. What do we have to show for 20 years of hard work? We expect our *Biodiversity Assessment Manual for the Hudson River Estuary Corridor* to change environmental planning in the region. We have shown through detailed design and monitoring that habitats can be created for the Threatened Blanding's turtle, but expense and limitations from surrounding land use must be considered. New and forthcoming publications on purple loosestrife and common reed demonstrate previously unrecognized complexity of relationships of these invasive marsh plants with other biota, including people. We are grateful for collaborations with the Hudson Valley's best naturalists, and many scientists, students, donors and funders, volunteers, and other institutions in the northeastern states. The challenge for Hudsonia in the next few years is to build on our experience and skills, and raise funds that will allow us to continue our research and provide the high quality information that is needed by professionals and the public. We want you to be part of this important effort. —EK

\*The white sucker (*Catostomus commersoni*) is one of the most abundant fishes of the Hudson River.

## Volunteer Observer Network



Hudsonia has been gathering data on the ecology of invasive plants in Westchester County and New York City for two years. Invasive plants, especially phragmites and purple loosestrife, present growing management challenges in many of our area's parks, nature reserves, coastal wetlands, and other open spaces. By better understanding the ecology of these invasives, we can develop management alternatives that produce the best ecological and economic outcomes.

Although funding is running out, Hudsonia would like to continue our work with amateur and professional naturalists to observe and record animal and plant interactions with phragmites and purple loosestrife. See our website ([www.hudsonia.org](http://www.hudsonia.org)) for more information. Our studies are funded by the New York City Environmental Fund and the Westchester Community Foundation.

## Some Recent Hudsonia Publications

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## Hudsonia T-shirts!!!

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This Blanding's turtle on the back of our T-shirt will tell people that you support Hudsonia's programs. The turtle is dark green with yellow throat, on white or buff 100% cotton. Adult S,M,L,XL short-sleeved \$18; long-sleeved \$22, child S,M,L short sleeved \$15; includes tax and shipping.



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- Van or SUV in good condition
- Good non-metal canoe with keel
- Assistance identifying specimens of sowbugs, long-horned grasshoppers, thrips, and springtails

### Special thanks

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