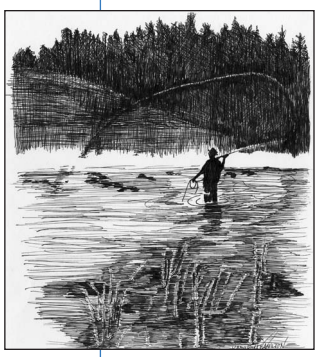
Chapter 5:

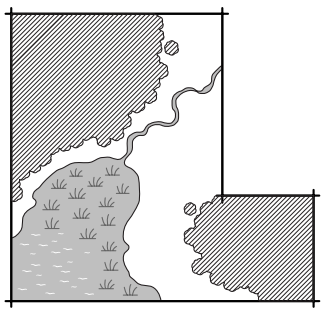
How To Conserve Habitats



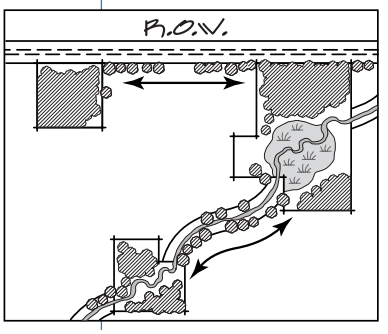
Once a community has made a commitment to conserve nature and identified its important natural areas and wildlife, it is poised to start protecting those habitats. This chapter is dedicated to resource-specific habitat conservation needs and tools for the Hudson River and its shoreline, wetlands, streams, forests, and grasslands. It includes specific information needed to conserve resources (e.g., what does a meadow need to be good bird habitat?), and suggests tools that best protect the resources. It contains the information municipalities need to incorporate habitat conservation into the smart growth strategies described in the remainder of the handbook.

General Conservation Principles

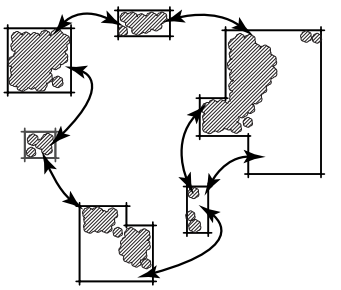
General Conservation principles apply to all habitats described in this handbook. They are the foundation for understanding the conservation guidelines described in the rest of this chapter.



Large, intact blocks of natural areas are most effective for wildlife conservation. Though all conserved habitat contributes to the protection of biodiversity, aim for preserving and expanding large areas whenever possible. Larger patches of habitat are more likely to be healthy and better able to sustain species. Where conserving a large area is not possible, try to connect the smaller patches of habitat to larger ones to facilitate the movement of species.



Connections are essential. Natural corridors that link larger patches of habitat can connect groups of the same species, which allows them to maintain healthy populations. It also allows for plants, animals, and habitats to adapt to a changing environment. Towns should try to connect local natural areas and areas in surrounding communities. Ideally, habitat corridors should encompass broad swaths of habitat that are known to be used by wildlife. Linear features with natural habitat, including river and stream corridors, unpaved trails, utility rights-of-way, and unused railroad rights-of-way provide modest linking opportunities, but keep in mind they often do not provide adequate habitat corridors.



Where connections between larger natural areas are not possible, small patches can act as stepping stones for wildlife movement. Small patches of habitat provide refuge where breaks in the network of habitats cannot be avoided. In areas with especially important habitat, development can be designed in ways that minimize impact on wildlife, for example, using sloped "Cape Cod" curbing to allow turtles, frogs, and salamanders to move across roads.

Protect rare landscape elements, sensitive areas, and associated species. You can identify these resources and their significance as part of a natural area and wildlife inventory. Direct development away from recognized sensitive areas and toward altered and less-sensitive land. It is far more expensive and uncertain to restore a habitat than to protect one that already exists.

Minimize alteration of natural features, including vegetation, soils, bedrock, and waterways. Minimize impervious surfaces to maximize groundwater recharge and reduce changes in surface-water quality and flow. By limiting changes to the landscape, it is more likely that sensitive species and habitats can continue to persist, even in developed areas.

(Adapted from Kiviat and Stevens 2001, McElfish 2004, and Navota and Dreher 2000.)

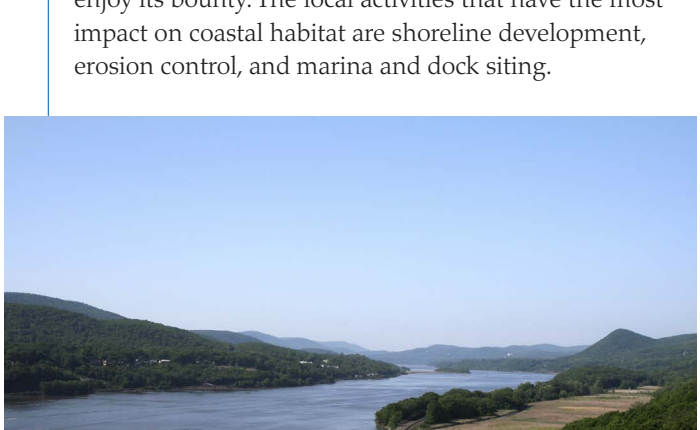
Conservation is planned action or nonaction to protect, manage, restore, or enhance natural resources for future generations.

Restoration

For more involved projects where work may needed to solve a problem (e.g., flooding), restore ecological function (e.g., tidal wetlands), or restore a target species (e.g., bog turtles), landowners and local governments should generally seek the advice of recognized restoration experts. An improperly designed restoration project could do more harm than good, despite sound intentions. Keep in mind that permits from state or federal agencies may be required for these kinds of projects.

Conserving the Hudson River Estuary and Its Shoreline

Today, many Hudson River communities are reconnecting with the waterfront. Some are redeveloping waterfronts, others are improving parks and gaining access. It is exciting to see such renewed interest in the Hudson, but development along the shoreline can impact the Hudson's habitats. Waterfront development can occur in a way that maintains the natural resources of the Hudson and its shoreline, so everyone in the region can enjoy its bounty. The local activities that have the most impact on coastal habitat are shoreline development, erosion control, and marina and dock siting.



The most important coastal conservation principles are:

- Coastal habitats are dynamic. Therefore, building on these shifting lands is a challenge. Land near tributary mouths is particularly unstable, naturally eroding and depositing sediment from the watershed.
- Shoreline and shallow water habitats are crucial to the health of many Hudson River fish and birds.

Are Coastal Habitats Protected By the State and Federal Government?

A permit is required for alteration to all tidal wetlands south of Tappan Zee and tidal estuarine wetlands north of the Tappan Zee that are 12.4 acres and larger and appear on the New York State freshwater wetlands maps. Permits are obtained from the New York State Department of Environmental Conservation. Projects in the coastal zone that use state or federal funding or require permits are subject to consistency review by New York State Department of State Division of Coastal Resources. The review ensures the action is consistent with all policies for the State's coastal areas and inland waterways. Policy 7 of the New York State Coastal Management Program addresses habitat: "Significant coastal fish and wildlife habitats will be protected, preserved, and where practical, restored so as to maintain their viability as habitats." For an explanation of significant coastal fish and wildlife habitats, visit www.nyswaterfronts.com.

What Local Governments Can Do

Require Sensitive Shoreline Development

On site plans for projects on the shoreline, towns could require mapping of all tidal wetlands. When approving Hudson waterfront projects, have applicants avoid filling shallows and small wetlands, which are important nurseries for fish and help protect against storm damage and flooding. Municipalities could also require a building buffer of 75 to 100 feet from the mean high tide mark to protect sensitive coastal habitat from impacts of construction.* More buffer is even better where possible. Leaving 300 feet would allow more flexibility for storm surge, flooding, and future sea-level rise. Buffer areas can be used for unpaved trails and other passive recreation. In urban waterfronts, this may not be feasible. For those projects, leave as much natural habitat as possible, especially wetlands, while still providing public access.

Control Erosion Using Ecological Methods

Though erosion of the Hudson's shoreline is a natural phenomenon, the degree of erosion along the estuary and many of the region's streams and lakes can exceed natural rates due to high water velocities, rapidly changing water levels, loss of stabilizing vegetation, and prior channel modification. The conventional solution to erosion has been to armor channels and shorelines with a hard surface such as concrete, steel, or rock. Of these, steel sheetpiling is the most detrimental to coastal habitats, particularly intertidal shorelines. Such approaches may be effective at the site, but they are typically quite expensive, destroy aquatic habitat, and may actually lead to increased flooding and erosion in other locations downstream.

*See also the Rhode Island Coastal Zone Buffer Ordinance, available at www.stormwatercenter.net.

Where shoreline stabilization is needed, use methods that maintain the ecological structure of the habitat and provide the protection needed. In many cases, protecting the land around areas where the shoreline is moving is all that is required. (see section on Stream channel and riparian zone maintenance on page 32)


Troy Wiedy

Carefully Site Marinas and Docks

Because access to the Hudson is limited, municipalities often don't have a choice in siting marinas and docks. If possible, these structures should be located away from vegetated and unvegetated shallows. The best sites are in deep water or where depth is naturally maintained, which will reduce the need for future dredging, protect habitat, and reduce maintenance expense and habitat impacts. If the marina must be sited in shallows, try to minimize disturbance, especially in large areas of vegetated shallows. Vegetated shallows are essential for the functioning of the Hudson River ecosystem.

Smart Growth Strategy

Local Waterfront Revitalization Plans

Hudson Riverfront communities can develop Local Waterfront Revitalization Plans (LWRPs) with the New York State Department of State Coastal Zone Management Program. The plans typically are developed to help river towns reconnect to the Hudson, but could also be used to protect the Hudson's unique natural resources. Include in the plan up-to-date information about tidal wetlands, natural shoreline characteristics, submerged aquatic vegetation, and fish use of the Hudson near your community. This information can be obtained from Department of Environmental Conservation's Hudson River Programs. Once significant coastal habitats have been identified, there is an opportunity to protect them as the waterfront is developed.

Conservation of Inland Wetlands

The most important wetland conservation principles are:

- Wetlands are affected by what happens in their watersheds up to 2 1/2 miles away (Houlahan and Findlay 2004)
- Healthy watersheds are mostly forested.
- Wetland buffers can be used to moderate the effects of watershed urbanization.
- Wetlands usually have physical and biological connections to streams and other wetlands.

Are Wetlands Protected By State and Federal Governments?

State and federal regulations protect some, but not all, wetlands. Protection under both federal and state jurisdiction is limited. State programs protect wetlands 12.4 acres and larger that appear on wetland maps; wetlands of unusual local importance; and a 100' buffer around those wetlands. Federal programs protect wetland of any size, but do not include a buffer. To find out if a permit is needed for a specific project or activity, contact the regional Department of Environmental Conservation office or the Army Corps of Engineers (see Appendix 3). Do not assume that if state and federal laws are followed that there are no impacts to wetlands. Because of the wetland conservation principles listed above, it is possible to follow those laws and still have an impact on local wetlands.

What Local Governments Can Do

Local governments can use a number of techniques to better protect the natural functions and habitats of wetlands. Local conservation programs can complement state and federal programs, filling the gap in enforcement by protecting smaller wetlands and their buffers. Remember that even for state protected wetlands, there is no substitute for careful local review to determine whether or not a particular project will impact a specific wetland.

Decide Which Wetlands to Be Protected Locally

Knowing which wetlands are most important to your community and how buffers can protect them is essential to any local program. Local wetland conservation programs in the Hudson Valley typically apply to wetlands smaller than those protected by the state. Some municipalities protect areas down to one-tenth of an acre, others only as small as five acres. It depends on how many wetlands are present in your jurisdiction, the services those wetlands provide in terms of flood control, water cleansing, and wildlife habitat, and what is acceptable to the community.

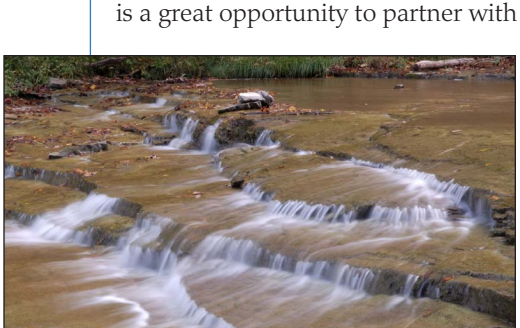
Identify Wetlands on Development Sites

No existing wetlands map includes all wetlands present on a site. Consider requiring wetland boundary delineations on all properties proposed for development and require third-party verification of those boundaries and any onsite determinations that isolated wetlands are present. Define and apply a buffer to help protect the site's wetlands and watercourses from the impacts of new development (see page 29).

Monitor Wetland Health

Local government and citizens can monitor the health of wetlands. A monitoring plan and program can shed light on the health of your community's wetlands. Monitoring

can characterize local wetlands, recognize trends over time, identify problems at a specific site, guide management actions, and provide information about your local ecology. Before starting a monitoring program, set goals for it. Potential goals are education, developing baseline information, identifying water quality problems, and identifying ecological problems. Wetland monitoring is a great opportunity to partner with schools, scouts, and other youth programs. Remember that you need permission to access private property.



The U.S. Environmental Protection Agency produced a volunteer wetland monitoring guide that will be useful to developing a local program (U.S. Environmental Protection Agency 2001). The document provides guidance for establishing a volunteer wetland monitoring program, including how to design a wetland study, set study goals, what techniques to use based on your goals, and resources for more information.

Smart Growth Strategy

Local Wetland and Watercourse Protection

In addition to working with the local planning board to conserve wetlands on new developments, municipalities can develop local wetland laws to protect wetlands. This approach will help to protect wetlands throughout the municipality. Understand, however, that local wetland laws have been controversial in several Hudson Valley communities and it is very important that local leaders take the time to engage the public by providing information and gathering input (see Chapter 7 for techniques).

In New York State, towns can regulate wetlands that are not protected by the state. This usually means wetlands smaller than 12.4 acres. Most wetland and stream protection ordinances also include a buffer to protect the resource from construction and or vegetation removal. Towns may also adopt regulations for wetlands already regulated by Department of Environmental Conservation, provided the local regulations are at least as protective as the state regulations, for example, requiring more than a 100-foot buffer. Towns often include streams in as part of a comprehensive wetland and watercourse ordinance. It is important to note that wetland ordinances alone will not protect wildlife because the required buffers are usually not wide enough to do so.

Recommended elements of a local wetland and watercourse protection ordinance are:

- prohibition of damaging modifications such as channelization, straightening, filling, impoundment, draining, and bank armoring;
- required mitigation for unavoidable disturbances;
- protecting natural buffer zones along the edge of wetlands and watercourses;
- requiring setbacks for buildings and pavement; and
- prohibition of direct discharges of untreated stormwater into natural wetlands and watercourses.

Other ordinances that protect wetlands include those for erosion and sedimentation, and stormwater control (see Chapter 10 for both). Groundwater, a crucial wetland resource, is discussed later in this chapter.

The Cost of Building on Wetlands, Town of LaGrange

The Importance of Local Performance Standards

During the 1960s, the Town of LaGrange in Dutchess County approved a twelve-home subdivision on a site that included a small wetland. After construction of the homes began in the late 1970s, several nearby residents noticed four feet of standing water in the foundations of at least six homes. The residents reported the condition to the building inspector, who said that nothing could be done. The homes were completed and sold, and the developer moved elsewhere.

In the wet winters of the early 1980s, people driving through the development frequently found the roads icy and very dangerous. The sump pumps draining the basements of the homes in the wetland area were the culprits. The homeowners eventually petitioned the LaGrange for help and ultimately the town agreed to pay $497,000 to relieve basement flooding. Using the planning process to avoid such incidents not only saves taxpayer money but also protects the health, safety, and welfare of future homeowners and promotes more stable property values.

(Adapted from Kendall 1998)

Local Example

Town of Pleasant Valley Wetland and Watercourse Ordinance

The Town of Pleasant Valley (Dutchess County) adopted a wetland, waterbody, and watercourse protection ordinance in 2003. The local law regulates wetlands 1/2 acre and larger. The law stipulates a 100-foot buffer on wetlands and all perennial (permanent) watercourses in town. Within the 100-foot buffer, the town requires that a 25-foot naturally vegetated buffer be maintained except

when the space is needed for emergency purposes or agriculture. A permit is required for draining; dredging, excavation, removal of soil, mud, or gravel; filling; dumping; depositing; building; and changing ebb and flow of water. Though existing plantings and yard can be maintained, there can be no new plantings, walkways, or mowing. A wetlands administrator first determines the significance of the requested action, and then refers the permit to the planning board for approval or denial.

Conservation of Streams

Some elements of stream conservation are similar to wetland conservation. Where this guide identifies the overlaps, the appropriate section will be identified.

The most important stream conservation principles are:

- Streams are affected by what happens in their watersheds;
- Healthy watersheds are mostly forested and have less than 10 percent impervious surface;
- Local plants and animals are adapted to natural variation in stream flow;
- Stream buffers are a tool that can be used to moderate the effects of watershed urbanization;
- Streams naturally move across the landscape over time;
- Streams usually have physical and biological connections to wetlands.

Are Streams Protected by State and Federal Governments?

State and federal regulations protect some, but not all streams, and those protections are limited. In New York State, a permit is required for altering the beds and banks of protected streams. A protected stream is one with

Stream and Wetland Buffers

Aquatic habitats are affected by everything that happens in their watersheds. In urbanizing and suburbanizing watersheds, naturally vegetated buffers can help moderate impacts to stream and wetland ecosystems (Miltner et al. 2004). Buffers aid water quality by trapping or removing sediment, excess nutrients, pesticides, and other pollutants from surface runoff and shallow ground water. They can also reduce excessive bank erosion. Buffers are usually located in what is known as the riparian area, or the vegetative transition zone between a stream or wetland and the surrounding uplands. The information about buffers that follows can be applied to any local conservation effort where stream and wetland buffers are used, including overlay zoning, setbacks, performance standards, site design, wetland and watercourse ordinances, and acquisition.

Buffers are not a tool to prevent development, but to direct development into less sensitive areas. But municipalities should recognize that establishing buffers may affect the way landowners use their properties. To accomplish stream or wetland protection while still allowing development, municipalities can use techniques like flexible zoning. For example, planning boards could permit the same number of units allowed on the property with no buffer area, but then require the lots to be clustered on less sensitive portions of the property. Flexible zoning techniques are discussed in more detail in Chapter 9.

Some Hudson Valley communities protect buffers on streams and wetlands. The largest of these buffers may provide an adequate short-term aquatic buffer, but will not protect all of the animals that use the stream or wetland. Conserving the full range of species that use the habitats requires conserving adjacent upland habitat.

Aquatic Buffer

Buffers of 100 to 200 feet usually protect the water resource and aquatic habitat in the short term (see Table 5-1 on page 30 for specific benefits). Local conditions may warrant an increase in buffer width to adequately protect the resource. One approach is to widen the buffer where there are sensitive areas, including slopes greater than 15 percent, adjacent wetlands along streams, 100-year floodplains that fall outside of the buffer area, and critical habitats.* Critical aquatic habitat might include a stream reach that has spawning native brook trout, presence of a documented significant ecosystem as defined by the New York Natural Heritage Program, or presence of a species of interest that depends on the aquatic habitat, such as wood turtle in streams or spotted salamander for vernal pools. Generally, the aquatic buffer should have natural vegetation. Trees and shrubs are preferable because they provide bank stabilization and shade. The aquatic buffer alone is not sufficient to protect all animals that use the stream or wetland. For that, you need to consider adjacent upland habitat.

Adjacent Upland Habitat

As noted elsewhere in this chapter, wildlife species that use streams and wetlands often use upland habitat adjacent to the water resource. These species will not necessarily be protected with only an aquatic buffer. If adjacent areas are protected, more species will be protected and the stream or wetland system itself will be more protected over the long term. The adjacent upland area may be able to accept limited disturbance. For example, productive vernal pools need an undisturbed buffer of 100 feet, and function best when surrounded by a 750-foot wooded area. The critical forest habitat for vernal pools can sustain up to 25 percent disturbance; larger impacts are likely to eliminate vernal pool wildlife (Calhoun and Klemens 2002). Narrow, isolated buffers along streams may provide only low quality habitat that may attract animals, but do not support breeding (Waterhouse and Harestad 1999).

* Buffer Model Ordinance by the Stormwater Manager's Resource Center, available at www.stormwatercenter.net.

Buffer Conservation Strategies

Protect and Restore Natural Vegetation Along the Edges of Streams, Lakes, and Wetlands

One of the simplest and most beneficial actions that local governments can encourage is protecting or restoring naturally vegetated areas along streams and rivers. A turf grass lawn down to the water's edge is not effective habitat and does little to prevent erosion.

Buffer characteristics can vary depending on local conditions, such as the size and quality of the waterbody or wetland. However, buffers should:

- Be of an appropriate width. Though any width of native vegetation along the edge of a watercourse or wetland will provide some benefit, the actual width should reflect the conservation goals of the community.
- Provide public access, where appropriate. While a continuous, uninterrupted buffer is preferable for protection of water quality and habitat, some flexibility may be desirable to provide access to a waterbody for recreational uses, particularly in parks and other public lands. Paving through a buffer is generally discouraged; instead use a mown footpath, a stepping-stone trail, or a pervious gravel path.
- Be naturally vegetated. Restored buffers should include native species that are suitable for the local conditions. Trees are essential for Hudson Valley stream health. Knee-high vegetation along lakes and ponds can discourage resident Canada geese. Resources for natural landscaping can be found in Chapter 13.
- Be flexible. Flexibility allows individuals to find innovative ways to conserve a meaningful buffer. For example, variable-width buffers can add protection to floodplains and wetlands or reduce buffer width on smaller residential lots.

Table 5-1. Benefits of Various Stream and Wetland Buffer Widths

This table provides guidelines on buffer widths based on current scientific literature. Only a site-specific biological survey can provide the exact buffer width needed to preserve species and ecosystems at a site. Note that the buffer sizes listed are not meant to be prescriptive, but are intended to help local governments better understand stream and wetland conservation. Buffer width in your municipality should be determined both by science and by what is acceptable in your community.

buffer width (in feet)	conservation benefit	source
80	nutrient and pollutant removal	Kennedy et al. 2003
100–200	buffer to protect water resources and core aquatic habitat	Semlitsch and Bodie 2003
100	temperature and microclimate regulation	Kennedy et al. 2003
100	core temporary woodland pool habitat (vernal pool)	Calhoun and Klemens 2002
160	stream detrital input and bank stabilization	Kennedy et al. 2003
330	water quality and minimal wildlife protection (includes adjacent upland)	Kennedy et al. 2003
250	stream salamander core habitat and buffer	Crawford and Semlitsch 2007
250–575	minimum corridor width needed to include 90 percent of bird species that use streamside habitat (adjacent upland)	Spackman and Hughes 1995
465–950	core riparian habitat for reptiles and amphibians (adjacent upland)	Semlitsch and Bodie 2003
535	long-term health of ecosystem (adjacent upland)	Howard 2004
750	critical terrestrial habitat for vernal pool breeding species (adjacent upland)	Calhoun and Klemens 2002

classification of A, B, or C(T). Listed in declining order of quality, the best use of an "A" stream is considered drinking water; for a "B" stream, swimming: a "C(T)" stream cannot be used for drinking or swimming, but it does support brook trout. See www.dec.ny.gov for more information. Federal programs protect streams and rivers, which means that a permit is required for activities in the regulated area. To find out if a permit is needed for a specific project, contact the regional Department of Environmental Conservation office or the Army Corps of Engineers (see Appendix 3). Do not assume that if state and federal laws are followed there are no impacts to streams. These laws are meant to minimize impacts on streams from development and other land disturbance, not protect them.

What Local Governments Can Do

Local governments can use a number of techniques to better protect the natural functions and habitats of streams. Local stream conservation programs should complement state and federal programs. For example, some municipalities protect buffers along the stream from building or alteration.

Decide Which Streams Are to Be Protected Locally

Knowing which streams are most important to your community and how buffers can protect them is essential to any local program. Streams are classified by order (is it a headwater or a large river?), water quality (is it drinkable, swimmable, or fishable?), and whether the flow is permanent or temporary. Streams of all orders and sizes are important for habitat and water quality. Your community may choose to have different regulations for different stream types. For example, a town could require a narrower buffer on a temporary stream than a permanent stream. The sidebar 'Stream and Wetland Buffers' on page 29 includes information on the importance of buffers and can help your community better define them.

Watershed Planning

Because all streams (and most wetlands) in a watershed are connected either by surface or ground water, one of the best ways to think about streams and wetlands is at a watershed scale. Watershed planning is emerging as the preferred management tool to protect stream health and water quality. Most streams and their watersheds span more than a single municipality; therefore conservation efforts should be intermunicipal to be effective. Examples of watershed planning initiatives in the Hudson Valley are described in Chapter 12.

Monitor Stream Health

The benefits of stream monitoring are similar to wetland monitoring. Stream monitoring can characterize your town's (or watershed's) streams, identify which of them meet state and federal water quality standards, identify stream quality trends, identify problems at a specific site, guide management actions, and provide information about your local ecology. Before starting a monitoring program, set goals for the stream-monitoring program. Good goals include education, developing baseline information, identifying water quality problems, and identifying ecological problems. Stream monitoring is a great opportunity to partner with schools, and scouts and other youth programs.

The Hudson Basin River Watch Guidance Document is useful for developing a local program for monitoring stream water quality (Behar and Cheo 2004). Hudson Basin River Watch is a volunteer river-monitoring network for the entire Hudson River watershed. The guidance document includes information on how to design a stream study, what techniques to use based on your goals, and lists regional coordinators who are available for technical assistance. Stream health can also be visually assessed from the condition of its bed, bank, and riparian corridor. This assessment will provide you will different information from water-quality monitoring, though it is compatible. To develop this kind of program, use the Stream Visual Assessment Protocol, developed by the USDA Natural Resources Conservation Service (NRCS) and used by county streamwalk programs (Newton et al. 1998). Contact your county soil and water conservation district for more information (see Appendix 3).

Ecological Stream Channel and Riparian Zone Maintenance

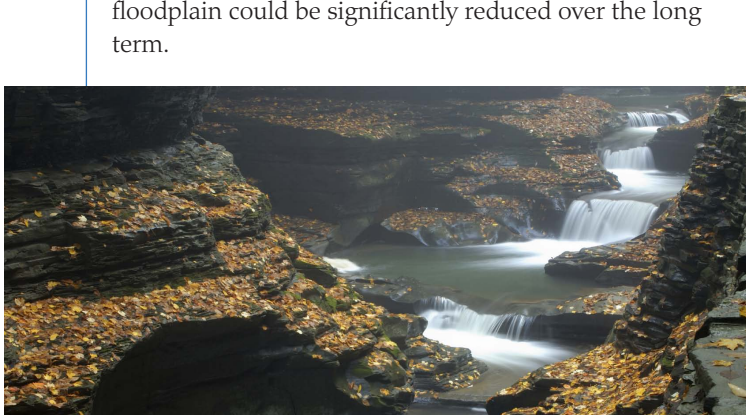
The historical focus of stream-channel maintenance has been the removal of woody debris (snags) and gravel, removal of riparian vegetation, armoring of banks (with rip rap), and straightening of the channel. These techniques are most often used to alleviate flooding and control streambank erosion. These practices ignore the multiple functions and desired uses of a stream channel. As a result, flooding problems are merely transferred further downstream. Newer techniques, such as natural channel design, consider how stream shape influences water and sediment movement in a stream. A properly designed local stream-corridor maintenance program should do the following to the greatest possible extent:

- Retain or restore the natural channel (which requires an understanding of the shape of the stream bed in the affected stream reach*);
- Retain woody debris in the stream to provide cover and nutrients for fish and wildlife;
- Retain or restore native vegetation (especially trees) within the stream corridor and the floodplain;

* This concept is also known as hydrogeomorphology, which is the study of stream shape and how that influences the way water and sediment move through the system.

- Minimize human activities/uses (e.g., trash disposal, buildings, etc.) in the floodplain and, particularly, within the aquatic buffer;
- Apply natural channel-design approaches to control ongoing streambank erosion and gravel deposition;
- Redesign stream crossings (e.g., bridges and culverts) to better accommodate flood waters and minimize biological impacts (e.g., allow for fish passage), especially when repairing the crossing or repaving the road.

The implementation of a maintenance program that follows these guidelines may require a higher initial cost than traditional methods; however, the overall annual costs to local government for maintenance in the floodplain could be significantly reduced over the long term.



Smart Growth Strategies

Local Wetland and Watercourse Regulations

Many towns have used local wetland and watercourse regulations to protect stream buffers of 25 to 200 feet. To define buffers that reflect your community's goals, see the sidebar on wetland and stream buffers on page 29. For more guidance on how to develop a local wetland and watercourse protection ordinance, see the section on conservation of wetlands on page 27.

Other Ordinances

Other ordinances that protect streams include those for erosion and sedimentation, stormwater control, and groundwater protection. Chapter 10 covers erosion and sedimentation and stormwater control.

Voluntary Land Preservation Agreements

Towns can work with landowners to protect wetlands, streams, and riparian areas with conservation easements. These lands are often less expensive than other lands due to their development constraints. The Towns of Montgomery and East Fishkill have established voluntary easement-protection programs along major waterways. For more information on how to apply this technique, see Chapter 11.

Local Examples

Town of Montgomery, Orange County

The Town of Montgomery, Orange County, has been protecting a locally important river corridor. The Wallkill River runs from northern New Jersey, through Orange and Ulster Counties, and empties into Rondout Creek before entering the Hudson River Estuary. The town identified the river as an important resource, and approached landowners on both banks along the river to protect a 250-foot buffer from development. Many landowners responded by donating an easement to the town preventing development in these areas. To date, 280 acres have been protected along the Wallkill in the Town of Montgomery.

Conservation of Forests

The most important forest conservation principles are:

- Forests need to be large and connected in order to be quality wildlife habitat and provide the most community benefits;
- Forests are more than trees: understory shrubs and herbs are important as well.

How Large Should Forests Be?

How large is an unfragmented forest? It depends on the local area: in a highly developed town, a five- or ten-acre lot with relatively mature trees may be significant. In more rural areas, forests of 200 acres or more provide significant wildlife benefit. Note that forests of this size occur across property boundaries. Communities should strive to conserve a variety of forests. The following table describes the wildlife benefit of different forest sizes. Forest fragments of just five acres or more have some wildlife and significant human health benefit. Therefore, if a town wants to conserve those forest values, five acres is should be considered the minimum area for forest habitat. Conserving large functioning forests does not mean they are off-limits to humans. There are many healthy forests that include some development and working forest land.

What Is Protected by Federal and State Government?

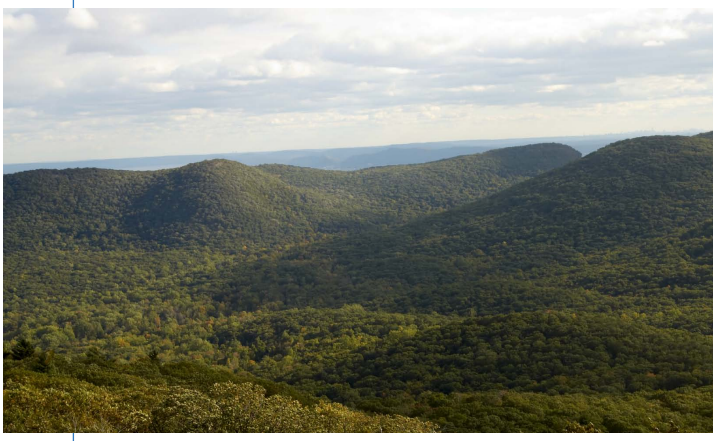
There are no state or federal laws that protect forests.

What Local Governments Can Do

There are few tools designed to help conserve forests locally. The primary vehicles for forest conservation in New York are purchase, conservation easement, and private landowner stewardship. Forest conservation can also be addressed using local planning and zoning, including tree conservation ordinances. All of these tools need to be used together strategically to conserve a large forest.

Develop In Ways that Maintain Connections Among Forests

Few parcels are large enough to protect a whole forest. If a natural-resources inventory identifies large, contiguous forests as an important community feature, development on forested parcels can be clustered to maintain ecologically significant connections across property boundaries. Performance standards, and subdivision



and site-plan regulations can also be used to maintain connections (see also Chapter 9). On site plans, forests can be delineated and nonforested areas suitable for reforestation can be identified. Municipalities can ask applicants to identify how connections will be made to adjacent properties. Sample ordinances and performance standards designed to minimize fragmentation can be found in the resource list at the end of the chapter.

Manage for Forests in Municipal Parks

For municipally owned forest lands, towns should consider developing management plans that protect habitat. To maintain forest habitats in parks, it is best not to mow under the trees. Maintaining a well-developed shrub and herbaceous understory will encourage diversity of woodland plants and animals. Maintenance crews should also avoid removing older trees unless they are dangerous. Old, rotten, and even dead trees provide nesting and feeding areas for many types of wildlife.

Manage Deer Impacts

Overabundant white-tailed deer threaten forests in the Hudson Valley. Deer eat shrubs and seedlings in the forest understory, preventing regeneration and reducing habitat quality for wildlife. The causes of deer overabundance are complex, as are the solutions. The Department of Environmental Conservation has produced *A Citizen's Guide to Management of White-tailed Deer in Urban and Suburban New York* (Bishop et al. 1999, 2007). This helpful guide identifies the pros and cons of the various methods that can be used to manage deer populations. Recognizing the problem deer were causing to their forests, the Town of Pound Ridge in Westchester County opened three of its town parks to deer hunting and encouraged private landowners to do the same.

Promote Wildlife-Friendly Forest Management

Forestry can be compatible with wildlife conservation provided it is done in accordance with established guidelines. The *Municipal Official's Guide to Forestry* (Daniels 2005) has tools and information on how local governments can promote sustainable forestry in their communities. Two excellent guides are available to help

Table 5-2. Forest Sizes for Effective Conservation

size in acres	species	notes	importance
5	small mammal diversity to reduce Lyme disease risk (Allan et al. 2003)	minimum size to represent a particular plant community (Kennedy et al. 2003)	
200–2,000	some less-sensitive forest-interior birds	broad corridors provide important connections to larger forests; edge habitats and species will dominate	stepping stone
2,000–5,999	minimum area needed for sensitive forest dependent birds	provide important corridors and connections among larger forests	local
6,000–14,999	some area-sensitive species	can accommodate some large-scale disturbance, but may not be able to maintain entire range of habitats after large-scale disturbance	regional
15,000+	wide-ranging and area sensitive species, including broad-winged hawk, barred owl, neotropical migrants, bear, and bobcat	contain a wide range of forest successional stages; can accommodate large-scale disturbances like blowdowns and fire	global

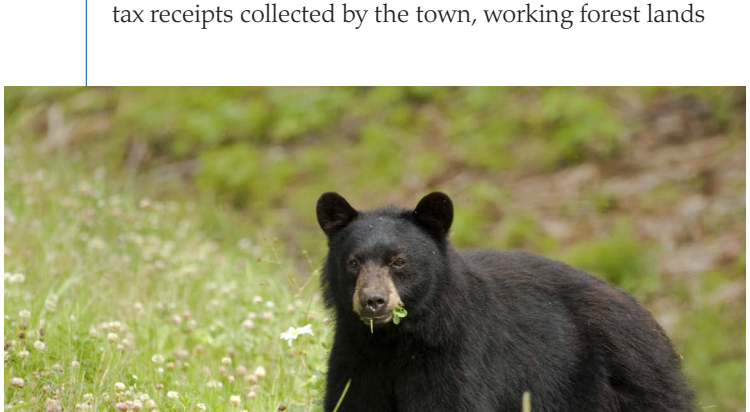
adapted from Orange County (N.Y.) Planning Department 2004.

landowners harvest timber and protect wildlife (Sullivan and Cox 2004, Calhoun and deMaynadier 2004).

Smart Growth Strategies

Tax Incentives

The New York State Forest tax law (also called the 480a program) can reduce the property tax impacts of working forest lands with an approved management plan from a qualified forester. Private forests of fifty acres or more are eligible for the program if they are managed primarily for timber production. The land conserved by the 480a program is significant in the Hudson Valley. As of April 2004, nearly 87,000 acres of working forest lands were enrolled in the program in the ten-county Hudson Valley Region. Though the program reduces property-tax receipts collected by the town, working forest lands



generally require far less in services than they generate in taxes. When the trees are harvested, the county receives a tax of 6 percent of the timber value. Contact your regional Department of Environmental Conservation office for more information on the 480a program (see Appendix 3).

Purchasing Land or Voluntary Land Preservation Agreements

Fee purchase of forestland or conservation easements that remove development potential or stipulate wildlife-friendly forestry practices can be effective in conserving forest lands. Hiking, hunting, and birdwatching are compatible recreational activities. Trails should be well-defined and directed away from the most sensitive habitats. See Chapter 11 for more information.

Conservation of Open Upland Habitats

The most important open upland conservation principles are:

- conserve open uplands in appropriate areas;
- connect habitats among separately owned parcels;
- facilitate appropriate management to maintain the open habitat.

How Large Should Open Uplands Be?

Contiguous grasslands of at least seventy-five acres, and preferably 250 acres support successful the breeding of rare grassland birds. These include the upland sandpiper, grasshopper sparrow, and northern harrier. Small grasslands of just ten to seventy-five acres will support some rare and declining grasslands birds, notably bobolink, eastern meadowlark, and savannah sparrow. Many birds of prey will use small grasslands for hunting in the winter (Jones and Vickery 1997 a,b,c). Shrubland species are adapted to the temporary habitat and can use smaller areas. Barrens are so rare in the Hudson Valley (and the world) that the habitat should be protected and connected where possible.

What Is Protected By the Federal and State Government?

There are no specific regulations addressing open upland conservation in New York, but some bird and insect species that use grasslands are listed as threatened or endangered by New York State or the federal government.

What Local Governments Can Do

Like forests, there are few tools designed to help conserve open uplands locally. The same primary tools are available: purchase in fee, conservation easement, and private landowner stewardship. Local planning and zoning tools can also be used to maintain connections across property boundaries. In reality, all of these tools will need to be used together to conserve open upland habitat.

Conserve Open Uplands In Appropriate Areas

There are few areas of large grassland habitats in the Hudson Valley that can support grassland-dependent birds. Areas particularly important for grassland birds in the Hudson Valley are the Wallkill River Valley in Orange and Ulster Counties, eastern Greene County, and western Columbia County. Shrubland habitat can occur in smaller patches than grasslands and still support rare species. Barrens are very rare in the Hudson Valley, but need a large, contiguous area for long-term maintenance.

Maintain Connections Among Habitats

Like forests, early successional habitats need to be connected to support rare and declining species. Towns

can help maintain connections in three ways: purchase land or conservation easements, develop in ways that maintain connections, and encourage voluntary private land stewardship to reconnect lands that are no longer connected. The first two are discussed on page 32, conservation of forests. The same principles apply to early successional habitats. Federal incentive programs,

like the Wildlife Habitat Incentives Program and Partners for Fish and Wildlife can help landowners share costs of habitat management.

Manage for Open Upland Habitats

If grassland and shrubland habitats are left alone, they will naturally become forest. Therefore, these habitats often require infrequent mowing or selective removal of trees to maintain rare species that live there. Ground-nesting birds nest in the spring and raise their young throughout the summer. Grasslands can be safely mowed annually in August, or every two to three years. With compatible management, airports, capped landfills, and active farms can provide good grassland habitat. Shrubland can be mowed every ten years outside of peak animal activity periods (e.g., the breeding season). Controlled burns are occasionally used to maintain these habitats, particularly barrens. Powerline rights-of-way can be good shrubland habitat. Maintenance of early successional habitat should be balanced with the need to conserve stands of unfragmented forest. Management regimes should be based on conservation priorities developed during the community's natural-resource inventory.

Manage for Meadows in Municipal Parks

Some municipalities maintain meadow areas in parks by mowing a few times a year. If your community wants to maintain meadow areas for birds, wait to mow until August to avoid disturbing grassland birds and destroying ground nests (Jones and Vickery 1997 a,b,c). Areas known to support rare plants, rare breeding birds, or rare butterflies should also be protected from frequent human disturbance.

Smart Growth Strategies

Sharing the Cost of Habitat Management

Several state and federal programs can be used to keep private land in grassland or shrubland cover. Many of the programs are for use on active farms, which comprise important habitat for grassland birds and other rare species in the Hudson Valley. Federal programs are managed by the Natural Resource Conservation Services (e.g., Wildlife Habitat Incentives Program), and the U.S. Fish and Wildlife Service (Partners for Fish and Wildlife). The New York State Department of Environmental Conservation manages the Landowner Incentive Program using funds from the U.S. Fish and Wildlife Service. These programs can be promoted in your community to conserve open uplands and barrens. Landowners should check with the individual agencies to determine eligibility.

Purchasing Land or Voluntary Land Preservation Agreements

Grassland or other early successional habitat can be conserved through fee purchase or voluntary land preservation agreement. In either case, management is necessary to maintain suitable habitat for wildlife of concern. Hiking, hunting, and birdwatching are compatible recreational activities. Trails should be well defined and directed away from the most sensitive habitats. See Chapter 11 for more information.

Local Examples

Grasslands and Jobs in Greene County

The Greene County Industrial Development Authority (IDA) wanted to attract businesses to the county to provide jobs. Conflict arose when it was discovered that the site chosen for the new business park was used by the state-threatened Northern Harrier. After an initial adversarial relationship with local citizens who were concerned about bird habitat, the IDA worked with the conservationists to develop a preserve for the Northern Harrier hawk. As a result, the Greene Habitat Conservation Advisory Committee was created. Since then, the IDA has conserved 1.4 acres for every acre it has developed while bringing in 600 new jobs. The agency is now working with the committee to design new commercial development sites that protect habitat and to create a habitat-management plan for the conserved areas. The Greene Habitat Conservation Advisory committee is led by the Greene County Soil and Water Conservation District. For more information, contact the District Office at 518 622-3620.

Restoring Connections with Natural Landscaping

The Albany Pine Bush is a unique habitat dominated by pitch-pine and scrub oak and is home to many rare species, including the federally endangered Karner blue butterfly. The habitat is actively managed by the

Albany Pine Bush Commission. Further complicating the conservation of the area, the Albany Pine Bush Preserve is highly fragmented by residential and commercial development. A native landscaping program was developed to connect pine barren habitats that had been separated by development.* The Albany Pine Bush Preserve Commission saw the expansion of a nursing home as an opportunity. As part of the permit approval for the expansion, nine acres were landscaped with native Pine Bush plants, connecting two previously unconnected patches of Pine Bush habitat. In addition, the facility also gave the Albany Pine Bush Commission a conservation easement to prevent future development and a management agreement to maintain the unique plant community on the nine acres. Local middle-school students worked with nursing-home residents to grow and plant the native Pine Bush vegetation used onsite. The conservation project is a great example of public–private partnership and a multigenerational conservation project. For more information, contact the Albany Pine Bush Preserve Commission at 518 785-1800.

Conservation of Urban Habitats

Habitat-conservation opportunities in urban areas are different than in rural and suburban areas. The habitats are smaller and often in need of restoration, but their many community benefits make them worth conserving. There are sometimes opportunities to enhance habitats through new development. The key is to identify and understand the local resources, so that they can be protected, enhanced, or restored.

What Is Protected by State and Federal Government?

No urban habitats are explicitly protected, but some wetlands and streams are protected as described earlier in this chapter.

What Can Local Governments Do?

To conserve local urban habitats, municipalities should identify important habitat throughout the community so they can take advantage of conservation opportunities presented by various projects. Streams often provide enhancement opportunities. Urban streams can benefit from riparian tree planting. Buried streams can be restored by "daylighting," or exposing them to daylight. Maintaining natural areas within parks can help protect important wildlife habitat. A plan to conserve nature can consider the need to buffer parks from surrounding land-use where appropriate. Homeowners with backyards that border urban natural areas might consider landscaping with native plants to buffer or expand wildlife habitat.

Smart Growth Strategies

New York State Department of Environmental Conservation Urban Forestry Program is designed to provide technical assistance for local government, citizen groups, service clubs, and other organizations interested in promoting trees and forests in urban and village settings. Contact your Regional Department of Environmental Conservation office for more information.

Local Example

Newburgh's Hidden Natural Heritage

Quassaick Creek is a tributary of the Hudson located on the border of the City of Newburgh and the Town of New Windsor. To connect urban residents to local natural resources and create a valuable education opportunity, the city sponsored a biological inventory of the creek's corridor. Though the area has long had industrial, commercial, and residential development, the inventory found important biological resources in the corridor. Some significant finds were two state-rare plants and the wood turtle, a state species of special concern. Some industrial development actually helped protect portions of the stream corridor by preventing trespassing and further development. Without taking the important step of inventory, the city would have never known of its hidden biological riches and may have lost them with the development of public access and trails. Now trails can avoid the sensitive areas and highlight Newburgh's biodiversity.

* See description of Glacial Lake Albany Native Plant Restoration Project in the local examples cited in Chapter 13.

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Forest Conservation

The Agroforestry Resources Center in Acra, Greene County, N.Y. promotes incentives for forested land to remain forested in order to provide tremendous environmental, economic, and public health benefits to the surrounding human population. Seminars, lectures, and workshops are held throughout the year. For more information, contact Cornell Cooperative Extension of Greene County at 518 622-9820.

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