

Sources Cited*

- Allan, B. F., F. Keesing, and R. S. Ostfeld. 2003. Effects of Habitat Fragmentation on Lyme Disease Risk. *Conservation Biology* 17:267–272.
- American Farmland Trust and Cornell Cooperative Extension. 1989. *The Cost of Community Services in Towns in Dutchess County, New York*. American Farmland Trust, Northampton, Mass.
- American Forests. 2004. *Greening New York's Cities: How Trees Can Clean Our Water, Improve Our Air, and Save Our Money*. www.americanforests.org/downloads/rea/NY_Report.pdf
- Arendt, R. 2006. *Greener Prospects*. www.greenerprospects.com (accessed February 2008)
- Behar, S., and M. Cheo. 2004. Hudson Basin River Watch Guidance Document, Revised Draft. The River Network, Montpelier, Vt. www.hudsonbasin.org (accessed December 2007)
- Benfield, K. F., J. Terris, and N. Vorsanger. 2000. *Solving Sprawl: Models of Smart Growth in Communities Across America*. Island Press, Washington, D.C.
- Benson, A. B. 1937. *Peter Kalm's Travels in North America. The English Version of 1770*. Revised from the original Swedish Vol. 1. Wilson–Erickson, Inc, New York.
- Biodiversity Project. 2003. *Getting on Message: Eastern Forest and Biodiversity*. Biodiversity Project, Madison, Wisc. www.biodiversityproject.org (accessed December 2007)
- Bishop, P., J. Glidden, M. Lowrey, and D. Riehlman. 1999. *A Citizen's Guide to Management of White-tailed Deer in Urban and Suburban New York*. New York State Department of Environmental Conservation, Albany, N.Y.
- Bishop, P., J. Glidden, M. Lowery, and D. Riehlman. 2007. *A Citizen's Guide to Management of White-tailed Deer in Urban and Suburban New York* [revised]. New York State Department of Environmental Conservation, Bureau of Wildlife, Deer Team, Albany, N.Y. www.dec.ny.gov (accessed January 2008)
- Burroughs, J. 1908. *Leaf and Tendril*. Houghton, Mifflin, Boston, Mass
- Bucknall, C. P. 1989. *The Real Cost of Development*. Scenic Hudson, Inc., Poughkeepsie, N.Y.
- Calhoun, A. J. K., and P. deMaynadier. 2004. Forestry Habitat Management Guidelines for Vernal Pool Wildlife. *MCA Technical Paper No. 6*. Metropolitan Conservation Alliance, Wildlife Conservation Society, Bronx, New York
- Calhoun, A. J. K., and M. W. Klemens. 2002. Best Development Practices: Conserving Pool Breeding Amphibians in Residential and Commercial Developments in the Northeastern United States. *MCA Technical Paper No. 5*. Metropolitan Conservation Alliance, Wildlife Conservation Society, Bronx, New York.
- Center for Watershed Protection. 2005. *Pond and Wetland Maintenance Guidebook*. Prepared for Tetra Tech, Inc., Fairfax, Va. under EPA Contract 68-C-99-253. Center for Watershed Protection, Ellicott City, Md.
- Center for Watershed Protection. 1998. *Better Site Design: A Handbook for Changing Development Rules in Your Community*. Center for Watershed Protection, Ellicott City, Md.
- Corbett, J., and M. Corbett. 2000. *Designing Sustainable Communities: Learning from Village Homes*. Island Press, Washington, D.C.
- Crawford, J. A., and R. D. Semlitsch. 2007. Estimation of Core Habitat for Stream-Breeding Salamanders and Delineation of Riparian Buffers for the Conservation of Biodiversity. *Conservation Biology* 21(1):152–158.
- Daniels, K. H. 2005. *A Municipal Official's Guide to Forestry in New York State*. New York State Department of Environmental Conservation, Albany, N.Y.
- DeGloria, S., M. Laba, and J. Braden. 2004. *Hudson Valley Land Cover Map Accuracy Assessment (30 meter)*. New York Cooperative Fish and Wildlife Research Unit, Department of Natural Resources, Cornell University, Ithaca, N.Y.
- Dodd, C. K. 2001. *North American Box Turtles: A Natural History*. University of Oklahoma Press, Norman, Okla.
- Driscoll, D. A., and L. N. Childs. [eds.] 2002. *Helderberg Escarpment Planning Guide*. Mohawk Hudson Land Conservancy, Slingerlands, N.Y.
- Dutchess County Department of Planning and Development. 2000. *Greenway Connections: Greenway Compact Program and Guides for Dutchess County Communities*. Dutchess County Department of Planning and Development, Poughkeepsie, N.Y.
- Edinger, G. J., D. J. Evans, S. Gebauer, T. G. Howard, D. M. Hunt, and A. M. Olivero. [eds.] 2002. *Ecological Communities of New York State. Second Edition*. A revised and expanded edition of Carol Reschke's *Ecological Communities of New York State*. New York Natural Heritage Program, New York State Department of Environmental Conservation, Albany, N.Y.
- Freegood, J. 2002. *Cost of Community Services Studies: Making the Case for Conservation*. American Farmland Trust, Northampton, Mass.
- Houlahan, J., and C. S. Findlay. 2004. Estimating the 'Critical' Distance at Which Adjacent Land-Use Degrades Wetland Water and Sediment Quality. *Landscape Ecology* 19:677–690.
- Howard, T. G. 2004. Buffering Natural Communities for Persistence. Draft methods document. New York Natural Heritage Program, Albany, N.Y.
- Hudson, W. H. 1919. *The Book of a Naturalist*. George H. Doran Company, N.Y.
- Huffman and Associates. 2000. *Wetlands Status and Trends Analysis of New York State: Mid-1980s to Mid-1990s*. Contract Report to the New York State Department of Environmental Conservation, Albany, N.Y. 19 pp. + figs., tables.
- Hustedde, R. J., Smutko, S., and Kapsa, J. J. Turning Lemons into Lemonade: Public Conflict Resolution. *Southern Rural Development Center Series 221*. Mississippi State, Miss. srdc.msstate.edu/publications/lemons/221.htm (accessed January 2008)
- Johnson, E. A., and D. Smith. [eds.] 2006. *Legacy: Conserving New York State's Biodiversity*. American Museum of Natural History, New York State Biodiversity Research Institute, New York State Department of Environmental Conservation, New York Natural Heritage Program, and The Nature Conservancy, Albany, N.Y.

* Sources that appear in the "Resources" sections of each chapter are not repeated here.

- Jones, A. and P. Vickery. 1997a. *Conserving Grassland Birds: Managing Agricultural Lands Including Hayfields, Crop Fields, and Pastures for Grassland Birds*. Massachusetts Audubon Society, Lincoln, Massachusetts.
- Jones, A. and P. Vickery. 1997b. *Conserving Grassland Birds: Managing Large Grasslands Including Conservation Lands, Airports, and Landfills over 75 acres for Grassland Birds*. Massachusetts Audubon Society, Lincoln, Massachusetts.
- Jones, A. and P. Vickery. 1997c. *Conserving Grassland Birds: Managing Small Grasslands Including Conservation Lands, Corporate Headquarters, Recreation Fields, and Small Landfills for Grassland Birds*. Massachusetts Audubon Society, Lincoln, Massachusetts.
- Katz, P. 1994. *The New Urbanism*. McGraw-Hill, N.Y.
- Kelley, K. [ed.] 2003. Local Environmental Ordinances. *Starting Ground Series*. Pace University Land Use Law Center. White Plains, N.Y. www.law.pace.edu/landuse.
- Kendall, B. 1998. *Local Strategies for Wetland and Watercourse Protection: An Educational Guide*. The Dutchess County Environmental Management Council and Cornell Cooperative Extension of Dutchess County. Millbrook, N.Y.
- Kennedy, C., J. Wilkinson, and J. Balch. 2003. Conservation Thresholds for Land Use Planners. *Environmental Law Institute Report*, Washington, D.C. www.elistore.org.
- Kerlinger, P. 1996. *Preliminary Report on the Economic Impact of Mohawk Preserve Visitors on Surrounding Communities*. Report prepared for Mohonk Preserve, New Paltz, N.Y.
- Kiviat, E., and G. Stevens. 2001. *Biodiversity Assessment Manual for the Hudson River Estuary Corridor*. New York State Department of Environmental Conservation. Albany, N.Y. 508 pages. www.hudsonia.org (accessed December 2007)
- Lerner, S., and W. Poole. 1999. *The Economic Benefits of Parks and Open Space: How Land Conservation Helps Communities Grow Smart and Protect the Bottom Line*. The Trust for Public Land. San Francisco, Calif. www.tpl.org (accessed January 2008)
- LoGiudice, K., R. S. Ostfeld, K. A. Schmidt, and F. Keesing. 2003. The Ecology of Infectious Disease: Effects of Host Diversity and Community Composition on Lyme Disease Risk. *Proceedings of the National Academy of Sciences* 100:567–571
- Marchland, M. N., M. M. Quinlan, and C. W. Swarth. 2004. Movement Patterns and Habitat Use of Eastern Box Turtles at the Jug Bay Wetlands Sanctuary, Maryland. Pages 55–61 in Swarth, C. W., W. M. Roosenberg, and E. Kiviat. [eds.] *Conservation and Ecology of Turtles of the Mid Atlantic Region*. Bibliomania, Salt Lake City, Utah.
- Massachusetts Audubon Society. *Grassland Birds*. Massachusetts Audubon Society. Lincoln, Mass. 617 259-9500 www.massaudubon.org/ (accessed January 2008)
- McElfish, J. 2004. *Nature-friendly Ordinances*. Environmental Law Institute, Washington, D.C.
- McKenzie-Mohr, D., and W. Smith. 1999. *Fostering Sustainable Behavior: An Introduction to Community-based Social Marketing*. New Society Publishers, Gabriola Island, British Columbia.
- Metropolitan Conservation Alliance. 2002. Conservation Area Overlay District: A Model Local Law. *Technical Paper Series* No. 3. Wildlife Conservation Society. Bronx, N.Y. 46pp.
- Meyer, J. L., L. A. Kaplan, D. Newbold, D. L. Strayer, C. J. Woltemade, J. B. Zedler, R. Beilfuss, Q. Carpenter, R. Semlitsch, M. C. Watzin, and P. H. Zedler. 2003. *Where Rivers Are Born: The Scientific Imperative for Defending Small Streams and Wetlands*. 23pp. www.americanrivers.org (accessed December 2007)
- Miller, N. A., and M. W. Klemens. 2004. Croton to Highlands Biodiversity Plan: Balancing Development and Environment in the Hudson River Estuary Catchment. *MCA Technical Paper No. 7*, Metropolitan Conservation Alliance, Wildlife Conservation Society, Bronx, N.Y.
- Miller, N. A., and M. W. Klemens. 2003. *Stormwater Management and Biodiversity: Impacts and Potential Solutions*. Fact Sheet, Metropolitan Conservation Alliance, Wildlife Conservation Society, Bronx, N.Y.
- Miltner, R. J., D. White, and C. Yoder. 2004. The Biotic Integrity of Streams in Urban and Suburbanizing Landscapes. *Landscape and Urban Planning* 69: 87–100.
- Morgiewicz, R. 2004. Fees In Lieu of Parkland: A New Look. *NYCOM Municipal Bulletin* May/June 2004, New York State Conference of Mayors and Municipal Officials.
- National Association of Homebuilders web site (www.nahb.com), Environment page (accessed January 2008)
- Navota, J., and D. Dreher. 2000. *Protecting Nature in Your Community: A Guidebook for Preserving and Enhancing Biodiversity*. Northeastern Illinois Planning Commission (NIPC). www.nipc.org/environment/sustainable/ (accessed December 2007)
- Newton, B., C. Pringle, and R. Bjorkland. 1998. Stream Visual Assessment Protocol. *National Water and Climate Center Technical Note 99-1*. U.S. Department of Agriculture, Natural Resources Conservation Service. Washington, D.C. www.nrcs.usda.gov (accessed December 2007)
- New York State Department of Environmental Conservation. 2006. *New York State Comprehensive Wildlife Conservation Strategy*. New York State Department of Environmental Conservation. Albany, N.Y.
- New York State Department of Environmental Conservation. 2001. *New York State Stormwater Management Design Manual*. New York State Department of Environmental Conservation. Albany, N.Y.
- New York State Department of Environmental Conservation. 2000. *Lower Hudson Waterbody Inventory, Priority Waterbodies List Report*. New York State Department of Environmental Conservation. Albany, N.Y.
- New York State Department of State. 2004. Guide to Planning and Zoning Laws of New York State. *James A. Coon Local Government Technical Series*. New York State Department of State. Albany, N.Y. www.dos.state.ny.us/lgss/ (accessed December 2007)
- Niederriter, H. S., and R. R. Roth. 2004. Ecology of Eastern Box Turtles (*Terrapene carolina carolina*) in an Isolated Forest Fragment in Northern Delaware. Pages 63–71 in *Conservation and Ecology of Turtles of the Mid Atlantic Region*. Swarth, C. W., W. M. Roosenberg, and E. Kiviat. [eds.] Bibliomania, Salt Lake City, Utah.
- Nolon, J. 2002. *Well Grounded: Using Local Land Use Authority to Achieve Smart Growth*. Environmental Law Institute, Washington, D.C.
- Northeast Illinois Planning Commission. 1998. *Pavement Deicing: Minimizing the Environmental Impacts*. 1998. Northeastern Illinois Planning Commission. Chicago, Ill.
- North East State Foresters Association. 2007. *The Economic Importance of Wood Flows from New York's Forests*. North East State Forester's Association. Concord, N.H. Available from: www.nefainfo.org (accessed 21 April 2008)
- Ohm, B. W. 2002. *Planning for Natural Resources: A Guide to Including Natural Resources in Local Comprehensive Planning*. Department of Urban and Regional Planning, University of Wisconsin–Madison Extension and Wisconsin Department of Natural Resources. Madison, Wisc.

- Orange County (N.Y.) Planning Department. 2004. *Orange County Open Space Plan*. Goshen, N.Y. www.co.orange.ny.us (accessed January 2008)
- Ostfeld, R. S., and F. Keesing. 2000. Biodiversity and Disease Risk: the Case of Lyme Disease. *Conservation Biology* 14:722–728.
- Ostfeld, R. S., and K. LoGiudice. 2003. Community Disassembly, Biodiversity Loss, and the Erosion of an Ecosystem Service. *Ecology* 84:1421–1427.
- Pace University Land Use Law Center. 2002. *A Report from the Intermunicipal Land Use Councils in the Hudson River Region*. Hudson River Valley Greenway. Albany, N.Y.
- Pendall, R. 2003. *Sprawl Without Growth: The Upstate Paradox*. 2003. The Brookings Institution Center on Urban and Metropolitan Policy. Available on the Brookings Institution web site: www.brookings.edu/metro/publications/200310_pendall.htm (accessed December 2007)
- Penhollow, M. E., P. G. Jensen, and L. Zucker. 2006. *Wildlife and Conservation Framework: An Approach for Conserving Biodiversity in the Hudson River Estuary Corridor*. New York Cooperative Fish and Wildlife Research Unit and New York State Department of Environmental Conservation, Hudson River Estuary Program, Ithaca, N.Y. www.dec.ny.gov (accessed December 2007)
- Phelps, M. G., and Hoppe, M. C. [eds.] 2002. New York—New Jersey Highlands Regional Study: 2002 Update. U. S. Department of Agriculture, Forest Service. *Publication NA-TP-02-03*. www.na.fs.fed.us/highlands/ (accessed December 2007)
- Postel, S., and B. Richter. 2003. *Rivers For Life: Managing Water for People and Nature*. Island Press, Washington, D.C.
- River Street Planning and Development. 2007. *Town and Village of Coxsackie Comprehensive Plan Cost of Community Services Analysis*. River Street Planning and Development.
- Schueler, T. R., and H. K. Holland. 2000a. The Benefits of Better Site Design in Residential Subdivisions. Article 46 in *The Practice of Watershed Protection*. Center for Watershed Protection. Ellicott City, Md.
- Schueler, T. R., and H. K. Holland. 2000b. The Benefits of Better Site Design in Commercial Development. Article 47 in *The Practice of Watershed Protection*. Center for Watershed Protection, Ellicott City, Md.
- Semlitsch, R. D., and J. R. Bodie. 2003. Biological Criteria for Buffer Zones around Wetlands and Riparian Habitat for Amphibians and Reptiles. *Conservation Biology* 17(5):1219–1228.
- Smith, C. R., S. D. DeGloria, M. E. Richmond, S. K. Gregory, M. Laba, S. D. Smith, J. L. Braden, W. P. Brown, and E. A. Hill. 2001. *An Application of Gap Analysis Procedures to Facilitate Planning For Biodiversity Conservation in the Hudson River Valley, Final Report. Part 1: Gap Analysis of the Hudson River Valley and Part 2: Atlas of Predicted Ranges for terrestrial Vertebrates in the Hudson River Valley*, New York Cooperative Fish and Wildlife Research Unit, Department of Natural Resources, Cornell University, Ithaca, N.Y.
- Smith, S. D., W. A. Brown, C. R. Smith, and M. E. Richmond. 2004. *Habitat Vulnerability Assessment for the Hudson River Valley*. Final report submitted to the Hudson River Foundation, New York, N.Y.
- Sobel, L. 2002. *Greyfields and Greenfields*. Congress for New Urbanism. San Francisco, Calif.
- Spackman, S. C., and J. W. Hughes. 1995. Assessment of Minimum Corridor Width for Biological Conservation: Species Richness and Distribution along Mid-Order Streams in Vermont, U.S.A. *Biological Conservation* 71:325–332.
- Sullivan, J. [undated]. *Atlas of Biodiversity*. Chicago Wilderness. www.chicagowilderness.org (accessed December 2007)
- Sullivan, K., and G. Cox. 2004. *Wildlife and Forestry in New York's Northern Hardwoods: A Guide for Forest Owners and Managers*. Audubon New York, Albany, N.Y. ny.audubon.org (accessed December 2007)
- Tompkins County Environmental Management Council. 2000. *Unique Natural Area Inventory of Tompkins County, Revised Edition*. Tompkins County Environmental Management Council, Tompkins County Department of Planning, Ithaca, N.Y.
- U.S. Department of the Interior, U.S. Fish and Wildlife Service, and U.S. Department of Commerce. 2003. *2001 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation*. U.S. Census Bureau, New York.
- Van Tine, J. [ed.] 2003. *Local Environmental Strategies. Starting Ground Series*. Pace University Land Use Law Center. White Plains, N.Y. www.law.pace.edu/landuse (accessed December 2007)
- Waterhouse, F. L., and A. S. Harestad. 1999. The Value of Riparian Forest Buffers as Habitat for Birds in the Coastal Western Hemlock Zone, British Columbia: A Pilot Study. *Forest Research Technical Report TR-001*. Vancouver Forest Region, Nanaimo, B.C.
- Young, S. P. [ed.] 2007. *New York Rare Plant Status Lists*. New York Natural Heritage Program, Albany N.Y.

Glossary

aquifer an underground layer of permeable rock or soil that holds water. Usually used in reference to drinking water supplies.

area-sensitive species animals that require large areas of suitable habitat to meet their life history needs and support viable populations.

base flow portion of the stream flow that is not generated from overland run-off. Base flows result from seepage of water from the ground into a channel slowly over time and are the primary source of running water in a stream during dry weather.

biodiversity the variety of living organisms, including the ecosystems and natural processes on which they depend; a natural system of all species, their habitats, and the landscape.

biota the total of the flora and fauna of a habitat or region.

bog acidic wetland characterized by spongy peat and sphagnum moss. Most of water in a bog comes from precipitation. Low in nutrients needed for plant growth, therefore a unique set of plants and animals use the habitat (*see also* **fen, marsh, swamp, tidal wetland, vernal pool, wetland**).

brackish a mix of saltwater and freshwater.

buffer or **buffer zone** any area that serves to protect natural areas from human alteration. Often used in reference to streams and wetlands.

conservation planned action or non-action to protect, manage, restore, or enhance natural resources for future generations.

conservation subdivisions subdivision characterized by common open space and clustered compact lots. The purpose of a conservation subdivision is to protect natural resources while allowing for the maximum number of residences under current community zoning and subdivision regulations. In some cases a greater density (incentive bonus) may be offered in the local ordinance to encourage this approach.

conservation target ecosystems, natural communities and species identified as priorities for protection.

corridor a patch of habitat that connects otherwise isolated larger habitat patches and differs from the adjacent land on both sides.

critical habitat components of the landscape that provides essentials for the survival of a population.

daylighting removing streams from underground pipes and culverts; restoring some of the form and function of historic streams.

disturbance natural or anthropogenic event that changes a local environment by disrupting, removing, or adding organisms, soil, or rock, or by subjecting the environment to other disruptions such as pollution by substances, noise, or light.

dredged spoil the sediment removed (dredged) from the bottom of a river. In the Hudson this was done to maintain shipping channels. Dredged spoil was deposited in the river; as a result there are numerous dredge spoil islands in the upper Hudson.

early successional habitat refers in this handbook to non-forested terrestrial habitats, such as grasslands, barrens and shrublands that will turn to forest over time. (*see also* **succession**).

ecosystem a dynamic and interrelating complex of plant and animal communities and their associated non-living environment (soil, water, and air) and the natural cycles that sustain them (nutrient and hydrological).

ecosystem functions the biophysical processes that take place within an ecosystem e.g., nutrient cycling in a forest, sediment transport in a stream

ecosystem services refers to the ecosystem functions from which humans derive benefit. Includes goods (e.g., food and medicine) and services (climate regulation, water purification, flood control).

endemic exclusively native to a particular place.

estuary an arm of the sea subject to tides and the press of salty ocean water. The tidal reach of a river where the freshwater of the river meets the saline water of the ocean.

extinct species is no longer living or existing.

extirpated locally extinct. For example, a species that is extirpated from Westchester County, used to occur there, but is no longer found there.

federally endangered a species listed by the U.S. Fish & Wildlife Service as being in danger of extinction in the near future throughout all or part of its range.

federally threatened a species listed by the U.S. Fish & Wildlife Service that may become endangered in the near future throughout all or part of its range.

fen peat-forming wetlands, receive nutrients through drainage from upslope mineral soils and groundwater movement, less acidic than bogs and more nutrients, groundwater fed supports a more diverse plant community, and unique animal species. (*see also* **bog, marsh, swamp, tidal wetland, vernal pool, wetland**).

floodplain an area of low-lying ground adjacent to a waterbody that is submerged during flooding.

fragmentation the process where large, contiguous landscapes are broken into smaller, more isolated fragments surrounded by human-modified environments.

geomorphology the description and interpretation of land forms.

GIS (Geographic Information System) a computer system that allows for input and manipulation of geographic data to allow researchers to manipulate, analyze, and display information in a map.

gradient slope or inclination of land surface. Also, a pattern of change in any environmental factor, such as moisture or disturbance.

habitat the area where a plant or animal lives that provides all the necessary elements it needs to survive (e.g., food source, cover, mating grounds).

habitat patch a relatively homogeneous type of habitat that is spatially separated from other similar habitat and differs from its surrounding.

habitat sink area that contains suitable habitat for survival of a species, but does not support successful reproduction. In contrast to habitat source, which contains suitable habitat and supports successful reproduction.

Hudson River Estuary the tidal portion of the Hudson River from the Federal Dam at Troy to the Verrazano Narrows Bridge.

Hudson River Estuary watershed the land and water that feed the Hudson River estuary.

hydrology the study of water's properties, distribution, and circulation on Earth. For the purposes of this book, we are primarily concerned with the flow of water on and through the land.

hydroperiod duration of flooding or standing water.

impervious surface surfaces that are impermeable to water, such as roofs and pavement that prevent the infiltration of water on the landscape.

intermittent stream a stream that may only flow during times of excess precipitation or snow melt (*see also* **perennial stream**).

intermittent woodland pool (*see* **vernal pool**)

intertidal area of tidal influence where substrate is exposed and flooded by changing tides (*see also* **subtidal**).

invasive species a species (usually, but not always, non-native) that is able to exploit the landscape, into which it was introduced, out-competing other species due to lack of natural predators and competitors (*see also* **native, non-native**).

landscape a large, diverse land area consisting of a cluster of interacting ecosystems repeated in a similar form.

land use the purpose to which land is used by humans (e.g. protected areas, agriculture, residential, commercial, industrial settlement). (vs. Land cover which is the dominant feature of the land (e.g., forest, meadow, pavement, etc.)

marsh a type of wetland that is frequently or continually inundated with water and is characterized by soft-stemmed emergent herbaceous vegetation. Water from surface water and groundwater; plentiful nutrients and neutral pH; (*see also* **bog, fen, swamp, tidal wetland, vernal pool, wetland**).

mouth or tributary mouth the confluence of a stream or river with a larger body of water.

native plant a plant that has grown in the region since the last glaciation and occurred before European settlement (*see also* **non-native**).

natural community a group of plants and animals living and interacting with one another that share a common environment.

non-native an animal or plant species that has been introduced to an area that is not a part of its range (*see also* **native**).

non-point source pollution diffuse source of pollutants not discharged from a pipe; associated with land use such as agriculture, contaminated groundwater, or onsite septic systems.

nutrients various elements required by plants for growth, such as phosphorus and nitrogen. The limited quantity of these elements in the environment controls plants grown; in excess, nutrients can be harmful.

New York State Endangered any native animal listed by the New York State Department of Environmental Conservation as being in imminent danger of extinction or extirpation from New York State.

New York State Endangered Plant any native plant on the rare plant protected list that has one or more of the following characteristics: (a) currently found in 5 or fewer sites statewide, (b) has fewer than 1,000 individuals statewide, (c) present on fewer than 4 USGS topographic maps, or (d) listed as federally endangered.

New York State Exploitably Vulnerable Plant any native plant on the rare plant protected list that is likely to become rare in the near future throughout all or a significant portion of their range within the state if causal factors continue unchecked. The exploitably vulnerable category also contains plants that are likely to be picked for commercial and personal purposes.

New York State Rare Plant any native plant on the rare plant protected list that has one or more of the following characteristics: (a) 20 to 35 extant sites, or (b) has 3,000 to 5,000 individuals statewide.

New York State Species of Special Concern any native animal listed by the New York State Department of Environmental Conservation as likely to become a threatened species within the foreseeable future in New York State.

New York State Threatened any native animal listed by the New York State Department of Environmental Conservation as being likely to become an endangered species within the foreseeable future in New York State.

New York State Threatened Plant any native plant on the rare plant protected list that has one or more of the following characteristics: (a) currently found in 6–19 sites statewide, (b) has 1,000–3,000 individuals statewide, (c) present on 4–7 USGS topographic maps, or (d) listed as federally threatened.

open space lands that are not fully developed. Open space can mean natural areas, farmland, scenic areas, and even golf courses and cemeteries. It is important to define open space when using that phrase.

perennial stream a stream that flows year round (*see also* **intermittent stream**).

permeable allowing fluids such as water to pass through.

point source pollution pollutants discharged through a pipe, often to a body of water. An example is municipal sewer systems.

pool area with deep with slow moving water; results in sediment deposition; good habitat for trout and mollusks (*see also* **run** and **riffle**).

rain garden a landscaped depression in the ground that is designed to store and treat stormwater.

recharge area an area where water percolates into the soil, replenishing groundwater.

regulated wetland wetlands that are subject to state or federal wetlands laws. In New York State, a wetland may be subject to the New York State Freshwater Wetlands Act, the New York State Tidal Wetlands act and the Clean Water Act.

restoration the practice of restoring degraded or altered lands to a state of higher natural functioning or other desired condition.

riffle shallow area of streams with fast, turbulent water running over rocks; habitat for aquatic invertebrates (*see also* **run** and **pool**).

riparian areas the aquatic ecosystem and the portions of the adjacent terrestrial ecosystem that directly affect or are affected by the aquatic environment. This includes streams, rivers, lakes, and bays and their adjacent side channels, flood plain, and wetlands.

rip-rap hard material placed along a shoreline to prevent erosion and stabilize shorelines, usually rock.

run deep with fast water and little or no turbulence; the main body of water that runs smoothly downstream; good area for small fishes that can't compete for pool areas (*see also* **riffle** and **pool**).

seasonal woodland pool (*see* **vernal pool**)

sheet pile Interlocking steel plates that create a rigid barrier for earth and water, while resisting the lateral pressures of those bending forces. In this book, we are specifically talking about sheet pile along streams and rivers to control erosion.

sprawl, urban sprawl a pattern of land use generally characterized by spread out development, large lot size; generally characterized by automobile dependency.

species of greatest conservation need species that states deem rare, imperiled, or whose status has not been established. The list was developed as part of a Comprehensive Wildlife Conservation Strategy required to access federal funding for those species. In New York State, the list and strategy were completed by the New York State Department of Environmental Conservation www.dec.ny.gov.

subtidal area of tidal influence where substrate is continuously submerged (*see also* **intertidal**).

succession the natural, sequential change in the composition of a plant community over time. In New York, the natural tendency of plant communities is to turn into forest.

supratidal on the Hudson river, the zone along a tidal shoreline within 1 m elevation above the mean high water level; this zone receives tidal flooding from the highest tides (spring tides and storm tides).

swamp a wetland dominated by woody plants (trees and shrubs), saturated soils during growing season and standing water during various times of the year; provide flood protection and nutrient removal; high in productivity and species diversity because of high nutrient content; fed by surfaced water (*see also* **bog, fen, marsh, tidal wetland, vernal pool, wetland**).

tidal wetland a near shore wetland near the ocean or an estuary where the water level is affected by tides (*see also* **bog, fen, marsh, swamp, vernal pool, wetland**).

tributary a stream or river that feeds into a larger stream, river, or lake. The former would be considered a tributary of the latter.

vegetated shallows shallow portion of a body of water (stream, wetland, pond, lake, or river), that has vegetation. In the Hudson River Estuary, vegetated shallow areas include submerged aquatic vegetation, as well as areas with water chestnut.

vernal pool (seasonal woodland pool, intermittent pool) seasonal wetlands in small depressions covered by shallow water for variable periods from winter through spring; may be completely dry for most of summer and fall; important for amphibians, especially mole salamanders and wood frogs (*see also* **bog, fen, marsh, swamp, tidal wetland, wetland**).

wetland transitional lands between terrestrial and aquatic systems where the water table is at or near the surface or the land is periodically saturated or covered by water; characterized by plants present, soils and frequency of flooding (*see also* **bog, fen, marsh, swamp, tidal wetland, vernal pool**).

watershed the land area that drains water, sediment and dissolved materials downslope to the lowest point such as a marsh, stream, river, lake or groundwater site.

Additional Habitat Information

In Chapter 3, the broad habitat types were described. More information on these habitats is available from Penhollow et al. 2006, Kiviat and Stevens 2001, Edinger et al. 2002, and www.guides.nynhp.org.

For Descriptions of Coastal Habitat Types

Ecological Community fact sheets from the New York Natural Heritage Program: Brackish intertidal mudflats, Brackish intertidal shore, Brackish subtidal aquatic bed, Brackish tidal marsh, Freshwater intertidal mudflats, Freshwater intertidal shore, Freshwater subtidal aquatic bed, Freshwater tidal marsh, Freshwater tidal swamp, Tidal river

Ecologically Significant Habitats from the Biodiversity Assessment Manual for the Hudson River Estuary Corridor: Clay bluff and ravine, Estuarine rocky shore, Fresh and brackish intertidal and supratidal marsh, Fresh and brackish subtidal shallows, Hudson River dredge spoil habitats, Hudson River rocky island, Intertidal and supratidal swamp, Supratidal pool, Supratidal railroad and road causeway, Tidal tributary mouth

For Descriptions of Wetland Habitat Types:

Ecological Community fact sheets from the New York Natural Heritage Program: Black spruce–tamarack bog, Deep emergent marsh, Dwarf shrub bog, Hemlock–hardwood swamp, Inland Atlantic white cedar swamp, Inland poor fen, Medium fen, Oligotrophic dimictic lake, Perched bog, Perched white oak swamp, Pine barrens vernal pond, Pitch pine–blueberry peat swamp, Red maple–black gum swamp, Red maple–hardwood swamp, Red maple–sweetgum swamp, Red maple–tamarack swamp, Rich graminoid fen, Rich shrub fen, Rich sloping fen, Shallow emergent swamp, Silver maple–ash swamp, Spruce–fir swamp, Vernal pool

Ecologically Significant Habitats from the Biodiversity Assessment Manual for the Hudson River Estuary Corridor: Acidic bog, Beaver pond, Circumneutral bog lake, Constructed ponds and lakes, Fen and calcareous wet meadow, Intermittent woodland pool, Kettle shrub pool, Noncalcareous wet meadow, Nontidal hardwood swamp, Nontidal marsh, Springs and seeps, Wet clay meadow

For Descriptions of Stream Habitat Types:

Ecological Community fact sheets from the New York Natural Heritage Program: Floodplain forest, Midreach stream, Riverside ice meadow, Rocky headwater stream

Ecologically Significant Habitats from the Biodiversity Assessment Manual for the Hudson River Estuary Corridor: Cool ravine, Intermittent stream, Perennial stream, Riparian corridor

For Descriptions of Forest and Woodland Habitat Types:

Ecological Community fact sheets from the New York Natural Heritage Program: Acidic talus slope woodland, Appalachian oak–hickory forest, Appalachian oak–pine forest, Beech–maple mesic forest, Calcareous talus slope woodland, Chestnut oak forest, Coastal oak–beech forest, Hemlock–northern hardwood forest, Limestone woodland, Maple–basswood rich mesic forest, Mountain fir forest, Mountain spruce–fir forest, Oak–tulip tree forest, Pitch pine–oak forest, Pitch pine–oak–heath woodland, Shale talus slope woodland, Spruce–northern hardwood forest

Ecologically Significant Habitats from the Biodiversity Assessment Manual for the Hudson River Estuary Corridor: Carbonate crest, ledge, and talus; Conifer plantation; Mature mesophytic lowland forest; Non-carbonate crest, ledge, and talus; Rich rocky woodland; Young woods

For Descriptions of Open Upland Habitat Types:

Ecological Community fact sheets from the New York Natural Heritage Program: Dwarf pine ridge, Highbush blueberry bog thicket, Pitch pine–oak–heath rocky summit, Pitch pine–scrub oak barrens, Post oak–blackjack oak barrens (New York City only), Red cedar rocky summit, Rocky summit grassland, Sedge meadow, Serpentine barrens (New York City only)

Ecologically Significant Habitats from the Biodiversity Assessment Manual for the Hudson River Estuary Corridor: Sand plains and barrens, Shrubby oldfield, Upland meadow, Waste ground

Contacts for Organizations and Agencies Listed in This Handbook

Federal Agencies

U.S. Army Corps of Engineers

www.usace.army.mil
New York District
26 Federal Plaza
New York, NY 10278
Phone: 212 264-0100

U.S. Department of Agriculture Natural Resources Conservation Service

www.nrcs.usda.gov
Columbia, Greene, Ulster, Dutchess, Putnam, Westchester, Rockland and New York City Counties
Time Square Professional Park
652 Route 299, Suite 202
Highland, NY 12528-2926
Phone: 845 883-7162

Albany and Rensselaer Counties
Leo W. O'Brien Federal Building, Room 333
Albany, NY 12207-2350
Phone: 518 431-4110

U.S. Department of the Interior, U.S. Fish and Wildlife Service

www.fws.gov
Northeast Regional Office 5
300 Westgate Center Drive
Hadley, MA 01035-9589
Phone: 413 253-8200

New York Field Office, New York Ecological Services, Partners for Fish and Wildlife
nyfo.fws.gov
3817 Luker Road
Cortland, NY 13045
Phone: 607 753-9334

U.S. Department of the Interior, U.S. Geological Survey

www.usgs.gov
Albany District Office
Leo W. O'Brien Federal Building
Albany, NY 12207
Phone: 518 431-4341

New York District Office
425 Jordan Road
Troy, NY 12180-8349
Phone: 518 285-5600

U.S. Environmental Protection Agency

www.epa.gov
Region 2
290 Broadway
New York, NY 10007-1866
Phone: 212 637-3000

New York State Agencies and Programs

New York State Department of Environmental Conservation

www.dec.ny.gov
625 Broadway
Albany, NY 12233

Division of Fish, Wildlife, and Marine Resources
Phone: 518 402-8924

Division of Lands and Forests
Phone: 518 402-9405

Region 2
1 Hunter Point Plaza
47-40 21st Street
Long Island City, NY 11101-5407
Phone: 718 482-4900

Region 3
21 South Putt Corners Road
New Paltz, NY 12404
Phone: 845 256-3000

Hudson River Estuary Program (Region 3)
Phone: 845 256-3016

Region 4
1130 North Westcott Road
Schenectady, NY 12306
Phone: 518 357-2234

New York State Department of State

www.dos.state.ny.us
41 State Street
Albany, NY 12231-0001

Division of Coastal Resources
www.dos.state.ny.us/about/coastal.htm
Phone: 518 474-6000

Division of Local Government
www.dos.state.ny.us/lgss/index.htm
Phone: 518 473-3355

New York State Office of Parks, Recreation, and Historic Preservation

www.nysparks.state.ny.us
Empire State Plaza, Agency Building 1
Albany, NY 12238
Phone: 518 474-0456

New York City Park Region
679 Riverside Drive
New York, NY 10031
Phone: 212 694-3608

Palisades Interstate Park Commission
Administrative Building
Bear Mountain, NY 10911-0427
Phone: 845 786-2701

Saratoga/Capital District Park Region
19 Roosevelt Drive
Saratoga Springs, NY 12866-2000
Phone: 518 584-2000

Taconic Park Region
P. O. Box 308
Staatsburg, NY 12580
Phone: 914 889-4100

Hudson River Valley Greenway

www.hudsongreenway.state.ny.us
Capitol Building, Capital Station, Room 254
Albany, NY 12224
Phone: 518 473-3835

New York Natural Heritage Program

www.nynhp.org
625 Broadway
Albany, NY 12233-4757
Phone: 518 402-8935

New York State Biodiversity Research Institute

www.nysm.nysed.gov/bri
New York State Museum
Cultural Education Center
Room 3140
Albany, NY 12230
Phone: 518 486-4845

New York State Soil and Water Conservation Committee

www.nys-soilandwater.org
10B Airline Drive
Albany, NY 12235
Phone: 518 457-7076

Regional Nonprofit Organizations

American Farmland Trust, Northeast Regional Office

www.farmland.org
6 Franklin Square, Suite E
Saratoga Springs, NY 12866
Phone: 518 581-0078

Catskill Center for Conservation and Development

www.catskillcenter.org
P. O. Box 504
Arkville, NY 12406
Phone: 845 586-2611

Hudson Basin River Watch

www.hudsonbasin.org
350 Route 29
East Greenwich, NY 12865
Phone: 518 677-5029

Hudson River Foundation

www.hudsonriver.org
17 Battery Place, Suite 915
New York, NY 10004
Phone: 212 483-7667

Hudsonia, Ltd.

www.hudsonia.org
Bard College
Box 5000
Annandale, NY 12504
Phone: 845 758-7053

Cary Institute of Ecosystem Studies

www.ecostudies.org
Gifford House Visitor and Education Center
181 Sharon Turnpike
Millbrook, NY
Phone: 845 677-5359

Metropolitan Conservation Alliance*
www.metropolitanconservationalliance.org

National Audubon Society, New York State Office

ny.audubon.org
200 Trillium Lane
Albany, NY 12203
Phone: 518 869-9731

The Nature Conservancy

New York State Office
www.nature.org
195 New Karner Rd, Suite 200
Albany, NY 12205
Phone: 518 690-7850

Eastern New York Chapter
265 Chestnut Ridge Road
Mount Kisco, NY 10549
Phone: 914 244-3271

Eastern New York Conservation Office
195 New Karner Road, Suite 201
Albany, NY 12205
Phone: 518 690-7878

Open Space Institute

www.osiny.org
1350 Broadway
Suite 201
New York, NY 10018-7799
Phone: 212 629-3981

Pace Land Use Law Center

www.pace.edu/lawschool/landuse
Pace University School of Law
78 North Broadway
White Plains, NY 10603
Phone: 914 422-4262

Scenic Hudson

www.scenichudson.org
One Civic Center Plaza
Poughkeepsie, NY 12601
Phone: 845 473-4440

Resources by County

Note: Only the county land trusts are listed for the counties that have them. All local land trusts are listed for Ulster County, and Rockland County has none. If you want to find additional land trusts in your area, visit the Land Trust Alliance web site at www.lta.org.

Albany County

www.albanycounty.com
Cornell Cooperative Extension
William Rice, Jr. Extension Center
24 Martin Road
P. O. Box 497
Voorheesville, NY 12186-0497
Phone: 518 765-3500

Economic Development, Conservation, and Planning
112 State Street, Room 720
Albany, NY 12207
Phone: 518 447-5660

Soil and Water Conservation District
Box 497, Martin Road
Voorheesville, NY 12186
Phone: 518 765-7923

Mohawk Hudson Land Conservancy
www.mohawkhudson.org
P. O. Box 567
Slingerlands, NY 12159
Phone: 518 436-6346

Columbia County

www.columbiacountyny.com
Cornell Cooperative Extension
Education Center
479 Route 66
Hudson, NY 12534-9706
Phone: 518 828-3346

Columbia County Planning Department
401 State Street
Hudson, NY 12534
Phone: 518 828-3375

Soil and Water Conservation District
www.ccsxcd.org
1024 Route 66
Ghent, NY 12075
Phone: 518 828-4386 (4385) ext.3

Columbia Land Conservancy
www.clctrust.org
P. O. Box 299
Chatham, NY 12037-0299
Phone: 518 392-5252

Dutchess County

www.dutchessny.gov
Cornell Cooperative Extension
2715 Route 44, Suite 1
Millbrook, NY 12545
Phone: 845 677-8223

Department of Planning and Development
27 High Street
Poughkeepsie, NY 12601
Phone: 845 486-3600

Soil and Water Conservation District
2715 Route 44 #3
Millbrook, NY 12545
Phone: 845 677-8011 (8199) ext.3

Dutchess Land Conservancy
www.dutchessland.org
2908 Route 44
Millbrook, NY 12545-5505
Phone: 845 677-3002

Greene County

www.greene-ny.com
Cornell Cooperative Extension
Greene County Office Building
906 Mountain Avenue
Cairo, NY 12413-9503
Phone: 518 622-9820
Department of Planning and Economic Development
Greene County Office Building
411 Main Street
Catskill, NY 12414
Phone: 518 719-3290

Soil and Water Conservation District
www.gcsxcd.com
907 County Office Bldg.
Cairo, NY 12413
Phone: 518 622-3620

New Baltimore Conservancy
www.newbaltimoreconservancy.org
P. O. Box 322
New Baltimore, NY 12124-0322
Phone: 518 436-2955

Greene Land Trust
www.greenelandtrust.org
c/o Greene County Soil and Water Conservation District
907 County Office Building
Cairo, NY 12413
Phone: 518 622-3620

Orange County

www.co.orange.ny.us
Cornell Cooperative Extension
Community Campus
1 Ashley Avenue
Middletown, NY 10940
Phone: 845 344-1234

Department of Planning
124 Main Street
Goshen, NY 10924-2124
Phone: 845 291-2318

Soil and Water Conservation District
225 Dolson Avenue, Suite 103
Middletown, NY 10940
Phone: 845 343-1873

Orange County Land Trust
www.orangecountylandtrust.org
P. O. Box 2442
Middletown, NY 10940-7917
Phone: 845 343-0840

Putnam County

www.putnamcountyny.com
Cornell Cooperative Extension
Terravest Corporate Park
1 Geneva Road
Brewster, NY 10509
Phone: 845 278-6738

Division of Planning and Development
841 Fair Street
Carmel, NY 10512
Phone: 845 878-3480

Soil and Water Conservation District
841 Fair Street
Carmel, NY 10512
Phone: 845 878-7918

Hudson Highlands Land Trust
www.hhlt.org
P. O. Box 226
Garrison, NY 10524-0226
Phone: 845 424-3358

Putnam County Land Trust
www.pclt.net
9 Fair Street
Carmel, NY 10512-1301
Phone: 845 225-0334

Rensselaer County

www.rensco.com
Cornell Cooperative Extension
Agriculture and Life Sciences Building
61 State Street
Troy, NY 12180-3497
Phone: 518 272-4210

Department of Economic Development and Planning
1600 Seventh Avenue
Troy, NY 12180
Phone: 518 270-2914

* Note that the Metropolitan Conservation Alliance is no longer a program of the Wildlife Conservation Society.

Soil and Water Conservation District
County Agriculture and Life Sciences Building
61 State Street
Troy, NY 12180-3496
Phone: 518 271-1740 (1764)

Rensselaer–Taconic Land Conservancy
www.rtlc.org
P. O. Box 40
Troy, NY 12182-0040
Phone: 518 454-2032

Rockland County
www.co.rockland.ny.us

Cornell Cooperative Extension
10 Patriot Hills Drive
Stony Point, NY 10980
Phone: 845 429-7085

Department of Planning
Robert Yeager Health Center
50 Sanatorium Road, Building T
Pomona, NY 10970
Phone: 845 364-3434

Soil and Water Conservation District
50 Sanatorium Road, Building P
Pomona, NY 10970
Phone: 845 364-2667

Ulster County
www.co.ulster.ny.us

Cornell Cooperative Extension
10 Westbrook Lane
Kingston, NY 12401-2928
Phone: 845 340-3990

Planning Department
County Office Building 244 Fair Street
P. O. Box 1800
Kingston, NY 12402-1800
Phone: 845 340-3340

Soil and Water Conservation District
Times Square Office Park
652 Route 299, Suite 103
Highland, NY 12528
Phone: 845 883-7162 ext.202

Cragsmoor Conservancy
P. O. Box 197
Cragsmoor, NY 12420-0197

Esopus Creek Conservancy
www.esopuscreekconservancy.org
P. O. Box 589
37 Oakledge Park
Saugerties, NY 12477-0589

Mohonk Preserve
www.mohonkpreserve.org
P. O. Box 715
New Paltz, NY 12561-0715
Phone: 845 255-0919

Rondout–Esopus Land Conservancy
www.relandconservancy.org
P. O. Box 345
High Falls, NY 12440-0345
Phone: 845 687-7553

Shawangunk Conservancy
P. O. Box 270
Accord, NY 12404-0270
Phone: 845 687-4759

Wallkill Valley Land Trust
www.wallkillvalleylt.org
P. O. Box 208
New Paltz, NY 12561-0208
Phone: 845 255-7547

Woodstock Land Conservancy
www.woodstocklandconservancy.org
P. O. Box 864
Woodstock, NY 12498-0864
Phone: 845 586-2232

Westchester County
www.westchestergov.com

Cornell Cooperative Extension
26 Legion Drive
Valhalla, NY 10595
Phone: 914 285-4640

Department of Planning
432 Michaelian Office Building
148 Martine Avenue
White Plains, NY 10601
Phone: 914 285-4402 or 285-4404

Soil and Water Conservation District
432 Michaelian Office Building
148 Martine Ave.
White Plains, NY 10601
Phone: 914 995-4422

Westchester Land Trust
www.westchesterlandtrust.org
11 Babbit Road
Bedford Hills, NY 10507-1813
Phone: 914 241-6346

New York City
www.nyc.gov

Cornell Cooperative extension
nyc.cce.cornell.edu
16 East 34th Street, 8th Floor
New York, NY 10016
Phone: 212 340-2900

Department of City Planning
22 Reade Street
New York, NY 10007-1216
Phone: 212 720-3300

New York City Watershed, New York City
Department of Environmental Protection
www.nyc.gov/watershed

Soil and Water Conservation District
www.nycscwcd.net
290 Broadway, 24th floor
New York, NY 10007
Phone: 212 637-3877

National Nonprofit Organizations

Biodiversity Project
www.biodiversityproject.org
214 North Henry Street, Suite 201
Madison, WI 53703
Phone: 608 250-9876

Center for Biodiversity and Conservation
research.amnh.org/biodiversity
American Museum of Natural History
Central Park West at 79th Street
New York, NY 10024
Phone: 212 769-5742

The Center for Watershed Protection
www.cwp.org
8390 Main Street, 2nd Floor
Ellicott City, MD 21043
Phone: 410 461-8323

Trust for Public Land
www.tpl.org
Mid-Atlantic Regional Office
666 Broadway, 9th Floor
New York, NY 10004
Phone: 212 677-7171

Natural Landscaping Resources

Brooklyn Botanic Garden
www.bbg.org
1000 Washington Avenue
Brooklyn, NY 11225
Phone: 718 623-7200

Catskill Native Nursery
607 Samsonville Road
Kerhonkson, NY 12446
Phone: 845 626-2758

The Native Plant Center
www.nativeplantcenter.org
Westchester Community College
75 Grasslands Road
Valhalla, NY 10595
Phone: 914 606-7870

New England Wildflower Society
www.newfs.org/garden.htm
Garden in the Woods
180 Hemmingway Road
Framingham, MA 01701
Phone: 508 877-7630

Saratoga Tree Nursery (NYSDEC)
www.dec.ny.gov
2369 Route 50
Saratoga Springs, NY 12866
Phone: 518 581-1439

Staten Island Greenbelt
www.sigreenbelt.org
Native Plant Center
3808 Victory Boulevard
Staten Island, NY 10314
Phone: 718 370-9044

WILD Ones—Central New York Chapter
www.hcgny.com
Habitat Gardening Club of CNY
Phone: 315 487-5742