

7.0 NATURAL AND ENVIRONMENTAL RESOURCES

With approximately one-third of its total land area devoted to preserved open space, Rockland County is known for its stewardship of natural and environmental resources, at the State, County, and local level. However, continuing development and future climate change can have significant implications for the county's environmentally sensitive areas. While it is not feasible for the County to halt all development within its borders, it is important to recognize that there are finite limits to Rockland's capacity to handle development. Therefore future growth must be implemented so that it does not create demands for water or other essential resources that exceed the levels which can be drawn sustainably from reasonably available resources. As such, municipalities are encouraged to consider redevelopment of existing developed areas that are abandoned or underused, thereby preserving the natural environment. In addition, the County should promote conservation of its water resources.

This chapter discusses the environmental setting of the county and ways to protect and enhance its sensitive natural and environmental features, including floodplains and wetlands, water resources, steep slopes and significant ridgelines, soils, critical environmental areas, waterfront areas, and threatened and endangered species.

7.1 Topography and Elevation

Rockland is located in the Lower Hudson Valley, and much of its land is rocky and steeply sloped (see Figure 7.1, Elevation Map). The western portion of the county contains the most significant topographic relief because of the Hudson Highlands, which traverse Harriman and Bear Mountain State Parks along the Rockland and Orange County boundaries. The Highland Mountains span from Pennsylvania into New Jersey, crossing New York in Rockland, Orange, Westchester, and Putnam counties, continuing northward into Connecticut.

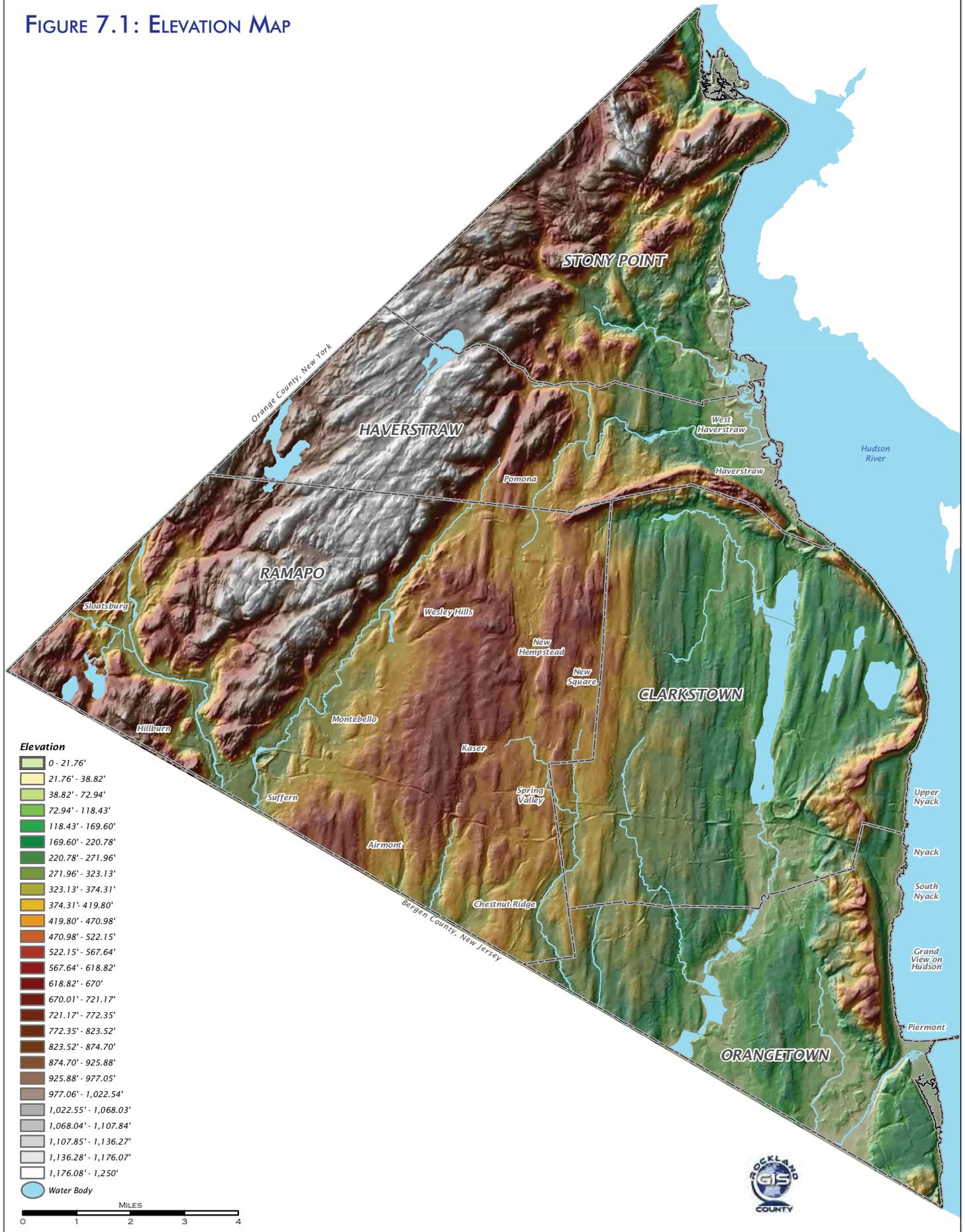
East of the Highlands, the rest of the county largely consists of two terrain basins, separated by the Palisades Ridge that turns and runs east/west along High Tor State Park and South Mountain County Park. Along the southeastern portion of the county, the Palisades Ridge runs along the Hudson River linking High Tor and Hook Mountain State Parks before turning and heading south to the southernmost tip of the county at Palisades State Park. From a high point of 1,283 feet at Rockhouse Mountain, northwest of Lake Welch in Harriman State Park, the county's elevation drops to sea level along the Hudson River. Views from and of the Palisades Sill – the geological name given to the massive Palisades cliffs – are outstanding and unique. In fact, there are only a handful of such intrusions in the world.



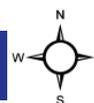
View of the Palisades Sill along the Hudson River.

Source: River to Ridge

FIGURE 7.1: ELEVATION MAP



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Steady population growth and increased land values have resulted in development of some steeply sloped areas which were once considered too difficult and prohibitively expensive to develop. From 2000 to 2009, according to the U.S. Census Bureau, Rockland's population grew approximately 5% to 300,173 people, and, given current trends, its population is expected to continue to grow at close to this rate over the next few decades. Although the county's recent population growth has slowed from the rapid pace of the 1960s and 1970s, Rockland is growing faster than Westchester and Bergen Counties. While much of the county's locations of highest elevation are protected as parkland, the Rockland County Planning Department's build-out analysis identifies major areas of potentially developable lands throughout the county, and shows that some of these areas are found in steeply sloped areas (see Figure 7.2, Topographical Map and Build-Out Analysis). Thus, there will likely be continuing pressure for residential development on steeply sloped sites.

Overdevelopment of steeply sloped areas can cause the loss of topsoil and vegetation, erosion and potential slides, alteration of drainage patterns, and impairment to viewsheds. Most of Rockland's towns and villages have regulations limiting development on steep slopes, but these regulations vary significantly. Some have a continual slope comparison and specify constraints for slopes over certain percentages, bluffs, and rock outcrops, while other regulations do not recognize slopes under 25% in grade and have no limitations on development on extreme topography.

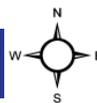
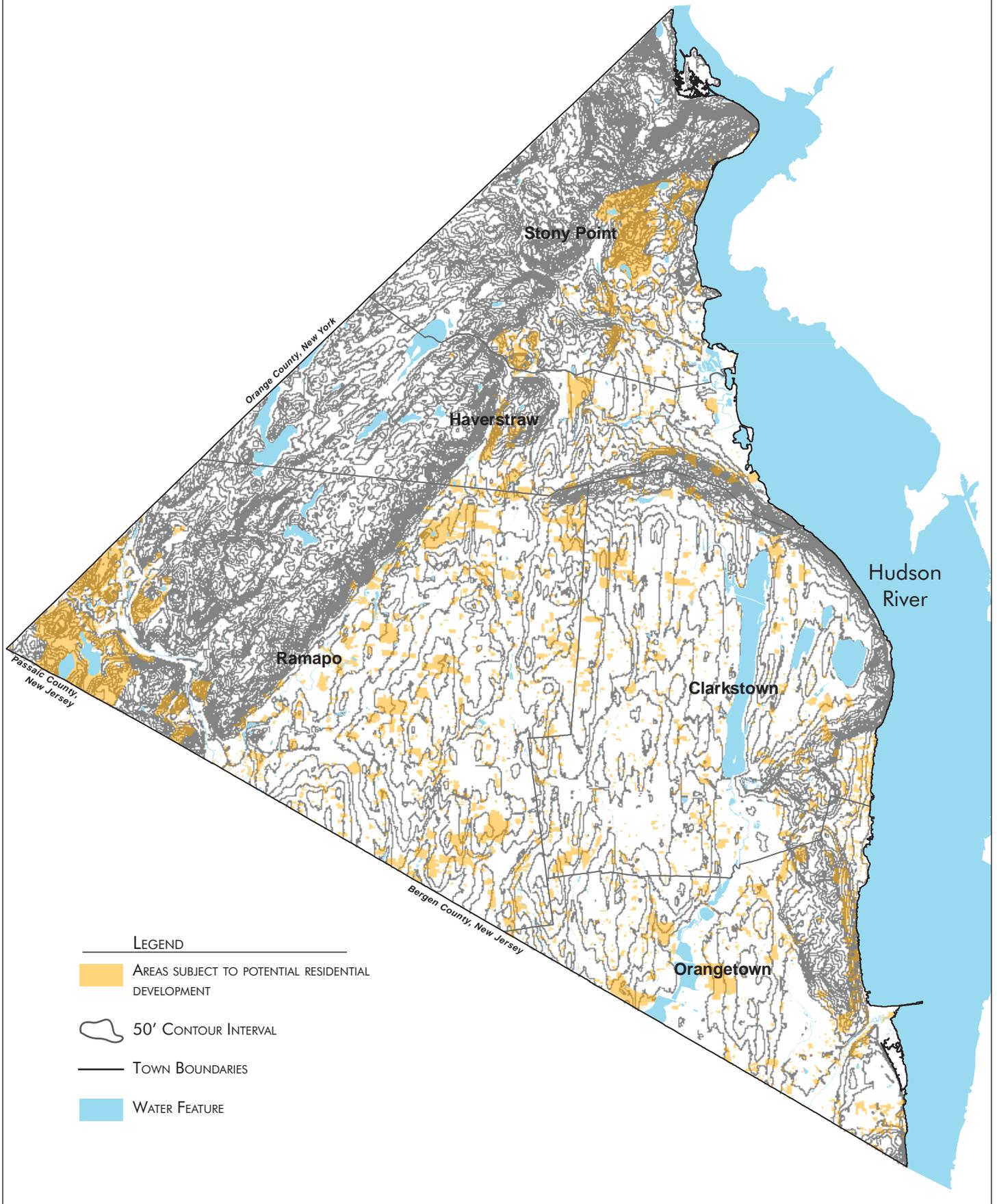
Development that is allowed on the crest of a ridgeline can be visually intrusive and seen from distant viewpoints. Clarkstown's planning board requires viewshed analyses for ridgeline development, its comprehensive plan recommends further strengthening ridgeline protection laws, and the Town has purchased ridgeline lands for preservation, such as the West Hook area. In addition, Ramapo has bought extensive ridgeline areas to ensure their preservation. Ridgeline development has cross-jurisdictional impacts, which are difficult to capture in local regulation; therefore, the County can play an important role in tackling these issues, such as by encouraging municipalities to incorporate overlay districts, floating zones, or laws that address ridgeline preservation.

The Rockland Riverfront Communities Council (RRCC) has developed a model Ridgeline Protection Local Law¹ that municipalities can adopt to address these ridgeline issues. Towns and villages in Rockland County may impose ridgeline overlay districts that provide standards for regulating the number, height, design, placement and impacts of structures on lands that are located on ridges. The municipalities should also consider viewshed protection and tree preservation laws, and incorporate restrictions on the development of steeply sloped lands into their laws.

The County should also encourage the use of smart growth development and construction techniques that help to enhance the existing environment. Examples of these include delineating and limiting construction disturbance envelopes; regulating the amount of cut and fill; adopting low-impact development programs that maintains the natural hydrology of a site; retaining trees and natural landscape; requiring construction materials to be comprised of natural tones and materials to better blend with the landscape; and discouraging non-native vegetative species and encouraging the planting of native vegetative species when landscaping.

¹ <http://www.co.rockland.ny.us/River/documents/RidgelineProtectionOrdinance.pdf>

FIGURE 7.2: TOPOGRAPHY MAP & BUILD-OUT ANALYSIS



7.2 Groundwater and Surface Water Resources

Rockland County is distinctive in that its water supply comes almost entirely from within its borders. However, not all of Rockland's water stays within the county; some of its water supplies more heavily populated downstream communities in New Jersey. Significant amounts of water are also lost to sewage treatment discharges into the Hudson River. See **Chapter 12.0: Infrastructure** for a full discussion of the county's water quantity and supply, including recommended water conservation measures.

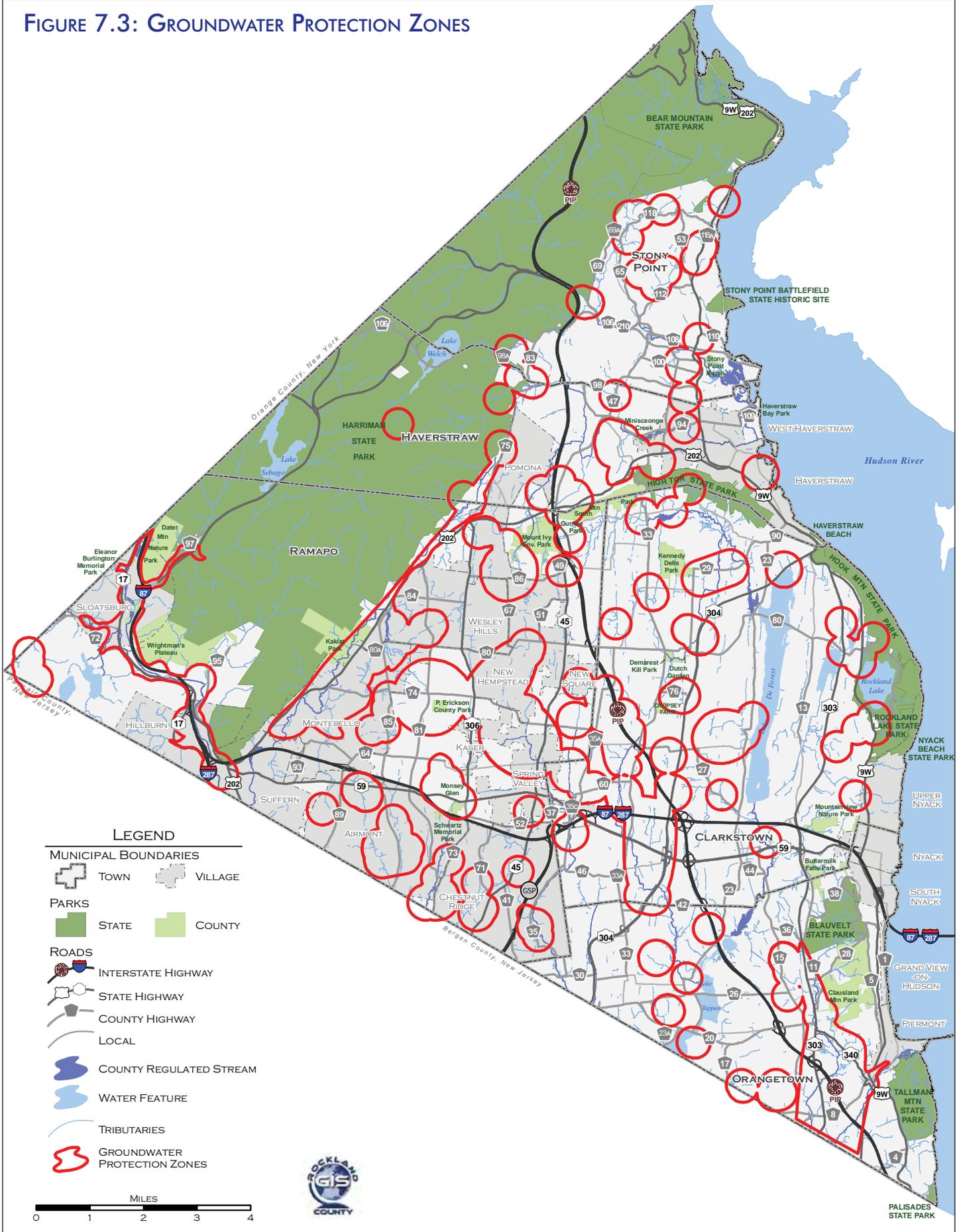
Groundwater

As detailed in **Chapter 12.0**, Rockland's water supply comes from two sources: aquifers and surface water. Aquifers are underground layers of permeable rock or other materials (gravel, sand, silt, or clay) from which groundwater can be extracted using a well. Surface water collects on the ground or in a stream, river, lake, wetland, or ocean. Surface water is naturally replenished by precipitation and discharge from aquifers as base flow, and lost through evaporation and subsurface seepage into aquifers.

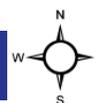
The Ramapo-Mahwah aquifer, a highly productive stratified drift deposit located along the Ramapo and Mahwah river corridors beneath western Ramapo, including the villages of Sloatsburg and Suffern and bordering Harriman State Park, is one of 18 principal aquifers in New York State. In 1992, it was designated as a sole-source aquifer, requiring any federal project within its boundaries to be reviewed by the Environmental Protection Agency. The aquifer has also been designated a "Primary Water Supply Aquifer" by the New York State Department of Environmental Conservation (DEC). The land use restrictions and regulations for sole-source aquifers only apply to Federally funded activities within the limits of the aquifer, while the DEC designation addresses protection of the aquifer only with respect to hazardous waste releases and solid waste disposal facilities. Thus, some private and non-federal land use activities may not be regulated with regard to the protection of the aquifer.

Because of this issue, the Rockland County Department of Health has established general groundwater protection zones (see Figure 7.3) corresponding to the overall locations of wells as defined by the State Department of Health. To date, the County has not adopted legislation or implemented regulations for these zones, and may consider doing so in the future, as well as encouraging the municipalities to adopt groundwater protection laws. The County's Private Well Testing Law, Section 389-5 of the Laws of Rockland County, which is implemented by the County Health Department, does require the completion of a well-water test when any new individual well is constructed, when ownership of properties with an individual water supply well are transferred, and on a regular and ongoing basis for rental properties. The intent of this law is to protect the public health by ensuring that residents, whether owners or renters, are aware of the quality of their water. This law also has the secondary benefit of eventually allowing the County Health Department to locate all private water systems within Rockland because of the mandatory reporting requirement.

FIGURE 7.3: GROUNDWATER PROTECTION ZONES



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The Newark Basin aquifer, a fractured, sedimentary bedrock aquifer underlying southeastern Rockland, is another major source of public water supply. The Newark Basin stretches from Rockland County, through New Jersey and Pennsylvania. This bedrock aquifer has been the focus of a study on Rockland’s water resources by the U.S. Geological Service (USGS) (see **Chapter 12.0: Infrastructure** for a full discussion of the study and its findings, and refer to <http://ny.water.usgs.gov/projects/rockland/images/rocklandfactsheet.pdf> for a fact sheet on Rockland’s aquifers, developed by USGS). According to the USGS study, Rockland County is underlain by a variety of bedrock types that largely influence its topography. The principal bedrock types include 1) metamorphic and igneous (crystalline) rocks of late Precambrian age, 2) metasedimentary rock of Cambrian and Ordovician age, 3) clastic sedimentary rock of late Triassic age, and 4) igneous intrusive and extrusive rocks of early Jurassic age. Crystalline bedrock generally underlies the upland area of the county, also known as the Hudson Highlands, in the northwest third of Rockland County; while the northernmost extent of the Newark Basin sedimentary bedrock underlies the lower two thirds of Rockland County, its lowland area. As discussed in further detail in **Chapter 12.0**, the amount and type of water resources available to the county are largely dependent on its underlying geology.

Surface Water

Perhaps the most significant surface water resource for Rockland County – in terms of its historical impact on development and commerce, its scenic beauty, and its role as a major ecosystem – is the Hudson River. The Hudson River Estuary has long been recognized as a valuable state and local resource and an integral part of the North Atlantic coastal environment. The estuary is as a spawning and nursery ground for more than 200 important fish and shellfish species. It contains the only significant acreage of tidal freshwater wetlands within the state. More than 16,500 acres of river habitat along the stretch from Troy dam to the southern Rockland-Westchester line have been designated “significant coastal fish and wildlife habitat” by DEC and New York State Department of State.

Recognizing the value of the estuary for the State’s environmental resources, the DEC created the Hudson River Estuary Program in 1987 to help people enjoy, protect, and revitalize the Hudson River and its Valley through a fivefold mission:

- Ensure clean water
- Protect and restore fish, wildlife, and their habitats
- Provide water recreation and river access
- Adapt to climate change
- Conserve world-famous scenery

The Hudson River Estuary Program extends from the Troy Dam to upper New York Harbor. It is guided by an Action Agenda designed to achieve measurable progress through community participation and partnerships with Federal and State agencies as well as municipalities, nonprofits, academic and scientific institutions, trade organizations, landowners, and volunteers. The 2010-2014 Action Agenda contains 12 long-range goals for the conservation and recovery of the Hudson estuary and its watershed:

1. Restore the signature fisheries of the estuary to their full potential, ensuring future generations the opportunity to make a seasonal living from the Hudson’s bounty and to fish for recreation and consume their catch without concern for their health.
2. Conserve, protect, and enhance river and shoreline habitats to assure that life cycles of key species are supported for human enjoyment and to sustain a healthy ecosystem.

3. Conserve for future generations the rich diversity of plants, animals, and habitats that are key to the vitality, natural beauty, and environmental quality of the Hudson Valley.
4. Protect and restore the streams, their corridors, and the watersheds that replenish the estuary and nourish its web of life, and sustain water resources that are critical to the health and well-being of Hudson Valley residents and the ecosystem.
5. Conserve key elements of the working pastoral landscapes and world-famous river scenery that define the character of the Hudson River Valley, and provide new and enhanced vistas where residents and visitors can enjoy Hudson River views.
6. Address the causes of climate change in the Hudson Valley and prepare for projected impacts to safeguard our health and safety and to protect the natural resources and local economies that sustain our communities.
7. Develop, maintain, and improve a regional system of access points for fishing, boating, swimming, hiking, education, river watching, and wildlife-related recreation, and build connections that allow residents and visitors to have rich and diverse river experiences.
8. Promote public understanding of the Hudson River, including the life it supports, its role in the global ecosystem, the challenges the river faces, and how they can be met.
9. Revitalize all the waterfronts of the valley so that the Hudson is once again the “front door” for river communities, where scenery and natural habitats combine with economic and cultural opportunity, public access, working ports and harbors, and lively adjacent downtowns, to sustain vital human population centers and a healthy environment.
10. Ensure that Hudson River water quality supports appropriate human benefits, including drinking water, swimming, fishing, navigation, and ecosystem protection.
11. Reduce contaminants entering the Hudson River, and remove or remediate river sediments contaminated by long-term pollutants so that food webs of the river are supported, people can safely eat Hudson River fish, and harbors are free of the contaminants that constrain their operation.
12. Track our progress and celebrate our successes.

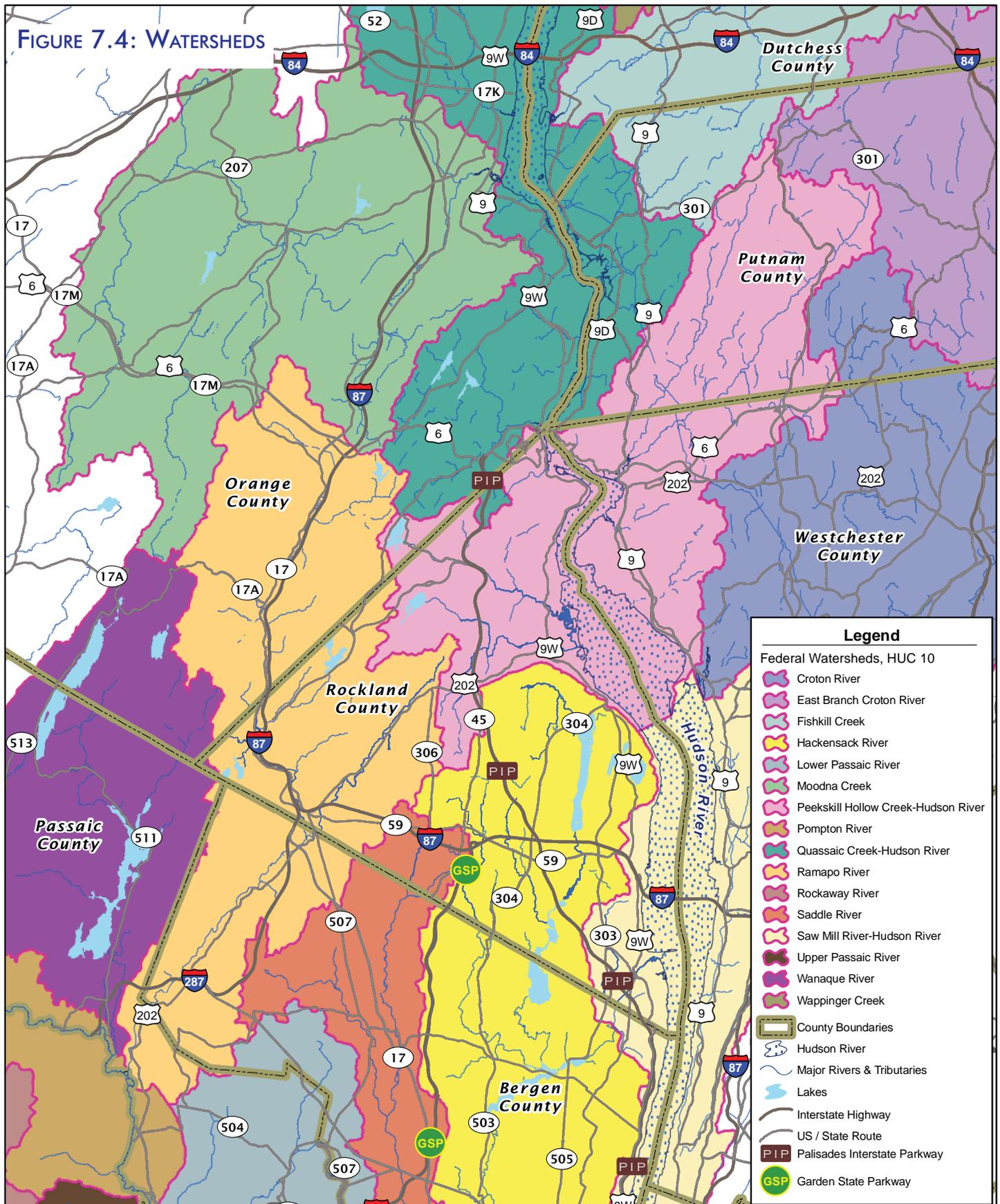
Aside from the Hudson River, other surface water resources include Rockland’s major rivers – such as the Mahwah, Ramapo, and Hackensack Rivers – as well as many lakes, ponds, and streams throughout the county. Figure 7.4 shows Rockland’s seven watershed areas: Hackensack River, Peekskill Hollow Creek-Hudson River, Quassaick Creek-Hudson River, Ramapo River, Saddle River, Saw Mill River-Hudson River, and Wanaque River.²

Several of these surface water resources are included among the 14 County-regulated streams, which carry restrictions on development and related activities within their 100-year floodplain. The following watercourses are regulated by Rockland County (see Figure 7.5):

- | | | |
|---------------------|---------------------|--------------------------------|
| ▪ Cedar Pond Brook | ▪ Nakoma Brook | ▪ Saddle River |
| ▪ Demarest Kill | ▪ Muddy Creek | ▪ Sparkill Creek |
| ▪ Hackensack River | ▪ Nauraushaun Brook | ▪ West Branch Hackensack River |
| ▪ Mahwah River | ▪ Pascack Brook | ▪ Willow Tree Brook |
| ▪ Minisceongo Creek | ▪ Ramapo River | |

² A watershed is the geographic land area that is drained by a river or stream. In Rockland, lands that are drained by the Hudson River act as a watershed whereas other portions of the county contain subwatersheds – a subdivision of a watershed based on hydrology, generally corresponding to the area drained by a small tributary, as opposed to a major river.

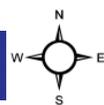
FIGURE 7.4: WATERSHEDS



A watershed is the geographic land area that is drained by a river or stream. In Rockland County, lands that are drained by the Hudson River act as a watershed whereas other portions of the County contain subwatersheds – a subdivision of a watershed based on hydrology, generally corresponding to the area drained by a small tributary, as opposed to a major river.

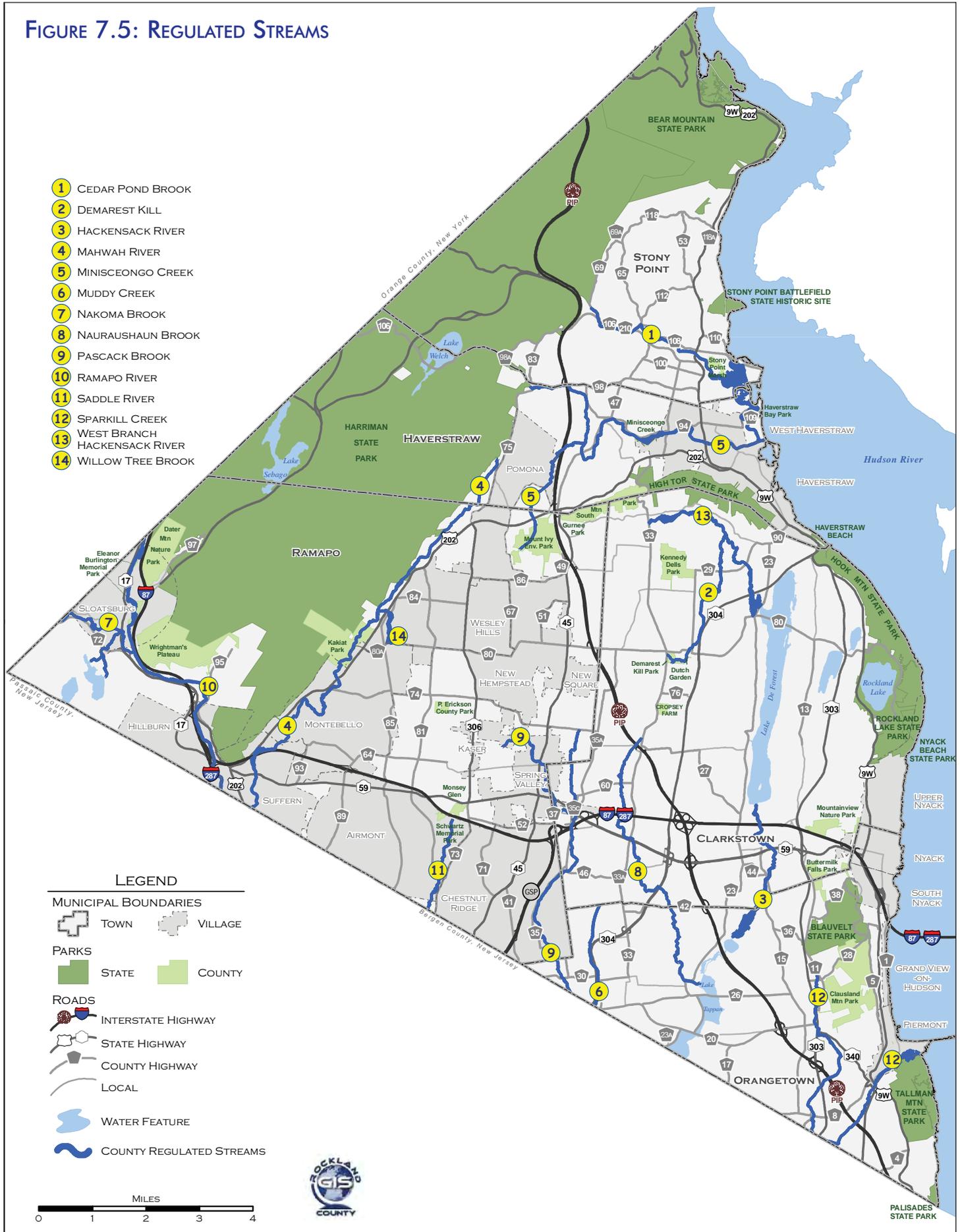


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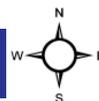
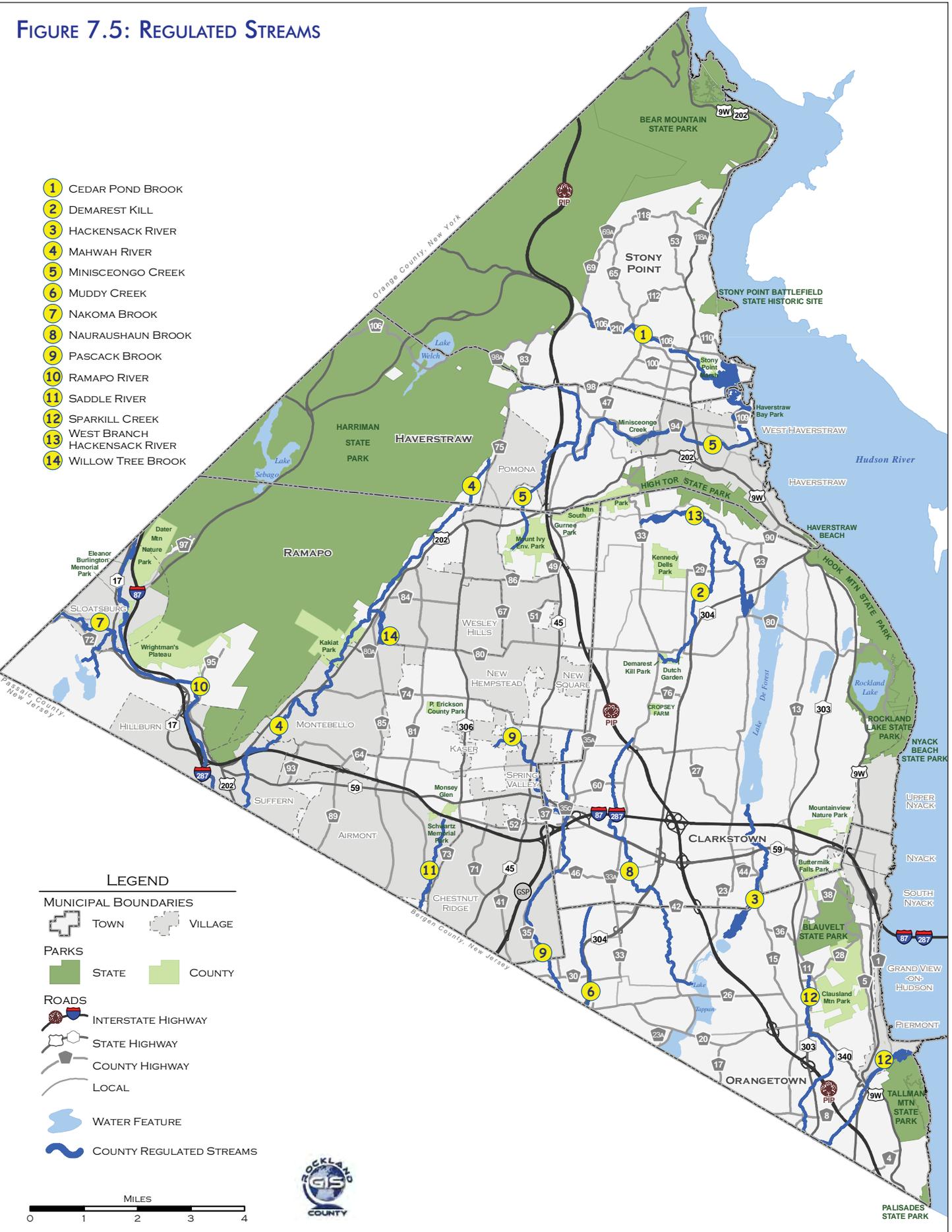


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FIGURE 7.5: REGULATED STREAMS



- 1 CEDAR POND BROOK
- 2 DEMAREST KILL
- 3 HACKENSACK RIVER
- 4 MAHWAH RIVER
- 5 MINISCEONGO CREEK
- 6 MUDDY CREEK
- 7 NAKOMA BROOK
- 8 NAURAUSHAUN BROOK
- 9 PASCACK BROOK
- 10 RAMAPO RIVER
- 11 SADDLE RIVER
- 12 SPARKILL CREEK
- 13 WEST BRANCH HACKENSACK RIVER
- 14 WILLOW TREE BROOK



Rockland's stream conservation regulations, adopted in 1975 and updated in 2000, prohibit filling, dumping, construction, excavation, and other activities that undermine stream bank stability, normal flow, and channel integrity in the 100-year floodplain (as determined by the Federal Office of Emergency Management [FEMA]) or water recharge area.

Hudson Valley streams are affected by a range of stresses, such as increases in impervious surfaces, loss of vegetative cover, agricultural and lawn runoff, failing wastewater treatment and septic systems, fish barriers, and atmospheric deposition of pollutants. These stresses can cause erosion, polluted stormwater runoff, flooding, loss of groundwater recharge and unnaturally low stream flows. Water withdrawals and large-scale sewer infrastructure (that draws water from one basin, and discharges it into another basin) also affect stream flow. Streams and rivers become degraded from these stresses, no longer providing healthy drinking water, outdoor recreation or productive fish and wildlife habitat.

Rockland's stream regulations are an important tool to address the impacts of development on the county's major watercourses, as many of these streams and their impacts cross municipal and even state boundaries. However, there are large parts of the county where smaller streams are not regulated: for example, northern Stony Point, southern Ramapo, and western Clarkstown. Some of these streams flow into County-regulated streams or other bodies of water, and their lack of regulation can contribute to flooding, sedimentation, and pollution of the regulated streams. Additional watercourses may be warranted for consideration of becoming County regulated streams, as well as some of Rockland's major lakes and other bodies of water. The County should also explore distinguishing in its stream regulations between open natural environments and urbanized areas. To help prevent pollution from stormwater runoff, Rockland has been assisting municipalities in developing uniform stormwater regulations that address both water quality and quantity. To continue with these efforts, both the County and its municipalities should be following all New York State stormwater regulations.

As discussed in **Chapter 6.0: Transportation**, regulated streams may also present an opportunity for trail creation, as a large amount of undeveloped space remains in many areas along the streams. Many streams run into and through parks, providing opportunities to increase public, non-vehicular access to the parks with a trail system. This stream trail system could enhance local circulation for pedestrians and bicyclists and improve connectivity between neighborhoods and municipal, County, and State parks. The initial effort could first focus on creating trails within the parks, and then later work with private property owners to secure easements and other agreements for access, to promote trail continuity. The County should, however, review new or expanded trails to ensure that they do not lead to pollution or increased runoff, and should give preference in open space acquisition to areas along regulated streams. Trail creation along streams must ensure the preservation of important habitats; trails should be of pervious (permeable) surface and should have 100-foot buffers on either side of the trails, as topography and other ground conditions permit.

Water Quality

Groundwater extracted by the county's public water suppliers is monitored by the Rockland Health Department for the presence of potential contaminants. If contamination is detected at levels above drinking water standards, the water source is either removed from service or treated to remove the contamination. County water quality issues include potential contamination by nitrates from wastewater and fertilizers, volatile organic compounds (VOCs) from spills of industrial solvents and fuel components, and chlorides resulting primarily from de-icing of roads and parking areas.

Nitrate contamination is frequently associated with septic systems, sewer leaks, and over-application of lawn fertilizers in residential areas. VOCs are associated with the presence of industrial facilities and commercial land uses (e.g. gas stations and dry cleaners). The main VOCs that have been detected in the county's groundwater include tetrachloroethene, trichloroethene, methyl tertiary butyl ether (MTBE), and perchlorates, although these have generally been found at low levels. In 2006, arsenic was detected at slightly above regulatory limits in two wells that supply water to Rockland County. These wells were later shut down until a treatment system could be designed and installed, and have since been approved by the New York State Department of Health to be used again.

Chloride contamination is strongly correlated with the density of roadways. Chloride salts are widely used for de-icing because they are cheap and effective. According to a recent USGS study, concentrations of chloride in groundwater have increased dramatically since the 1950s. While most of the existing treatment systems on public water supply wells address VOC contamination, there are some public supply wells that have either exceeded or closely approached the acceptable threshold for chloride contamination. Furthermore, chlorides are very costly to remove since reverse osmosis, the treatment technology employed in desalination plants, is the only feasible option. The issue of chloride contamination requires the balancing of public safety on roadways with environmental contamination and future costs of water treatment.

The chemical quality of groundwater in Rockland is a particular concern because its bedrock aquifer is especially susceptible to contamination from actions at the land surface. The USGS study of the Newark Basin bedrock aquifer noted that several supply wells in this aquifer have been taken off line or had treatment systems installed to remove contaminants.

Water quality is also a concern for non-drinking uses of Rockland's surface water resources, such as swimming and fishing. Although no official public beaches are located along the Hudson River in Rockland, "unofficial" swimming sites are used along the shoreline from Sneden's Landing to Stony Point. A collaborative study by the nonprofit environmental advocacy group Hudson Riverkeeper, Columbia University's Lamont-Doherty Earth Observatory, and Queens College-CUNY was done on water quality in the Hudson River between Manhattan and Troy. This study concluded that most sites tested in Rockland County (eight of nine) did not meet State and Federal standards for water quality for swimming. However, the study noted that conditions in the mid-channel and near-shore areas were often quite different, suggesting that local sources of pollution are influencing the near-shore water quality, and that local action could improve water quality in these areas. One of the study's key recommendations was to improve the process of notifying the public of poor water quality issues in the Hudson due to sewer contamination - whether it is chronic (consistently impaired water quality), wet weather-related (due to combined sewer overflows), accidental, or planned. Such a notification program would need to be consistent (i.e., the public should be notified of ALL discharge events) and extensively publicized so that the public takes notice and acts accordingly. In addition to notification of sewer contamination events in the Hudson, Rockland should explore providing regular water quality reports for the Hudson so the public is always aware of the degree of cleanliness or pollution in the river, comparable to daily air quality reports and UV indexes. Because of the highly technical nature of these reports and the staffing required, the County should look to partner with nonprofit organizations and educational institutions to perform the actual testing, as many of these groups can rely on volunteers for this work.

Since 2006, the Rockland County Soil & Water Conservation District has conducted annual stream assessment reports on a number of stream sites throughout the county. For 2008 (the most recent year

data were available), the assessment indicated that overall water quality conditions for Rockland have declined. However, the locations of the sampling sites for 2008 were predominantly in the more urbanized southern and eastern portions of the county, while the sampling locations for 2006 and 2007 were in streams originating in predominantly forested watersheds. Because of this variability, the 2008 report recommended a rotating basin monitoring program to accurately capture water quality conditions, detect sequential changes, and identify likely sources of impact throughout the county.

The Rockland County Water Quality Committee provides education and outreach programs for all county residents on a range of watershed topics, including voluntary stream monitoring and storm drain marking programs. In addition, the County Health Department conducts a number of water pollution control programs, as well as a mosquito control program.

Stormwater Management

Stormwater discharges are generated by precipitation and runoff from land, pavement, building rooftops, and other impervious surfaces.³ Runoff accumulates pollutants such as oil and grease, chemicals, nutrients, metals, and bacteria as it travels across land. Heavy precipitation or snowmelt can also cause sewer overflows which in turn, may lead to contamination of water sources with untreated human and industrial waste, toxic materials, and other debris. Under the National Pollution Discharge Elimination System (NPDES) stormwater program, operators of large, medium, and regulated small municipal separate storm sewer systems (MS4s) are required to obtain an NPDES permit which allows them to discharge pollutants. Rockland County has conducted efforts to begin to map these municipal facilities.

Under delegation from the federal government, New York State is using two Stormwater Management General Permits as the framework for stormwater management. Regulations require operators of construction sites and operators of MS4s to obtain coverage under a general permit. Local stormwater management programs must include the following six elements, called Minimum Control Measures:

- Public education and outreach on stormwater impacts
- Public participation and involvement
- Illicit discharge detection and elimination
- Construction site stormwater runoff control
- Post-construction stormwater management in new development/redevelopment
- Pollution prevention/good housekeeping for municipal operations

One of the requirements of the SPDES General Permit for Stormwater Discharges from MS4s is the preparation of a report that depicts pollutants of concern, their sources, steps being taken to diminish waste in stormwater runoff, and the effectiveness of pollution prevention practices. Municipalities are obligated to organize a yearly statement that describes how its programs deal with the impacts of stormwater discharges upon water bodies, the pollutants of concern and their sources, steps being taken to avoid pollutants in stormwater runoff, and the efficiency of best management practices. Municipalities must make the report publicly accessible and provide opportunities for public comment prior to filing it with the DEC.

³ An impervious surface is a surface that has been compacted or covered with a layer of material that reduces or prevents the absorption of surface water into the soil.

Developments over one acre require preparation of a Storm Water Pollution Prevention Plan (SWPPP) under regulations set forth by the DEC and the local municipality where appropriate. Municipalities can enact stricter regulation, requiring SWPPPs for projects of less than one acre; for example, Clarkstown uses 10,000 square feet as the threshold for SWPPP requirement, and also requires a maintenance agreement for stormwater infrastructure. SWPPPs specifically address stormwater management, post-development water quality, and soil erosion and sediment control measures during construction. However, they tend to address increased runoff on a site-by-site basis, rather than larger-scale or cumulative impacts. Stormwater management on a regional or watershed basis is handled by the County's Drainage Agency. However, because many stormwater issues take place on a local level, the County should assist in the creation of uniform, shared-language municipal stormwater regulations that look at both water quality and quantity.

The current DEC State Pollution Discharge Elimination System (SPDES) program for stormwater discharges expired in April 2010, and the U.S. EPA adopted new stormwater regulations for stormwater discharges from MS4s. In compliance with these new regulations, the DEC has also updated its program. Changes include the responsibility of builders and developers to monitor and contain stormwater turbidity for discharges from construction that disturbs 20 or more acres. To comply, builders and developers still need to exercise best management practices (BMPs) in six categories:

- Erosion and sediment control
- Soil stabilization
- Dewatering
- Pollution prevention
- Prohibited discharges (such as wastewater that includes cement and stucco), and
- Surface outlets that withdraw water when discharging from basins or impoundments

Provisions encouraging the use of green infrastructure and design practices are also included in the new DEC regulations (**see Chapter 12.0: Infrastructure**). In addition to these measures, the County should promote conservation of its water resources through infrastructure repairs, careful landscaping, rain barrels, and other means. The reuse of greywater (wastewater generated from domestic activities, such as laundry, dishwashing, or bathing, which can be used for irrigation or other non-drinking uses) should also be encouraged. The County should also encourage municipalities to enact and enforce strict erosion control methods such as the proper installation of silt fences, which can help to reduce the transfer of silt, particularly near streams or other water bodies.

The Stormwater Consortium of Rockland County is a collaborative initiative comprised of all five towns and 13 of the villages within the county, as well as with Cornell Cooperative Extension and the Rockland County Soil & Water Conservation District (SWCD). The consortium has developed two model local laws – on illicit discharge detection and elimination, and erosion and sediment control and stormwater management – and has provided grant assistance to municipalities and stormwater educational sessions for homeowners, businesses, and professionals. In addition, the SWCD periodically offers training in stormwater management and erosion and sediment control. The County's Division of Environmental Resources also provides stormwater management education and outreach, and has undertaken a number of stormwater initiatives, including the storm drain marking program, rain gardens at Kennedy Dells County Park and Piermont Public Library, and the purchase of rain barrels for demonstrational use on County and municipal property.

Rockland’s Water Pollution Control Bureau, part of the County Health Department, regulates all phases of wastewater disposal in the county. The Bureau reviews and approves engineering plans for the installation of sewer main extensions and plans for individual sewage disposal systems. The Bureau also investigates water pollution complaints, inspects municipal water pollution control plants, and investigates construction-related stormwater management complaints in cooperation with the DEC.

New York State Realty Subdivision Laws (Public Health Law & Environmental Conservation Law) requires that subdivisions of five lots or more obtain approval from the Rockland County Health Department, and, in addition, all subdivisions, regardless of the number of lots, must be signed by the Drainage Agency. If a property is subdivided into fewer than five lots, but additional lots are created by subdivision within a three-year period so that the total number of lots is equal to or greater than five, then Health Department approval is needed. The Water Pollution Control Bureau is working to educate the towns and villages on the issue of “creeping” realty subdivisions, in which multiple smaller, contiguous subdivisions with fewer than five lots are filed separately, and therefore fall beneath the threshold for County Health Department approval, but when combined together, the lot totals are greater than five.

Impervious Surfaces

An impervious surface is one that is resistant to penetration by moisture, and includes paving, concrete, asphalt, and roofs. From 2000 to 2007, Rockland experienced a slight increase in total impervious surfaces, from 13% of the county’s total acreage to 14%. As Figure 7.6 shows, most towns and villages saw an increase of 1.5% or less during this period, with the Village of Hillburn actually reporting a 0.6% decline in impervious surfaces. However, several villages had greater increases: New Square (6.8%), Kaser (2.5%), Pomona (1.9%), Montebello (1.6%), and South Nyack (1.6%).



Parking area with permeable pavers.

*Source: Center for Watershed Protection/
NYSDEC Stormwater Design Manual*

Reducing impervious surface areas will help the County achieve groundwater protection goals. Impervious surfaces generate runoff with contaminants, which leach into water bodies and groundwater. There are several ways that municipalities can promote pervious paving materials for use, especially in commercial areas and residential subdivisions. Pervious surface products like permeable pavers and pavements should be used instead of asphalt or concrete pavement in low traffic areas, such as parking lots. In subdivisions, open areas should be designed to act as filters, buffers, swales, wet and dry ponds, and detention and retention areas. Public open space areas should be designed to filter polluted runoff from nearby impervious areas. These

techniques can also be used to limit impervious surfaces in County-owned recreation and open space areas.

FIGURE 7.6: IMPERVIOUS SURFACES



NATURAL AND ENVIRONMENTAL RESOURCES



Shown as above

7.3 Floodplains

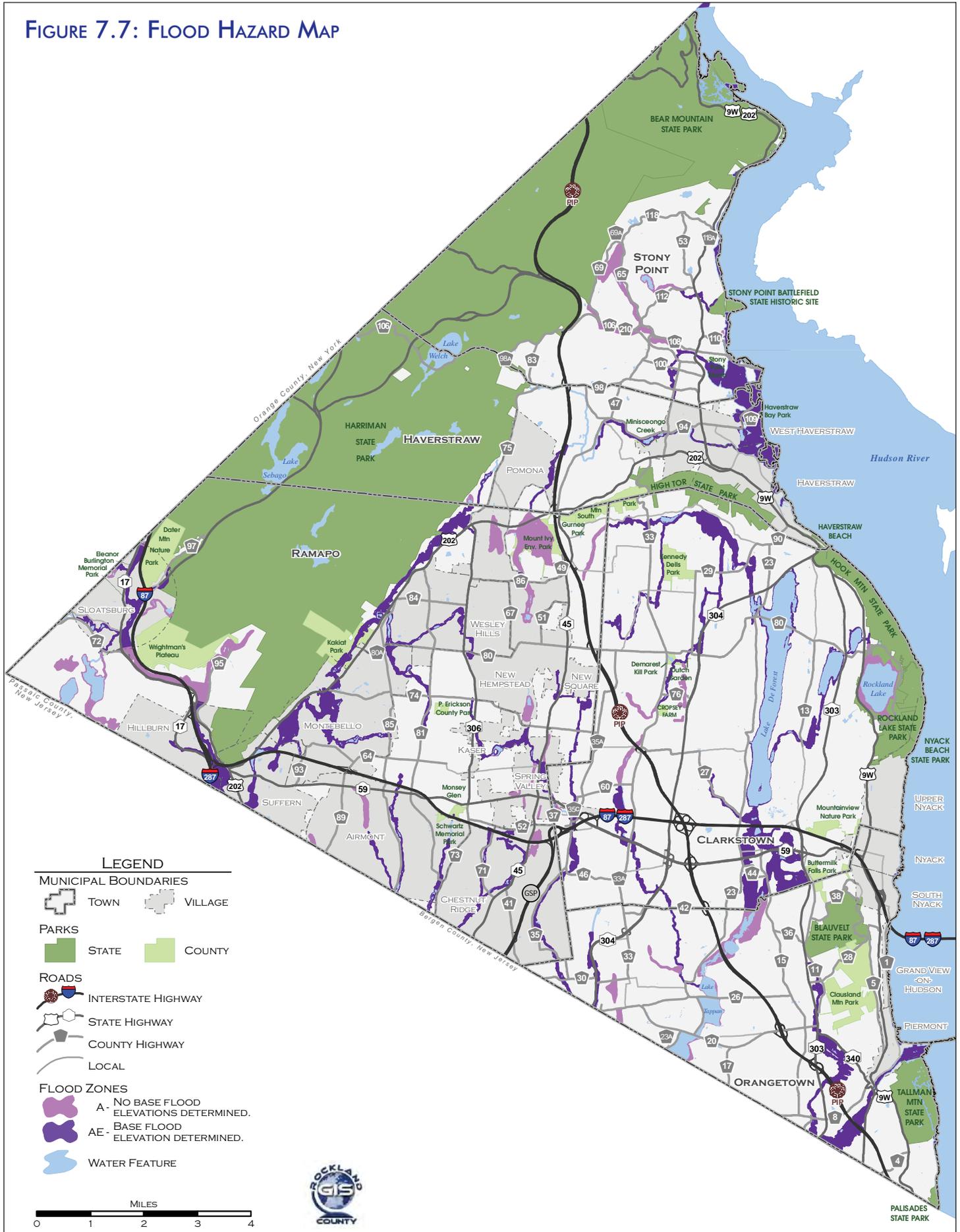
The regulatory floodplain is typically viewed as all lands within reach of a 100-year flood, or a flood that has a 1% chance of occurring in any given year. FEMA produces floodplain maps identifying the 100-year floodplain in order to implement its National Flood Insurance Program (NFIP). The NFIP allows property owners, in participating communities, to purchase flood insurance in exchange for state and community floodplain management regulations that reduce future flood damages. If a community adopts and enforces a floodplain management law for new construction in floodplains, the federal government will make flood insurance available within the community to mitigate flood losses.

According to FEMA, most floods fall into the following three categories: *Riverine Flooding*, along a channel (as on the Hudson River or along other rivers and streams); *Coastal Flooding*, along the coasts of oceans and large lakes; and *Shallow Flooding*, in flat areas where a lack of channels means water cannot drain away easily. In Rockland, most flooding issues concern riverine flooding, shallow flooding resulting from urban drainage issues, and occasional ice jams. Figure 7.7 shows the county's 100-year flood zones.

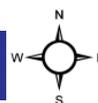
The Rockland County Office of Fire and Emergency Services has prepared a draft Hazard Mitigation Plan, which, once approved by FEMA, will make the County eligible for FEMA project grants under programs such as the Hazard Mitigation Grant Program (HMGP), Flood Mitigation Assistance Program (FMA), and Pre-Disaster Mitigation Grant Program (PDM). According to the draft Hazard Mitigation Plan, about 12% of Rockland lies within high or moderate flood risk zones, based on current FEMA mapping. Ramapo has the greatest proportion of its area within a high flood risk zone, followed by Clarkstown, which has large flood zones in West Nyack and in the vicinity of South Mountain Road, and Haverstraw and Stony Point, which each have large flood zones along the Hudson River.

Since 1978, according to the draft Hazard Mitigation Plan, Rockland NFIP-insured flood losses have totaled nearly \$11.9 million, or about \$400,000 per year. In terms of dollar loss amounts, roughly half of all NFIP losses in the county have occurred in the Town of Clarkstown and the Village of Suffern.

FIGURE 7.7: FLOOD HAZARD MAP



NATURAL AND ENVIRONMENTAL RESOURCES



Shown as above

7.4 Wetlands and Soils

Wetlands

Wetlands, which are present throughout Rockland, act as natural storage basins for floodwaters and aid in groundwater recharge. Groundwater is replenished by rain that percolates through the soil into the ground, and from recharge areas, such as wetlands. In addition, wetlands are natural filtration systems that assist in purifying surface water before it enters the aquifers. Wetlands provide habitat for many types of wildlife and contribute to the county's natural and scenic beauty.

Rockland County contains two unique tidal/freshwater wetlands: Iona Island and Piermont Marsh, two of only four such features in New York. Both are part of the Hudson River Estuary Program, which aims to protect and improve the historic and scenic Hudson River watershed. The program, created in 1987 and extending from the Troy dam to the Verrazano Narrows, seeks to:

- Ensure clean water
- Protect and restore fish and wildlife habitats
- Provide recreation in and on the water
- Adapt to climate change
- Conserve the scenic landscape



Tidal and freshwater wetlands, like Piermont Marsh, contain a variety of rare animal and plant species.

Source: Patsy Wooters

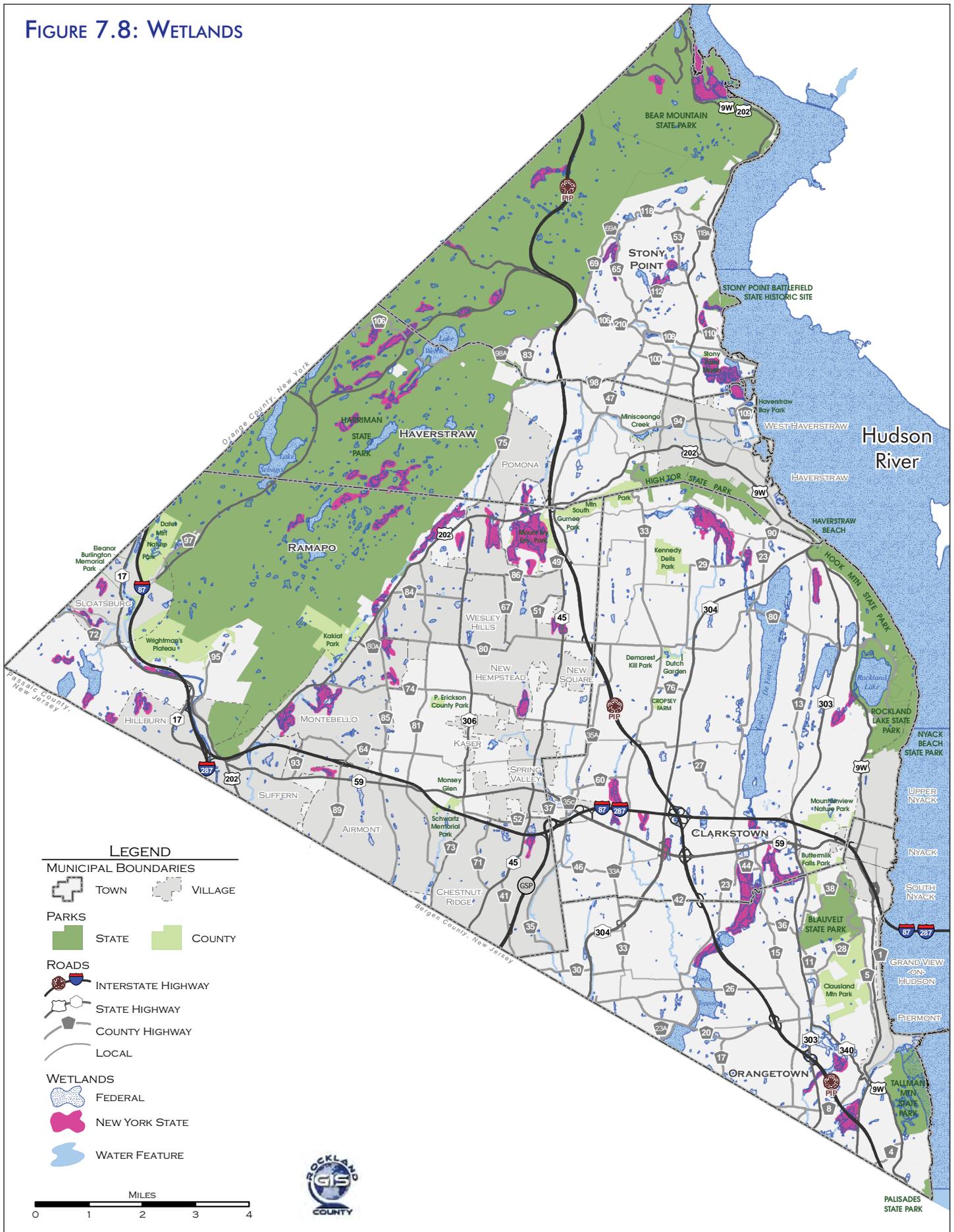
Over the past several years, the Estuary Program has helped to protect and enhance natural resources and establish grants for estuary-related projects, such as fish restoration, river floor mapping, education services, and native tree and shrub planting.

Wetlands are important to preserve because they play a valuable role in the environment. They reduce the danger of flooding downstream by acting as natural detention basins during peak runoff periods, help to maintain water quality by absorbing excess nutrients in runoff, and play a vital role in the ecosystem by providing habitat for various flora and fauna.

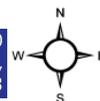
There are three levels of wetland protection: national, state, and town/village. The U.S. Army Corps of Engineers is responsible for regulating national wetlands, and issues permits for regulated activities under Section 404 of the Clean Water Act, which regulates the disposal of dredged or fill material into waters of the United States.⁴ Wetlands over 12.4 acres in size are mapped and protected by the State DEC. Any construction activity that may affect these wetlands (excavation, filling, building, obstructions, potential pollution sources, etc.) is regulated, whether it occurs in the wetland itself or in the 500-foot buffer of the wetland. Rockland's State- and Federal-designated wetlands are shown in Figure 7.8.

⁴ According to the Environmental Protection Agency (EPA), "Waters of the United States" are waters used in interstate or foreign commerce; all interstate waters (including wetlands); all other waters such as lakes, rivers, streams (including intermittent streams), mudflats, sand flats, wetlands, or natural ponds, the use, degradation, or destruction of which could affect interstate or foreign commerce; the territorial sea; and all impoundments and tributaries of, and wetlands adjacent to, defined waters of the United States.

FIGURE 7.8: WETLANDS



NATURAL AND ENVIRONMENTAL RESOURCES



Shown as above

A number of the towns and villages have their own wetland regulations. For example, Stony Point requires a permit for regulated activities within wetlands smaller than 12.4 acres, while Montebello regulates activities within 100 feet of a wetland greater than one-tenth of an acre and within 50 feet of a natural watercourse or stream. The local regulation of wetlands in Rockland is not uniform; some municipalities regulate only the wetland itself, others include a buffer area, and others do not regulate wetlands at all. Therefore, there are many locations within the county in which smaller wetlands are unregulated and vulnerable to the pressures of development. Projects that protect existing wetlands should be encouraged, and municipalities should also be encouraged to enact wetlands legislation to protect these resources. The County may assist through the development of model wetlands laws.

Soils

The physical properties of soils have a direct impact on land use and carry important implications for future development and runoff. However, consideration of the engineering properties of soils is generally done at the local level as part of site design and review. On a county level, soil classification is important in areas where there are no sewers, and the soils need to have a higher infiltration rate so that the septic systems work properly. Some areas in the northern and western parts of Rockland have limited sewer systems, though the County is currently installing new sewer lines and a treatment plant for western Ramapo because of problems with failing septic systems. In addition, soil properties affect land development projects, as soil erodability issues can have impacts on down-slope properties.

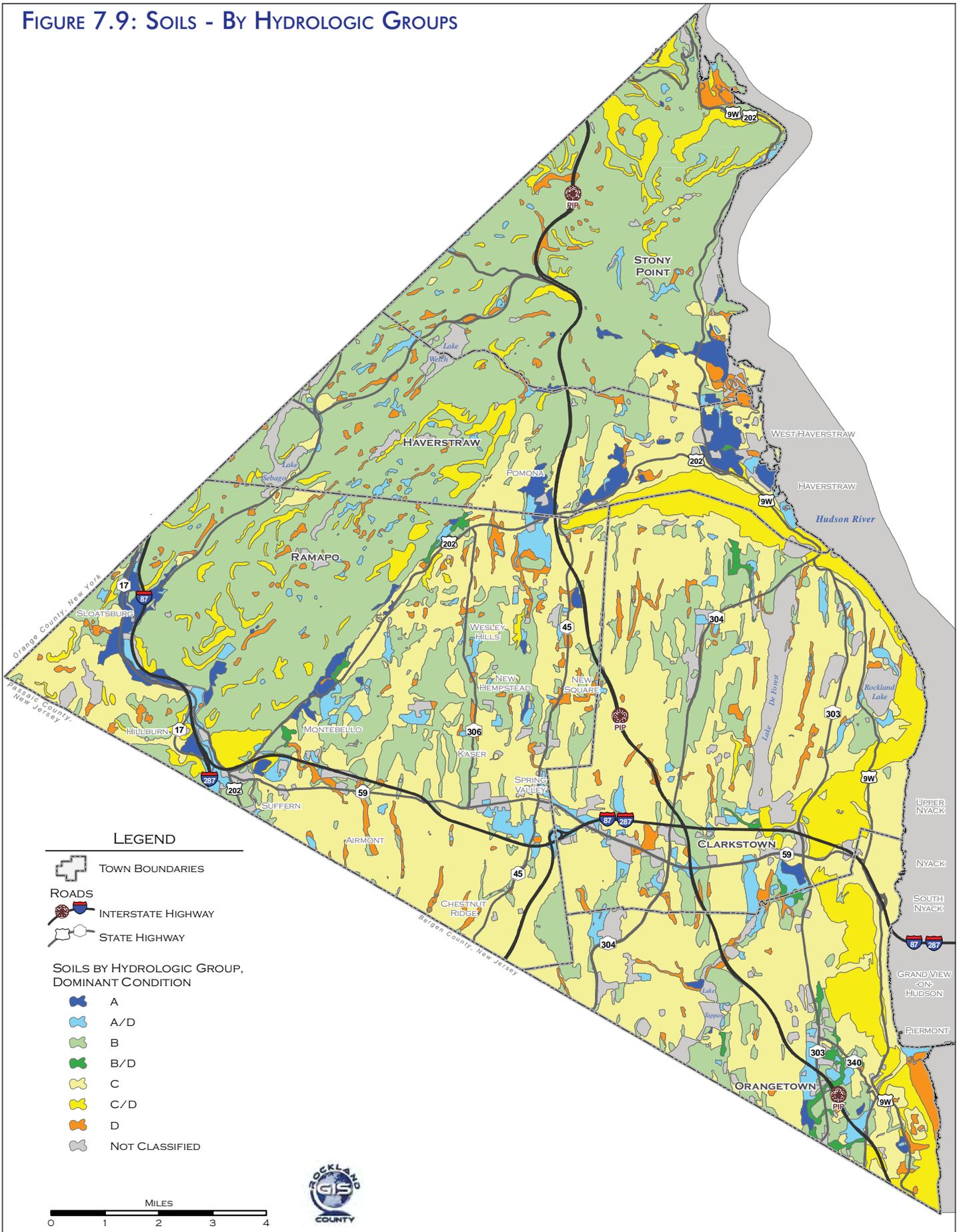
Figure 7.9 illustrates the general pattern of soils by hydrologic group in Rockland County. The map is based on the following hydrologic group definitions:

- **A** – High infiltration rate, low runoff potential when thoroughly wet; very deep, well drained to excessively drained; sands or gravelly sands; high rate of water transmission.
- **B** – Moderate infiltration rate, moderate runoff potential when thoroughly wet; moderately deep or deep; moderately well drained to well drained; moderately fine to moderately coarse; moderate rate of water transmission.
- **C** – Slow infiltration rate, slow runoff potential when thoroughly wet; has layer that impedes downward movement of water; moderately fine to fine; slow rate of water transmission.
- **D** – Very slow infiltration rate, high runoff potential when thoroughly wet; has permanent high water table; claypan or clay layer at or near surface, or shallow over nearly impervious layer; clayey soil that has high shrink-swell potential; very slow rate of water transmission.

As the figure indicates, most of the western portion of the county – largely corresponding to the location of Harriman and Bear Mountain State Parks – consists of moderately well-drained to well-drained soils with a moderate potential for runoff. Much of Rockland’s eastern two-thirds consist of more poorly-drained soils with a slow to very slow infiltration rate. Some of these soils have greater runoff potential.

The Rockland County Soil and Water Conservation District, part of the Division of Environmental Resources, develops countywide programs to protect soil, water, prime and unique farmland, wildlife, energy, and other renewable resources. Its board of directors consists of representatives from each of the towns’ highway departments, assisted by Environmental Resources staff.

FIGURE 7.9: SOILS - BY HYDROLOGIC GROUPS



7.5 Sensitive Environmental Area Programs

In addition to the environmental resources described above, several other key sensitive areas are of particular importance to Rockland, which are addressed through a number of State and regional programs.

Critical Environmental Areas

Under the DEC's Critical Environmental Area (CEA) program, local agencies may designate specific geographic areas within their boundaries as CEAs that have an "exceptional or unique character" with respect to one or more of the following:

- A benefit or threat to human health;
- A natural setting (e.g. fish and wildlife habitat, forest and vegetation, open space, and areas of important aesthetic or scenic quality);
- Agricultural, social, cultural, historic, archeological, recreational, or educational values; or
- An inherent ecological, geological, or hydrological sensitivity that may be adversely affected by any change.

Development proposed in a CEA is subject to a more rigorous review than other areas. Proposed development wholly or partially within or substantially contiguous to a CEA under the State Environmental Quality Review Act (SEQRA) requires the lead agency to study potential impacts on the characteristics of a CEA in an Environmental Assessment Form or Environmental Impact Statement.

While no CEAs have been designated on a county level, the following five areas have been designated by municipalities as CEAs in Rockland: the entire Village of South Nyack; Upper Grandview and environs in Orangetown; and the Palisades slope area, Sparkill Creek area, and pier area of Piermont (which together comprise all of the Village of Piermont). Clarkstown's 2009 Comprehensive Plan recommended the creation of CEAs, and the Village of Montebello's last Comprehensive Plan (2003) included a Conservation Overlay District for such areas to ensure protection of these resources and enhance visual access for the public by limiting building in the Overlay District. Montebello is in the process of updating its Comprehensive Plan and is recommending enhanced protective measures for environmental features, including steep slopes and water resources, as well as the creation of an Environmental Overlay District, the adoption of a Greenprint, and the designation of a CEA.

Waterfront Areas (Local Waterfront Revitalization Program Areas)

New York State's Coastal Management Program, administered by the Department of State's (DOS) Division of Coastal Resources, was developed in 1982 to address regulation and development of coastal resources through the implementation of 44 State coastal policies. These policies are intended to promote the beneficial use of waterfront resources, prevent their impairment, and provide for the management of activities that may affect these resources. As part of the Coastal Management Program, waterfront communities are encouraged to prepare a Local Waterfront Revitalization Program (LWRP) to incorporate local needs and objectives into the state's coastal policies. An LWRP approved by the Secretary of State is a legally binding document, and requires that all local government agencies using Federal or State funding or requiring permit actions, must adhere to the policies contained within. Additionally, the Coastal Management Program provides technical support to communities with approved LWRPs, helping them with implementation of local public access, recreation, and related waterfront projects. Given these benefits, Rockland's municipalities are thus encouraged to participate in the LWRP program.

Four Rockland communities have completed and received New York State Department of State approval for LWRPs: Nyack, Piermont, Stony Point, and the Village of Haverstraw. The proposed land and water uses and proposed projects for each plan are described briefly below.

Nyack

Approved in 1992, Nyack's LWRP indicated five general land use categories for the waterfront area: low-density residential, moderate-density residential, mixed urban development, institutional, and waterfront (including high-and low-density residential, mixed waterside development, and parkland). Major proposed projects include a master plan for Memorial Park, a fishing dock, riverfront walks, and the expansion of parking.

Piermont

This LWRP, approved in 1992, proposed to rezone a former industrial area to Riverfront District, allowing for a mix of uses, including attached and detached single-family units, multifamily housing, boat and marine sales, commercial and office uses, restaurants, boat storage, public buildings, parks, and public walkways. Among other projects, the plan proposed a "Village Landing" area for commercial fishing, boat launching and mooring, and a boat ramp, together with related uses.

Stony Point

Approved in 1995, Stony Point's LWRP proposed a total of 11 zoning categories in the waterfront area. Projects proposed in the LWRP included creation of a walking and hiking trail, restoration of a bicycle trail, potential development of a boat launch, acquisition of waterfront property, provision of scenic overlook areas, and consideration of designating a local historic district.

Village of Haverstraw

Haverstraw's LWRP and Greenway Plan, approved in 2005, proposed a number of waterfront projects. These proposed projects range from the creation of recreation facilities, to economic revitalization efforts, to the provision of transportation options. Specifically, the LWRP projects included: creation of a greenway trail along the Hudson River, development of public recreation facilities, redevelopment of the former Empire Chair Factory, downtown streetscape improvements, securing a viable downtown location for the Haverstraw Brick Museum, creation of additional parking in the central business district, establishment of a commuter ferry, construction of a public fishing pier, and developing affordable housing throughout the village.

National Natural Landmarks

The National Parks Service's National Natural Landmarks Program, established in 1962, recognizes resources with "outstanding condition, illustrative value, rarity, diversity, or value to science and education." National Natural Landmarks include both public and private lands with a variety of uses. Participation in the program is voluntary, and all new designations must have owner permission. Property owners of National Natural Landmarks may receive some tax benefits, and federal projects located within these areas must comply with the National Environmental Policy Act (NEPA).

Within Rockland County, the following areas are designated as National Natural Landmarks:

- **Hook Mountain and Nyack State Beach State Park** (designated 1980): Contain a portion of the Palisades Sill and other important geological deposits. Ownership: State.
- **Iona Island Marsh** (designated 1974): A brackish estuarine marsh in a near-natural state that fringes the Hudson River and contains many rare plants. Ownership: State.

- **Palisades of the Hudson** (designated 1983): Located along the western bank of the Hudson River from Sparkill, New York, south 13 miles to below the George Washington Bridge in New Jersey. This is the best example of a thick diabase sill formation known in the United States, and the glaciated crest provides evidence of the Pleistocene glacier.

7.6 Air, Noise, and Light Pollution

In addition to the water quality issues discussed above, Rockland faces pollution from other sources: air, noise, and light. Because the impacts of such forms of pollution do not necessarily conform to municipal boundaries (for example, potential pollution from I-287/87), the responsibility of mitigation often falls to the County or regional governance.

Air Pollution

Poor air quality can cause a variety of health problems, such as respiratory illness and asthma. Air pollution also causes haze and smog; reduces visibility; dirties and damages buildings; and harms water bodies, plants, and wildlife. It is important to monitor air quality in Rockland due to the potentially high levels of pollutants coming from automobile traffic and commercial and industrial facilities, and from other sources within the region.

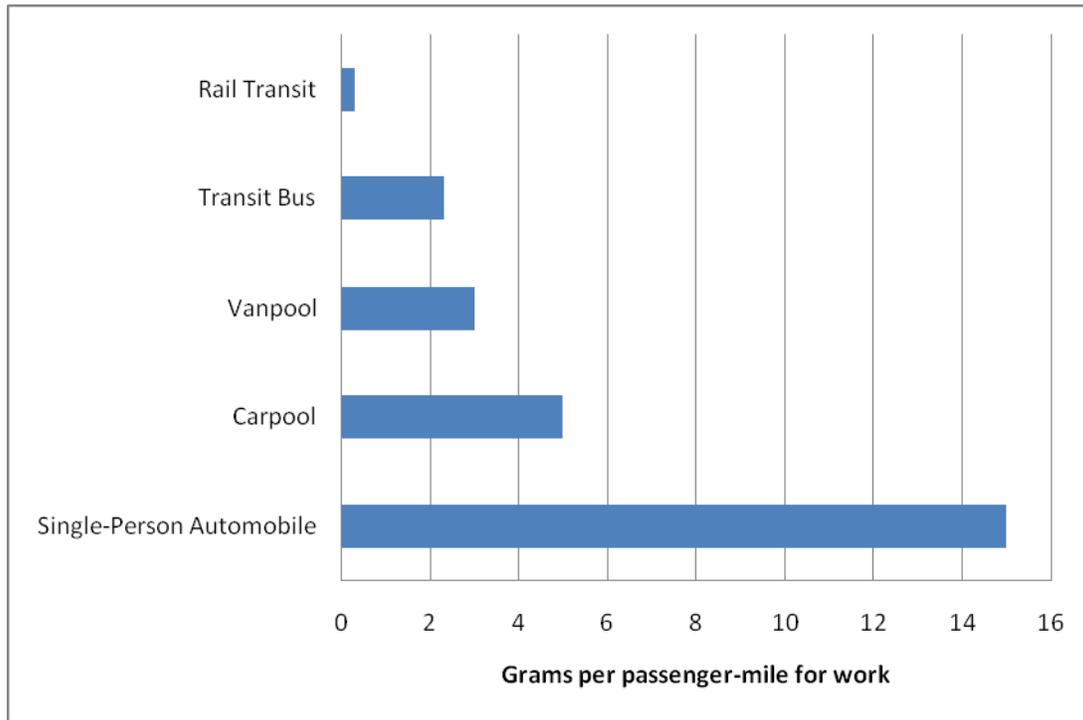
Air contaminants or pollutants take the form of solid particles, liquefied particles, and vapor or gases, which are discharged into, or form in, the atmosphere. Air quality in any particular location is influenced by contaminants discharged into the atmosphere and by regional and local climatic and weather conditions. Atmospheric conditions such as sunlight, rainfall, humidity, air turbulence, temperature differences, and wind speed and direction can disperse, intensify or chemically alter the levels and effects of air contaminants.

National Ambient Air Quality Standards (“NAAQS”) have been established for six air pollutants – particulates, sulfur dioxide, nitrogen oxides, carbon monoxide, ozone, and lead. In 1990, ultra-fine particulate matter was added to the list of criteria pollutants. This is associated with the combustion of fossil fuels, including natural gas and propane. Primary and secondary standards for varying exposure times have been established for each of these criteria pollutants. Primary standards are designed to protect public health, while secondary standards are established to prevent other adverse environmental impacts and to protect the public welfare.

The Federal Clean Air Act was designed to ensure that the standards set forth in the NAAQS were met. States are required by the EPA to conduct ambient air monitoring for a number of years to determine if ambient air quality in various geographical areas meets the standards. If compliance with the standards is demonstrated, then the air quality region is said to be in attainment.

Air pollution can stem from point (stationary) sources (such as power plants); area sources (the cumulative impact of small individual sources such as body shops or dry cleaners); mobile sources (such as automobiles); and biogenic sources that naturally occur in vegetation. The most significant sources of carbon monoxide emissions are single-occupancy automobiles. Chart 7.1 illustrates the varying levels of emissions of several different modes of transportation.

Chart 7.1: Comparison of Carbon Monoxide Emissions by Transportation Mode



Source: Rockland County Department of Planning

In 2008, NYSDEC designated most of the New York Metropolitan Area (NYMA) Combined Statistical Area (CSA) a non-attainment area for the 2008 ozone NAAQS. Of the counties included in this CSA, Suffolk, Nassau, Bronx, Kings, New York, Putnam, Queens, Richmond, Rockland, and Westchester, only Putnam County achieved acceptable standards.

Under the Clean Air Act, New York State will be required to develop a State Implementation Plan (SIP) for submission to the EPA. The plan must include enforceable measures for reducing air pollutant emissions, and must describe the steps the area will take toward attaining the fine particulate (PM 2.5) standards.

Because of efforts on the part of Rockland County government, the DEC agreed to install a permanent air quality monitor at the Orchards of Concklin in Ramapo in 2009. The monitor serves several functions: 1) it issues air quality health advisories as needed, 2) determines air quality trends, and 3) addresses background levels of pollutants to help identify when and how pollution is transported from other areas of the state and region. DEC also operates temporary air monitors in different locations, previously having installed them at the Palisades Center and at the Dr. Robert Yeager Health Center in Pomona.

Rockland participates in the New York Metropolitan Transportation Council's emissions reduction subcommittee. The County is also part of EPA's New York Metropolitan Air Quality Initiative (NYMAQI), a cooperative agreement among Nassau, Suffolk, Putnam, Rockland, and Westchester Counties and New

York City to implement and promote measures to reduce emissions from on-road and off-road mobile sources that operate in their jurisdictions. The initiative outlines specific actions that each county can take to address emissions, especially diesel emissions. Key actions that Rockland County has taken include⁵:

- Purchase of hybrid and alternative fuel vehicles for the County fleet.
- Installation of Best Available Retrofit Technology (BART) on diesel-fueled vehicles over 8,500 pounds
- Passage of Local Law No. 3 of 2006 (Rockland County Ultra Low Sulfur Diesel Fuel and Best Available Retrofit Technology Act).
- Passage of Local Law No. 4 of 2006, (Rockland County Fuel-Efficient Vehicle Act)
- Passage of Local Law No. 4 of 2007, which imposes civil and criminal penalties for vehicles idling longer than three minutes.
- Becoming a founding Board Member of the New York City and Lower Hudson Valley Clean Communities (NYCLHVCC) program, which works with private energy companies; local academia; and city, state, and county agencies to reduce oil consumption and greenhouse gases. (Sponsored by the U.S. Department of Energy.)
- Agreement with New Jersey Transit that trains will no longer idle at the Spring Valley and Suffern rail yards if stationary for more than an hour, or if the temperature is above zero.

In addition to the NYMAQI, the County may also consider setting its own goals for reducing emissions from its vehicles and equipment. The County should establish a clean air toolbox that contains general guidelines and strategies that local municipalities can use to reduce air pollution at the local level. In cooperation with the municipalities, the County should also create efficient traffic routes and patterns and promote alternatives forms of transportation (i.e. bus transit, walking, and biking) as part of a daily routine in order to have the greatest impact on reducing air pollution. See below for suggested specific climate change and pollution goals.

Noise Pollution

Noise can be defined as undesirable or unwanted sound that interferes with normal activities such as sleeping, conversation, or recreation. It can also cause hearing loss and have an adverse effect on mental health. Most of the sounds heard in the environment are not composed of a single frequency, but are a band of frequencies, each with a different intensity or level. Levels of noise are measured in units called decibels (dB). Typically, a change in noise level of two or three decibels is required for most people to notice a difference in noise. Environmental noise is considered with regard to several factors, including level – which relates to perceived loudness of a noise – but also its character, duration, time of day, and frequency of occurrence.

The regulation of noise is generally accomplished at the local level through controls such as restrictions on the hours of construction or operation activities and truck deliveries and the issuance of temporary permits for noise-generating events. However, some noise generators occur across several municipalities, and their regulation is appropriately handled at the county level. For example, in 2002, the Rockland County Planning Department completed a study of railroad crossings for the West Shore (River) Line, which resulted in proposed safety upgrades for the West Shore crossings so that a “Quiet Zone” can be created, where train horns would not routinely be blown at the railroad crossings along 23

⁵ For a full list of New York Metropolitan Air Quality Initiative actions conducted by Rockland County, visit <http://www.nymtc.org/EPA%20file/Statement.pdf>

miles of the West Shore Line. A future project could include Quiet Zones on the other two rail lines that operate in the county. On a local level, all municipalities should have uniform codes to ensure consistency between noise mitigation guidelines, which take into consideration all facets of noise control.

For many parts of Rockland, roadway traffic is the major cause of noise pollution, especially noise from I-287. Sound barrier walls are generally used to help reduce the amount of noise that enters residential areas. However, there may be a further need for sound barrier walls along the Thruway corridor, as the right-of-way will be entirely used once the Tappan Zee Bridge and corridor construction is complete.

Noise pollution can also occur on a regional level. In an effort to increase the efficiency and reliability of the airspace structure and Air Traffic Control system in the region, the Federal Aviation Administration (FAA) launched the New York/New Jersey/Philadelphia Metropolitan Area Airspace Project in 2007. The preferred alternative, the Integrated Airspace Alternative, would reduce flight delays, but noise impacts to Rockland were identified, as it would expand the current airspace for airplanes to and from the major airports in New York, New Jersey, and Philadelphia. As a result, areas along the Hudson River may experience an increase in flight traffic; although proposed mitigation measures could reduce the number of residents affected for many areas of Rockland. The County should lobby the FAA to ensure that mitigation measures will eliminate any adverse impacts on residents.

Light Pollution

Light pollution is excessive or obtrusive artificial light. While it is most often associated with heavily populated areas with significant development, even relatively small amounts of light in more rural areas can create problems. Light pollution can generally be grouped into the following categories, although some sources of light may fall into more than one category:

- *Light trespass* occurs when unwanted light enters one's property, such as when a strong light enters the window of one's home from the outside.
- *Over-illumination* is the excessive use of light.
- *Glare* can range from being blinding to causing temporary visual impairment to producing discomfort.
- *Light clutter* refers to excessive groupings of lights.
- *Skyglow* is the "glow" effect that can be seen over populated areas, and results from the combination of all light sources in an area reflected into the sky.

Light pollution has several adverse consequences, including energy waste, effects on public health, and disruption of plant and animal ecosystems. One of the most effective ways to reduce light pollution is by using full cutoff lighting fixtures that prevent light from shining in unwanted areas and may allow lower wattage lamps to be used. While the types of lighting proposed for new development is typically addressed during the site plan review process at the municipal level, the County could encourage its towns and villages to adopt laws that promote dark sky-friendly lighting.

The County may also want to develop guidelines that municipalities can use for their own lighting laws. Such guidelines should stress that lighting should be directed so as not to interfere with traffic or the surrounding environment. No lighting should ever shine directly into a state or county road. When applicable, landscaping plans should be supplemented with low evergreen plantings to help shield lights from shining in the state or county rights-of-way. In addition, full cutoff lighting fixtures and other measures to reduce light pollution should be used on all County facilities.

Other Sources of Pollution

Quarries, or open pit mines, have played a major role in Rockland County due to their environmental and economic impacts. In fact, the Palisades Interstate Park system was established, in part, as a response to the destruction being done by the quarries on the Palisades Ridge, particularly from the viewpoint of Westchester County. Historically, quarries in Rockland have provided stone for structures in the County, New York City, and elsewhere. The Hudson River has also been a resource for transporting the rock from quarries, as well as transportation for industrial uses, such as gypsum and brick making. Today, companies such as Tilcon conduct quarry operations that produce millions of tons of crushed stone for roads, curbs, parking lots, drainage and septic system bedding, erosion control, cement concrete mixtures, and other needs. Tilcon has operations in Haverstraw, Tompkins Cove, and West Nyack.



Crushed stone piles from quarries, such as this one in Haverstraw, should be monitored for the use of sediment control measures.

Source: BFJ Planning, 2009

In Rockland, crushed stone is generally brought down to stockpiles located at Tilcon plants, and is then delivered to customers both by truck and barges that travel on the Hudson River to deliver the product. Tilcon uses a number of measures to reduce its environmental impact, such as land reclamation⁶; however, the issue of dust is often a concern for residents and businesses in the areas near the quarries. Communities containing Tilcon quarries should keep the company informed of any environmental concerns and be involved in addressing these issues.

Like other heavy industrial uses quarries offer economic and standard-of-living benefits, though they can also affect the environment through air and noise pollution, impacts from the leftover ash piles and blasting. In Rockland, the rock ore is generally mined using an open pit method seen next to the hillside slopes of several mountain ranges. Quarries that have reached - or are approaching – abandonment can be reused in ways that can benefit the county. For example, the former Tilcon quarry in Suffern could be reused for cultural and recreational uses, affordable housing, flood remediation, or the creation and revitalization of habitats through reversion to the land's natural state. Other alternative uses – such as industrial, commercial, or residential uses can represent potential beneficial reuse of these sites in fiscally advantageous ways.

In addition, a number of contaminated sites, such as brownfields, are present in Rockland. These sites, as well as Environmental Protection Agency (EPA) and New York State DEC Superfund sites in various stages of site cleanup, can be sources of pollution.⁷ The County and its municipalities should continue

⁶ Reclamation is the process of returning the mined property to another usable state.

⁷ For a complete list of Federal EPA Superfund sites in Rockland County, see http://www.epa.gov/region02/cleanup/sites/nytoc_sitename.htm. For New York State Superfund sites, see <http://www.dec.ny.gov/cfm/external/derexternal/haz/results.cfm?pageid=3>

to work with the EPA, the State DEC, and property owners to eliminate threats to residents or wildlife from known site contaminations and return these sites to productive use.

7.7 Threatened and Endangered Species and Habitats

Rockland County is home to a variety of wildlife, largely due to its location within the Lower Hudson watershed basin. The basin, which includes the Hudson River Estuary, is one of 28 Estuaries of National Significance. Together with the Long Island Bays and Atlantic Ocean watershed basins, the watershed basins of southeastern New York State contain some of the most diverse ecosystems in the state. According to the DEC, 267 Species of Greatest Conservation Need have been identified in these three basins, accounting for nearly 50% of all such species statewide.

In 1986, in recognition of the value of the Hudson River Estuary, the DEC established an action plan that proposed strategies for protecting the river's natural resources. The program, which was updated in 2005, identified the following habitat types in the Hudson Valley as being particularly important to biodiversity:

- **Coastal Habitats**, including sand beaches, mudflats, salt marshes, tidal wetlands, and tidal creeks, support waterfowl, colonial wading birds, marine and estuarine fishes, and a number of species of turtles, mollusks, and raptors.
- **Wetlands**, ranging from freshwater tidal swamps and brackish tidal marshes to fens, bogs, and forested wetlands, contain a wide variety of species, many of which are endangered or threatened. More than 50% of the wetlands in the region have been lost since European settlement.
- **Tributaries and Riparian Areas** provide important habitat for a number of species of fish, amphibians and mammals. Removal of riparian areas, modification of stream channels, and increasing impervious surfaces cause some changes to watershed hydrology that place the water and habitat quality of tributary streams in the Hudson River Valley at risk.
- **Unfragmented Forest and Habitat Corridors**, including forests of moderate-sized and moderate-aged trees (few examples of old-growth lowland forest remain) still provide valuable habitat and have the potential to provide mature forest habitat in the future.
- **Open Uplands and Barrens** include grasslands, shrublands, agricultural lands, and rarer communities, such as pitch-pine scrub-oak barrens, and rocky summit grasslands. Without



Streams offer scenic views, recreation, and biodiversity and must be protected from encroaching development.

Source: River to Ridge

management or disturbance of the uplands, early successional habitats become forested, resulting in the decline of many animals that depend on such habitats.

- **Caves and Cliffs** provide habitat for a number of rare plant and animal species, and are threatened by damaging practices such as mining and high-volume recreational activities like rock climbing, hiking, and mountain biking.

In Rockland County, significant biodiversity areas in the Hudson River Estuary that have been identified by the DEC consist of the Hudson River Estuary and Tidal Wetlands, the Hudson Highlands and the Palisades. A number of State-listed threatened, endangered and special concern animal and plant species have been documented within the county. There are a number of resources available for determining the presence of these types of species, which Rockland County uses for development proposal reviews under Section 239 of the General Municipal Law (GML) application process. Development proposals that require a Full Environmental Assessment Form (EAF) under SEQRA are also required to indicate the presence of threatened or endangered species. These resources are then used to fully evaluate potential impacts to these species before proposals are approved.



The Bog Turtle and Peregrine Falcon are both on NYSDEC's endangered species lists.

Sources: Animal Planet, National Geographic

The DEC maintains databases of animals, plants, and significant natural communities that have been found in specific locations in New York. An interactive DEC map and database, called the Nature Explorer, plots these species by county and species name⁸. The DEC Environmental Resource Mapper can also be used to identify the state's natural resources and environmental features that are State-protected or of special concern. This tool is more applicable to specific properties throughout the state or county. The maps include locations of animals and plants that are rare in New York; freshwater wetlands; streams, rivers, lakes and ponds; and significant natural communities, such as rare or high-quality forests, wetlands, and other habitat types.

A complete list of all endangered, threatened, and special concern fish and wildlife species in New York State is found at <http://www.dec.ny.gov/animals/7494.html#Endangered>. The DEC also recommends contacting the New York Natural Heritage Program – a partnership between the DEC and The Nature Conservancy – for the status and location of rare species and natural communities. This is especially recommended when rare species or significant natural communities are found on or near a project site.

Classification of species as endangered, threatened or of special concern can result in grants and other state and federal conservation funding. For example, the State Wildlife Grants program provides funds to state wildlife agencies for conservation of fish and wildlife species in greatest need of conservation. To access these grant funds, New York State was required to develop a Comprehensive Wildlife

⁸ For a full list of these species in Rockland, visit <http://www.dec.ny.gov/natureexplorer/app/>

Conservation Strategy that focuses on the species of greatest conservation need. These species were chosen based on their inclusion on the Federal and State lists of endangered, threatened or special concern species, and their presence on the New York Natural Heritage Program database, resulting in a list of more than 500 species of greatest conservation need. All but three of the endangered, threatened or special concern species found in Rockland County are classified as species of greatest conservation need.⁹

Municipalities have existing tools for identifying and mapping ecologically significant habitats within their reach. One such program, the Biodiversity Assessment Training (BAT) Project, which was initiated by the partnership of the Hudson River Estuary Program and Hudsonia, Ltd., focuses on supporting the State's Hudson River Action Plan. There is also a Biodiversity Assessment Manual available to help train people in the mapping of habitats. As a result of this program, several areas have begun to be mapped and documented for their biodiversity, including the Torne Valley area in the Ramapo River Valley and lands running parallel to the Hudson River. The Town of Clarkstown has also performed an extensive biodiversity study as part of its updated comprehensive plan.

Mapping and understanding habitats in the County will ultimately help to develop programs to preserve them. For example, in the late 1980s, the Thruway Authority added two falcon-nesting boxes to the Tappan Zee Bridge. The bridge and the falcons have a symbiotic relationship: the nesting boxes provide falcons with a high perch, and the falcons keep away pigeons, which can be detrimental to the paint, and consequently, the steel on the bridge.

Invasive species, which are non-native species that can cause harm to the environment or to human health, pose a risk to the biodiversity of the county. In some cases, invasive species are accidentally introduced to areas by humans; for example, anglers and boaters can introduce invasive species if outboard engine props are not properly cleaned and maintained. Submersed aquatic plants, such as water milfoil, can get caught up in propellers and ultimately spread diseases that can affect the fish population.

The Rockland County Environmental Management Council has an Invasive Plant Committee dedicated to educating the public about invasive plant species. However, data on invasive species is sparse and in some cases, interim lists only exist. In New York, the DEC contains information on invasive species, provides alerts, and guidelines for combating invasive species¹⁰.

Other risks to biodiversity in the County's parks, particularly in environmentally sensitive sections, include accidents, such as fires, or hikers walking off designated trails and into sensitive areas. Trails should be enhanced with signage explaining the importance of this vegetation, to help ensure that hikers stay on the trail. In residential areas and on golf courses, the use of phosphorous-based fertilizers, pesticides, and herbicides can adversely affect environmentally sensitive areas, such as water

⁹ The three species in Rockland County not considered of greatest conservation need are the eastern wormsneak, the lake chubsucker and the mud sunfish.

¹⁰ For a list of current information on invasive species in New York State, visit <http://www.dec.ny.gov/animals/265.html>. For a list of invasive herbaceous and woody plants, visit http://www.ny.nrcs.usda.gov/technical/ni_species/plants/interim_list_plants.html. Invasive aquatic species are found at <http://www.dec.ny.gov/animals/32861.html>. The U.S. Department of Agriculture maintains invasive species lists for the entire nation at <http://www.invasivespeciesinfo.gov/unitedstates/ny.shtml>.

bodies, with resulting negative impacts to wildlife. Public education is one of the best tools for providing information to the public on how to reduce its footprint on natural landscapes.

7.8 Future Climate Change

According to the DEC's policy for assessing energy use and greenhouse gas emissions in environmental impact statements (EISs), global climate change is a significant environmental challenge, and one that will continue to affect the environmental and natural resources of New York State. There is scientific consensus that human activity is increasing the concentration of greenhouse gases in the atmosphere, and that this, in turn, is leading to climate change. The six main greenhouse gases are carbon dioxide, nitrous oxide, methane, hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride. Emissions of carbon dioxide represent an estimated 89% of the total greenhouse gas emissions in the state, and the vast majority of these emissions result from fuel combustions. Other sources of greenhouse gases include electricity distribution; refrigerant substitutes; management of municipal waste, municipal wastewater and agriculture; and natural gas leakage.

While climate change is often perceived as a federal, state or regional issue, local communities can take actions to mitigate its impacts. The DEC has identified a number of measures that can increase energy efficiency, reduce energy demand, and reduce greenhouse gas emissions from proposed projects. Some of these include designing energy-efficient building envelopes to reduce heating/cooling requirements; constructing green roofs; collecting/reusing rainwater; conducting third-party building commissioning to ensure energy performance (e.g. Leadership in Energy and Environmental Design [LEED[®]] certification); using biofuels for heating fuel or in vehicles and equipment; incorporating renewable energy sources (e.g. wind and solar) into projects; using brownfields or greyfields for redevelopment to minimize vegetation and forest loss; incorporating mixed-use design to promote short commutes for employment and shopping; locating new buildings near areas designated for transit-oriented development (TOD); ensuring parking capacity that meets but does not exceed local parking requirements; pursuing reductions in parking supply through shared or banked parking; and promoting recycling.

Rockland County's government could take a lead on some of these actions, and has already undertaken other mitigation measures. Incorporating sustainable building techniques such as green roofs, solar panels, and LEED[®]-certification into all new County buildings and major renovations, continuing to replace the County's auto fleet with hybrid or biofuel vehicles, and continuing County employee incentive programs to encourage use of bicycles, carpooling, and mass transit are all examples of specific actions Rockland County can take (or has already taken) to reduce emissions.

Some examples of Rockland County's air quality initiatives include its coordination with the Clean Air NY Program, Air Quality Alerts to County employees; County employees' reduced transit fare program; and TOR-BeeLine Connections campaign, which encourages transit use between Rockland and Westchester. Now more than ever, the County can become more environmentally sensitive with support and direction to local municipalities. Rockland should consider instituting goals and guidelines that towns and villages can use to help reduce their carbon footprint.

Rockland County recently took steps to become a member of New York State's Climate Smart Communities program. This program, a partnership between the State and local governments, focuses on local actions that will lower operating costs, promote economic growth, improve operational efficiency and upgrade infrastructure, while protecting the climate. Climate Smart Communities seek to minimize the risks of climate change and reduce its long-term costs by reducing greenhouse gas

emissions and adapting the built and natural environment in anticipation of predicted climatic changes or in response to actual changes. Members of the program can use a State clearinghouse for information on available energy-efficiency programs, including assistance under federal stimulus programs. Rockland adopted the Climate Smart Communities Pledge in August 2010, and upon the DEC's confirmation of its inclusion in the program, the County will begin receiving notification of grant opportunities, presentations, and training.

Other actions to address climate change include better connecting the County's key destinations, such as State and County parks, major shopping and employment areas and colleges and universities. The goal is to establish alternative means of travel as a more desirable and efficient option, encouraging healthier lifestyles, enhancing recreation opportunities, and incrementally reducing the number of vehicles on local roads. Connectivity between entertainment venues and residential and recreation assets should be a component of all development alternatives. In addition, one of the simplest ways to reduce the heat island effect and energy and to enhance aesthetics and quality of life is to invest in a suburban reforestation program. Effective site selection is essential to achieve the primary goal of improving the rate of plant survival and the likelihood that plants will reach their optimal size and provide the intended benefits. Programs headed by individual towns and villages, the County and other organizations should be coordinated. The County should also work with the Public Service Commission (PSC) on improving utility tree cutting and removal, to preserve as many of Rockland's mature trees as possible while allowing for necessary maintenance.

7.9 Issues and Recommendations

Rockland County has a wealth of natural and environmental resources, including its parks and designated open spaces, ridgelines and steep slopes, wetlands, groundwater and surface water resources, quarries, and sensitive environmental areas such as waterfront areas and steep slopes. These features are critical components of the county's ecosystem. However, the county's location within a major urban region means that some of these resources may be threatened by obtrusive development and pollution. The County should encourage its towns and municipalities to take local actions to combat these potential issues, but should also take the lead on regional actions and on activities involving County-owned property.

Recommendation #1: Protect the Hudson River and Other Significant Surface Water Resources

As discussed in this chapter and throughout this Plan, the Hudson River is one of Rockland's most valuable environmental resources, and has significant impacts on land use, commerce, ecosystems, and scenic vistas. The Hudson's well-being is a regional, state, and national issue, and the County should be involved in protecting its future. Proposed measures to protect the Hudson River and other significant water resources include:

- **Working with the Hudson River Estuary Program and neighboring counties.** Rockland and its municipalities should adopt the goals outlined in the 2010-2014 Action Agenda of the Hudson River Estuary Program (see above) and work with this organization and neighboring counties on the river to develop a river stewardship ethic.
- **Identifying and adopting strategies for protecting the Hudson River and all surface water resources.** Rockland's municipalities should consider strategies, such as the inclusion of better

site design principles in zoning, riparian and wetland buffer protection laws, and local stormwater laws.

- **Working to establish Haverstraw Bay as an important estuary learning center.** In particular, Haverstraw Bay in the Hudson River is one of Rockland’s most significant natural resources, and should be protected to ensure that it is free of pollution. The County should work to establish the bay as an important estuary learning center, based on its designation by the DEC as a significant coastal fish and wildlife habitat, including an educational component to increase awareness of the importance of Haverstraw Bay’s tidal marshlands as a unique habitat.
- **Identifying and developing actions for woodland areas.** One way to address the overall quality of the Hudson and Rockland’s other surface waters is for the County to identify the woodland areas that are significant to the health of the headwaters of these rivers and streams. Once these areas have been identified, action plans should be developed to protect the headwaters, including raising public awareness of the ecological relationship between the health of upland woodlands and lowland streams and rivers.
- **Implementing a water quality notification program.** The County should also implement a public notification program for water quality in the Hudson River (and potentially other surface water resources) so that the public is fully informed of all sewage discharge events. Further, Rockland should explore providing regular water quality reports on the Hudson, and potentially other areas, using nonprofit and institutional partners to conduct the necessary testing with volunteer staff. These reports would be regularly distributed to municipalities for their use in future planning and zoning decisions.
- **Continue and expand volunteer community and nonprofit programs.** Because of limited State and County staff to assess the health of Rockland’s streams, the County should continue and expand community and nonprofit programs such as the Volunteer Stream Monitoring Program, which collects baseline data on the biological health of the streams.

Recommendation #2: Promote Conservation of Water Resources

The County should promote conservation of its water resources through infrastructure repairs, careful landscaping, rain barrels, and other means. The reuse of greywater (wastewater generated from domestic activities such as laundry, dishwashing, and bathing for irrigation and other non-drinking uses) should be explored at all County facilities, and municipalities should be encouraged to promote greywater reuse for newly developed or redeveloped properties. See **Chapter 12.0: Infrastructure**, for further discussion of water conservation.

Recommendation #3: Improve Water Quality

In terms of stormwater, the County should assist in the creation of uniform, shared-language municipal stormwater regulations that look at both water quality and quantity. As part of this effort, Rockland should consider mapping the operators of large, medium, and regulated small municipal separate storm sewer systems that are required to obtain NPDES permits. Property owners are discouraged from constructing berms, retention ponds, or other stormwater structures without ensuring proper stormwater and drainage control. In addition, County and municipal highway departments should continue to improve road salt application techniques – as well as explore the use of alternative de-icing materials – to prevent groundwater pollution due to runoff from roadways.

Recommendation #4: Work With Towns, Villages, and Regional Groups to Protect Environmentally Sensitive Areas and Resources

Rockland County contains a number of important natural resources and other environmentally sensitive areas. While protection of these elements is typically accomplished at the local level through zoning and other land use regulations, there are protective steps the County can undertake, such as:

- **Adopting laws that protect environmentally sensitive areas and resources.** Rockland should adopt the Rockland Riverfront Communities Council’s model Ridgeline Protection Local Law – as well as applicable viewshed protection, tree preservation (to prevent clear-cutting of large tracts), steep slopes, wetlands, and impervious surfaces laws – for all County property and encourage municipalities to do the same. Projects that protect existing wetlands will also be encouraged, and municipalities will be encouraged to enact wetlands legislation to protect these resources. The County may assist through the development of model wetlands laws.
- **Enhancing wellhead protection regulations.** Regulations governing development in County wellhead protection zones should also be adopted and implemented, and buffers around reservoirs and watershed lands should be created and enforced. Rockland should also explore forming aquifer recharge areas, with legislation to prevent pollution and preserve water supply in these areas,¹¹ and should consider adding selected water bodies to the list of County-regulated streams. Finally, the County Department of Health will continue strict enforcement of the well testing law (Chapter 389 of the County Code), which requires that private wells be tested when a property is sold.
- **Establishing buffers along streams.** The County should encourage the municipalities to establish buffers along streams as appropriate, with the specific distance dictated by conditions on the ground and scientific study. The County should also explore distinguishing in its stream regulations between open natural environments and urbanized areas.
- **Creating County Critical Environmental Areas.** The County will identify and designate County Critical Environmental Areas to afford greater protection for its major resources, such as the Hudson River.
- **Educating municipalities and the public.** The County must continue to educate its municipalities and the public about the risks to biodiversity from invasive species; hiking in non-designated areas; wildfires; and the use of fertilizers, herbicides, and pesticides. In residential areas and on golf courses, the use of phosphorous-based fertilizers, pesticides, and herbicides can adversely affect environmentally sensitive areas, such as water bodies, with resulting negative impacts to wildlife. Regarding hiking in non-designated areas, trails could be enhanced with signage explaining the importance of certain types of vegetation to help ensure that hikers stay on the trail. Public education is another important tool for providing information to the public on how to reduce its footprint on natural landscapes. County staff members are also encouraged to participate in ongoing educational opportunities on natural and environmental resources, including key regional conferences and workshops.

¹¹ Washington State’s Department of Ecology has compiled significant resources about aquifer recharge areas, including model local ordinances to protect these areas. A number of municipalities and counties in that state have adopted applicable laws or programs. See <http://www.ecy.wa.gov/programs/wq/grndwtr/cara/index.html>.

Recommendation #5: Continue Efforts to Address Air, Noise, and Light Pollution

In addition to the climate change actions discussed above, Rockland has taken a number of positive steps to address air, noise, and light pollution. Additional direct initiatives to be undertaken by Rockland County include:

- **Use of full cutoff lighting fixtures** for all new and retrofitted County property.
- **Development of guidelines** for local noise and lighting laws.
- **Establishment of a “Clean Air Toolbox”** with general guidelines and strategies that municipalities can use to reduce air pollution at the local level.
- **Improved enforcement and promotion of public awareness of County laws** on vehicle idling, littering and dumping, and recycling through effective fines and other punitive measures.
- **Further steps to reduce air pollution** under the New York Metropolitan Air Quality Initiative.
- **Continued County efforts under the Railroad Crossing Safety/Quiet Zone project**, including evaluating the need for a Quiet Zone study on the Pascack Valley and Port Jervis/Main/Bergen rail lines.
- **Continued work with Rockland’s Federal Congressional delegation and the Federal Aviation Administration** to ensure that mitigation measures for the proposed expansion of airspace in the region will eliminate adverse impacts on County residents.
- **Support for the inclusion by the Tappan Zee Bridge study team of additional sound barrier walls** along the entire Thruway corridor in Rockland, using appropriate sound-absorbing materials to reduce any noise reflection to uphill areas.
- **Support for the study of decking over highways** to reduce noise and vibration pollution and to possibly capture and scrub vehicular emissions.
- **Facilitate the establishment by municipalities of uniform codes** to ensure consistency among noise mitigation guidelines, taking into consideration all facets of noise control.
- **Development of guidelines for local lighting laws** to address light pollution.

Recommendation #6: Revitalize Abandoned or Underutilized Properties

Rockland should work with towns, villages, and private property owners to promote the use of abandoned quarries and other industrial areas for potential recreational or cultural use, creation of new habitats, or other beneficial uses. With the amount of land available for such uses continuing to decrease, opportunities to increase the supply of recreation facilities – particularly near existing centers – should be acted upon. Large underutilized properties, such as the Letchworth Village property, a former institution for the developmentally disabled, is another example of a property that has been partially redeveloped and has more development potential. Previously developed properties, such as Letchworth, should be revitalized and used before major new developments are considered in order to protect and conserve natural resources.

A number of brownfields are present in Rockland County, as well as EPA and New York State DEC Superfund sites in various stages of site cleanup. As discussed above, focusing on the reuse of brownfields for development, as opposed to using undeveloped lands, is less environmentally intrusive because it minimizes vegetation and forest loss. In addition, the County and its municipalities should continue to work with the EPA, the State, and property owners, as appropriate, to eliminate threats to residents or wildlife from any known site contaminations.

Recommendation #7: Employ All Available Tools to Address Climate Change

Climate change may be one of the greatest economic and environmental challenges of the 21st century, with significant consequences for Rockland County. The County has been proactive in taking steps to reduce its contribution to air pollution and climate change, by replacing its automobile fleet with hybrid or biofuel vehicles; instituting incentive programs that encourage the use of bicycles, carpooling, and transit; and instituting laws to limit vehicle idling. Rockland County should also explore the following:

- **Continuing climate change efforts through membership with New York State’s Climate Smart Communities Program.** As an important move forward the County is in the process of becoming a member of New York State’s Climate Smart Communities program. The first step in becoming a Climate Smart Community was for the local legislative body to adopt the Climate Smart Communities Pledge, which the Rockland County Legislature did in August 2010. Carrying out the Climate Smart Communities pledge involves appointing a climate coordinator; identifying sources of greenhouse gases in the community; setting goals for emission reduction; and developing and implementing a Climate Action Plan. The County should encourage its municipalities to become Climate Smart Communities as well.

Specific Climate Smart Communities steps that Rockland County should explore include:

- Adopt the State’s goal of reducing greenhouse gas emissions by 80% from 1990 levels by 2050
 - Adopt the State’s goal of reducing electricity use by 15% from projected levels by 2015
 - Set a goal to maximize the use of public energy generated from renewable sources
 - Partner with the Rockland County Solid Waste Management Authority to facilitate recycling – particularly for certain materials that are either not being collected or are not being collected in an efficient or effective way – and adopt a green purchasing program
 - Promote land use policies to reduce sprawl, minimize development in floodplains, and protect forests, primarily through the use of the County’s GML reviews
 - Develop a Climate Adaption Plan to minimize the risks to government facilities and functions from unavoidable climate change
 - Incorporate climate protection and sustainability into economic development plans and encourage work-force training and public education for energy efficiency and renewable energy
 - Publicize the County’s commitment to reducing energy use and emissions
- **Exploring available tools.** It is important to note that the goals listed above are broad suggestions, and are more long-term (i.e., ambitious) in nature. More specific and tailored goals – including short-term milestones and timelines – will need to be developed for Rockland County, based on an accurate inventory of its emission levels, electricity use, solid waste levels, etc., to use as a baseline and to help create specific milestones. While this task may seem

technically daunting, there are a number of tools available to assist counties and municipalities, including the following¹²:

- U.S. EPA's Resources for Inventory Development: EPA assists state and local governments in the inventory process by providing technical assistance and guidance on inventory preparation. State and local governments use inventories to track emission trends, set goals, develop strategies and policies, and assess progress.
 - The International Council for Local Environmental Initiatives (ICLEI) Local Government GHG Protocol: This protocol, aimed at local government operations, is part of process to write the official Protocol for GHG inventory for all U.S. local governments.
 - Clean Air and Climate Protection Software: CACP 2009 has been updated to support emissions inventoring and climate action planning based on the principles and methods of the Local Government Operations Protocol (LGOP).
 - Office Carbon Footprint Tool: This tool was created for office-based organizations ("offices") located in the United States to assist offices in making decisions to reduce their GHG emissions associated with their activities.
- **Coordinating the County's Climate Change Initiatives.** Because of the highly technical and complex nature of setting and implementing goals to address climate change, a structure will be established to provide centralized coordination and guidance among relevant departments as a means to implement these efforts. Initial key steps to be undertaken by the appropriate County departments include establishing baseline inventories of greenhouse gas emissions in Rockland County (for County operations and fleets) and solid waste generated by County facilities, conducting an energy audit of all County facilities, seeking funding to begin implementing measures to reduce the County's energy usage, and developing a visible public campaign to address climate change within the county.
 - **Developing Short-Term Climate Goals.** Based on the above first steps, the County would then develop specific short-term goals to address climate change. The long-term goals set by the Climate Smart Communities program are ambitious, and in order to reach them and to provide guidance for the future, the County should first establish more reachable near-term goals with targeted schedules for implementation.

The County should also work to facilitate cooperation from the towns and villages. The County could promote municipal participation by developing model local laws, green building codes, and other policies for use at the local level; providing technical assistance to municipalities and other groups on applying for funds for sustainable initiatives; developing financial incentives for energy-efficient/green building and conservation measures; advocating for State and Federal government assistance for implementation of climate change measures; and working with municipalities on smart growth land use policies.

- **Providing education programs.** A key component of reducing greenhouse gas emissions beyond County government is for the County to provide technical assistance to sectors within Rockland

¹² For examples of sustainability actions by other U.S. counties (King County, WA; Broward County, FL; and Alameda and Sonoma County, CA) see <http://your.kingcounty.gov/solidwaste/greenbuilding/index.asp>, <http://www.broward.org/ClimateChange/Pages?cityresources.aspx#best>, <http://www.acgov.org/sustain>, and <http://www.coolplan.org>.

(school districts, businesses, etc.) on funding for sustainability initiatives, and offer educational programs for homeowners and members of the development community (builders, architects, landscapers) to promote green building products and techniques. Rockland should consider making knowledge of sustainable development techniques a part of its licensing requirements for contractors and other key members of the development community. The County should also work with Cornell Cooperative Extension and the Rockland Municipal Planning Federation on an educational campaign for landowners and landscapers to discourage the use of pesticides and herbicides.

- **Creating an environmental task force.** To assist in municipal and regional environmental efforts, the County should create an environmental task force including staff from the appropriate County departments and other agencies, as well as town and village appointees and volunteers from a range of sectors in the county. This task force – which could be under the auspices of either the Division of Environmental Resources or the Environmental Management Council – would serve as a clearinghouse of information on regional environmental issues such as climate change, sustainability, and water, as well as grant opportunities. The task force would also coordinate and organize environmental efforts of various municipalities, ensuring that they are not operating within a vacuum, and work with the Rockland Municipal Planning Federation to provide training programs for municipal planning boards on green building codes, water conservation, green infrastructure, and other climate change initiatives. In addition, the task force should engage with regional planning organizations to develop regional climate action plans and to work collaboratively with other counties on environmental issues, such as new mandates, that could be facilitated by working together.

Recommendation #8: Encourage Sustainable Development

Rockland should continue to explore the use of sustainable development tools to reduce the impact of new or expanded development. One of the most effective ways to minimize the impact of development is to channel growth into the county's existing village and hamlet centers. Focusing development on infill sites, areas with existing drinking water and wastewater infrastructure, and places near transportation hubs is significantly less harmful to the environment – and much more cost-effective – than developing in rural and vacant areas. Smart-growth land use policies that encourage mixed-use development in close proximity to public transportation help to reduce climate change impacts by reducing automobile usage. In addition, the County should consider the following:

- **Encouraging sustainable development in GML reviews.** In the course of its GML reviews, the Rockland County Planning Department should encourage new development to be as unobtrusive as possible, to enhance rather than detract from the existing environment. This can be accomplished through such means as retaining existing mature trees, implementing appropriate new landscaping using native species, using permeable rather than impervious surfaces, and reducing the footprint of new structures if feasible.
- **Using tools and techniques to reduce impervious surfaces.** The county should limit impervious surfaces in County-owned recreation and open space areas, as well as in all future development of County-owned land, and take advantage of opportunities to decrease impervious surfaces at existing County development. County-owned public open space areas should also be designed to filter polluted runoff from nearby impervious areas.

- **Using sustainable building practices.** The County can have a positive environmental impact by incorporating sustainable buildings practices on its own properties. In addition, “green” building techniques, such as green roofs, solar panels, and LEED[®] certification should be considered for all new County buildings, and existing buildings should be evaluated for the benefit of retrofitting with green building technology. These actions often require substantial up-front investment, but can generate significant cost savings over the long run. Tax incentives should be considered to encourage municipalities and property owners to undertake green building measures. Municipalities can also incorporate design standards into their codes in order to encourage sustainable development practices.
- **Promoting the creation of new wetland areas.** Because small wetland areas that do not meet regulatory thresholds are especially vulnerable to development, the County should promote the protection of existing wetlands, potentially requiring creation of new wetlands when existing wetlands are to be filled. In addition, the County should promote creation of new wetland areas in future development, as feasible.
- **Exploring launching a suburban reforestation program.** Rockland should explore launching a suburban reforestation program to reduce hot spots and improve natural neighborhood aesthetics. Rockland should also protect mature trees through development of model tree regulation laws and coordination with the PSC on improving utility tree cutting and removal.
- **Addressing “creeping” realty subdivisions.** The County should continue to work with its municipalities to address the issue of “creeping” realty subdivisions, or properties that have been subdivided multiple times in a way that avoids the required approval from the County Health Department.
- **Promoting efficient alternative transportation networks.** The County should promote efficient transportation networks and alternative forms of transportation. A well functioning vehicular transportation system reduces the amount of time drivers must idle in traffic and thus lowers carbon monoxide emissions. As discussed in **Chapter 6.0: Transportation**, a number of regional initiatives are underway to address the significant congestion on Rockland’s major roadways. Also, see Recommendation #5, above, for specific actions to address air pollution.

Alternative forms of transportation – carpools, mass transit, and bicycles – should be encouraged through the use of incentive programs, cooperation with transit providers on system improvements, and the creation of bike lanes and trails. For example, the County could capitalize on opportunities for creation of trails along regulated streams, focusing first on the portions passing through parks and working with private property owners to secure access agreements elsewhere. The priority in creating trails should be to improve connections among major destinations, so that alternative travel modes become more feasible and attractive, while ensuring that sensitive environmental areas and riparian buffers are preserved. Trail creation along streams must ensure the preservation of important habitats; trails should be of pervious (permeable) surface and should ideally (based on the County Official Map, Part III) have 100-foot buffers on either side of the trails, as topography and other ground conditions permit.

8.0 PARKS & OPEN SPACE

The 2009 *New York State Open Space Conservation Plan* defines open space as, “land which is not intensively developed for residential, commercial, industrial or institutional use...It includes agricultural and forest land, undeveloped coast and estuarine lands, undeveloped scenic lands, public parks and preserves. It also includes water bodies such as lakes and bays.”

As stated by the National Recreation and Parks Association, the benefits of parks are endless and include, at a minimum, the following:

- Parks provide for many the opportunity to be physically active and to improve personal health
- Parks enhance property values and can be economic engines
- Parks keep our living environment healthy and, in turn, keep people healthy
- Parks provide habitat for wildlife, enjoyment for people and educational opportunities
- Parks and open space help to ensure the protection of flora, fauna, scenic viewsheds, geology and other natural resources
- Parks encourage social interaction and build strong communities
- Leisure activities enjoyed within parks reduce stress and enhance our sense of wellness.

8.1 Parks and Open Space in Rockland County

Rockland County’s network of parks and recreational facilities is one of the Hudson River Valley region’s greatest assets. Indeed, Rockland’s image and character is defined largely by the high quality of these resources, as well as some 45 miles of scenic Hudson River waterfront; more than 600 lakes and ponds; brooks and rivers; trails and scenic byways; and abundant scenic vistas created by varied and dramatic topography. Open space in Rockland has many functions and forms such as State, County, and local parks; hiking and biking trails; farms and orchards; and private recreation areas, may be public or private in ownership, and can include active or passive recreational areas.

Examples of passive, or low-impact recreation, include hiking, bicycling, nature observation, camping, picnicking, fishing, non-motorized recreation and sports, and archaeological or historic preservation; while active, or high-impact recreation examples include motorized recreational use (e.g. snowmobiles, dirt bikes, etc.), paved running tracks, ball fields, playgrounds, swimming pools, or golf courses. In general, Rockland’s State and local parks provide for a relatively balanced mix of active and passive activities, while County parks are largely defined by passive recreation. While many perceive parks to only contain active recreation, passive recreational areas are just as valuable, as they help to improve the quality of life for residents by helping to cleanse air, recharge aquifers, provide balanced ecosystems, promote biodiversity, and preserve viewsheds that can be seen for miles. A mix of active and passive opportunities comprise the county’s private recreation network, including athletic fields, picnic areas, fitness centers, campgrounds, golf courses, equestrian centers, and boat launches. In addition to these open space resources, there are opportunities to acquire land for new parks or open space, as well re-use existing land, such as brownfields. This chapter provides details on Rockland’s vast and diverse network of parks and open space resources, potential park and open space opportunities, and offers guidelines and recommendations for refining the County’s short- and long-term planning goals.

State Parkland

Rockland County is home to 11 State-owned parks totaling some 31,800 acres (see Figure 8.1), all of which fall under the jurisdiction of the Palisades Interstate Parks Commission (PIPC). The Bear Mountain-Harriman State Park constitutes nearly 90% of Rockland's State parkland. Extending across the northern and western portion of the county, this parkland includes Rockhouse Mountain and Jackie Jones Mountain, the highest elevations in Rockland; Pine Meadow Lake and a portion of Hessian Lake; Lakes Sebago, Wanoksink, and Welch; part of the Anthony Wayne Recreation Area; Sebago Cabins and Beaver Pond Campgrounds; the historic Bear Mountain Inn; the Trailside Museum & Zoo; and Iona Island Estuarine Reserve and bird refuge. The parkland also includes hiking and biking trails, streams and scenic roadways, cross-country ski trails, swimming pools, playing fields, picnic groves, row boating, and an outdoor ice skating rink. The remaining State parkland includes the string of land holdings stretching from High Tor State Park east toward Haverstraw Beach and the Hudson River, then south along the riverfront to Palisades State Park. This stretch includes Hook Mountain, Rockland Lake, Nyack Beach, Blauvelt, and Tallman Mountain State Parks, which offer a wide variety of passive and active recreational amenities. Rockland Lake State Park alone has a swimming pool, two 18-hole golf courses, tennis courts, lake fishing, and a 3.2-mile paved trail around the lake. Significant relics from Rockland County's rich history are also preserved within its parklands, notably Stony Point Battlefield State Historic Park, the site of the pivotal 1779 Battle of Stony Point as well as the oldest lighthouse on the Hudson River.

County Parkland

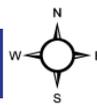
The Rockland County park system is comprised of 25 properties totaling approximately 3,034 acres of land (see Figure 8.1). The County has an additional 134 acres of open space encompassed within two properties: the 40-acre Hillburn Properties and the 94.5-acre Orchards of Concklin. Rockland has acquired a significant amount of County parks and open space land holdings through its Open Space Acquisition Program. Since 1998, the County has acquired about 1,200 acres of parkland and open space, an increase of more than 180%. Significant acquisitions include the 588-acre Wrightman's Plateau (purchased in conjunction with the PIPC) and the 94.5-acre Orchards of Concklin, both located in Ramapo, as well as the 50-acre parcel adjacent to Clausland Mountain County Park (purchased in conjunction with the Town) and the 37-acre Collins property in Orangetown (purchased in conjunction with the Town and the PIPC). County parkland has also been obtained through a variety of other methods, including tax delinquency, donations, ISTEAs grants, etc.

Among the 25 County parks are the 376-acre Kakiat Park in Ramapo – featuring hiking and equestrian trails, fishing, scenic outlooks, off-leash dog area, and guided tours; the 179-acre Kennedy Dells Park in New City – with fitness, hiking, and cross-country skiing trails, a horse corral, soccer fields, and forestry and wildlife conservation areas; and the 27-acre Haverstraw Bay Park, located on the Hudson River, featuring a park office with restroom facilities, open-air pavilion, large playground, paved walking trails, three fishing piers, a boat launch, and the County's September 11th Memorial and Patriot Garden, all of which are handicapped accessible.

FIGURE 8.1: PARKS



PARKS & OPEN SPACE



The County parks supplement the State-owned parks, complementing many of their passive and active recreational amenities, and providing continuity among various parkland and open space holdings. These parkland connections, such as Clausland Mountain, South Mountain, and Dater Mountain Nature parks, allow visitors to travel between multiple parks without reliance on motorized vehicles, and also serve as natural habitat corridors for the region’s wildlife. Like much of the State parkland, many County parks protect environmentally sensitive lands, including the 42-acre Stony Point Marsh in Stony Point and the 273-acre Samuel G. Fisher Mount Ivy Environmental Park near Pomona in unincorporated Ramapo. Also, a number of historically significant structures are found in the County parks, such as Dutch Garden, constructed as a Works Progress Administration (WPA) outdoor work project in 1934. The park consists of formal gardens and a brick teahouse built in the Dutch tradition. A major restoration of the structures and the landscaping was completed in 2008. In addition, the County, partnering with the Village of Piermont, purchased the Ash Street Train Station, located along the Long Path/Old Erie Railroad Bed Loop. The Village restored the original train station built in 1873 and opened it to the public as a museum.

Town and Village Parkland

There are approximately 3,790 acres of parks and open spaces at the local level: 759 acres in Clarkstown, 737 acres in Haverstraw, 830 acres in Orangetown, 1,039 acres in Ramapo, and 425 acres in Stony Point. Comprised within these totals are village-operated parks such as the 25-acre Manny Welder/Spring Valley Memorial Park in Spring Valley; Emeline Park, co-owned by Scenic Hudson and the Village of Haverstraw; Memorial Park in the Village of Nyack; and Peck’s Pond Park in the Village of West Haverstraw. Linear parks are found along abandoned railroad rights-of-way in the Villages of Grand View, South Nyack, and Piermont (see the discussion of hiking and biking trails below). The local system of parks and open space also includes public golf courses, recreation centers, athletic fields, boat launches, and historic monuments. At the neighborhood level, there are a number of playgrounds and pocket parks that are walkable to area residents. See Figure 8.1.

Over the past decade, Rockland’s towns and villages have increased significantly the amount of land devoted to local parks and open space facilities. Table 8.1 shows the percentage increase, by town, between 2001 and 2010. Strategies and resources for open space acquisition at the local level are discussed below in greater detail.

Table 8.1: Local Parks and Open Space Holdings by Town

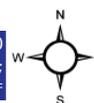
<i>Town</i>	<i>2001</i>	<i>2010</i>	<i>Percentage Increase</i>
Clarkstown	565	759	34%
Haverstraw	453	736	62%
Orangetown	488	830	70%
Ramapo	569	1,039	83%
Stony Point	141	425	201%
Total	2,216	3,789	71%

Source: Towns of Clarkstown, Haverstraw, Orangetown, Ramapo, and Stony Point, 2010

FIGURE 8.2: HIKING & BIKING TRAILS



PARKS & OPEN SPACE



Hiking and Biking Trails

Rockland's park systems are complemented by a network of regional and local trails (see Figure 8.2). Regional trails include the Appalachian Trail, the Hudson River Valley Greenway and Water Trails, Bike Route 9, and a 35-mile long stretch of the Long Path. The Appalachian Trail crosses the Hudson River at the Bear Mountain Bridge and traverses the northern corner of the county between Orange and Westchester Counties. The Long Path, which is on the County Official Map, extends from the George Washington Bridge along the west bank of the Hudson, weaving along the Palisades ridge through State, County, and local parks and through private property, with river views at various points. As it heads north out of Hook Mountain, the trail turns west along High Tor, parallels the Palisades Interstate Parkway, climbs Cheesecote Mountain, and crosses Harriman State Park into Orange County where it intersects with the Appalachian Trail, before continuing north toward Albany.

Within Rockland there are many existing and proposed local trails, in parks, along roads, and on former railroad rights-of-way. Bear Mountain/Harriman State Park has more than 200 miles of hiking trails, notably the Suffern-Bear Mountain Trail, which traverses the entire park. In the southeast portion of the county, parts of the abandoned Erie Railroad line have been converted to the Joseph B. Clarke Rail Trail, a 4.5-mile hiking trail through Orangetown. On the same rail line, the Villages of Piermont, Grand View, and South Nyack and the Town of Orangetown have created miles of connected hiking trails. In addition, there are 35 miles of Greenway Trails and six water trail sites on the Hudson River, designated under the Hudson River Valley Greenway (see below for a more detailed discussion of this program).

There are numerous State-recognized bike routes offering a more intimate interaction with Rockland's scenic beauty, including the five-mile Nyack Beach-Hook Mountain Greenway Trail running along the shore of the Hudson River from Nyack Beach State Park to the north end of Haverstraw Beach; the 4.5-mile Joseph B. Clark Rail-Trail, running between Oak Tree Road and Western Highway in Orangetown; and the 1.3-mile Jones Point Greenway Trail, running along old Route 9W/Dunderberg Mountain in Bear Mountain State Park. The New York State Department of Transportation (NYS DOT) has designated the following highway corridors as part of the regional system of State bike routes: New York State Routes 59 and 304, and U.S. Routes 9W and 202. State Bicycle Route 9 – one of only three long-distance, on-road bicycle routes maintained by NYS DOT – closely parallels the Hudson River as it follows the U.S. Route 9W corridor through Rockland. There also are local roads throughout the county with designated bike lanes, while additional roads are being restriped and signed to include space at the shoulders for bikes. With any designation of specific roadways as bicycle routes comes the necessity to ensure that the safety of these roads for bicyclists has been secured. Appropriate signage to educate both drivers and bicyclists should be provided, as well as enforcement of traffic regulations for both types of road users.

Farms and Orchards

Rockland County's farms and orchards continue to be one of the most vulnerable categories of open space. Development pressure and conversion of farmland to non-agricultural uses have resulted in a significant loss of this valuable open space resource, as well as a change in community character. In the 1920s, the county was home to more than 900 active farms. As of 2010, there remain in the county only nine active farms and orchards totaling 213 acres (see Figure 8.3).

Actions at various levels have been undertaken to prevent the continued loss of this valuable and irreplaceable open space resource. For example, Clarkstown's comprehensive plan states as a goal that the Town will "Continue the acquisition of open space lands to protect sensitive environmental areas, as well as farmland. The Town has specifically indicated Davies Farm – the last large operating farm in

Clarkstown – as a preservation priority. On a countywide level, the Rockland County Agriculture and Farmland Protection Board works to preserve farming opportunities through local initiatives and the protection of open space. The Rockland County Open Space Acquisition Program has been successful in preserving portions of both the 94.5-acre Orchards of Concklin in Ramapo and the 24-acre Cropsey Farm in Clarkstown, of which five acres will be actively farmed. At the civic level, the Rockland Farm Alliance (RFA) – a coalition of farmers, community groups and activists, and local and county officials – works to facilitate local sustainable agriculture in the county. Among its goals are maintaining and enhancing farm viability and profitability, increasing the amount of land for agricultural production, and developing collaborative networks between farms and the food industry. The Rockland County Agriculture and Farmland Protection Board, at the request of the RFA, has investigated the possibility of designating a local agricultural district in the County, under the New York State Agriculture and Markets Law, but the County does not meet the acreage requirements for such a district. The Rockland County Agriculture and Farmland Protection Board is considering submitting a request for an amendment in the law to lower the minimum acreage requirements.

Private Recreation

In addition to its abundant public parks and open space holdings, Rockland County contains some 2,675 acres of land devoted to private recreation (see Figure 8.4). This wide range of resources includes private golf courses, equestrian centers and stables, campgrounds and day camps, marinas and boat launches, picnic grounds, fitness centers, and a variety of recreational centers and facilities.

The network of private recreation facilities plays a valuable role in helping preserve large tracks of open space and habitat corridors; providing connections among existing parks and open space properties; and providing for recreational needs not otherwise met by the public park systems. For example, Krucker’s Catering and Picnic Grove, near Harriman State Park in the Town of Haverstraw, is one of the region’s leading catering facilities, providing for a full range of catering and special event services. Similarly, Platzl Brauhaus, a catering and special events facility, sits on a 20-acre property in the Town of Haverstraw, and can accommodate more than 3,500 guests. Private golf courses play a central role among the County’s active recreational opportunities. In addition, a number of day camps comprise portions of the county’s private recreation network, including the 312-acre Rockland County Boy Scout Camp - Camp Bullowa in Stony Point, the 92-acre Rockland County Girl Scout Camp - Camp Addison Boyce also in Stony Point, and the nearly 50-acre Candy Mountain Day Camp in Clarkstown. Other opportunities within the network include bowling alleys, tennis clubs, fitness centers, and yacht clubs.

As with Rockland’s farms and orchards, the county’s private recreational facilities are vulnerable to outside development pressure. This is particularly true with large land holdings, such as golf courses, and the Boy and Girl Scout properties.

Hudson River

As discussed in **Chapter 7.0: *Natural and Environmental Resources***, and throughout this Plan, the Hudson River may be the most significant surface water resource for Rockland County. The river has a rich history in the county; offers scenic beauty; and is a major ecosystem, containing valuable fish, wildlife, and plant species. The Hudson River also provides valuable recreational opportunities to residents and tourists, such as fishing, boating, swimming, hiking, education, river watching, and wildlife-related recreation. In many ways, the Hudson is a focal point in Rockland County and efforts should be made to retain this position. Therefore, this Comprehensive Plan supports the Hudson River Estuary Program efforts to continue to maintain, develop, and improve connections to the river that allow residents and visitors to have rich and diverse Hudson River experiences.

FIGURE 8.3: ACTIVE FARMS & ORCHARDS

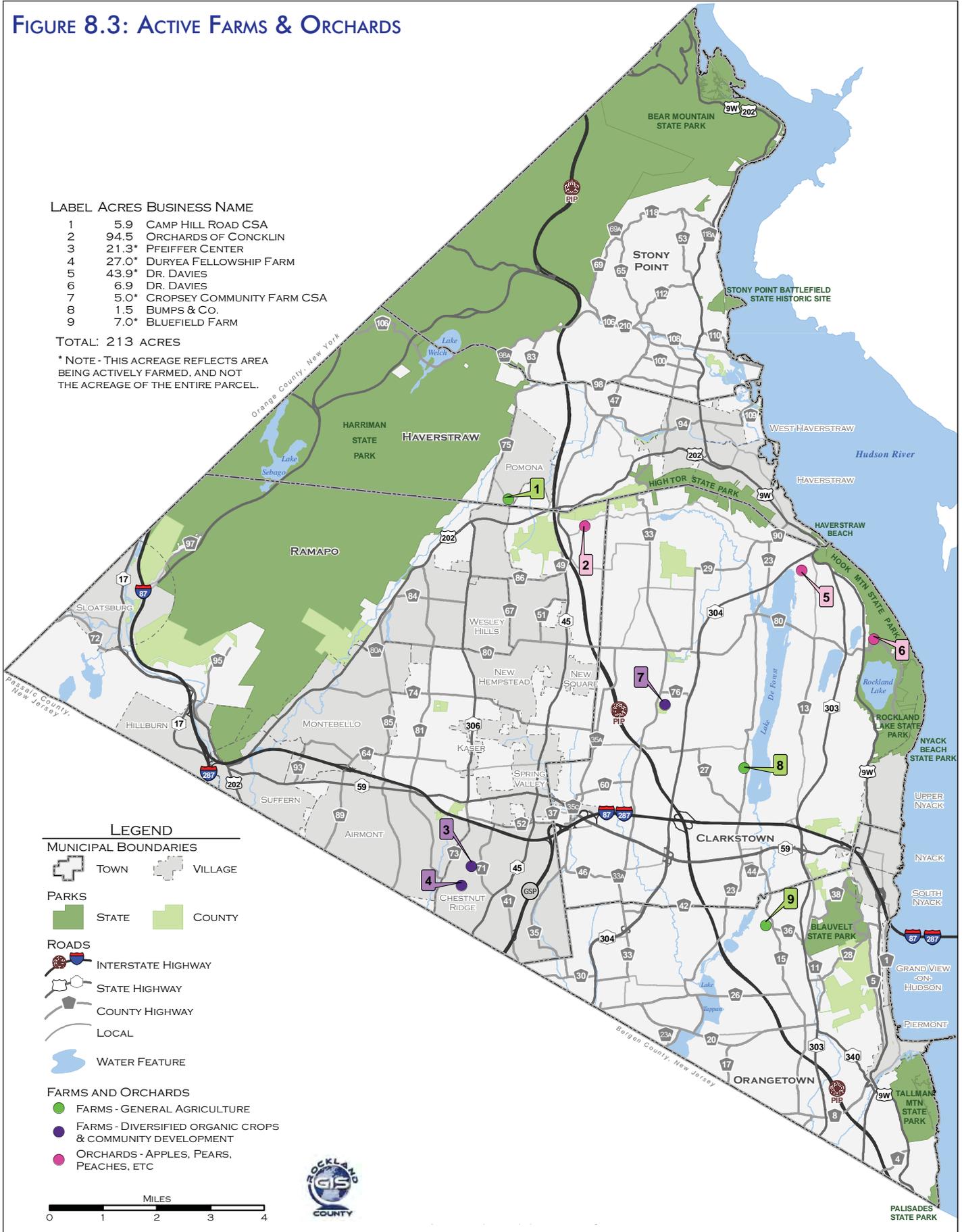
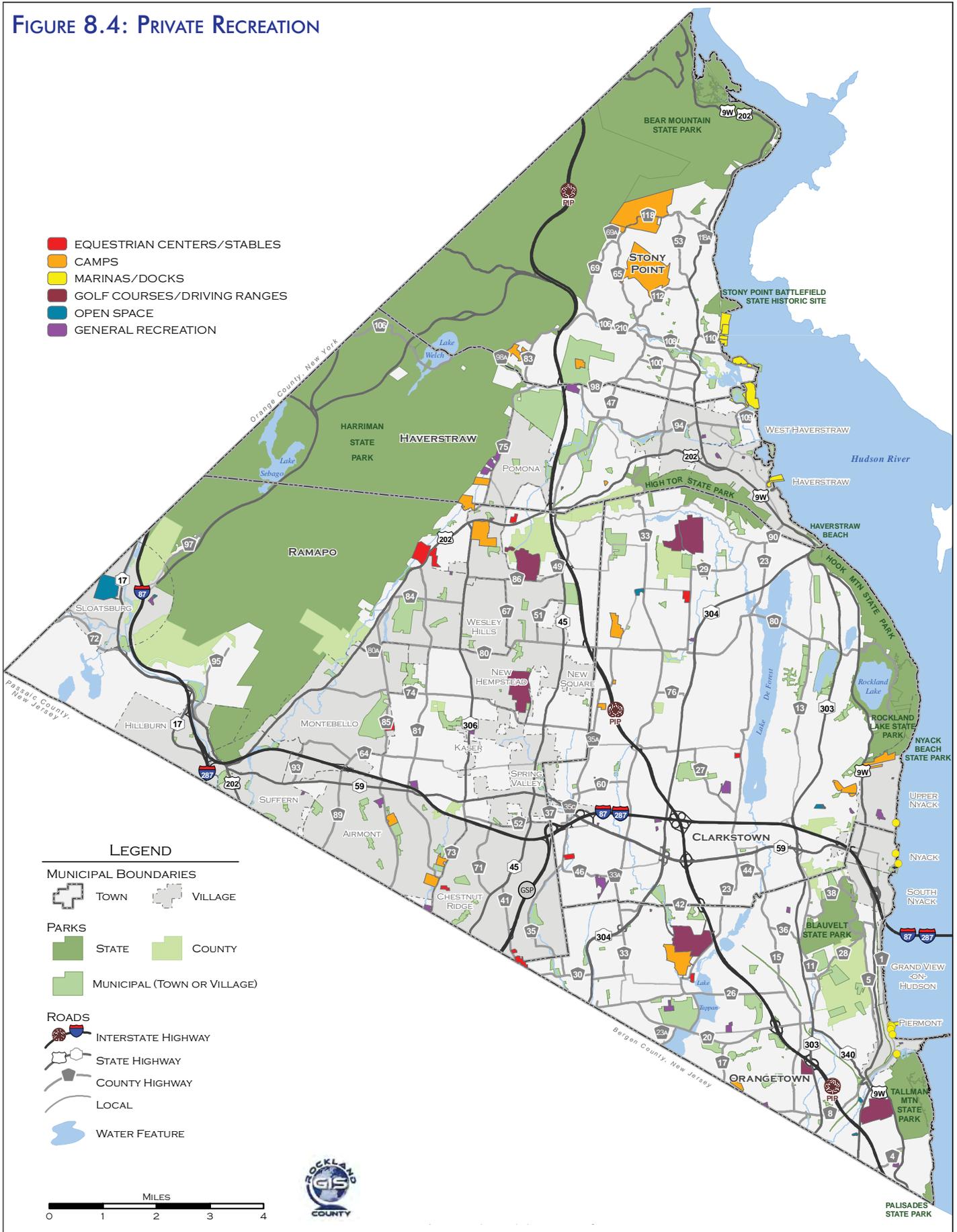
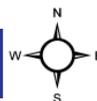


FIGURE 8.4: PRIVATE RECREATION



PARKS & OPEN SPACE



8.2 Parks and Open Space Acquisition

Rockland County Open Space Acquisition Program and Open Space Guidelines

In 1999, Rockland County created an Open Space Acquisition Program to acquire, through a variety of funding mechanisms, areas of scenic beauty, environmentally sensitive lands, farms, Hudson River waterfront areas, and historic and cultural resources. An Open Space Advisory Committee was formed to develop specific guidelines, policies, and procedures for land acquisition and protection. These initiatives resulted in the publication of the Open Space Guidelines (1999), outlining the County's policies for the acquisition and preservation of open space. The guidelines set nine criteria by which land is evaluated and prioritized for acquisition. A Capital Project was created totaling \$35 million to fund the acquisitions. To date, 1,200 acres of property have been preserved expending \$23,209,456 in county funds, bringing the total County preserved acreage to 3,168 acres (see Figure 8.5). An additional \$11,576,000 has been leveraged from the State, local municipalities, not-for-profit land trusts and private contributions.

Parks and Open Space Acquisition at the Town and Village Level

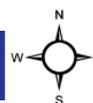
Municipalities play a key role in preserving open space through local planning, land use controls, and the purchase of local open space resources. A provision in New York Municipal Home Rule Law, Section 10, authorizes local governments to adopt and amend local laws for the protection and enhancement of the physical and natural environments. In addition, Section 247 of the General Municipal Law (GML) establishes the preservation of open space as a public purpose and authorizes local governments to expend public funds to acquire interests or rights in real property to preserve open space.

Local governments can conserve significant open space through their authority to control growth and development. For example, municipalities with adopted zoning codes can use zoning techniques such as overlay districts and incentive (bonus) zoning to conserve open space. Other planning strategies for preserving local open space may be administered through the site plan approval process or with techniques like conservation (cluster) subdivision development¹ or planned unit development (PUD).

The early stages of the subdivision review process are often an ideal time to address parkland preservation. As per Section 277 of the GML, local planning boards can require the developer to include in the proposed subdivision plat sufficient parkland for playground or other recreational purposes. This authority can be contingent on the planning board determining – based on an evaluation of the present and anticipated future needs for park and recreational facilities – that the proposed project is a proper case for the requirement. If parkland cannot be suitably located on the proposed subdivision, an in-lieu payment may be required, known as the “rec” (recreation) fee exacted by the municipality from the developer on a per-lot basis. These fees are reserved in a municipal fund earmarked for park and recreation improvements or land acquisition. Whatever technique is used, it is in the municipality's interest – and would benefit the county as a whole – to keep an accurate, updated parks and recreation inventory and needs assessment to reference in the subdivision review process.

¹ See Chapter 10.0: *Housing* for a detailed discussion of conservation development.

FIGURE 8.5: OPEN SPACE ACQUISITIONS SINCE 1999



As is the case at the county level, New York State municipalities are empowered to develop open space guidelines and adopt policies and procedures for land acquisition and protection.²As discussed above, municipalities can use the subdivision process to reserve dedicated open space. In addition, conservation subdivisions are the most inexpensive ways of acquiring dedicated municipal open space. The method is designed to use the private development process to yield publicly available land. This technique has been known as “clustering,” and is now called conservation (or open space) subdivision to make clear the public purpose underlying the organizing of new residential development into smaller lots. Conservation subdivisions and the reservation of parkland are distinct open space acquisition methods, and can be used simultaneously within the same subdivision. Other techniques include direct purchase, conservation easements, donations from private property owners, and special assessment taxes set aside for land purchase. In a model process, the municipality would acquire land already identified as having open space values prized by the community: habitat preservation, vista protection, special area or rural character needing protection, non-programmed recreation (walking, biking, bird watching, horseback riding), or connections between existing parks and trails. This identification takes the form of an officially adopted inventory (both text and map) of existing parks and open space, parcels with open space potential, and techniques for acquiring those parcels.

Towns and villages are encouraged to consult the 2007 *Local Open Space Planning Guide* (see below) for strategies aimed at developing and implementing local open space conservation programs.

Brownfield/Superfund Sites Cleanup and Re-use of Existing Land

Brownfields provide potential opportunities for additional parks and open space in the county. Brownfields are generally abandoned or underutilized industrial or commercial land that may be contaminated from past uses of the property. Reclaiming brownfields or other abandoned or underutilized properties can be very useful in establishing new parks in urban areas or in communities that currently do not have sufficient access to park or open space opportunities. Programs such as the New York State Department of State’s Brownfield Opportunities Area Program are available to assist municipalities and community-based organizations in assessing the possible costs associated with environmental remediation in order to reuse a brownfield for a public park or open space. Some municipalities in Rockland County have had success in cleaning up sites for the creation of new parks. For example, the Village of Chestnut Ridge successfully remediated an abandoned gas station and created a new community park.

In addition to brownfields, there are a number of Environmental Protection Agency (EPA) and New York State DEC Superfund sites in Rockland County. The County and its municipalities should continue to work with the EPA, the State DEC, and property owners to eliminate threats to residents or wildlife from any site contaminations, and to facilitate potential reuse of such sites for open space or parkland.

The County should consider other innovative ways to add parkland in addition to reusing abandoned or underutilized properties. One way may be to add open space to major infrastructure projects, such as a new lid park in South Nyack in conjunction with the I-287 corridor project. As future projects proceed, consideration might be given to expanding the scope of the project to include an open space component. Wherever possible, the County and its municipalities should consider reclaiming a portion of its land and returning it to its more natural state.

² Clarkstown, for example, adopted Open Space Guidelines for the acquisition of property to specifically protect open space resources, including environmentally sensitive areas, farmland, rivers and streams, watersheds, historic and cultural places, and Critical Environmental Areas.

8.3 Programs and Plans

Hudson River Valley Greenway Program

New York State's Hudson River Valley Greenway Act of 1991 established the Hudson River Valley Greenway to facilitate the development of a regional strategy for preserving scenic, natural, historic, cultural, and recreational resources while encouraging compatible economic development and maintaining the tradition of home rule for land use decision-making. Two organizations oversee the implementation of the Greenway process: the Hudson River Valley Greenway Communities Council and the Greenway Conservancy for the Hudson River Valley, Inc. The Communities Council works directly with local and county governments in the development and enhancement of local land use planning strategies and the creation of a voluntary regional planning compact for the Hudson River Valley. The Communities Council also makes available to Greenway Communities a variety of grants and technical assistance. The Greenway Conservancy is responsible for developing the Hudson River Valley Trail system and assists in the preservation of agricultural resources.

One of the fundamental objectives of the Greenway Act is the development and implementation of a regional compact strategy. As an arm of the Hudson River Valley Greenway program, the Greenway Compact makes available a range of financial and procedural benefits to eligible communities. Each Compact area must develop a regional planning contract that addresses the following criteria: natural and cultural resource protection, economic development, public access, regional planning, and heritage and environmental education. Further, participating Greenway communities must incorporate provisions to identify development of regional impact and areas of regional concern, and identify necessary public facilities and infrastructure consistent with the Greenway criteria.

Rockland County has secured from the Greenway Council the funds necessary to begin developing a countywide regional compact. To this end, this Comprehensive Plan – by incorporating the goals and objectives of the Hudson River Valley Greenway – will be used as Rockland's greenway compact plan.

The Greenway Land Trail Program assists communities and trail groups in establishing a system of trails that link cultural and historic sites, parks, open spaces, and community centers as well as providing public access to the Hudson River. Working in tandem with the Hudson River Valley Greenway Communities Council is the Rockland Riverfront Communities Council (RRCC), whose mission is to "protect, enhance and utilize assets of the Hudson River and nearby parks."³ In addition to developing a list of available grant sources for municipalities and non-profit organizations with similar goals, the RRCC has worked with member municipalities to determine the route of the Greenway Trail in Rockland County. To date, approximately 35 miles of Greenway trails have been established in the county, and a continuous trail has been designated from Haverstraw Beach in the Village of Haverstraw to Tallman Mountain State Park in Orangetown (see Figure 8.6).

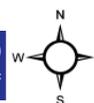
The water and waterfront resources of the Hudson River continue to provide irreplaceable recreational, environmental, cultural, and economic values for Rockland County. The county's waterfront areas are used for a variety of recreational purposes, including local boaters, excursion boats, and rowers and kayakers. The non-boating public also enjoys the river at waterfront areas that provide opportunities for walking, picnicking, fishing, special waterfront events, and enjoyment of the majestic views of the Hudson River and the Hudson Highlands.

³ <http://co.rockland.ny.us/River>

FIGURE 8.6: GREENWAY LAND TRAILS & WATER TRAIL SITES



PARKS & OPEN SPACE



Another key responsibility of the Greenway program concerns public access to the Hudson River. With more than 45 miles of Hudson River shoreline, preserving existing and creating new public access points – both land-based (trails, waterfront parks) and water-based (boat launches, swimming, fishing) – is a critical issue. To address the latter, the Greenway has developed a water trail, defined as “a recreational waterway on a river, lake, or ocean between specific points, containing access points and day use sites and campsites for the boating public.”⁴ To date, the Greenway Water Trail has designated six water trail access points along Rockland’s Hudson River shoreline:

- Stony Point Battlefield State Historic Site, Town of Stony Point
- Haverstraw Bay County Park, Town of Haverstraw
- Nyack Beach State Park, Village of Upper Nyack
- Memorial Park, Village of Nyack
- Gesner Avenue Park, Village of South Nyack
- Parelli Park Boat Launch, Village of Piermont

On average, there is one access point every 7.5 miles. While additional access points should be sought, the County has met the Greenway Program’s goal of providing one or more access points (launches and take-outs) every 10 miles or less along the shore of the river. However, at this time, there are no campsites along Rockland’s riverfront designated under the Greenway Water Trail Program.

Local Open Space Planning Guide

The *2007 Local Open Space Planning Guide* – prepared jointly by the New York State DEC and the Department of State – is intended to help interested local governments develop and implement local open space conservation programs. The guide assists local officials, private organizations, and individual citizens in preparing and implementing their own open space plans and open space components of their local comprehensive plan.

8.4 Issues and Recommendations

Over the last decade, Rockland County has increased significantly its parks and open space holdings. These property acquisitions have been the collective result of formalized acquisition programs, a variety of State and Federal funding mechanisms, partnerships with land trusts, decisions rendered during subdivision review processes, and the acquisition of tax delinquent parcels. The result has been a notable increase in the amount of parkland and open space, particularly in the most densely urbanized and populated areas, which had been lacking such resources.

Despite these achievements, the County must continue to update and refine its vision of open space and recreation. Ongoing challenges include identifying new parcels for acquisition, additional costs of maintaining newly acquired open space, gauging the appropriate use of open space, and – perhaps most importantly – sustaining funding for future acquisition and maintenance.

⁴ North American Water Trails, Inc.

Recommendation #1: Work with Municipalities on Accurate Parkland and Recreation Inventories to Ensure Proper Use and Adequate Maintenance of Open Space Resources

Mechanisms regulating the programming of a particular park or open space resource must be adequately enforced, particularly at the local level.⁵ Municipalities should encourage a highly integrated system of active and passive open space, which maximizes the potential of the open space resource with consideration of its users. As stated above, municipalities could maintain – and share with the County – an accurate, up-to-date parkland and recreation inventory and needs assessment to ensure a balance of passive and active open space resources. Such an inventory could be displayed on official County maps.

Public support must be garnered not only for the general goal of preserving open space, but also the day-to-day realities of owning and using the space. For example, while adjacent residents might support open space acquisition to protect against over-development, they might oppose the public access that could accompany the acquisition. It is important, therefore, for the County and municipalities to conduct context-sensitive evaluations of potential property acquisitions in order to ensure adequate use and maintenance. This might include monitoring the current use of the space; determining whether the space should be programmed for active or passive use, or preserved “forever wild”; and assessing the need for access, parking, or other amenities.

Recommendation #2: Expand Trail and Bikeway Network

In addition to the park systems, Rockland’s existing network of trails and bikeways can play a role in guiding acquisitions for open space. Acquiring land adjacent to these corridors can create a significant unified resource of both passive and active spaces that will be accessible to residents in various parts of the county. Bike or hiking paths, roadway corridors, and existing linear features such as abandoned railway rights-of-way or waterway corridors can all present opportunities for providing connectivity among existing and future open space holdings.

County-regulated streams, for example, are a relatively unexploited opportunity for trails. In some locations, they are crowded by residential property, but elsewhere there seems to be a substantial amount of undeveloped space along the banks. Many streams run through parks, are flanked by parallel roads or perpendicular dead ends, and are frequently crossed by roads – all places that can provide opportunities for public access and greater continuity in the local circulation system for pedestrians and bicyclists. Highway and railroad bridges over streams often have space under their spans in which the trail can be constructed along the stream banks, thereby avoiding at-grade crossings. To help facilitate trail creation, the County should give preference in its open space acquisitions to the areas along regulated streams. Trail creation along streams must ensure the preservation of important habitats; trails should be of pervious (permeable) surface and should ideally (based on the County Official Map, Part III) have 100-foot buffers on either side of the trails, as topography and other ground conditions permit (see **Chapter 6.0: Transportation, and Chapter 7.0: Natural and Environmental Resources**).

The Palisades Interstate Parkway presents an opportunity to connect existing open space. Although it now serves as a commuter artery, the Parkway was built as an elongated landscaped park, providing both a recreational experience while driving through it, and access to the parks to which it connects. A bicycle trail or pedestrian path is consistent with the original intentions of the designers of the parkway. On a larger scale, the trail would connect with the Long Path in Palisades Interstate Park and the trails in Harriman-Bear Mountain State Park, including the Appalachian Trail.

⁵ See Local Open Space Planning Guide: <http://www.dos.state.ny.us/lgss/pdfs/openspaces.pdf>

Rockland thus should continue efforts through the Greenway Land Trail Program to establish a regional system of trails that link valuable open space resources. In addition, trail links and loops should be established between existing trails to provide more opportunities for users, such as a connecting trail between the Long Path and the Greenway Trail in various locations as they parallel the river.

As noted above, the Long Path has been added to the County Official Map, which confirms the County's acknowledgement and support of this trail. The County should add other existing trails to the Official Map as recognition of their importance and validity. As additional trails are developed in the future, they would also be added to the map.

In addition, as discussed in **Chapter 6.0: Transportation**, the new bicycle and pedestrian lanes on the proposed replacement Tappan Zee Bridge should, where possible, be tied into existing pedestrian and bicycle trail networks in Rockland County.

Recommendation #3: Protect and Support Rockland's Farms and Orchards

The County should continue to work closely with its towns and villages, and with the Rockland County Agriculture and Farmland Protection Board, to preserve Rockland's remaining farmland and orchards. Beyond historic resource protection concerns, the County must actively promote the myriad benefits gained from supporting small acreage community farms, including:

- Health benefits associated with consuming fresh, locally-grown food
- Economic benefits gained from buying locally grown food
- Social benefits gained by providing fresh, healthy food for diverse community members
- Environmental benefits such as healthier soils, water and habitats

The Rockland County Agriculture and Farmland Protection Board is also researching Right to Farm laws in New York State. If the creation of an Agriculture District does not move forward, the board may recommend that municipalities adopt local Right to Farm laws. This issue is currently (as of late 2010) under discussion within a subcommittee of the Rockland County Agriculture and Farmland Protection Board.

Recommendation #4: Protect Private Recreational Facilities from Development Pressure

Some of Rockland's private recreational facilities may become faced with budget constraints, rendering these properties vulnerable to outside development pressure. To the greatest extent possible, Rockland must continue to assist in the preservation of these valuable resources. Stewardship of significant private recreational lands is possible through the County's Open Space Acquisition Program, and through the forging of public-private partnerships between, for example, the County and land trusts or other environmentally focused nonprofit organizations.

Recommendation #5: Maintain and Improve Access to the Hudson River

Public waterfront access and open space are fundamental elements to a healthy and inclusive community. Rockland County is fortunate to possess some 45 miles of Hudson River shoreline, and has been successful in preserving this valuable resource for public use and enjoyment. As discussed above, the Greenway Water Trails Program has designated six water-based access points along Rockland's Hudson River coastline. In addition, a number of public parks are situated along the Hudson, providing abundant scenic vistas of the river itself and areas beyond. Nevertheless, there are undeveloped areas along the waterfront that could be developed in the future, and thus pose a threat to waterfront access and views. Any future development projects on or near the waterfront must recognize the importance

of this prized and irreplaceable amenity. Future projects should not prohibit or otherwise restrict continuous public access to and along the Hudson River, subject to satisfaction of safety and security concerns (some water-dependent uses, such as utilities, industrial uses, and marinas, may not be suitable for public access), and subject to any trails or access points having low impact upon the river and its valuable natural resources and habitat (e.g. the use of pervious or semi-pervious trails are preferred over impervious surfaces).

At the same time, development initiatives must enhance public views of the river – both at the shore and further inland. However, it is not enough to simply preserve or create access to the waterfront. Access must be convenient to *all* potential users. Therefore, development plans that would make walking and bicycling difficult, including plans for large blocks or “superblocks,” must be discouraged. Small blocks with numerous east-west connections allow for convenient waterfront access as well as enhanced views of the river.

Recommendation #6: Continue Open Space and Parkland Acquisitions

Rockland County will continue supporting open space and parkland acquisitions utilizing the criteria in the Open Space Acquisitions programs, with the collective goal of protecting the County’s natural resources, providing access to the Hudson River, protecting viewsheds and linking existing parklands and contiguous areas. To this effect, the County should coordinate with its municipalities and land trusts toward acquiring and preserving not only active parkland, but passive open space areas that can contribute to protecting habitat corridors, promoting biodiversity, recharging aquifers, improving air quality, and linking to other open space or parks, either within or adjacent to Rockland County. The objective is to ensure a balanced mix of active and passive uses that serve the recreational needs of county residents without adversely affecting habitats and sensitive environmental areas. In its open space acquisitions, the County must be clear about the intended use – whether active or passive – and ensure that the use is appropriate for the site’s environmental conditions.

Recommendation #7: Preserve Open Space Using Conservation Easements

The County should work cooperatively with its towns and villages and private land owners to preserve open space using conservation easements. Again, the focus of these efforts could be to promote the retention and creation of native vegetation and wildlife habitat on private property with the goal increasing biodiversity and improving the overall health of the natural environment. Conservation easements can be used to help protect a range of open space resources including agricultural land, scenic viewsheds, and “green cemeteries.”⁶

⁶ Green cemeteries are an environmentally sustainable alternative to conventional cemeteries, whereby natural burial procedures are followed.

Recommendation #8: Continue to Pursue Funding for Proper Stewardship of Parkland

While the Open Space Acquisition Program has made tremendous strides in preserving significant environmental resources throughout the County, perhaps its larger challenge pertains to its ability to properly manage and maintain these properties due to budget and staff reductions. The County therefore will continue to pursue funding for proper stewardship of its parkland and open space holdings through a variety of sources, including State funding and partnership with land trusts.

Recommendation #9: Support Brownfield Cleanup and Reuse Initiatives

Reclaiming brownfields, Superfund sites, or other abandoned or underutilized properties can be very beneficial in establishing new parks in communities that currently do not have sufficient access to park or open space opportunities. Through the New York State Department of State's Brownfield Opportunities Area Program, municipalities and community-based organizations are entitled to financial and technical assistance for site assessments, revitalization plans, and implementation strategies for areas affected by brownfield sites. Recent legislation signed into law by former Governor David A. Patterson reforms certain aspects of the New York State Brownfield Cleanup Program – specifically, it restructures tax credits to provide balance between remediation and redevelopment credits. The legislation potentially more than doubles the current tax incentives for site preparation and on-site groundwater cleanup. The County will work with municipalities on educating them on possible brownfield remediation and redevelopment programs, as well as considering brownfields for future county land acquisitions.

Recommendation #10: Establish Full Participation in the Hudson River Valley Greenway Program

Rockland will support a regional strategy for preserving scenic, natural, and recreational resources by establishing full participation in the Hudson River Valley Greenway Program. The County has secured from the Greenway Council the funds necessary to begin developing a countywide regional compact. To this end, this Comprehensive Plan – by incorporating the goals and objectives of the Hudson River Valley Greenway – will be used as Rockland's compact Greenway plan.

Recommendation #11: Examine the Feasibility of an Open Space Component in the I-287 Tappan Zee Corridor Project

As the I-87/287 Transit Corridor Study proceeds (see **Chapter 6.0: Transportation**), consideration might be given to expanding the scope of the project to include an open space component. More specifically, preliminary studies might address the feasibility of re-connecting parkland and/or open space properties that were divided by the original construction of I-87/287 in the 1950s. One suggestion put forth by residents from South Nyack who attended the opening public workshop for this Comprehensive Plan considered a partial “cap” or deck over a segment of a re-built I-87 approach to the Tappan Zee Bridge that would connect existing trails and create new open space. Rockland County supports exploration of the lid park proposal that the Village of South Nyack has formalized. This will reconnect the north and south sides of South Nyack and can be both a recreational and a cultural addition to the existing dynamic, as well as provide for the possibility of secondary economic impacts. This addition of new green space will help mitigate potential negative impacts associated with the I-287/Tappan Zee Bridge Corridor. In addition, the proposed lid park would provide a “hub,” linking the new bridge bicycle/pedestrian lanes with the Esposito Trail and the Long Path, as consistent with Recommendation #2, above.

Recommendation #12: Continue Efforts to Address Deer Overpopulation

Currently, hunting is not allowed in any parkland in Rockland County. However, in recent years, the Rockland County has sought to address the issue of deer overpopulation, which can have a number of negative environmental and safety impacts. Deer primarily eat the underbrush in forests, preventing secondary growth and destroying habitat for smaller animals. In addition, deer can cause road hazards. In 2009, the County Legislature authorized creation of a special committee on deer management to study the potential for legalizing bow hunting in Rockland County at designated Rockland County parks. The effort to allow legal bow hunting in certain County parks was not successful, largely because recreational hunting is under the jurisdiction of the New York State Department of Environmental Conservation's (DEC) Division of Fish, Wildlife & Natural Resources. However, the DEC is in the process of developing a five-year Deer Management Plan (a draft of which will be available in late 2010), intended to reflect management needs, public priorities and other input that is consistent with deer management goals. The process included and held a series of 20 public meetings across the state to help prioritize the issues most important to deer hunters and the public. While future actions to address the deer population in Rockland County will largely depend on the direction taken by the State, the County will continue to participate in the deer management process and advocate for Rockland's needs.