Chapter 3:

Natural Areas and Wildlife Habitat of the Hudson Valley

Background

Understanding the natural areas and wildlife of your town and learning about habitats is important to conserving nature locally. A local plan that aims to protect nature should describe known natural areas and wildlife and the benefits they provide to the residents of the town. This chapter outlines the major habitat types of the Hudson Valley: coastal and estuarine habitats, wetlands, streams, forests, open uplands and barrens, steep slopes, and urban habitats. These habitats co-occur, connect to one another by water or animals, and are dependent on one another.

This chapter has information about each habitat type that communities can use to develop a local conservation program. To learn more about these habitats, see Appendix 2.

Diversity of the Hudson Valley

The Hudson Valley is a biological crossroads, bringing together northern, southern, western, and coastal species and habitats. The valley's location, plus its varied geology and topography, give rise to the biological riches of the region. The region's habitats provide home to more than 2,000 different kinds of plants, birds, mammals, reptiles, and amphibians. Nearly 90 percent of the birds, mammals, reptiles, and amphibians that live in New York State are found in the Hudson Valley. The Hudson Valley is especially important for turtles, ranking among the top four river drainages in the world for turtle species richness. There are also many thousands of less glamorous, but ecologically important species of invertebrates, fungi, and bacteria, about which little is known. We do know that more species of dragonflies and damselflies are found in the Hudson Valley than almost anywhere else in the nation.

Species Need Habitat Connections: Eastern Box Turtles

The Eastern box turtle, a species of special concern in New York, occurs throughout the Hudson Valley. It is an example of a species that uses several habitats to complete its life cycle. The turtles hibernate in forests, digging in leaf litter and soil to protect themselves from the cold and snow. Once they emerge, box turtles look for food in forests and wetlands and warm up, or bask, in open areas. Breeding typically occurs in the spring and females again seek out open, sunny areas to build nests and lay eggs. In the summer, Eastern box turtles use wetlands and streams to regulate their body temperature and to rehydrate during droughts. By the end of August, eggs begin to hatch. The turtles continue to forage until it is time to hibernate in the forest again. If suitable habitat is not found in a small area, the turtles need to travel farther to meet their habitat needs. If these suitable habitats are no longer connected, and turtles are forced to cross roads to meet their needs, they are at greater risk. The best way to conserve the Eastern box turtle is to make sure a population has forest, open areas, wetlands, and streams that are connected to one another.

S. Young

(Dodd 2001; Marchland et al. 2004; Niederriter and Roth 2004)

Coastal Habitats—Living In and Along the Hudson River Estuary

The ebb and flow of the tides in the Hudson River Estuary creates habitats distinct from those in nontidal environments. The Hudson River is an estuary with coastal habitat from the Atlantic Ocean to the end of the tidal influence at the Federal Dam near Troy. Coastal habitats of the Hudson strongly influenced by nearby lands are vegetated shallows, tidal wetlands, and intertidal shores. Coastal habitats support a wide array of species because the Hudson River contains salt, fresh,

G. Kenney

S. Stanne

and brackish water. Salt is an influence south of the Tappan Zee year-round, and the water is slightly salty all the way to Newburgh in the summer.

Because tides influence the entire length of the estuary, tidal wetlands can be found all the way to Troy. The tidal wetlands are freshwater north of Newburgh, salty near Manhattan, and a mix in between. These wetlands are important nurseries for fish and provide nesting habitat for marsh birds. Freshwater tidal wetlands, though common on the Hudson River, are a globally rare habitat.

All vegetated shallows are important habitats, even those with nonnative Eurasian water-chestnut. The submerged aquatic vegetation that grows in shallow areas is critical to the health of the estuary ecosystem, providing shelter and feeding areas for fish and invertebrates and food for waterfowl, and contributing life-giving oxygen to the river. Hudson River vegetated shallows support a greater density and diversity of macroinvertebrates and fish than do unvegetated shallow areas.

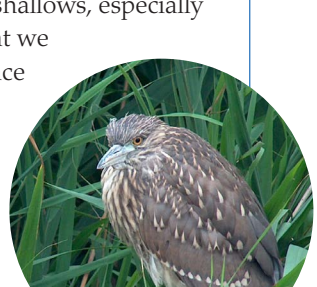
Intertidal shores are areas that are flooded during high tide. The shores tend to be rocky and gravelly, and are an important habitat for rare plant species like the heartleaf plantain. Intertidal shorelines also provide habitat for foraging birds and fishes.

Benefits of Coastal and Estuarine Habitats

- The river's nursery. Coastal wetlands and vegetated shallows are the nurseries for Hudson River fish and blue crabs, the basis of the Hudson's recreational and commercial fisheries.
- Wastewater treatment. Tidal wetlands help to treat wastewater, removing nitrogen and phosphorus from the water, a service that could cost many thousands of dollars to replace with a treatment plant.
- Water absorption. Coastal wetlands, like inland wetlands, absorb water, helping to protect property from storm and flood damage.

Threats

- Historic changes. Like most large rivers and estuaries, the Hudson River has been greatly altered during the last 200 years. The historic practice of filling tidal shallows with dredge spoil has contributed to the decline of important commercial and recreational fish species as well as bald eagles and ospreys. It is estimated that more than one-third of the estuary (~3,000 acres) had been filled between Hudson and Troy from 1920 to 1965. This makes it even more important to protect shallows, especially vegetated shallows, because what we see today is a fraction of what once was present.
- Shoreline development. This often involves the filling of wetlands and armoring the shoreline with steel bulkheads. Both of these practices reduce the habitat value of the estuary and prevent the habitat's benefits from being realized.



L. Heady

Representative Species of Hudson Valley Coastal Habitats

Blue crab *(Callinectes sapidus)*

Hudson river water nymph *(Najas guadalupensis guadalupensis)*

Least bittern *(Ixobrychus exilis)*

Black-crowned night heron *(Nycticorax nycticorax)*

Great egret *(Ardea alba)*

Inland Wetlands—Marshes, Swamps, Bogs, Fens, and Woodland Pools

The Hudson Valley is home to many different kinds of wetlands. Marshes are the most commonly known wetland—cattails are a common marsh plant. Wet meadows don't look wet from a distance, but the distinctive plants give them away. Swamps are forested wetlands, with trees adapted to soggy bottoms. Bogs are covered with a mossy mat and harbor rare orchids and insectivorous plants. Seasonal woodland or vernal pools are a common but threatened wetland type important to biodiversity of the Hudson River Valley. These small pools look unassuming and are dry for part of the year, but are the only breeding habitat for certain types of declining species of salamanders. Permanent and temporary streams are often associated with wetlands. As different kinds of wetlands disappear, the unique plants and animals that live in them may be lost.

Benefits of Wetland Habitats

- Water cleansing. Wetland ecosystems remove and recycle nutrients and sediment from the water that flows through them. Filtering out impurities keeps

drinking water clean and provides safe recreational opportunities.

- Nature's sponges. Wetlands also store water, which helps reduce flood damage and feed groundwater aquifers. Streams, lakes, and wetlands naturally store and release water that runs off our increasingly developed landscape.
- Stream feeding. By transferring surface water to groundwater, wetlands also help maintain minimum flows in streams.

Estimated value of all economic benefits generated by a single acre of wetland: $150,000 to $200,000

(Lerner and Poole 1999)

Threats

- Broken connections. Species that use vernal pools and large wetland complexes are at risk when connections with surrounding uplands or nearby wetlands are broken.
- Draining and filling of wetlands. These common practices cause direct habitat loss.
- Historic losses. The net loss of wetlands in the region from draining and filling has been great. At least 60 percent have been lost in New York since European settlement. The Hudson Valley lost more wetlands than other regions of the state from 1985 to 1995.

L. Heady

- Vulnerable habitats. Smaller wetlands, especially woodland pools, are particularly threatened because they fall below the state's regulatory threshold.
- Watershed effects. All wetlands are sensitive to pollution and changes in groundwater flow. Changes in a wetland's watershed can change the flow of surface and groundwater that feeds the wetland, resulting in too much or too little water. Nutrient-rich runoff encourages rapid plant growth and the "pea soup" appearance of some lakes and wetlands.

Representative Species of Hudson Valley Wetlands

American woodcock *(Scolopax minor)*

Great blue heron *(Ardea herodias)*

Jefferson *(Amblystoma jeffersonianum)*, marbled *(A. opacum)*, and spotted *(A. maculatum)* salamanders

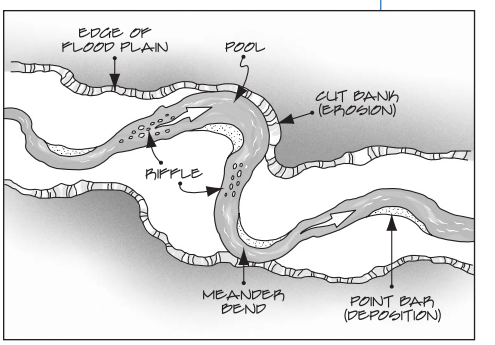
Northern leopard frog *(Rana pipiens)*

Pitcher plant *(Surracenia purpurea)*

Spotted turtle *(Clemmys guttata)*

Tributary Streams and Riparian Areas—Streams, Shorelines, and Floodplains

Hudson River tributary streams and their associated shoreline and floodplain areas provide some of the most productive wildlife habitat in the region. Stream habitats are also among the most threatened habitats in the Hudson Valley. The water and habitat quality of tributary streams are increasingly threatened by removal of shoreline vegetation, modification of stream channels, and land-use changes in the watershed. Streams naturally meander and change course over time, moving across the floodplain, with some banks eroding as new banks are deposited. Streams transport large amounts of sediment, gravel, and rock along the bed of the stream during a single storm event. Streams that can periodically flood nearby lands tend to maintain their overall shape and course, even as water, sediment, and rock move.



Features of a natural meandering stream. Riffles are shallow gravel or rock areas on the stream bed. At low flows, water moves faster over riffles and provides oxygen to the stream. Pools are deeper areas on the outside of meander bends between riffles. Riffles, pools, and adjacent floodplains are important habitat features for fish and other aquatic wildlife.

Shoreline areas and floodplains are ecological transition zones from wet to dry habitats. Vegetation that grows along streams is adapted to frequent flooding. Because floodplains are important seasonal habitats for fish breeding and nursery areas, streams need to remain connected to their floodplains to have healthy fish populations. Trees near the shoreline are especially important for providing shade, bank stabilization, woody debris, and nutrients that benefit stream animals. Many terrestrial species are also dependent on shorelines and floodplains. High quality floodplain forests with large

trees are scarce and significant in the Hudson River Valley. Wooded streamside corridors are important as foraging areas for mosquito-eating bats, breeding sites for some bird species, and travel routes for turtles.

Benefits of Stream Habitats

Streams, shorelines, and floodplains provide many benefits to people and wildlife.

- Flow control. Small streams and shoreline areas help regulate the amount of water in larger tributaries, helping to moderate flooding and prevent destruction of stream channels. This affects the quantity and quality of water found in the larger tributaries and the Hudson itself.
- Fish habitat. Vegetation along all streams creates habitat such as undercut banks where fish find refuge, and overhanging tree limbs that cool the water and shelter macroinvertebrates. These small aquatic insects digest plant nutrients and are in turn food for fish.

- Water absorption. Stream corridor wetlands and floodplains absorb water, reducing flood damage. The roots of riparian vegetation help to strengthen stream banks and provide resistance to erosion.
- Nature's sponges. Riparian wetlands and floodplain forests slow runoff, allowing water to percolate into the ground and be released gradually into the stream—while filtering out nutrients and sediment.
- Dilution. Maintaining stream flow is also essential for diluting pollution that is legally discharged into streams and rivers, particularly sewage wastewater.
- Clean water. Streams provide clean water which supports boating, fishing and swimming.

Threats

L. Heady

- Stormwater. Impervious surfaces in the watershed do not allow the natural recharge of ground water. Instead, water flows overland or through storm drains directly into streams. As a result, urbanized streams have sharp peaks of high flow after rain storms and very low flow in drought because less ground water was stored in the ground to gradually discharge to streams. The diverted stormwater is warmer than groundwater and might contain pollutants and sediment that are harmful to fish and wildlife. Plants that need their roots continually wet will not thrive along stream banks where the water level drops between storms. More runoff can cause streams to erode in some areas, reducing the extent and quality of stream habitats. In addition, downstream flooding can increase.
- Building in floodplains/removal of floodplain vegetation. Building in these areas leads to loss of shoreline habitats and can put private property at risk of erosion and flooding. Removal of woody vegetation increases stream bank erosion risk. Many stream animals, notably native brook trout, are sensitive to increased water temperature that follows clearing of shading plants. Habitat is lost for riparian specialist species.
- Dams and water diversions. Stream plants and animals are adapted to flowing water and periodic flooding. Dams and excessive removal of groundwater stop this natural process. Groundwater pumping can reduce the amount of water in streams, especially during the summer. Dams turn fast-flowing riffle habitats into slower pool habitats, resulting in the loss of specialized species. They also "fragment" the stream by preventing fish and other animals from migrating.

"Amount spent by Americans on the purchase of canoes and kayaks in 1996: $99.1 million. Protection of our water bodies can enhance local economies by providing recreational opportunities."

(Lerner and Poole 1999)

Representative Species of Hudson Valley Streams

Cerulean warbler *(Dendroica cerulea)*

River otter *(Lontra canadensis)*

Northern spring *(Gryrinophilus porphyriticus)* and Northern dusky *(Desmognathus fuscus)* salamanders

Brook trout *(Salvelinus fontinalis)*

Wood turtle *(Glyptemys insculpta)*

Groundwater Resources

Groundwater is a crucial, yet finite, resource that can be depleted if more water is drawn than can be added through recharge. It is also susceptible to contamination from many sources, including septic leaks, animal lots, fertilizers and pesticides, underground tanks, salt storage, chemical storage and spills, and commercial and industrial processes. Pollutants enter streams and lakes from groundwater and adverse affect fish, aquatic insects, and other wildlife.

Groundwater can provide 50 percent of stream flow in normal years and 90 percent of stream flow in dry years.

Benefits of Groundwater

- Millions of people that live in the Hudson Valley depend on groundwater to fill their wells. Its importance cannot be overstated.
- Groundwater is an important source of water for streams and wetlands.

What Can Local Governments Do?

Prevention of groundwater pollution is the best way to protect groundwater quality and its effect on wildlife because cleaning up groundwater is costly and difficult.

The quantity of groundwater can be increased and protected by promoting water conservation and limiting impervious surfaces, especially near critical recharge areas. Water can be recharged by constructed wetlands and ground discharge of gray water (if allowed) or by low-impact development techniques. Water conservation efforts are important all year round, in drought and nondrought conditions. (For more information on limiting impervious surface and low impact development, see Chapter 10)

Groundwater Conservation Resources

The New York Rural Water Association has information about how groundwater concerns can be integrated into the planning efforts of small communities. (www.nyruralwater.org/).

The Groundwater Foundation is a nonprofit organization dedicated to educating and motivating people to care for and about ground water. They sponsor the Groundwater Guardians program, a community-based program that brings businesses, local officials, and citizens together to address groundwater protection issues.

Unfragmented Forests and Habitat Corridors: Forests and Woodlands

Five hundred years ago, most of the Hudson Valley was covered by mature forest with large old trees and a well-developed understory. Today, though forest and woodland is 67 percent of the region's land cover, much of it is in small fragments (DeGloria et al. 2004). Very large forests (greater than 15,000 acres) are uncommon in the Hudson Valley. The large forests that remain tend to be at higher elevations. Lowland forests are scarce in the Hudson Valley because lower elevation areas with deep soils and intermediate moisture were cleared for farming centuries ago and more recently may have been developed for residential, commercial, or industrial use.

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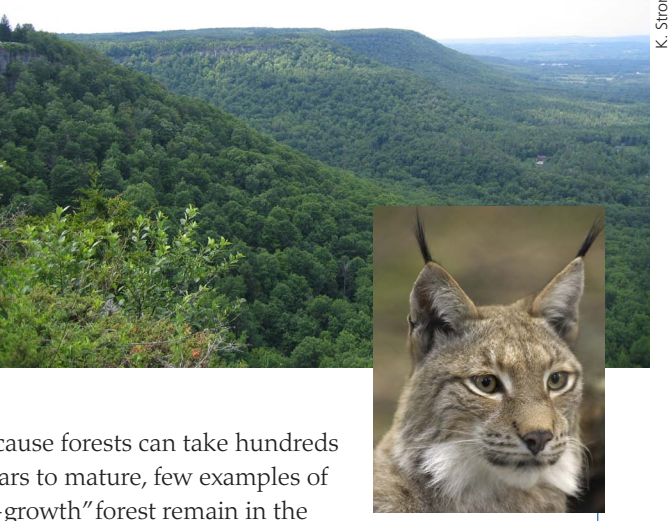

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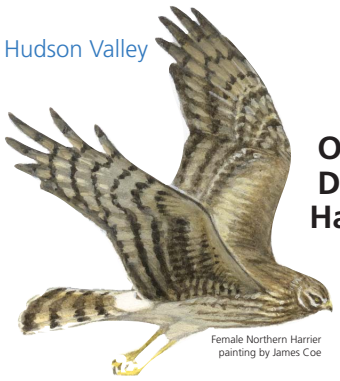
Because forests can take hundreds of years to mature, few examples of "old-growth" forest remain in the Hudson Valley. However, forests of moderate-size and -age trees continue to provide valuable habitat and could be mature forest habitat in the future. The many types of forest in the Hudson Valley are defined by the plant species that live there.

Benefits of Forest Habitats

Forest ecosystems protect the quality and quantity of our water supply, clean the air, create soil, prevent erosion, and moderate the climate.

- Clean abundant water. Native forest plants help the ground absorb water, ensuring it reaches aquifers and reservoirs. Forests not only do this better than machines can, but for less money.
- Clean air. Trees in forests and cities naturally clean our air by using carbon dioxide and producing oxygen.
- Climate moderation. Trees capture carbon dioxide, absorbing some of the excess greenhouse gas emissions, thereby slowing the effects of climate change.


Female Northern Harrier painting by James Coe

- Nature's recycling bin. Fungi, insects, and micro-organisms that live on the forest floor break up dead plants and animals—recycling every ounce of once-living material into soil and nutrients other organisms can use.
- Economic driver. Forests provide economic products (maple syrup and timber) and recreational opportunities (hunting, hiking, and fall foliage–viewing) that contributed $8.8 billion to New York's economy in 2007 (North East Forester's Association 2007).
- Scenery. Trees and forests also enhance a community's quality of life, enhancing aesthetics and providing shade and cooling.

Threats

- Fragmentation. The carving-up of forests into smaller and smaller lots is called fragmentation. This process decreases habitat quality and ecosystem health by increasing access for predators and parasites, and disrupting wildlife movement. Invasive plants and animals can more easily invade a fragmented forest, changing the unique mix of native plants and animals. Fragmentation can also reduce or eliminate the economic and social benefits of forests listed above.
- Population explosions. Overabundant white-tailed deer thrive in suburbanized landscapes and threaten forest understories and tree seedling growth.

An acre of eastern forest produces more than two tons of oxygen per year, providing enough oxygen for eighteen people.

1.47 tons of carbon dioxide are removed from the atmosphere for every ton of wood a forest grows. That wood stores an average of 31.45 tons of carbon.

(cited in Biodiversity Project 2003)

Representative Species of Hudson Valley Forests

Bobcat *(Lynx rufus)*

Barred *(Strix varia)* and long-eared *(Asio otus)* owls

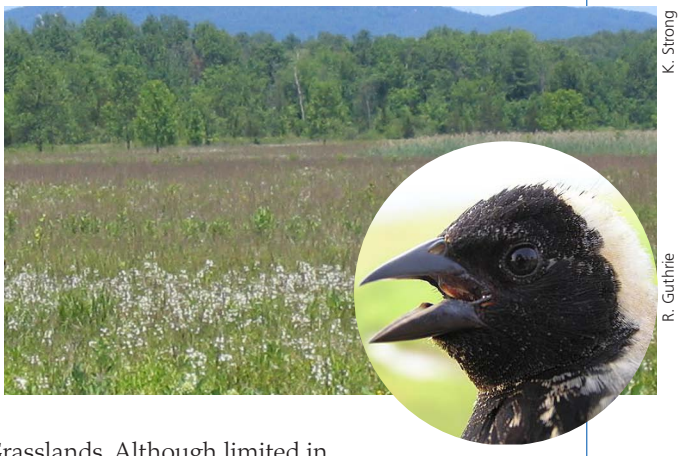
Scarlet tanager *(Piranga olivacea)*

Worm-eating warbler *(Helmitheros vermivorus)*

Wood thrush *(Hylocichla mustelina)*

Open Uplands and Barrens: Disturbance-Dependent Habitats

Open upland habitats are less common than forests in the Hudson Valley, but provide important habitat for some rare and declining species. Open uplands are also known as disturbance-dependent habitats, meaning they need disturbance to prevent them from becoming forest. In the past, natural disturbance was more common, but today, grassland and shrubland species depend on management. They were maintained historically by natural and human-induced burning, but now many require periodic mowing to prevent succession to forest.


K. Strong

R. Guthrie

- Grasslands. Although limited in range prior to European settlement, grasslands in the state are native. Grassland-dependent species—particularly grassland-breeding birds such as the northern harrier, short-eared owl, sedge wren, grasshopper sparrow, and Henslow's sparrow—are found in few places. Not surprisingly, these habitats occur most often in areas that have been cleared for agriculture.
- Shrublands. Shrublands are found in open areas such as old fields and utility rights-of-way, and on edges of fields and forests and hedgerows. Shrublands are habitats for declining species of songbirds, including the golden-winged warbler, as well as rare butterflies. Shrubland is increasingly of concern in the state because it is declining as a cover type in both wetlands and uplands. From the mid 1980s to the mid 1990s, shrub-scrub wetlands declined statewide by 44,000 acres, or 9 percent (Huffman and Associates 2000).
- Barrens. Barrens are a globally rare habitat adapted to poor (low-nutrient) soil. In the Hudson Valley, barrens are found in the Albany Pine Bush, on the Shawangunk Ridge, and on Staten Island. Barrens

are similar to the plant community of the African Savannah, with a dense and diverse herbaceous understory and sparse tree canopy.

Benefits of Open Uplands and Barrens

- Multiple-use areas. Grasslands and shrublands are compatible with many human activities, and are especially good for hunting, trapping, and birdwatching. Some agricultural activities are compatible with grassland habitat, in particular, pasture for animals and late-season haying. Some species, like the bog turtle, will probably not survive in the Hudson Valley without agriculture.
- Water flow control. Shrublands help manage watershed runoff by retaining snowpack longer than forested areas or grasslands. They also maintain soil cover, act as a living snow fence, and can be a good riparian buffer.
- Scenery. Grasslands and shrublands create pastoral scenery themselves and also provide unobstructed views of distant ridges, mountains, and the river, vistas of particular importance in the Hudson Valley.

Threats to Open Uplands and Barrens

- Loss of disturbance. Grassland and shrubland areas have been maintained in the past by natural and human-induced wildfire, beaver activity, and extensive farming. With the loss of disturbance, open uplands are becoming less common.
- Fragmentation. This is a problem for grasslands and barrens, as it is for forests. Breaking habitat connections restricts animal movement, encourages predators and introduces invasive species.

Representative Species of Hudson Valley Open Uplands and Barrens

Bobolink *(Dolichonyx oryzivorus)*

Eastern meadowlark *(Sturnella magna)*

Golden-winged warbler *(Vermivora chrysoptera)*

Northern harrier (marsh hawk) *(Circus cyaneus)*

Rare butterflies

Short-eared owl *(Asio flammeus)*

Active Farms

Working farms can support a diverse array of species—if managed with nature in mind. Many at-risk species of reptiles, amphibians, and birds depend almost entirely on Hudson Valley farms because they are one of the few current land uses that maintain open grasslands, fields, and shrublands.

Farm-associated habitats are rapidly disappearing throughout the northeastern United States, along with the species that depend on them. Major causes of these declines include regrowth of forests as fields are abandoned, and urbanization, which fragments and eliminates open habitat. As with forest wildlife, many farm-dependent species must be able to disperse among open habitats; therefore, fragmentation by roads and developments should be minimized in agricultural areas having high biological diversity. Policies and practices that promote the continuation of small-to-medium-scale, ecologically sensitive farms that are interconnected would help to maintain biological diversity. Several programs are available to technically and financially assist farmers with habitat conservation through the U.S. Department of Agriculture's Natural Resources Conservation Service.

The Farmscape Ecology Program at Hawthorne Valley Farm in Columbia County aims to explore the relationship between the working farm and the natural landscape. Scientists study wildlife use of farm habitats and relate pasture-plant diversity to milk production. For more information, visit www.hawthornevalleyfarm.org.

Adapted from Orange County (N.Y.) Planning Department 2004.

Parkland and Open Space—Habitats in Densely Developed Areas

Much of this guide is applicable to rural and lower-density suburban areas. However, the Hudson Valley includes fourteen cities and many more dense older suburbs that provide surprising opportunities for biodiversity. Habitat conservation is no less important in urban areas than rural areas. The major difference is scale: you will not find the 1,000-acre forest in Yonkers that you might in Ulster County. All of the habitat types described in this handbook can be found in urban areas, though most urban natural areas are smaller and concentrated in parkland and open space. Fragmentation is a dominant landscape feature, which means there will be fewer development-sensitive species.

K. Strong

Some urban areas harbor rare species and unique habitats. Van Cortlandt Park in the Bronx has more butterfly species than all of Great Britain. The Albany Pine Bush is a globally rare pitch pine–scrub oak

community that is home to many rare plants and animals—surrounded by suburban development. Uninhabited islands in New York Harbor are home to nine species of nesting egret, heron, and ibis. Urban streams are often polluted, dammed, straightened, and culverted, yet are often the only seminatural habitat left in cities. Even street trees provide important services, absorbing stormwater, cleaning the air, providing shade, and providing some habitat that is clearly essential in cities. It is important that some natural habitat is preserved in urbanized areas, even if it is not connected to other natural areas.

Benefits of Urban Habitats

Natural areas in highly developed parts of the Hudson Valley provide many benefits. Controlling erosion, improving air quality, retaining nutrients, and protecting water quality and quantity would be costly to reproduce. Developed landscapes can be designed to retain some of these ecological and habitat functions. Because people who have less access to nature are concentrated in cities, urban parks and preserves are important for educating communities about the natural environment. They may be the only exposure to nature urban residents ever have.

Threats and Conservation Issues

- Natural areas in urban and suburban areas are subject to high development and recreation pressures.
- Invasive plant species often dominate in urban parks and natural areas. Invasive plant removal may benefit local wildlife, but removal of invasive plants can sometimes cause more harm than good and should be carefully considered (see Chapter 10).

The Importance of Street Trees and Urban Forests

Urban trees provide more than just shade and visual pleasure. They absorb stormwater, lower winter heating and summer cooling costs, absorb air pollution, and reduce noise. A 2004 report released by American Forests, found that the City of Poughkeepsie has 24 percent tree cover. The city's trees absorb 69,564 pounds of air pollution per year—a service that would cost $169,831 to replace. It would cost $11.5 million to build stormwater detention structures that would replace the work the street trees do. Poughkeepsie's trees also absorb 1042 tons of carbon per year (American Forests 2004).

Resources

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