Orange County, NY
Open Space Plan

July 2004

Edward A. Diana,
County Executive

Quality of life for future generations

Acknowledgements

Edward A. Diana, County Executive
A. Alan Seidman, Chair, Orange County Legislature

The Orange County Executive directed the Planning Department to develop an Open Space Plan for County Legislature review and adoption. As adopted, this Plan identifies existing open space initiatives and outlines a strategy to protect undeveloped lands for future generations to enjoy and appreciate. Those actively involved in the process include:

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Chapter 1
Introduction

Background

In 2003, at the request of Edward A. Diana, County Executive, the Orange County Department of Planning began preparation of the first Orange County Open Space Plan. Completion of this Plan was recommended in the newly adopted Orange County Comprehensive Plan (April 2003), and is presented here as a formal supplement to the County Comprehensive Plan.

Given Orange County's current and projected population growth and the related demand for services, this Plan is designed to:

- Define the uniqueness and environmental characteristics of the County as they relate to quality of life (see Map 1),
- Define future open space needs, and
- Recommend County and other priority actions needed to protect key open spaces.

Additionally, the Open Space Plan supports and is supplemented by the three existing documents:

- 2000 Orange County Park Master Plan
- 2002 Orange County Water Quality Strategy
- 2004 Orange County Agricultural Economic Development Strategy

This Open Space Plan also addresses some key "areas of concern" identified in the 2003 Comprehensive Plan. These areas of concern include:

- Better management of development patterns - providing guarantees that land development location and design is consistent with open space needs and,
- The future of agriculture – supporting farmland protection efforts that complement lead efforts to support the economic, business vitality of agriculture.

The Planning Department was assisted by a number of individuals and organizations in the preparation of the Orange County Open Space Plan. Notable was the Orange County Land Trust, which, along with a technical committee of professional and volunteer land and open space experts, provided regular input. Draft elements of this Plan related to agriculture were prepared by ACDS, LLD of Columbia, Maryland with assistance from the American Farmland Trust, Northeast Regional Office. As components of the Orange County Agricultural Economic Development Strategy, these elements were reviewed and accepted by the Orange County Agricultural and Farmland Protection Board and the Orange County Legislature. Finally, preliminary ideas and all draft materials were reviewed and accepted by the Orange County

Planning Board prior to referral for adoption to the County Executive and County Legislature.

The County Open Space Plan is a five-year plan, keyed to the five-year horizon of the County Comprehensive Plan. Recommendations in the Open Space Plan include early action items (to be implemented in one year) and longer-term, five-year actions. Recommendations also include low-cost actions as well as actions requiring a commitment of financial and/or staff resources.

Open Space Plan Categories

The major resource areas for consideration are **Water Resources, Agriculture, Recreation, Landforms and Landscapes, and Biological Diversity (Biodiversity).**

Water Resources: Water resources include the surface waters and its water shed areas, protection zones around the well heads for subsurface water, wetland areas and buffer zones, 100 year flood plain areas, vernal pools, streams, rivers and lakes. The area mentioned can encompass large tracts of land and can be protected through a variety of protection measures that limit land use but do not forbid all uses.

Agriculture: Agriculture remains an important feature of the County's economy and landscape. Agricultural activity occurs primarily in the Wallkill River Valley but is also common in other areas. Approximately 20,000 acres of generally unbuildable "black dirt", of which 14,000 is farmed, is located in the Towns of Goshen, Warwick, Wawayanda, Minisink and a small part of Chester. Efforts are presently under way to protect some upland farmland but larger efforts will be necessary to keep ahead of the growing development pressures.

Recreation: Recreation includes lands varying by types and sizes. Local parks and urban open spaces include a range of large parks with natural areas, playing fields, playgrounds, and small "passive" parks with trees and benches. Within these open spaces, there may be community gardens, and paths for walking and biking through woodland and along streambeds.

Significant Landforms and landscapes: Significant landforms and landscapes are natural features that were formed through dramatic changes in the earth's surface. The features may include palisades, steep inclines, rock out-cropping, prominent mountaintops and valley vistas. Some of these features may include agricultural areas where land has been cleared for farming or man-made buildings were constructed to create picturesque landscapes. Other areas may be connected with historical events such as military battlefields or industrial activities.

Biodiversity: Biodiversity is a shortened version of the term "biological diversity". The concept encompasses the complex community of individual species and their habitats, acknowledging the variability within and among the species. Orange County contains unique features and circumstances that produce exceptional biodiversity. These

include its geology, an ecological crossroads, low-density development and active agricultural uses.

Why a Plan?

Planning for the protection of open space is a community-wide effort. It is not just an acquisition plan, but a wide range of recommendations and techniques for protecting open space.

An open space plan can:

- identify and recommend new recreational facilities and water related public access points that may help the economic and social well being of the County.

- identify such natural resources as wetlands, stream corridors and other ecologically important features.

- identify and recommend trail linkages that will provide corridor connections between public parks and protected natural areas.

The open space plan identifies the priority areas that are important for protection and recognizes the areas that are more desirable for economic development proposals. It will also identify land use techniques that will protect and provide open areas within new developments.

Through the plan, residents of the County have an opportunity to protect important resources for future generations to enjoy and benefit. Open space is a service. Although there may be controversy surrounding the idea of protecting open space, the planning process establishes a way whereby people can discuss and recognize important resources and develop priorities that will benefit the whole community.

Benefits of Open Space

Open space provides many benefits to Orange County. There are direct and indirect benefits as well as short term and long-term benefits. The natural environment not only provides resources to provide food products but also items for medicine and goods that we use on a daily basis. Residents benefit greatly from the social, environmental and economic products of having open space within individual communities and the County as a whole. For this reason, open space should be considered a service just like transportation infrastructure or education.

Social Benefits

Orange County developed historically as an agriculture community with clusters of settlement on the rivers and near major intersecting highways. This pattern of development remained until the introduction of the automobile in the early 1900's. The

attraction of beautiful tree covered mountains, clean fishing streams and open pastureland brought people from the New York Metropolitan Area to vacation and ultimately to live permanently. Better transportation systems also made it easier for people to commute to jobs far from their place of residence.

More and more people have left the nearby urban communities to experience the tranquility and comforts of living in a more rural environment. The diversity of recreational opportunities within the County and the nearby Catskill and Pocono Mountains has contributed to interest in living near these natural vacationlands. These new residents have demanded local recreation opportunities. This has helped to protect open space for parks, trails, water access and general passive types of recreational opportunities.

Orange County has produced diverse agricultural goods such as dairy, vegetable, fruit and forest products for many decades. Even though the industry has declined, demands for these products continue to grow. Residents are still able to enjoy the opportunity to purchase fresh farm products from local farmers. Agriculture contributes to the quality of life in the County, underscoring the need to protect critical remaining farmland and invest in agricultural economic development.

Orange County is filled with natural and historic landmarks that provide a common heritage for residents. They provide a sense of pride that binds us together on common issues and provide a historic basis for future decision-making.

The many recreational opportunities, whether passive or active, provide great opportunities for family and group outings and camaraderie. The remaining forests and fields, a few beach areas, wetlands, historic sites and natural areas provide unique, educational opportunities for all ages and cultural backgrounds.

The importance of parks for active and passive recreational opportunities is enormous. The County Parks Plan identifies capital improvements necessary to maintain existing County Parks and recognizes the importance of protecting future lands that will become passive and/or active County Parks. This Plan will re-emphasize the importance of expanding and protecting the existing parks and also encourage new locations of future areas to fulfill the needs of a growing population.

Residents in urban neighborhoods seek out recreation and open space opportunities close to their homes. It is important that future open space and park considerations consider the needs of urban areas. An awareness of opportunities to set aside land along streams or within neighborhoods is essential to provide places for children to play and participate in athletic activities. Trails and open spaces offer not only opportunities for recreation but also the chance for adults and children to work together to create activities that maintain the park and open space areas.

Environmental Benefits
Healthy natural systems play an important part in protecting and maintaining the environmental quality of communities. Diverse ecological communities are an important part of the overall landscape that gives the community its character as well as the quality of life that attracts people to make their homes and businesses in Orange County.

Environmental benefits of open space include:

- Forested areas contribute to minimizing the creation of global warming by removing carbon dioxide from the atmosphere.
- Freshwater wetlands and tidal wetlands provide a filtering system that treats polluted water, buffer developed areas from flooding, aquifer recharge, stream base flow maintenance and recreational opportunities.
- Trees and parks, especially in urban settings, can reduce noise, lower temperatures in the summer, reduce the need for cooling and heating buildings, and trap pollutants from the atmosphere.
- Forests are vital to the transfer of rainwater to ground water through root systems, which help to maintain and improve the clarity of the groundwater.
- Biological resources and natural habitats add value to the quality of life for all living things. Open spaces provide un-fragmented areas large enough to maintain habitats and roaming areas for larger wildlife. With these larger areas the plant and animal communities can maintain healthy growth and reproduction patterns. The natural environment draws millions of people to Orange County to either live or recreate.
- Our educational institutions have used the open space areas within the County for education for children and adults. Natural areas are living museums that provide interpretive walks and vibrant classrooms within which to describe the importance of the natural environment and the positive impact it has on our lives.

Economic Benefits
Protecting open space provides a variety of significant benefits to Orange County. Some of the major benefits include tourism, farmland, timber harvesting and recreation opportunities. Development design that complements open space can also result in less costly environmental protection and mitigation, more efficient infrastructure and capital investment, and increased real estate values where neighborhoods and communities are close to open spaces.

Tourism is an important industry to Orange County and to New York State. Parks, lake beaches, pools, scenic views, streams, historic sites and river recreation attract millions of out of town and state visitors who spend large amounts of money for services and products provided by local area businesses. The effects of trickling down provide jobs and income for support service providers. Visitors to Orange County generate almost $210 million in sales to local areas, and another $8.4 million is generated through tax revenues.

Agriculture in the County is still an important economic industry that provides jobs and income to the economy. The recent Orange County Agricultural Economic Development Strategy (summarized in Chapter III) outlines the importance of farmland to the County and establishes a series of recommendations to continue the industry for generations to come. A section is set-aside in the Plan that explains the benefits and the importance of the County's farming industry.

Although timber harvesting is a minor industry in Orange County, small lumbering companies harvest much of the hardwood found in the larger forested areas in the County. Several property owners participate in the New York State Forest Tax Law that requires owners to develop a management plan for logging at designated growth levels. The map entitled "Protected Open Space" in Chapter III identifies the parcels that are presently receiving property tax reductions.

The County's economic development community markets Orange County by highlighting its natural amenities as incentives for marketing large scale commercial and office facilities. They realize that these amenities are important in attracting not only the workers for these businesses but also the company executives as well.

Through numerous studies completed in New York State and other states, open space protection demonstrates that money at the municipal level can be saved or reduced. Land use design techniques such as clustering can reduce the costs of infrastructure costs such as utilities, transportation and public works. Studies that were completed in other areas of the country demonstrate that infrastructure costs in the local community were less due to clustering housing and protecting the remaining open space. In New Jersey a study found that communities in the study were able to save $1.3 billion in infrastructure costs over a 20-year period. In South Carolina $2.7 billion could be saved over a 20-year period. Another study in the Minneapolis/St. Paul area demonstrated that clustering units within a more dense zoning area could slash $3 billion in capital infrastructure costs over a 20-year period.

Recent studies demonstrate that land (that remains in forest production and farmland production) produces revenue to the local municipality yet reduces the need for additional services. Homes that are located near or adjacent to open space lands are valued higher due to the amenities of adjacent non-development. Studies also demonstrate that new residential development in previously undeveloped land can result in a net loss of tax revenues to the municipality. New services such as schools, police, fire protection, roads, solid waste, sewage treatment and municipal offices can outweigh the increased tax revenues.

A recent Trust for Public Land publication, titled "The Economic Benefits of Parks and Open Space" and published in 1999, identified the following as examples of increased home value near protected open space. "In Salem, Oregon, land adjacent to a greenbelt was assessed at $1,200 more than only 1,000 feet away. A three mile greenbelt in Oakland, California near the city center added $44 million to surrounding property values, in Denver, Colorado a survey showed that resident's desire to live near a greenbelt rose from 16% to 48% and in Dayton, Ohio the increased selling price of

homes near the Cox Arboretum and park were influenced by the close proximity to the park facility."

Targeting development where services are provided and protecting vital open space will improve the economy and quality of life in the community. Even reuse of previously developed land such as vacant lots or brownfields will help produce additional tax revenues.

Existing Plans to Protect Open Space

New York State's Open Space Conservation Plan 2002

In 1992 New York State established its first Open Space Plan beginning a long-term effort to protect open space. Every two years with the support of regional committees, the Department of Environmental Conservation (DEC) and the Office of Parks, Recreation and Historic Preservation (OPRHP) have updated the Plan to add new policies and new sites to the long list of proposed protection resources.

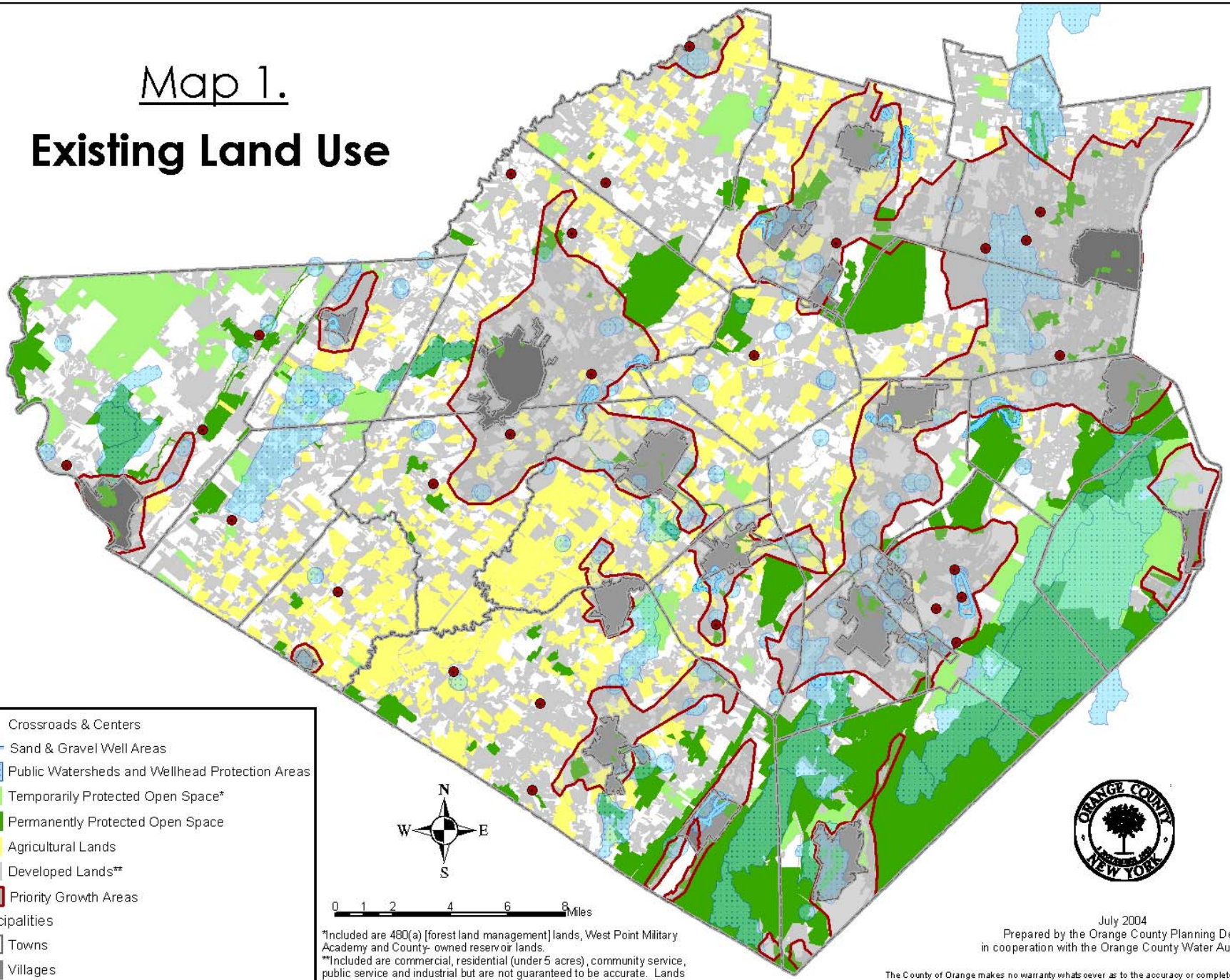
The missions of the two agencies are similar. DEC is directed "to conserve, improve and protect the State's natural resources and environment and control water, land air pollution, in order to enhance the health, safety and welfare of the people of the state and their overall economic and social well-being." OPRHP's mission is "to provide safe and enjoyable recreational and interpretive opportunities for all New York State residents and visitors and to be responsible stewards of our valuable natural, historic and cultural resources."

The plan includes several chapters that discuss the benefits of open space, the inventories of resources, recommendations, and the framework for protecting open space for future generations. The New York State Open Space Section 3 Committee that includes Orange County has identified the resources to be protected in a series of resource corridors. Areas that specifically apply to the County are Mongaup Valley Wildlife Management Area, Schunnemunk Mountain/Woodcock Mountain /Moodna Creek, Shawangunk Mountains, Sterling Forest surrounding area, Hudson /Wallkill Valley Farmlands, Hudson Valley Estuary/Greenway Trail, Long Path, New York Highlands, Wallkill River Valley.

As money becomes available through the Environmental Protection Funds to purchase properties, other properties identified in the plan are moved to priority positions for acquisition. The State has made a commitment to protect one million acres of open space over the decade. The State Plan will continue its effort through constant updating to fulfill the demands identified.

Map 1.

Existing Land Use



*Included are 480(a) [forest land management] lands, West Point Military Academy and County- owned reservoir lands.
**Included are commercial, residential (under 5 acres), community service, public service and industrial but are not guaranteed to be accurate. Lands shown here represent the closest approximation of developed lands with the data available.

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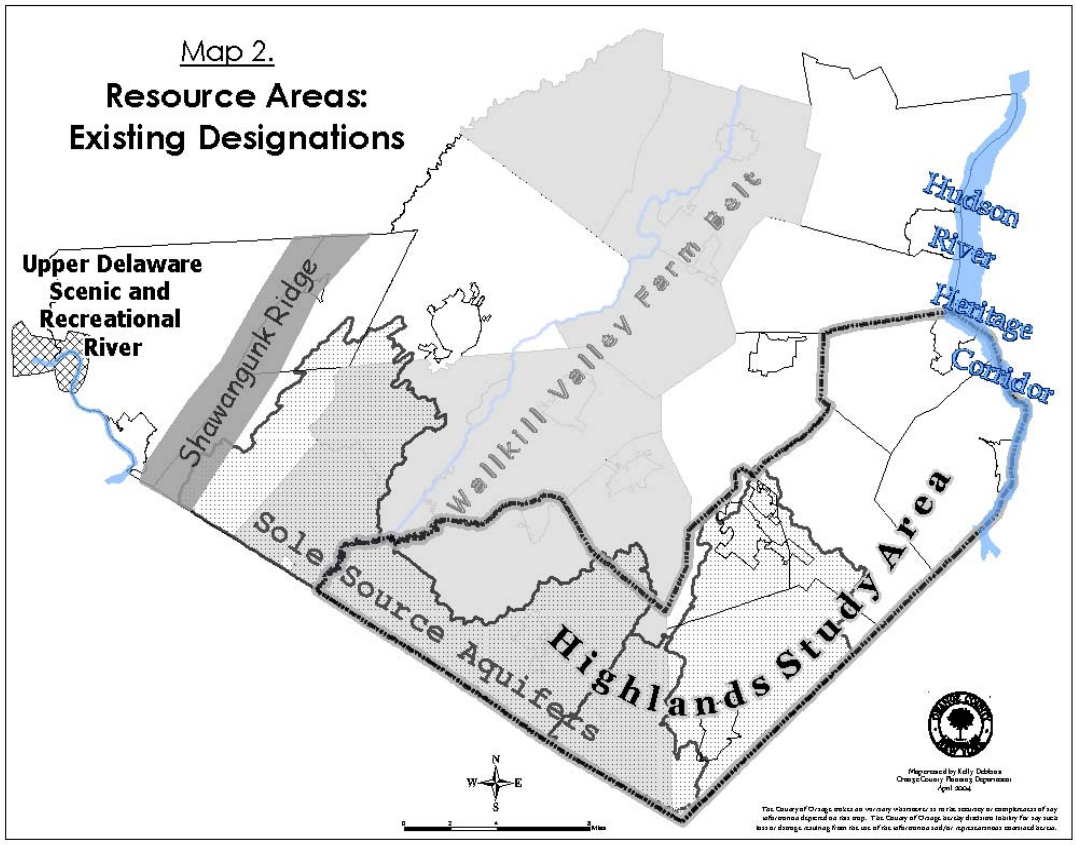
Prepared by the Orange County Planning Dept
in cooperation with the Orange County Water Authority.



The New York State Quality Communities Initiative:

New York State, under the leadership of the Governor, established a Quality Communities Interagency Clearinghouse to bring together State agencies to discuss ways in which they could better coordinate and administer the numerous State Legislative directives and funding mechanisms to better serve the residents of the State of New York. As a result a document was formulated that identifies the recommendations for accomplishing such a goal.

Although there are many recommendations that cover a variety of topics, the two that specifically apply to the Open Space Plan are those on conserving open space and protecting farmlands as a viable economic base. Below are paraphrased recommendations that apply to relevant State agencies.

1. The State will continue to fund open space protection and stewardship initiatives of locally significant open space, significant State open space and farmland protection.
2. It will encourage a partnership with local governments, not-for-profit organizations and private landowners.
3. In addition to funding, local governments are encouraged to use municipal comprehensive planning, zoning laws and development partnerships to set aside open space and recreation lands.

4. The State will further the conservation goals of the State and local governments by providing a tax credit to encourage landowners to donate real property or other interests in real property such a s conservation easements.
5. The State will pursue the authorization of the creation of open space districts by local governments.
6. The State will continue and enhance the dedicated funding source for the purchase of development rights on undeveloped land including farmland and study new techniques to protect open space in areas experiencing less development pressure.

Orange County Comprehensive Plan of 2003

In 2003 the County Legislature adopted a significant update of the 1987 Comprehensive Plan. The Plan includes recommendations on open space, recreation and agriculture, among other topics.

Below are a few highlights of some of the recommendations that will influence the content of this plan.

1. Maintain the County's existing parks and strategically purchase or facilitate the preservation of additional parkland or prominent vistas.
2. Conserve the County's natural land resources in a sustainable, linked combination of parks, open space, agricultural lands and waterfront.
3. Identify undeveloped areas of the County as appropriate for permanent open space, establish acquisition priorities and conserve farmland to enhance the open space character of the County as well as diversify its economic base.
4. Utilize the active and passive recreation and open space potential of waterfront resources.
5. Preserve and promote the County's historic heritage.
6. Maintain existing and provide for future expansion of pedestrian and bike trails and corridors in the County.

Orange County Park Master Plan

In 2000 the County Legislature accepted a County Park Master Plan that lays out capital and needs strategies for the County Park System. The Plan surveyed the needs and concerns of the residents and established a direction for the County in the next twenty years. Some of the needs are outlined below. Many of the strategies apply to existing facilities and may consist of plans for active recreation. The open space plan looks at proposals that will expand existing open areas and add needed protection areas to existing park and historic properties.

The Parks Plan outlines two basic goals that encompass a large range of recommended actions. The first goal is to support the County's effort to preserve and enhance the County as a desirable place to live, work, and play for current and future residents. The second goal is to support efforts to maintain through capital programs the existing facilities.

The major strategy for preserving and enhancing the County's open space and historic resources includes taking an inventory of lands for protection, developing acquisition policies for historic protection and open space protection, connecting hiking and biking trails, linking open spaces and historic sites, transfering County-owned lands appropriate for open space, and balancing recreation availability in the County.

Orange County Agriculture and Farmland Protection Plan, 1996
Orange County Agricultural Economic Development Strategy, 2004

In 1996, Orange County adopted an agricultural and farmland protection plan, becoming the first county to adopt such a plan in the State. The Orange County Agricultural and Farmland Protection Board (AFPB) developed the Plan with the assistance of Cornell Cooperative Extension.

The Plan, which was updated and accepted by the Orange County Legislature in early 2004, provides all County agencies and organizations, led by the County Planning Department and AFPB, with the clear direction and specific strategies that enable them to effectively address critical issues facing agriculture in Orange County. The plan is intended to inform long-term policy formation in support of agriculture while providing a specific short-term work plan to guide local programs and agencies regarding specific agricultural economic development initiatives. The Plan assesses and identifies specific strategies, programs and action projects that best encourage agricultural economic development and foster the protection of the County's most strategic farmland. The Plan is a living document and intended to be modified over time to meet evolving needs.

The plan's goals are to:

- Improve on-farm profitability.
- Enhance agribusiness infrastructure.
- Improve understanding of agriculture as a key economic engine.
- Heighten awareness of agriculture as an important community asset.
- Enhance market access for local agricultural products.
- Increase value-added production activity.
- Engage the public and elected officials in the future of agriculture

Orange County Water Quality Strategy, 2002

Federal regulations under the Clean Water Act, as amended in 1987, require each of the 50 states to address their non-point source water pollution problems. In New York State the job of developing and implementing this requirement along with strategies for protection and enhancing water quality was delegated to the individual counties. In Orange County, the Soil and Water Conservation District took a lead role and in 1992 established an Orange County Water Quality Coordinating Committee. This ad-hoc, interagency committee prepared, and has periodically updated, a strategy identifying primary non-point sources of pollution to be addressed as well as priority surface water bodies where protection and enhancement efforts should be focused.

The 2002 updated Strategy identifies improving water quality in the following streams:

1. Hudson River/Moodna Creek, from Orrs Mills to its confluence with the

Hudson River, and the Hudson from river mile 44 to 56.

2. Neversink River
3. Ramapo River
4. Wallkill River

Additionally, this 2002 Strategy identifies two priority County wide issues for enhancement and protection:

1. Drinking Water Supplies – both surface reservoirs and underground aquifers.
2. Wetlands and other surface water bodies.

Chapter II
Physical and Social Characteristics

Geographic Features

Orange County's natural environment is extremely varied, with distinctive topographic features, water bodies, wetlands and woodlands that need to be preserved, enhanced or carefully developed in those cases where future development is permitted.

The County's rivers and streams, including the Hudson River, the Delaware River and the Wallkill River, are important assets that geographically define the County. The Hudson River Valley, with its steep topography, its built-up communities along the river's shore, and its historic sites, including the U.S. Military Academy at West Point, extends a distance of approximately 21.5 miles, forming the County's eastern edge from just north of the Bear Mountain Bridge to six miles north of the Newburgh-Beacon Bridge.

The less dramatic, but still beautiful Delaware River runs along the western boundaries of Deerpark and Port Jervis, a distance of 7.7 miles in Orange County. Like the Hudson River, the Delaware River provides recreational opportunities for the County and the region. Its role in economic development is more limited than the navigable and tidal Hudson River that has a number of shallow water industrial operations.

The north-flowing Wallkill River, which bisects the County, extends a distance of 33 miles, from Sussex County, New Jersey to the Rondout Creek south of the City of Kingston. The Wallkill River is an important environmental resource, offering additional wildlife habitat and recreational opportunities among a variety of urban and non-urban land uses.

A number of small rivers and streams, including the Ramapo River in Monroe and Tuxedo, Moodna, Creek, and Neversink River, plus numerous ponds, lakes and reservoirs, exist throughout the County. Wetland areas, including Federal and State-designated wetlands, are present in nearly every community in the County. Unlike wetlands that are dispersed throughout the County, the rich "black dirt" soil, a highly valuable agricultural resource, is concentrated in the southern portions of the County, in the vicinity of the Wallkill River corridor. Another productive pocket is found adjacent to the northern boundary of the Village of Chester.

The County's topography ranges in elevation from sea level along the Hudson to over 1,600 feet above sea level to the southwest of Newburgh. The steepest topography in the County is concentrated in two areas. In the western portion, the Shawangunk Mountains provide an eastern slope for the Neversink and a boundary between Orange County and Sullivan County. The Town of Deerpark is also separated from the balance of the County by this mountain ridge. In the east, the Village of Highland Falls, West Point and vicinity are separated from the balance of the County by the Highlands

that extend from the New Jersey border northeastward toward Bear Mountain and the Hudson River.

Between these two mountain ranges, there is gently rolling terrain in the interior portions of the County. However, within this expanse, there are numerous areas where steep slope conditions occur, including large areas in the eastern and southeastern parts of the County. Variations in the topography provide significant opportunities for viewing panoramic vistas of agricultural areas, open spaces and ridgelines.

Additional natural features in the County include large wooded areas, principally along the mountains and steep slopes previously noted and north-south trending watershed and aquifer areas in the western, eastern and south-central portions of the County.

These environmental features have played a major role in shaping the County's existing development pattern. Future development will be channeled carefully recognizing the importance of the remaining essential natural resources that are vital to the County's future.

Orange County has a variety of protected lands used for a variety of purposes (see Maps 3 & 4). The uses range from active parks to trails on rails. Presently there are 92,156 acres of protected open space and 36,515 acres of temporarily protected land in the County. They are identified as follows:

Federal	2,830 acres (permanent) 14,355 acres (temporary)
State	68,900 acres (permanent)
County	2,730 acres (permanent) 3,960 acres (temporary) (proposed reservoir lands)
Municipal	5,840 acres (water supply) 2,370 acres (municipal parks)
Private	9,486 acres (permanent) 18,200 acres (temporary) (480a Forest Tax Law)

Publicly protected acreage is comprised primarily of active parkland and, to a lesser-degree water resources. Privately protected land may include all five categories.

Environmental Constraints (See Map 2b)
Also important is an appreciation that certain federal, state, and municipal environmental regulations effectively limit the development of lands in Orange County, as they do in the remainder of New York State and much of the country. Notable are federal and state designated wetlands, federal designated floodways and floodplains,

and municipally designated steep slopes. While regulations associated with these designations are variable and subject to change, such regulations have served to temporarily protect lands from certain development activity considered inappropriate for these environmental conditions.

Demographic Overview

Historical trends indicate that Orange County has consistently experienced increases in its resident population. The rate of these increases varies from decade to decade. For example, Census figures from 1990 to 2000 reflect an 11% increase in the County's population, while the previous decade, 1980 to1990, showed a rate of change closer to 19%. A long-term growth rate signals the importance for protecting the open space resources that are essential to support the growth needs. The major resources are recreation lands, water supply locations and farmlands. The protection of scenic areas and habitat regions is essential to having long lasting positive effects on the quality of life that attracts future residents and businesses.

The population for 2000 was 341,367. It positioned the County as the 12th most populated county in New York State and the 4th highest in its rate of growth. Although the County experienced periods of growth spurts, from 1950-1960 and in the subsequent 10-year period (1960-1970) the County's population increased approximately 21%, yet when analyzed over time, the average **annual** growth rate for the County is 1.24%.

Projections suggest the County's population will continue to grow, but at a slower rate than in the 1990s. Projections also indicate that the county's population will gradually grow older, but remain one of the youngest populations in the region. Racial and ethnic diversity is also expected to increase. Significant variation in population characteristics will continue in different areas of the county.

Proprietary data sources (Claritas Inc.) forecast a slower rate, about 0.7% annual for the five-year period up to 2003. For the subsequent five-year period 2003-2008, the growth rate projected by Claritas is even lower at 0.5%. The graph below illustrates both Orange County's population growth outpacing its neighbor counties, especially in the 1980's, in addition to its place as the largest county in this group. Extending this region to include Sullivan and Putnam County, Orange still remains the most populated.

Area	1960	1980	2000	% Change 1960-2000
Orange	183,734	259,603	341,367	86
New York State	16,782,304	17,558,072	18,976,457	13
United States	179,323,175	226,546,000	281,421,906	57

Households, Age Structure, and Racial Diversity

Population increases affect land use, but the most direct effect on both home buying patterns and land use is caused by growth in the number of households. In 1980, the number of households in Orange County was 84,199. By 1990, the county had 101,506 households, reflecting a 20% increase during the 80s.

In 2000, the number of households was 114,788, an increase of 11.57% during the 90s. Forecasts suggest that this slowing in the rate of increase will continue. Households are projected to grow at an annual rate of 1 percent or less through 2020. By 2018, the projected number of households is 124,000. While growth in the number of households may slow in the years ahead, it likely will still outpace population increases.

Orange County's population is slowly growing older, but growth is expected in the youngest segment of the population. The age groups that are expected to grow the fastest in the next twenty years are children in the 0-15 age group and residents in the 45-54 and 55-64 age groups. There will also be growth in the over 65-age group.

With the exception of New York City, Orange County's age distribution mirrors that of the Mid Hudson Region, the State and the Nation. When considering age as life cycle related, the 2000 age distribution chart can be interpreted as patterns of moving through the school system, labor force participation and retirement.

From 2000-2010, the absolute and relative numbers of those in the 25-44 age group are expected to decline. The 25-44 year old segment is anticipated to be 27% of the population by 2020. In 1990, this group was 33% of the population.

By comparison, for this same timeframe, projections suggest that by 2015, the 45-54 age group will be decreasing. The 55-64 age group will continue to increase, and is projected to grow to 14% of the population by 2020, doubling its 1990 percentage. By 2020, the 65-79 age group age is estimated to account for 11% of the population, a 3% increase from 1990. A modest increase in the number of those 85 and over is also projected for this period.

While the market for single family homes is likely to be adversely affected by these changes (particularly the decline in the 25-44 age group), the housing market for empty nesters, townhouses, assisted living, retirement communities, and continuing care retirement homes is likely to increase. These changes also imply an increase in the "dependency ratio" in the county (the ratio of non-working to working population) over the next two decades.

Even with the gradual "graying" of the population, in a regional context Orange is a relatively young county. The county's median age of 34.7 years is the lowest in the region. Orange is the only county in the region in which half the population is under 35 years old.

Census figures show Orange is racially and ethnically diverse. The 2000 Census estimates that the County's population was 84% White, 8% Black, and 1.5%

Asian/Pacific Islander. The Hispanic population, an ethnic category that may include all categories of race, was estimated to be 12%, the largest segment of the minority population.

Census figures indicate slower growth in the white population in Orange County relative to higher growth in other racial population segments. The increase in the Hispanic population is consistent with the growth of this segment in neighboring counties such as Westchester and Rockland.

The Black and Hispanic populations are largely urban. Despite recent immigration from Asia, the Asian population is less than 2%.

In the New York metropolitan region, ethnic diversity varies inversely with proximity to New York City. Orange is less diverse than its southern neighbors, but more diverse than neighbors to the north. A similar pattern is found in the percentage of foreign-born residents, about 7% of Orange County's population.

Jobs, Incomes and Housing Prices

More than 30% of Orange County's workforce commutes to jobs outside the county, primarily in New York City, Westchester and Rockland Counties and northern New Jersey (refer to graphic on page 20). These workers often earn salaries above the County's median income. The local economy employs about 70% of the resident workforce and also attracts about a third of its workers from outside the county. These workers often earn less than the median income.

Housing and Land Use

A major objective of the 2003 County Comprehensive Plan is to encourage a development pattern of land use over the next 20 years that accommodates population and housing growth while fostering economic development and maintaining the open space and rural character of the County. A comparison of the residential development pattern with the urban-rural growth concept of the 1987 Comprehensive Plan Update shows that much of the residential development has taken place outside of the core urban areas defined in that Plan. In 2000, approximately 18% of the County's population resides in the cities, while 61% live in the towns, and the remaining 21% reside in the villages.

New housing construction is one of the most important determinants of future land use patterns. An estimated total of 15,322 building permits were issued for the period 1990-2000, resulting in an annual average of about 1,392 building permits. Assuming permits continue to be issued at this rate, about 27,840 permits will be issued over the next twenty years. If construction occurs at this rate, it is estimated that 28,000 acres (about 5%) of the County's 522,000 acres of remaining developable acreage would be needed to support residential construction over the next 20 years. The anticipated lower growth in the number of households over this period, however, suggests that residential construction may also occur at a lower rate.

If current trends continue much of the residential development in the next twenty years will occur in Monroe, Chester, Warwick, Blooming Grove, Woodbury, Montgomery and New Windsor areas. Other areas like Deerpark, Greenville, Wawayanda, Minisink and Mount Hope are also likely to experience growth in residential development, though as the existing population base is relatively small these increases will not represent as many new residents as in the larger towns. Large-scale residential developments in the southeastern part of the County could further skew the geographic distribution of growth over the next decade. Since housing construction in the County's villages and cities is generally in-fill or redevelopment, units in these areas don't represent large-scale conversion of vacant or agricultural land.

Non-Residential Growth

Orange County offers excellent Interstate highway access, rivaling many States, as well as relative land affordability when compared to the metropolitan areas to the south and east. If current market trends persist, growth in commercial, industrial and institutional land uses is anticipated over the next five years and beyond. The location of these uses, whether along corridors, at interchanges or downtown centers will place demands on existing vacant or agricultural land. Business parks, a priority site location marketed by Empire State Development Corporation and the Orange County Partnership, will remain priorities, but may quickly get built out.

Historic and future growth patterns for such uses are expected, and are encouraged to mirror the availability of public infrastructure and services. The primary elements of this infrastructure are roads and centralized sewer and water. This Plan seeks to encourage appropriate locations for such uses to allow efficient access for employees, maximizing the use of the current road capacity as well as the provision of transit services, primarily bus but including train and aviation services.

Connections from such locations to transportation hubs and centers are critical. Ideally, new or expanding commercial, industrial or institutional land uses first seek options in immediate proximity to population centers with adequate public services. Where this is not possible, corridor, interchange or crossroad locations may work as long as environmental and transportation impacts are mitigated, and key open spaces or prime agricultural lands are avoided.

CHAPTER III

Description and Inventory of Resources

Protected Open Space

Thomas Bull Memorial Park

Sterling Forest State Park

To determine where, what and how much open space land should be protected for future generations, this Open Space Plan first addresses the existing open space resources through a series of maps and text. The County needs to determine where the resources are located in order to identify and locate future open space needs.

The Planning Department staff, with the aid of other experts, identified existing protected open space, analyzed their significance and revealed the areas that need protection. Map 1 shows the existing land uses in conjunction with the protected open spaces. With this contrast of uses, the County can establish priorities for preservation, as well as priorities for growth.

Successful open space planning explores protected open space areas in neighboring communities and then identifies and states priorities that will expand and complement these existing areas. Map 3 shows the inventory of protected open space in the nearby Counties of Ulster, Sullivan, and Rockland in New York State; Sussex and Passaic in New Jersey; and Pike in Pennsylvannia.

Map 4 shows an inventory of the categories of protected open space, both permanent and temporary. To understand the significance of areas identified on the map, the Plan defines protected open space, permanently protected open space and temporarily protected open space.

This Open Space Plan defines **protected open space** as predominantly undeveloped land that is historical, agricultural, recreational, vacant, or any combination thereof in nature and is at least temporarily protected from development. This land can be publicly or privately owned and may or may not be open to the public. Protected open space can serve multiple purposes, including agricultural, recreational, historical, scenic, or natural resource protection. Such areas can range in size and character from a small urban pocket park to large tracts of forest.

Within this category, this Plan establishes two categories of protected open space, permanently protected and temporarily protected:

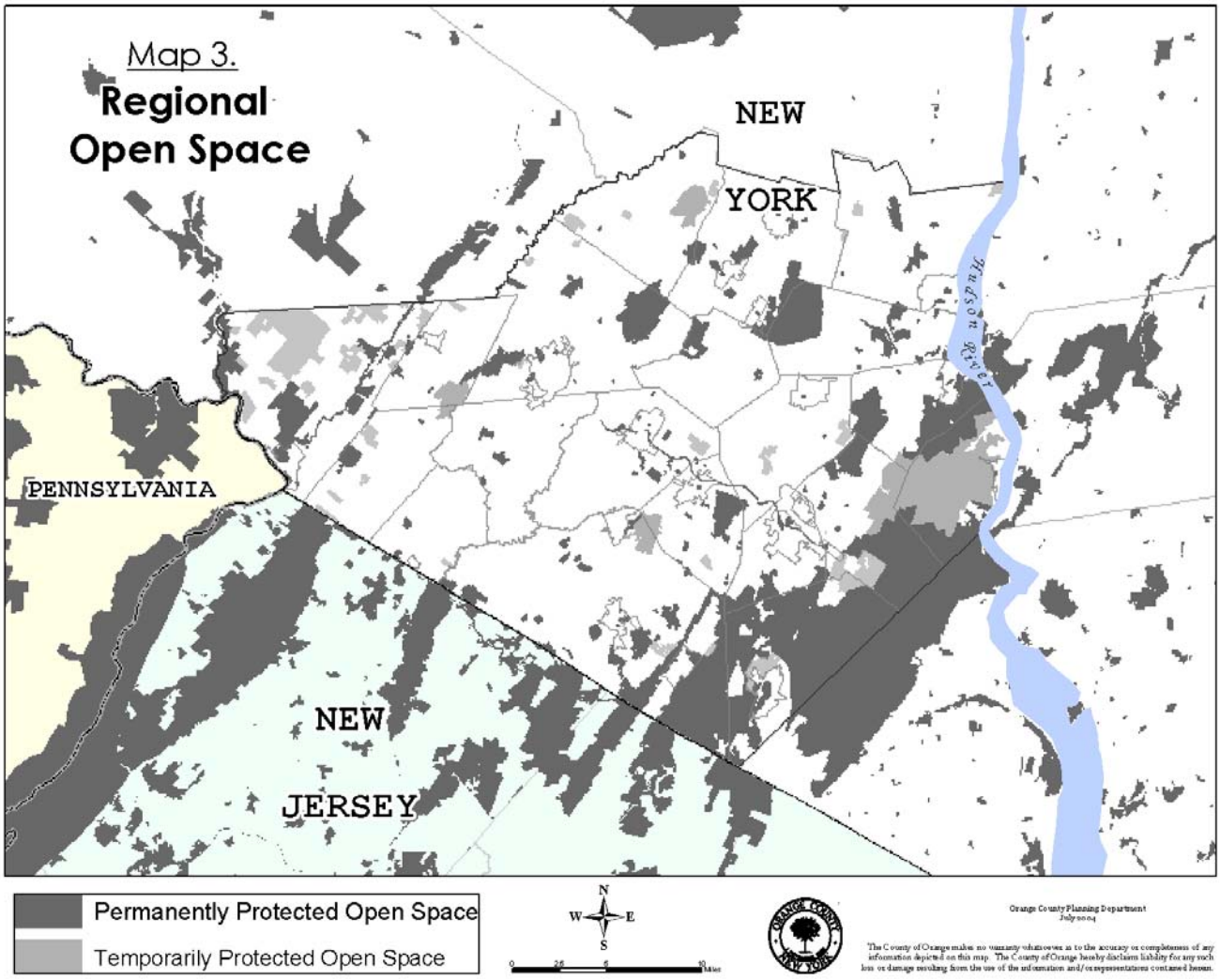
Permanently protected open space is guaranteed to remain undeveloped in perpetuity by virtue of: 1) its ownership by a conservation organization (such as a land trust), a government agency, or by any other entity whose mission is to protect land from development, or 2) the presence of a conservation easement upon the deed of a land parcel.

Included in this category are Federal Wildlife Refuges, Federal Parkland, National Wildlife Refuges, State Parks, State Forests, State Unique Areas, county parks, and municipal parks.

Temporarily protected open space cannot be developed for a certain period of time due to a contractual agreement such as a term easement.

This category includes County-owned Reservoir Lands, West Point Military Academy, and privately owned land that receives a 480[a] tax exemption by the DEC for being in the forest management program.

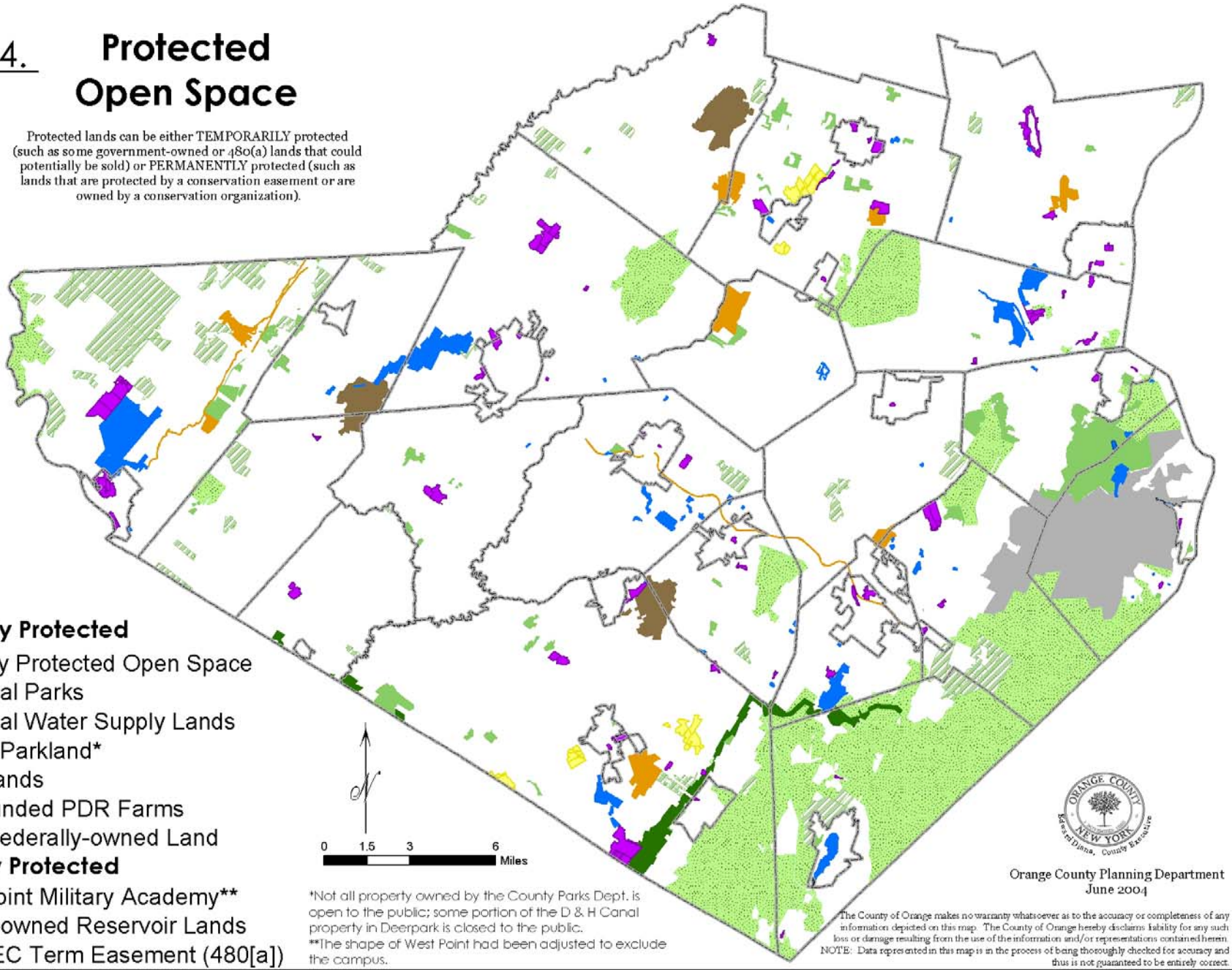
Temporarily protected open space is useful to inventory primarily because these lands are suitable for future permanent protection. In Orange County, temporarily protected open space makes up almost 30% of the total protected open space and 7% of the land area of the County (Map 4). If these lands were to be developed, County residents, especially those in the town of Deerpark, would most certainly notice the change in landscape.


Map 3.
Regional
Open Space
NEW
YORK
Hudson River
PENNSYLVANIA
NEW
JERSEY
Permanently Protected Open Space
Temporarily Protected Open Space
N
W
E
S
Orange County Planning Department
July 2004
The County of Orange makes no warranty whatsoever as to the accuracy or completeness of any information depicted on this map. The County of Orange hereby disclaims liability for any such loss or damage resulting from the use of the information and/or representations contained hereon.

Map 4.

Protected Open Space

Protected lands can be either TEMPORARILY protected (such as some government-owned or 480(a) lands that could potentially be sold) or PERMANENTLY protected (such as lands that are protected by a conservation easement or are owned by a conservation organization).



Permanently Protected

- Privately Protected Open Space
- Municipal Parks
- Municipal Water Supply Lands
- County Parkland*
- State Lands
- State-funded PDR Farms
- Other Federally-owned Land

Temporarily Protected

- West Point Military Academy**
- County-owned Reservoir Lands
- NYS DEC Term Easement (480[a])

0 1.5 3 6 Miles

*Not all property owned by the County Parks Dept. is open to the public; some portion of the D & H Canal property in Deerpark is closed to the public.
**The shape of West Point had been adjusted to exclude the campus.

Orange County Planning Department
June 2004

Water Resources

Moodna Creek

Glenmere Lake

Orange County has had a long and continued interest in water. The County is physically and historically defined by two of America's great rivers: the Hudson River on the east and the Delaware River on the west. Until the dominance of rail and, most recently, car mobility, the County heavily relied on its proximity to the Hudson and the Delaware, as well as their tributaries, such as the Wallkill, Moodna, Ramapo and Neversink. More recently, as land use has spread and diversified, surface and ground water continue to be vital resources, but less for transportation or power than for drinking water, first and foremost. Other leading uses include agricultural irrigation, recreation and waste assimilation.

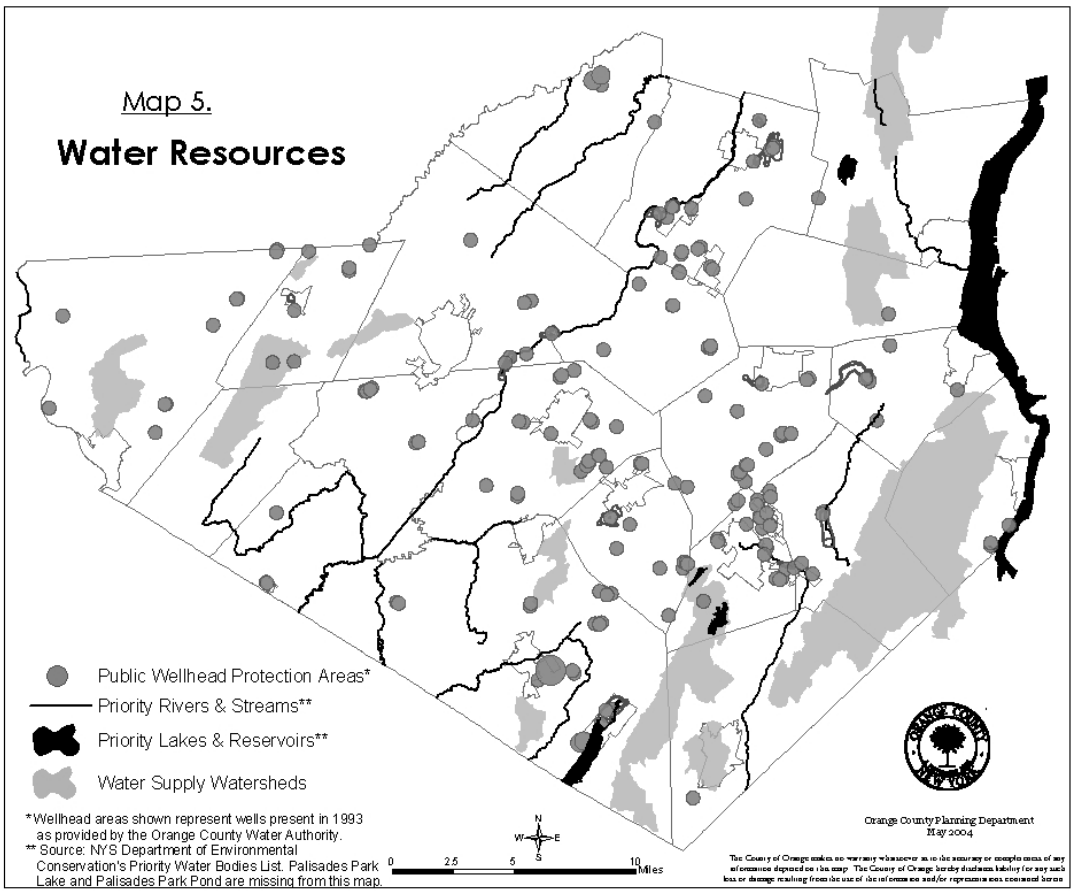
Today, Orange County constituents consistently identify water resources protection as a priority goal of open space preservation. Indeed, based on research, interviews and other outreach for this Plan, water resources are the lead priority. And the majority of up-to-date municipal master plans proactively cite water supply, water quality, river corridors, or aquifer protection as major community values. The benefits of open space distinguished by water resources can include:

- water quality protection
- water supply
- groundwater recharge
- sedimentation & erosion control
- stormwater management
- waste assimilation
- flood protection
- scenic enhancement
- habitat protection
- transportation (surface waters)
- recreation (surface waters)
- historic preservation (surface waters)
- agricultural productivity

Water resources are truly regional, defying municipal, county and even state borders. They are also shared. For example, significant portions of the Ramapo River and Pochuck Creek watersheds are in Orange County, yet both have been designated by

the US Environmental Protection Agency as *sole source aquifers* for their roles in serving as the sources of water for thousands of nearby New Jersey residents. (See Map 2) With water, what Goshen does links it with Washingtonville, as Greenville does with Middletown, Otisville with Pine Bush, Chester with Tuxedo, Deerpark with Port Jervis, Pine Island with Walden, and Newburgh with Cornwall. In the end, all of our County's communities are connected with each other and with hundreds of others in the Hudson and Delaware watersheds.

Under this water resources category, our focus is on two primary components – water supply and water quality protection. The following map highlights this focus.



Public Water Supply

There are three primary types of public water systems: community, non-community, and non-transient non-community systems. In relation to open space, the County's highest priority is community systems, those serving at least five connections and/or 25 residents year-round. This category includes all municipal water systems. While these systems rely predominantly on groundwater sources, significant populations are served by surface water reservoirs.

According to the Orange County Department of Health, as of March 2004, there are 161 community water systems in Orange County. One hundred and thirty two (132) rely on ground water (wells) while twenty-nine (29) use surface water as a source.

There are also some three hundred and fifty five (355) non-community water systems in Orange, of which forty-nine (49) serve non-transient customers (schools, commercial/industrial)-- forty-seven (47) from groundwater wells and two (2) from surface sources. The remaining majority of non-community systems, three hundred and six (306), serve transient customers (e.g. motels/hotels, restaurants), again predominantly (301 of 306 total) through groundwater wells.[i]

Protecting these water supplies provides a connection to open space planning; improved land management and open space conservation at both current and potential high-yield water supply sources can help ensure residents, institutions and businesses that clean, plentiful water will be available.

The New York State Source Water Assessment Program Plan[ii] establishes policies for water supply protection from which are adapted recommended open space/ water resource protection areas (see Map 5). For surface water supplies, the critical protection area is the topographic watershed of all public reservoirs (also known as surface water supplies) in the County. For groundwater supplies, the adopted recommendation here is a two-zone approach: an inner well zone is a 100-foot sanitary radius around any community supply well where ownership and strict protection is the highest priority. This is complemented by a 1500-foot radius or outer wellhead protection zone for all community groundwater systems, where development and land use should be monitored to assure "aquifer-friendly activities".

When mapped, the total area of the County in these water supply protection areas is estimated at 84.9 square miles or 54,571 acres (wellhead protection areas = 22,358 acres or 34.9 square miles + water supply watersheds = 32,213 acres or 50.3 square miles).

Water Quality Protection

Federal regulations under the Clean Water Act, as amended in 1987, require each of the 50 states to address its non-point source water pollution problems. In New York State, the job of developing and implementing comprehensive strategies for protecting and enhancing water quality was delegated to the individual counties.

The Orange County Soil and Water Conservation District, as the leader, established an Orange County Water Quality Coordinating Committee in 1992. Priorities, goals and activities were compiled into the original Orange County Water Quality Strategy, dated August 12, 1992 and recently updated in 2002.

Rapid urbanization and land development have directly impacted the majority of waterbodies cited in the 1996 Priority Waterbodies List (PWL), as cooperatively defined

by the County Water Quality Coordinating Committee and NYS Department of Environmental Conservation. Groundwater resources face similar threats to their integrity. Twenty (20) Orange County waterbody segments were identified as stressed, threatened, impaired or precluded on the 1996 PWL, ten (10) of which are adversely impacted, primarily by urban/suburban sources. Agriculture is identified as the primary polluter of five (5) of the listed segments.

Another primary water quality threat is referred to as "urban runoff". Inadequately designed or managed development can result in increased erosion from unprotected or inadequately protected construction sites. As paving and roofs replace permeable soil surfaces, management of excess storm water runoff becomes a necessity. A primary concern of growers who farm the County's unique mucklands is the additional runoff from residential developments that is causing earlier and more extensive flooding of their fields. The adverse impact of sediment, road salt, farm and lawn chemicals, animal manure and hydrocarbon residues transported by runoff directly into our vulnerable waterways, including surface drinking water supplies, must be addressed. Waterways identified as adversely impacted require concerted efforts to upgrade water quality or to prevent the pollution problems described as "imminent."

1996 NEW YORK STATE DEC
PRIORITY WATER BODIES LIST FOR ORANGE COUNTY

Segment	Condition	Primary Source
Dwaar Kill	Threatened	Urban runoff
*Greenwood Lake	Impaired	Urban runoff
Hudson River	Impaired	Contaminated sediment
Longhouse Creek	Threatened	On-site systems
Lower Mongaup River	Impaired	Hydromodification
Mombasha Lake	Threatened	Urban runoff
Orange Lake	Stressed	On-site systems
Pakanasink Creek	Threatened	Urban runoff
Palisades Park Lake	Threatened	Acid rain
Palisades Park Pond	Threatened	Acid rain
Pochuck Creek	Stressed	Agriculture
Quaker Creek	Stressed	Agriculture
Quassaick Creek	Stressed	Urban runoff
*Ramapo River	Stressed	Other source
Rutgers Creek	Stressed	Agriculture
*Wallkill River	Stressed	Agriculture
Walton Lake	Stressed	On-site systems
Wawayanda Creek	Threatened	Urban runoff
Wheeler Creek	Stressed	Agriculture
Woodbury Creek	Threatened	Private

* Identified as priority watersheds by the Orange County Water Quality Coordinating Committee

The Neversink River is also listed as a Priority Waterbody in Sullivan County.

Selected Priority Watersheds

(In alphabetical order)

1. **Hudson River/Moodna Creek**: The Moodna Creek, from Orrs Mills to its confluence with the Hudson, and the Hudson River between miles 44 and 56, have been designated as "irreplaceable" Significant Coastal Fish and Wildlife Habitats by the New York State Coastal Management Program.

2. **Neversink River**: In 1990, according to The Nature Conservancy, the lower Neversink was found to contain thriving populations of the globally endangered dwarf wedgemussel (Alasmidonta heterodon). The Neversink River population of heterodon is considered the largest and healthiest remaining population of this species in the world.

3. **Ramapo River**: The Ramapo and its associated aquifer have been declared a "Sole Source" of drinking water for the community of Mahwah, NJ. A total of two million people living and/or working in Rockland County, NY, and northern New Jersey rely on the Ramapo aquifer. The watershed, in Orange County, includes the Towns of Blooming Grove, Monroe, Tuxedo and Woodbury, and the Villages of Harriman, Monroe and Tuxedo Park.

4. **Wallkill River**: The Wallkill River drains the heartland of Orange County, including approximately 14,000 acres of highly productive organic soils (black dirt/muck). Along the length of its course the River is seen as being impacted by both muck and upland agriculture, two landfills on its banks, numerous sewage treatment plant discharges, and continued urban development.

Priority Water Quality Issue: Drinking Water Supplies

Both surface reservoirs and groundwater aquifers face the same potential risks of pollution as the identified Priority Water Bodies. Portions of the recharge zones of two sole source aquifers have been identified in Orange County. The Orange County Groundwater Study, published in 1995, highlights areas with a high potential for groundwater development, and provides estimates of groundwater resource quantities available in and near local municipalities. Recommended next steps could involve actual groundwater exploration, and assistance to communities to define where additional water supplies are or will soon be needed. Water conservation, wellhead and aquifer recharge area protection, and surface reservoir watershed studies are recommended as continuing priorities.

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[i] Orange County Department of Health, Environmental Health, 2004.

[ii] New York State Department of Health, Source Water Assessment Program Plan (NYS DOH, Bureau of Public Water Supply Protection, Troy, NY: 1999)

Agriculture

For many, farmland is synonymous with open space, but what farmland "means" as open space depends on one's perspective. To some, farmland may represent a "placeholder" for either future park or recreational lands or future residential or commercial developments, and for others farmland may be appreciated as the working landscape that it is. For farmers, like any property owner, the land is a primary investment. To be sure some farmers see their land as the means of making possible a future that does not include their continued farming in Orange County, but for farmers that want to stay in the business of farming the land is at the heart of the business.

The expectations for Orange County's remaining farmland are many. The challenge for the County is to find the common ground among the varied perspectives, and to meet overall goals related to the County's economy, fiscal management, and how the overall landscape mosaic relates to "livability" or quality of life.

Farmland is a commercial land use that can, when managed to do so, concurrently provide open space, recreational opportunities, watershed protection, and biodiversity protection and enhancement. Lands with agricultural use can also be used to help balance public revenues and expenditures. But for a farmer to stay on the land in the business of farming he or she must be able to generate sufficient income from the farm operation and not have overwhelming economic disincentives related to agricultural markets, high land values or taxation that forces the sale of the farm. If the County is to successfully institute policies to keep substantial areas of land as working farmland, it will be necessary to address both farmland preservation and agricultural economic development through appropriate means.

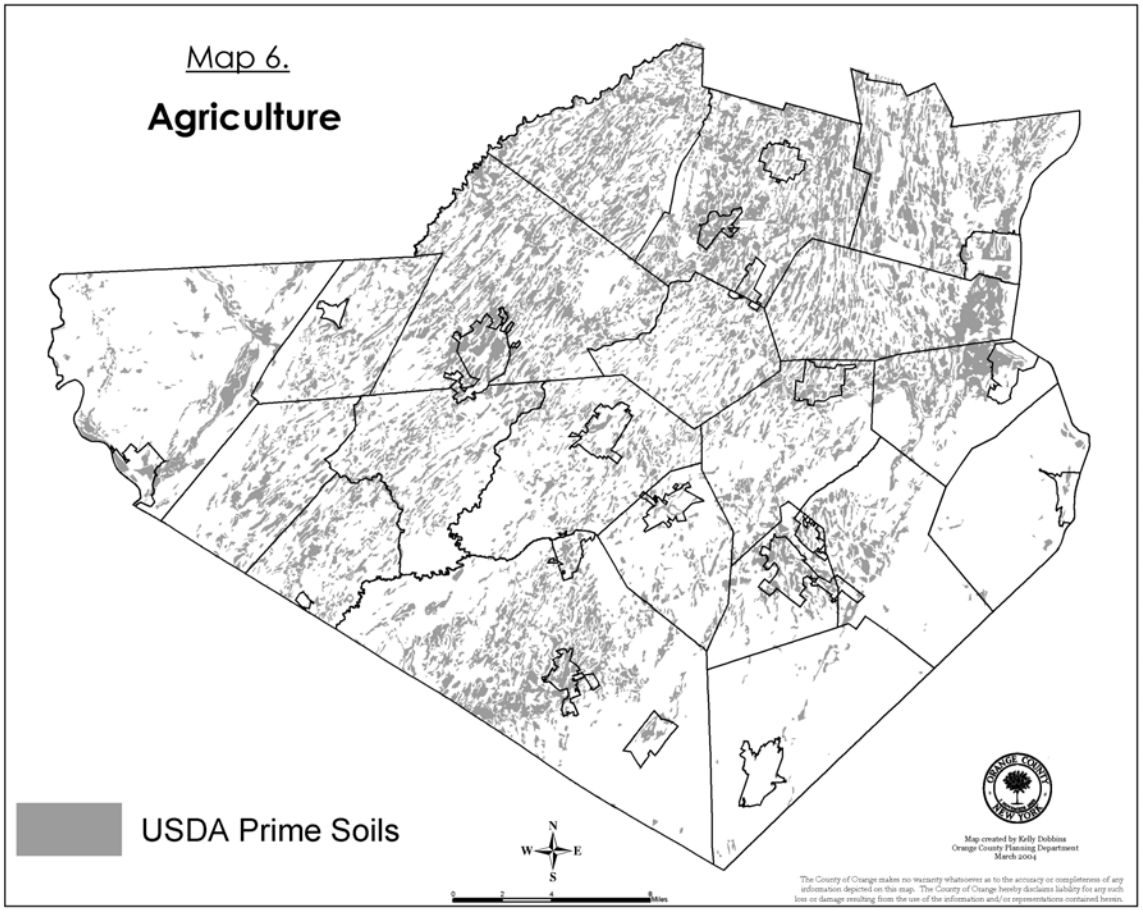
To preserve critical areas of farmland the Orange County Open Space Plan recommends the following actions be taken at the County level:

- Support farm-friendly land use policies and programs at the County and municipal levels.

- Implement the 2004 Agricultural Economic Development Strategy.
- Choose purchase of development rights (PDR) and/or term easement strategies and commit to levels of public investment that meet open space plan goals.

What follows is an assessment of the current state of agriculture in Orange County.

Agriculture in Orange County – Current Conditions[♦]



[♦] A comprehensive analysis of agriculture in Orange County is available in the 2004 Orange County Agricultural Economic Development Strategy.

Economic Impact of Orange County's Agriculture Sector

Understanding the structure and characteristics of agriculture in Orange County is essential to understanding how farmland can and should relate to County efforts to plan open space. Because farming is a business, it is important to consider the role of agriculture in the County's economy and relevant economic characteristics that have implications for farmland conversion. There are two common methods for measuring the economic impact of any sector of the economy: 1) the direct measure of a sector's economic importance as measured by its output; and 2) an output multiplier for the sector which quantifies the sum total of upstream and downstream effects on the economy.

The direct measure of the output of the four principal farm commodities (vegetables, dairy, greenhouse/nursery, and livestock) in Orange County was $62.1 million in 1997, accounting for 89 percent of the County's $69.8 million farm output. In 1997, the vegetable and dairy sectors were of equal value, just over $20 million dollars per industry.

Since economic output does not happen in a vacuum, analysts often use output multipliers as a secondary measure of economic activity. Goods, services, and labor from within the economy are used to produce output. This output is usually further transformed by other sectors of the economy, stimulating more business activity. Thus, a second measure of economic impact is an output multiplier for a sector, which quantifies the sum total of upstream and downstream effects on goods, services and labor.

Based on the output multipliers for Orange County's farm commodities, every $1 increase in total farm output led to an additional 55 cents in economic activity in other sectors of the local economy. Thus, the direct output of Orange County's agricultural sector was $69.8 million, but an additional $38.4 million was generated in other sectors of the local economy, based on 1997 data (the year of the most recent USDA Census of Agriculture which was available for the preparation of this plan). Using the latest data from 2000 for the aggregate farm sector, output value was $108.4 million, which generated another $59.6 million in other sectors.

The Economic Challenge

Agriculture in Orange County, New York is undergoing significant structural change as its agricultural base transitions from a pure wholesale commodity basis of dairy, tree fruit, and vegetable production to an economy based on the production of higher value crops, direct market oriented marketing, and agritourism. This is occurring at a time when the value of developable land is substantial and appears to be trending upwards.

Historically, dairy farms and feed production to support the dairy industry had comprised a significant portion of Orange County's agriculture industry. However, with the change in federal dairy policies in the 1980s and the emergence of corporate-sized

dairies in the West in the 1990s, family-sized dairy farms in the Eastern states faced a rough economic climate. Orange County, N.Y. was not immune. From 1985 to 2000, dairy cow numbers in the County were cut in half. In addition, the amount of hay and corn acreage dropped dramatically during this same time period.

Key Economic Findings

Orange County's farm economy produced $108.4 million in output value in 2000, which generated an additional $59.6 million in related economic activity within other sectors of the local economy.

In the last 15 years, growth in Orange County's vegetable and greenhouse/nursery sectors have offset the declines experienced in the dairy and feed sectors. Cash receipts for vegetables produced in Orange County were up 52 percent from 1987 to 2000, while cash receipts for the sale of greenhouse and nursery crops more than doubled during this time period.

The vegetable sector is the largest segment of the farm economy and accounts for nearly 40 percent of Orange County's agricultural output. However, there have been significant swings in this sector's output in the last decade, suggesting some instability.

A few farms with relatively high sales provide most of Orange County's agricultural economic activity. In 1997 the largest 30 percent of the farms accounted for 86 percent of the County's agricultural output.

After trending higher for much of the 1980s, farm profitability in Orange County fluctuated widely in the 1990s. These variations likely reflected changes in the vegetable sector over the same period.

Growth in vegetable production and the greenhouse/nursery sector have been matched by an increase in Orange County's wholesale trade and, in the case of vegetables, vegetable manufacturing. The decline in the dairy sector caused losses in the number of farm supply stores, dairy manufacturers, and dairy wholesalers in Orange County.

Despite the decline in the dairy sector, Orange County's agriculture has adapted to national and local economic forces. At a local level, Orange County has experienced significant growth in population: 31 percent in the last 20 years. Such growth can contribute to higher land and labor costs for farmers but this growth can also lead to new local markets for high value crops that are costly or difficult to transport and desired by suburban and urban consumers. As a result, local vegetable, nursery, and greenhouse producers find they may have a comparative advantage and the opportunity to pursue alternative marketing strategies (i.e. direct or near-direct marketing).

Orange County can help the ongoing transition of its agricultural industry and individual farms by pursuing the economic development strategy for the sector as laid out in the 2004 Orange County Agricultural Economic Development Strategy. The 2004 Strategy

recommends a combination of structural economic development programs, such as business retention, expansion, and attraction programming related to primary production sectors; recruitment or internal development of secondary market opportunities; broad based work force development; and infrastructure planning, as well as business development programming that specifically addresses the needs of individual agricultural enterprises. Please consult the 2004 Strategy for details.

Farm Characteristics

The number of farms in Orange County fell by 17 percent from 1987 to 2001, with most of the decline occurring from 1987 to 1997. At the same time, land in farms fell by 20 percent. Based on data from the New York Agricultural Statistics Service for 2001, the most recent year available, there were 730 farms in Orange County that covered nearly 95,000 acres or 18 percent of the total area in Orange County.

Farm size, as measured by average acreage per farm, declined modestly from 135 acres per farm to 129 acres per farm from 1987 to 2001. Although national farming trends show farms growing larger, the shift of Orange County's agriculture from dairy to vegetables and greenhouse/nursery crops would explain why farm sizes have remained nearly constant over the last 15 years, as these crops are more labor intensive and less land intensive.

Even though Orange County farms are relatively small in terms of acreage, a significant proportion of these farms post high sales figures relative to most other New York counties. For 1997, 30 percent of Orange County's farms had gross sales of more than $100,000, up from only 25 percent in 1987. Yet these large farms accounted for nearly 86 percent of the County's agricultural output in 1997. There are just as many farms with sales of less than $10,000 but this group of farms shrunk from 33 percent of all farms in 1987 to 30 percent by 1997.

Operator Characteristics

In areas such as Orange County with high conversion pressure on the agricultural base, it is important to understand the structure of farm ownership, operator characteristics, and the factors that influence farmland conversion.

Counter to regional trends, agriculture continues to have a substantial presence in Orange County. Given the industry's heavy dependence on dairy, vegetable, and nursery/greenhouse production, this is not surprising. Much of this dependence on agriculture as a primarily income source can, in fact, be linked to the substantial muck lands in the County. Based on interviews conducted for the 2004 Orange County Agricultural Economic Development Strategy the 30 percent of farmers who derive primary income elsewhere farm as a source of secondary income. The primary income of a spouse typically supports the farming venture. Anecdotal evidence indicates that hobby farming is not as prevalent as in nearby jurisdictions, however it is growing with urban encroachment. As this segment grows, it will be important to gauge its needs and issues, and integrate it within the broader agricultural support network.

An interesting and significant point raised during interviews about future full time farm operators is that these future farmers are likely to rise from the ranks of the current agricultural labor force. Many of those interviewed for the 2004 Orange County Agricultural Economic Development Strategy are expecting Hispanics and Asians to make up a large portion of the new farmers that are not intergenerational transfers. If this population does provide a significant influx of new farm operators/owners, it will be important to address capital access and training issues to facilitate the transfer.

Table 1: Selected Farm Operator Characteristics

Operator Characteristics	Orange County		Hudson Valley		New York State	
	Total	% Total	Total	% Total	Total	% Total
Total Farm (Number)	**624**	**100%**	**2,365**	**100%**	**31,757**	**100%**
Average Age	**53.0**		**56.5**		**53.5**	
Operator by Age Group						
54 and Younger	**348**	**56%**	**1,159**	**49%**	**17,357**	**55%**
55 and Older	**276**	**44%**	**1,206**	**51%**	**14,400**	**45%**
Operator by Place of Residence						
On-Farm	**470**	**75%**	**1,834**	**78%**	**26,320**	**83%**
Off-Farm	**118**	**19%**	**378**	**16%**	**3,849**	**12%**
Principal Occupation						
Farming	**435**	**70%**	**1,431**	**61%**	**18,426**	**58%**
Other	**189**	**30%**	**934**	**39%**	**13,331**	**42%**
Operators by Gender						
Male	**552**	**88%**	**2,054**	**87%**	**28,632**	**90%**
Female	**72**	**12%**	**311**	**13%**	**3,125**	**10%**

Source: 1997 Census of Agriculture.

Other operator characteristics of note include Orange's relatively low average age and high proportion of young farmers (56% under age 55). Nationally, the non-governmental organization Farm Aid found that for every farmer under age 35 there are two over age 65. The fact that many farmers do not live on the farm is an indicator of high residential land values and the fact that much of the production land is in the hands of people other than the farmer.

Land Tenure

A substantial percentage of Orange County farmland is owned and controlled by non-farmers. This is demonstrated in 1997 federal statistics whereby only 19% of local farms were fully owned by the farm operator, 31% were partly owned by the operator, and 14% were tenanted only. This ratio is significantly higher than those for the region and State where nearly 60% of farms are owned by the operator. This situation, which seems to impact significantly on dairy producers, contributes to a sense of instability. With ownership split among family members (many of whom no longer farm), speculators, and others, farmers are never sure about their land base from year to year. This trend has important implications for on-farm investments in plant and capital equipment, as

farmers are reluctant to make significant investments in property that they do not control.

Farms in Orange County also seem more likely than their other New York counterparts to be under corporate and partnership legal structures. This fact is significant for several reasons. First, the corporate form of ownership facilitates intergenerational transfer by reducing the estate tax burden on succeeding generations. Second, it was the experience of the consultants that prepared the 2004 Orange County Agricultural Economic Development Strategy that corporate farms are more likely to transfer management to a younger generation at an earlier stage than are sole proprietors. However, high corporate and partnership ownership of farms may also indicate the presence of speculative investors in agricultural lands. The 1997 Census of Agriculture indicated that 24 percent of Orange County farms are held in partnership or as a corporation.

Table 2: Selected Farm TENURE Characteristics

Tenure Characteristics	Orange County		Hudson Valley		New York State	
	Total	% Total	Total	% Total	Total	% Total
Total # Farms	624		2,365		31,757	
Total Farm Acreage	94,771		453,818		7,254,470	
Legal Structure						
Sole Proprietorship	473	76%	1,745	74%	26,855	85%
Partnership	69	11%	277	12%	3,153	10%
Corporation	79	13%	322	14%	1,568	5%
Other	3	0%	21	1%	181	1%
Type of Interest						
Full Owner (Farms)	334	54%	1,404	59%	19,170	60%
Full Owner (Acres)	26,600	28%	153,207	34%	2,782,516	38%
Part Owner (Farms)	194	31%	728	31%	10,742	34%
Part Owner (Acres)	51,609	54%	269,778	59%	4,126,147	57%
Tenant (Farms)	86	14%	233	10%	1,845	6%
Tenant (Acres)	16,562	17%	30,688	7%	345,807	5%

Source: 1997 Census of Agriculture.

Outside of the "Black Dirt" region, the consultants found that rental rates are declining as fewer farmers compete for upland resources and as landowners seek to reduce the property tax burden through the preferential agricultural tax provisions (i.e. supply has outpaced demand). With nearly 12,000 surplus acres of vacant, productive agricultural land in the County, it is unlikely that this condition will change in the near future unless there is an increase in farmer demand.

Farm Conversion/Transition Characteristics

During the process of conducting interviews for the 2004 Orange County Agricultural Economic Development Strategy, the concepts of expansion, business growth, and farm transition were frequently discussed and frequently answered with similar

comments. Farm conversion and farm transition in the uplands are most commonly affected by the relative high rate of residential growth. Farmers in these areas are very likely to feel that their operations will not be able to transition to the next generation because development value far exceeds the farm value of these properties. Furthermore, as land becomes fragmented and as agricultural operations come into conflict with new residential development, traditional farming becomes more difficult.

Farm uses in the upland that are more compatible with agricultural uses such as market gardening, nursery and greenhouse production, and equine operations, are thriving. In Orange County as in other parts of the nation, it is uncommon to find a significant number of traditional farmers, or their family members, transitioning between operations such as dairy to greenhouse and nursery production though there are some outstanding examples where this has happened. Such transitions by existing farmers tend to be more common in areas where the risk of success or failure is relatively known and where networks for farmer to farmer exchange of information, or other broad-based technical assistance, exist. Most new operations are started by new entrants to the industry or by relocating businesses. It is also important to remember that traditional upland farming, unlike these new operations, requires a much larger land base for row crop production and pasture.

Table 3: Building Permits and Housing Construction Costs for Selected Jurisdictions, 2002

	Orange County		**Dutchess County**		**Ulster County**	
	2002	**10-Year Growth Rate**	**2002**	**10-Year Growth Rate**	**2002**	**10-Year Growth Rate**
Building Permits Issued	**1,727**	**92%**	**909**	**15%**	**718**	**54%**
Cost of Construction per Unit	**$152,561**	**69%**	**$202,617**	**73%**	**$179,549**	**89%**

Source: U.S. Census Bureau, Construction Statistics Division.

In the muck lands, which face almost no development pressure, conversion and transition issues are fundamentally different. Perhaps the biggest issue is successful intergenerational transfer. Within the region, intergenerational transfers and tax sales have caused single farms to be broken up into multiple parcels resulting in a patchwork of ownership. As successive generations get out of farming, they sometimes retain residual control, through resource ownership, in the farm, making on-farm investments, management decision-making, and further generational transfer a challenge. A second issue in the Black Dirt is an expected wave of competing recreational uses that cause land competition and promote incompatible uses.

The Land Base for Agriculture

Agriculture relies on accessible and high quality natural resources such as soil and water. These resources are necessary for a healthy agricultural industry.

Soil quality is important in assessing agricultural productivity and remains relatively fixed over time. Orange County has a wide range of soil qualities and conditions, anchored by the highly productive muck lands or "Black Dirt" in the Towns of Warwick, Goshen, and Chester.

Orange County is just over 522,000 acres, of which 224,000 acres have a USDA land capacity classification of I through III, which are considered prime and productive soils. Of these soils, approximately 10,000 are found as muck soils in the " Black Dirt" regions. These Black Dirt soils are highly productive and suitable for production of a wide variety of vegetable and field crops. Within the "Black Dirt" regions, these soils are found in large contiguous blocks, and since these soils support little development potential, they will likely remain highly suitable for farming into the foreseeable future. Approximately 4,000 additional muck acres can be improved through drainage to achieve similar productivity capacity. Other soils with high land evaluation scores are scattered throughout the upland portions of Orange County, but are concentrated in upland valleys and throughout the Wallkill River Valley. Based on data provided by the Orange County Department of Planning and interviewees, these upland soils are the most prone to development.

Orange County's prime agricultural lands in Classes I, II, and III total 224,000 acres (Classes I-III of seven classes are considered prime). Thus, prime and productive soils account for 43% of all soils in the County. Most of the soils are deemed prime to fair for one or more of the following: flowers, vegetables, or fruit and tree fruit production. Prime and productive soils are highly desirable for residential and commercial construction. These soils are present to some degree in almost every town with large blocks in Warwick, Goshen, Wawayanda, Minisink, Montgomery, and Newburgh. These towns are also under high development pressure.

TABLE 4: AGRICULTURAL LAND INVENTORY BY TYPE AND TOWN GROWTH RATE

	Agricultural Classification							
Town	**Livestock/ Poultry**	**Equine**	**Dairy**	**Orchard/ Vineyard**	**Truck Crops**	**Nursery/ Greenhse.**	**Gen Ag Land**	**Total**
Blooming Grove	564	45	310	75	0	0	1,977	2,970
Chester	861	150	790	0	273	69	378	2,520
Cornwall	465	100	0	87	0	16	695	1,362
Crawford	1,485	765	2,303	0	0	0	586	5,139
Deerpark	0	0	342	0	86	0	37	465
Goshen	2,601	777	3,376	35	4,617	0	1,440	12,844
Greenville	1,249	0	1,389	0	0	0	511	3,150
Hamptonburgh	1,245	1,772	1,025	236	0	45	1,068	5,391
Highlands	0	0	0	0	0	0	0	0
Minisink	472	88	3,249	45	566	0	3,337	7,758
Monroe	89	0	0	0	0	0	0	89
Montgomery	3,374	681	2,055	332	264	54	2,399	9,160
Mount Hope	487	129	1,141	0	0	49	394	2,200
Newburgh	166	0	28	705	0	0	313	1,212
New Windsor	903	0	759	246	94	36	432	2,470
Tuxedo	0	0	0	0	0	0	0	0
Wallkill	2,899	253	2,527	0	177	108	627	6,591
Warwick	1,427	664	4,580	693	5,281	35	2,586	15,266
Wawayanda	683	258	1,552	418	2,942	98	1,179	7,129
Woodbury	157	0	0	0	26	19	0	201
Total Ag Land	**19,129**	**5,680**	**25,427**	**2,871**	**14,326**	**528**	**17,957**	**85,917**
Ag Land in High Growth Towns	**15,591**	**4,715**	**18,460**	**2,704**	**9,057**	**512**	**12,449**	**63,488**
% Ag Land in High Growth Towns	**82%**	**83%**	**73%**	**94%**	**63%**	**97%**	**69%**	**74%**

Sources: Orange County office of Real Property Services and Orange County Department of Planning.
Note: Agricultural classifications are based on Office of Real Property use codes. Codes have been aggregated.

Agricultural land is widely dispersed throughout the County. However, eight towns in central Orange County, a north-south corridor roughly bisected by the Wallkill River, account for 80% of the County's agricultural land or approximately 69,300 acres. This corridor, along with parts of the town of Goshen and Chester, includes much of the County's prime "Black Dirt" or muck soils that are generally considered to be undevelopable. With the exception of the muck soils area, this part of the County is developing quickly contributing to a 20% decline in farmed acres since the late 1980's.

Development Pressure

Orange County is currently undergoing an extraordinary growth phase that is expected to last through the next two decades. This condition is driven by several factors including regional population growth, radial growth from New York City with Orange County representing the outer ring of affordable single-family residences, and the fact that its southern neighbors such as Rockland, Putnam, and Westchester Counties are approaching build-out status. The population growth rate in Orange is projected to increase through 2020, with the greatest absolute and relative growth occurring outside of Orange's incorporated cities. The growth rate of Orange County's towns is expected to be nearly double the growth rate of the County as a whole with only five towns experiencing growth rates equal to or less than the overall growth rate of the County.

Table 5: Growth Rates of Orange County Towns

	Actual			**Projected**			
	1990	**2000**	**Change from Prior Period**	**2010**	**Change from Prior Period**	**2020**	**Change from Prior Period**
Blooming Grove	16,673	17,351	**4%**	22,376	**29%**	28,855	**29%**
Chester	9,138	12,140	**33%**	14,593	**20%**	17,541	**20%**
Cornwall	11,270	12,307	**9%**	13,943	**13%**	15,797	**13%**
Crawford	6,394	7,875	**23%**	9,257	**18%**	10,881	**18%**
Deerpark	7,832	7,858	**0%**	8,483	**8%**	9,157	**8%**
Goshen	11,500	12,913	**12%**	14,302	**11%**	15,842	**11%**
Greenville	3,120	3,800	**22%**	4,539	**19%**	5,421	**19%**
Hamptonburgh	3,190	4,686	**47%**	5,456	**16%**	6,353	**16%**
Highlands	13,667	12,484	**-9%**	14,318	**15%**	16,422	**15%**
Minisink	2,981	3,585	**20%**	3,966	**11%**	4,388	**11%**
Monroe	23,035	31,407	**36%**	43,300	**38%**	59,697	**38%**
Montgomery	18,501	20,891	**13%**	23,976	**15%**	27,516	**15%**
Mount Hope	5,971	6,639	**11%**	7,892	**19%**	9,382	**19%**
Newburgh	24,058	27,568	**15%**	34,489	**25%**	43,148	**25%**
New Windsor	22,937	22,866	**0%**	30,099	**32%**	39,621	**32%**
Tuxedo	3,023	3,334	**10%**	3,572	**7%**	3,826	**7%**
Wallkill	23,016	24,659	**7%**	31,499	**28%**	40,237	**28%**
Warwick	27,193	30,764	**13%**	36,343	**18%**	42,934	**18%**
Wawayanda	5,518	6,273	**14%**	7,226	**15%**	8,324	**15%**
Woodbury	8,236	9,460	**15%**	11,529	**22%**	14,049	**22%**
Town Total	**247,253**	**278,860**	**13%**	**341,158**	**22%**	**419,391**	**23%**
Orange County	**307,647**	**341,367**	**11%**	**386,215**	**13%**	**436,954**	**13%**

Note: Town data excludes incorporated cities of Newburgh, Middletown, and Port Jervis,
Source: Orange County Planning Department

It should be noted that population projections are developed by a formula that considers birth and death rates, in and out migration trends, and historical growth. They do not take into account the actual zoned-but-unbuilt 'capacity' of a jurisdiction, nor the effect of environmental limitations to building on the remaining undeveloped land.

Much of the growth in population is accommodated with single-family housing. In fact, 2002 permit data provided by the U.S. Census Bureau, indicates that single-family building permits were issued at a rate of 265:1 over two family permits in Orange County's towns. Based on interviews and surveys with town officials, much of the single-family development is occurring on large lots of two acres or more meaning that nearly 1,000 acres of land is converted for every 500 new homes. In order to accommodate infrastructure improvements that accompany this growth several towns including Montgomery and Goshen have instituted temporary moratoria on new subdivisions.

The implications for agriculture are clear. Towns within the commuter corridors and adjacent to employment zones are experiencing high growth. Many of these towns such as Warwick and Montgomery also have high concentrations of agricultural land. As development pressure builds, these prime agricultural areas become threatened as land values rise and incompatible residential uses are scattered throughout areas of formerly concentrated agricultural activity.

Table 6: Single Family Building Permits by Town

Towns	**Agricultural Land**	**2002 Single Family Building Permits Issued**	**% of Town Permits Issued**
Blooming Grove	2,970	26	4.39%
Chester	2,520	20	3.38%
Cornwall	1,362	30	5.07%
Crawford	5,139	39	6.59%
Deerpark	465	37	6.25%
Goshen	12,844	18	3.04%
Greenville	3,150	21	3.55%
Hamptonburgh	5,391	32	5.41%
Highlands	0	1	0.17%
Minisink	7,758	7	1.18%
Monroe	89	12	2.03%
Montgomery	**9,160**	**33**	**5.57%**
Mount Hope	2,200	20	3.38%
Newburgh	1,212	96	16.22%
New Windsor	2,470	45	7.60%
Tuxedo	0	5	0.84%
Wallkill	6,591	44	7.43%
Warwick	**15,266**	**64**	**10.81%**
Wawayanda	7,129	31	5.24%
Woodbury	201	11	1.86%
Town Total	85,917	592	100.00%
Orange County	86,765	1,727	

Note: Town Total excludes property within city borders.
Sources: Orange County office of Real Property Services and U.S. Census Bureau, Construction Statistics Division.

Conversion of farmland to housing affects County and town fiscal conditions. In general, most residential housing does not generate as much revenue to a jurisdiction as it costs to provide all public services to it. Commercial development and farmland usually subsidize residential development to varying degrees. This makes farmland, even with a preferential tax assessment (or exemption), a net fiscal positive and in many cases a preferred land use. "Cost of Community Services" studies commissioned by the American Farmland Trust have found this to be the case.

"Cost of Community Services" (COCS) studies are a case study approach used to determine the average fiscal contribution of existing local land uses. COCS studies involve three basic steps with local oversight: 1) data on local revenues and expenditures is collected; 2) revenues and expenditures are grouped and allocated to the community's major land use categories; and 3) data is analyzed and revenue-to-expenditure ratios are calculated for each land use category. This last step requires significant research, including extensive interviews with financial officers and public administrators.

The American Farmland Trust reviewed COCS studies conducted throughout the nation over 15 years prior to 2002 and found that agricultural land is similar to other commercial and industrial land uses in that it generates a fiscal surplus whereas residential use creates a deficit. *The purpose of this analysis was not to demonstrate that one land use is preferable to another, but simply that agricultural land use can be used by municipalities to help balance local budgets just as commercial and industrial land use is used to do.*

Based on their analysis of the median cost of community services relative to real property tax contributions by land use, the American Farmland Trust found that commercial/industrial land use cost 27 cents per dollar of revenue raised, followed by working lands/open space and residential at 36 cents and $1.16 respectively. The figure for working lands/open space was based on actual assessments including assessment for current agricultural use or agricultural exemption.

Land Use Regulations

Most towns in Orange County are making an attempt to deal with rapid suburban development through land use control policies. In many towns with any significant agricultural industry presence, agriculture plays at least some role in balancing future land uses from a fiscal and economic perspective. The maintenance of farmland as an open, working landscape results from the economic use of the land for agricultural purposes. Towns can take this into consideration as they develop their land use control policies just as they do when planning for residential, commercial or industrial development. They take into account the nature of the planned use, the compatibility of adjoining uses and the respective demand for public services of those uses.

Most town planning begins with the town's comprehensive plan. Based on interviews with town officials, as well as the results of a short mail survey, many towns are in the

process of updating their comprehensive plans and they are only now beginning to address agriculture within these plans. Of the 13 survey responses received during the Fall of 2003 by the consultants who developed the Agricultural Economic Development Strategy, only five towns were addressing agriculture through the existing plan (Crawford, Warwick, Deerpark, Montgomery, and Minisink).

Beyond the comprehensive plan, a handful of towns, mostly within the central agriculture corridor defined above, have proactive agricultural policies ranging from town level agricultural and farmland protection programs, cluster development, right-to-farm provisions, notification of new residents that they are moving into an agricultural production area, and business recruitment and attraction strategies.

Zoning is, by far, the land use regulation that most impacts farming. Most Orange County towns currently set the lowest residential density of one dwelling per one acre (1:1) to one per four acres (1:4). With regulation of minimum residential lot size, zoning can set up housing densities that compromise the land base or, *if properly timed*, it can keep residential development sufficiently low to allow agriculture to continue. As the Agricultural and Farmland Protection Board learned through the Agricultural Economic Development Strategy process, efforts to change densities at this level are also likely to alienate farmers and turn them against other public policies that may have a positive impact on local farming operations. Choices made in zoning can drive up land values, making farm expansion impossible. This effect coupled with the aforementioned characteristics of Orange County's farming population (e.g. aging farmers, the transitioning agricultural economy, the challenge of intergenerational transfer) can make selling the land for development irresistible.

Recreation

Heritage Trail

Stanley Deming Park, Village of Warwick

Open Space resources provide for a variety of recreational opportunities. Federal, State, regional and local parklands; urban spaces; public-access sites; water based recreation and trail systems are examples of these opportunities. The following description identifies the variety of existing facilities from the Federal government down to the community park.

Types and Location

Orange County contains a variety of recreational experiences that are provided at several levels of government management. The **Federal** presence in the County is limited to the Wallkill River National Wildlife Refuge Area that is primarily in New Jersey but spills over into a small area of the Towns of Warwick and Minisink, and the Upper Delaware Scenic and Recreation River Corridor in the Town of Deerpark olong Route 97. In addition, the National Park Service owns several miles of the Appalchian Trail corridor outside of the State Parks. Members of the NY-NJ Tail Conference maintain the trail.

New York State on the other hand owns a significant number of park, historic, water-related public access, trail, and wildlife refuge sites in the County. Some sites have an urban setting, they are for all ages and disabilities, and they serve the diverse ethnic population that is found in the State and the country.

The Palisades Interstate Park Commission (PIPC) is the steward of more than 100,000 acres of parkland in New York and New Jersey. Seven of its parks are located in Orange County. They have come to be included in the Palisades Park System either through direct purchase or as gifts over the last one hundred years. Sterling Forest State Park and Schunnemunk are the State's two most recent additions, accounting for 21,000 acres. In addition to Sterling Forest and Schunnemunk, Bear Mountain State Park and Harriman account for another 20,000 acres. These four parks are located in the southeast end of the county.

Smaller State parks managed by PIPC in Orange County, such as Highland Lakes, Goosepond Mountain and Storm King, total approximately 6500 acres and are identified as "passive parks."

In addition to parkland, PIPC manages four historic sites in Orange County: Knox Headquarters, New Windsor Cantonment, Fort Montgomery Battle Site and Washington's Headquarters.

Annual visitation to the parks and historic sites that are actively managed by PIPC total over three and one-half million people. New York State pays taxes totaling $5,522,000 for PIPC lands located in the Towns of Cornwall, Highlands, Monroe, Warwick, Tuxedo and Woodbury.

Much of the State-owned parkland in Orange County is important forested segments of "The Highlands" a geophysical region through four states (Pennsylvania, New Jersey, New York and Connecticut). The U.S. Forest Service has studied the Highlands for over a dozen years. In one of the opening paragraphs of their most recent reports, they state: "The water resources of the Highlands have long been recognized as the region's most valuable resource." And, "Land-use activities are major factors in changing hydrologic and environmental conditions within watersheds. Expected continued growth of population and development in the Highlands balanced with open space protection measures will have a positive effect in protecting stream and ground water quality and aquatic communities."

State parks offer a wide variety of activities to all ages of patrons. Parks like Bear Mountain and Harriman are premier "active recreation" parks. Activities range from hiking and biking to fishing, boating, swimming, horseback riding, snowmobiling, tent and cabin camping. Parks like Sterling Forest, purchased by New York State, New Jersey and the federal government, offer fishing, biking, hunting, hiking, boating, horseback riding. The geographic boundaries of each of these activities is carefully documented and defined in the Master Plan for Sterling Forest, adopted in 2001.

Not all of the State parks lend themselves to all activities. Indeed, some of the smaller parks are specifically designated as "passive parks" because of their size and location. Highland Lakes and Goosepond Mountain State Park are prime examples where the communities that surround them enjoy them for fishing, hiking, horseback riding and even model airplane flying.

Orange County Parks and Historic Sites

Orange County has had the foresight to develop an extensive network of parks that are strategically located in most regions of the County. Presently the Park System consists of 2,918 acres within 10 parks and provides a variety of services and benefits. They include "environmental health and well-being, protection and preservation of open space, public access to parks, trails and open space, preservation of access to historically significant sites, facilities for a full range of recreational and leisure activities, and opportunities for public events and gatherings."

The locations of the parks are such that they are easily accessible to most residents. The Orange County Park Plan recognizes that there are gaps in the location of parks within the County and plans should be made to search for new locations. One of these areas is the Greenville, Mount Hope, and Minisink region.

Presently the County has parks in the following areas. The Delaware and Hudson Canal Park is located in the Town of Deerpark on Route 209. Nearby the County obtained the Swarthout property and has leased some of the land to the Town for field recreation facilities. Further east, between the Towns of Crawford and Montgomery is the Winding Hills Park. It is located on the Route 17K. Just south on Route 416 in the Town of Hamptonburg, is the Thomas Bull Memorial Park, the most central and widely used facility. East of the Winding Hills Park on Route 17K and in the Town of Montgomery is the Brick House Museum and Farm Museum. In the Town of Newburgh between Route 52 and Route 32 is Cronomer Hills/ Algonquin Park. The Warwick County Park serves the southern section of the County. It is located in the Town of Warwick on Route 17A. Along the Hudson River is a DEC-owned piece of land known as Plum Point and renamed Kowawasee Unique Area. DEC and the County signed an agreement giving the County Parks Department the management authority for the facility. Finally, an abandoned railroad ROW known as the ERIE Mainline was developed as a non-motorized multi-use trail, excluding horses, from Goshen to Harriman.

The County has also undertaken efforts to add lands to existing parks. A recent acquisition effort includes land adjacent to the Thomas Bull Memorial Park.

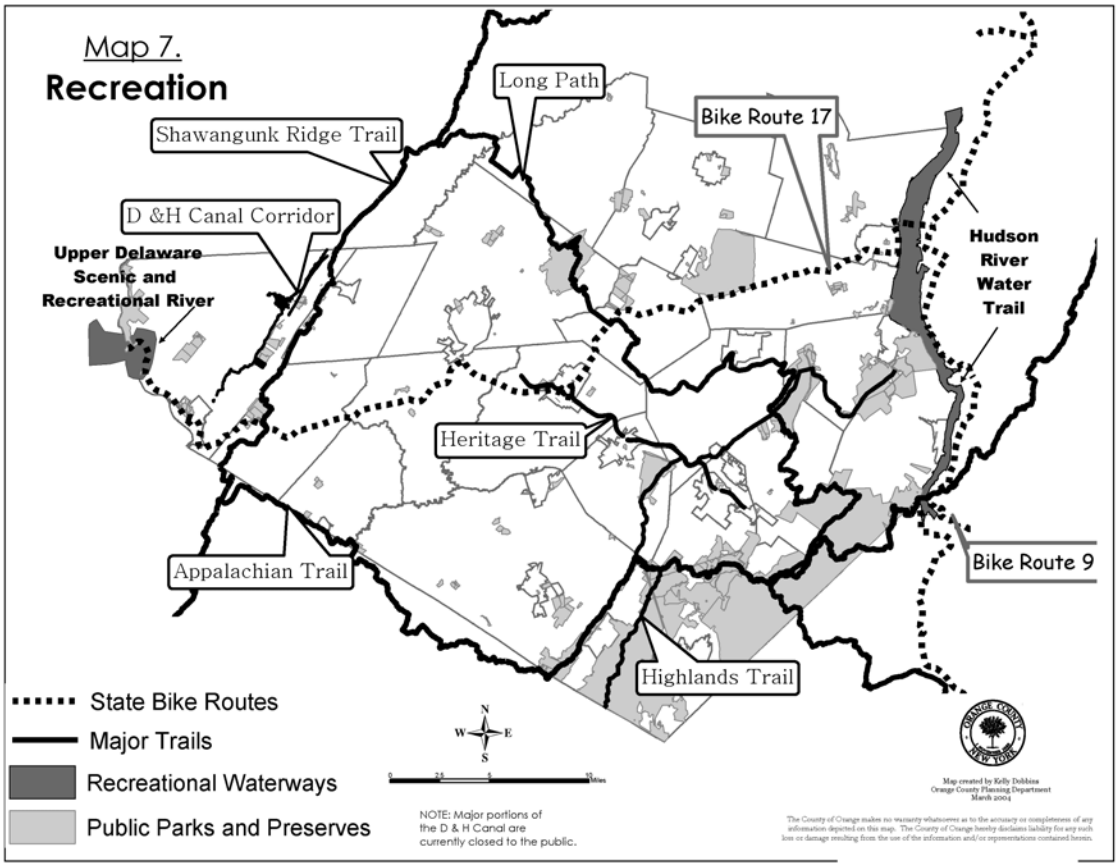
For the location of the County Parks see Map 7.

Even though the County has added Hickory Hill Golf Course, Kowawasee Unique Area, the Brick House Museum, and the Heritage Trail to its system within the last ten (10) years, there is still a need to pursue additional parkland to accommodate the growing population, needs and changes in recreation pleasure. A comparison of similar Counties in the U.S. for the County Park Plan indicate that Orange County has 9 acres of parkland for 1000 people as opposed to a standard of 10 acres per 1000 people and a peer average of 17.35 acres per 1000 people. Although further study is warranted to determine more precisely the needs and locations of future parkland, the numbers indicate that the County should pursue additional land to meet its growing population.

Municipal Parks

Municipalities in Orange County have successfully created active parks that provide active recreation, including ball fields, tot lots, soccer fields and to a limited extent swimming facilities, hiking trails, bicycle trails, tennis courts and similar types of active recreation. Even though these are important needs at the local level, this plan will emphasize the importance of setting aside open space areas that may be used for future active recreation, but not be the primary purpose.

The Plan will recognize the need to set aside land for trails and connective corridors for larger open space areas and existing park systems. Appropriate farmland and watershed areas could also play a part in developing trail networks within and beyond municipal boundaries. For locations of municipal parks see Map 7.



Trail Systems and Networks

Trails and interconnecting trail networks or corridors are primarily for linear recreation as cross-country skiing, nature study, hiking, jogging, bicycling, horseback riding, roller blading, etc. Existing linear systems in the County such as the D&H Canal Towpath, Railroad rights-of-way and streambeds can provide immediate solutions to trail needs. Long term needs can be planned and acquired through conservation easements on lands that are planned for future development. Future trail systems may take advantage of existing trails and other public places to provide linkages between communities. They also stimulate economic growth in communities that have retail establishments through patronage of these services by users of the trails.

The Orange County Comprehensive Plan, the County Parks Plan, the New York State Recreation Plan and the New York Greenway recognize the importance of trails as a growing recreation resource for the growing population in the County. Trail corridors

and linkages need to be a part of the future plans being considered by planning officials at all levels of government.

The County, presently, supports a variety of trails that range from multi-state trails to municipal trails. Each trail has a basic purpose and serves a select group of users. Map 7 shows a few of the trails, but, for lack of space, does not encompass the entire number of trails that are found in the parks and the municipalities.

Below are a few examples of the major trails that are enjoyed by County and out of County users:

Multi-Use Trails

1. Orange Heritage Trail: This trail is located on the former Erie Mainline that ran from Middletown to Harriman. Presently the trail is owned by the Orange County Parks Department and maintained by Orange Pathways. Uses on the trail include walking, bicycling, and rollerblading. Additional areas on the original railroad ROW are available to expand the trail from the Wallkill River to Middletown and beyond.

2. The Hudson River Valley Greenway Trail System: The New York State Greenway Community Council and Conservancy are actively seeking community trails that can fit into a Greenway trail along a corridor of the Hudson River. Several trails in Orange County are designated and more are sought. Examples of these trails are the Trail of Two Cities (Newburgh to Beacon), Stillman and Howell Trail in Cornwall, Highland Falls Trail and the West Point Trail. The Stillman and Howell Trail is the only walking trail of that list.

3. Single-Use Only Hiking Trails

a. **The Delaware River Heritage Trail:** This trail is located primarily in the City of Port Jervis and follows a course along the river and through the streets of the city. The river and various historic sites are the themes for this trail.

b. **The Appalachian Trail:** The trail is a regional trail that begins in Georgia and ends in Maine. The trail is owned by the National Park Service and maintained by the NY-NJ Trail Conference. The Trail is over 2000 miles long and is a popular destination for many County and State residents.

c. **The Long Path:** The trail is a regional trail that begins near Fort Lee, New Jersey and ends in the Adirondack Mountains of New York. It diagonally traverses the County connecting public parklands and following roads in between. The NY-NJ Trail Conference continues to pursue ways to relocate the entire trail on public and private lands through cooperative agreements.

d. **Shawangunk Ridge Trail:** The Shawangunk Mountains in Orange County are part of a mountain ridge that runs from New Jersey north to the Kingston area of New York. The Shawangunk Ridge Trail originates in the High Point State Park of New Jersey and intersects with the Appalachian Trail. It runs northeast along the ridge of the mountain. Much of the trail in Orange County uses private property and roads for the trail. The NY-NJ Trail Conference is actively pursuing avenues to purchase land that would secure the trail on public land.

e. **The Highlands Trail:** This is a new trail that follows the Highlands, a mountain area that originates in Pennsylvannia and ends in Connecticut. The trail is located on roads and public land and follows a path that begins in Warwick and passes through Chester,

Monroe, Woodbury and Cornwall. Once again, the NY-NJ Trail Conference is pursuing methods to secure a permanent trail.

Trends in Recreation

The **New York Statewide Comprehensive Recreation Plan for 2003** outlines the existing programs and facilities, looks at needs and trends and recommends solutions for future needs and concerns. In the area of trends the Plan relied upon a survey of recreation users in the State to give them information for developing a strategy for the future.

The State, 1998 has conducted a General Public Recreation Survey, a Park Professional Survey and a Park Visitor Survey. Among the top priority of needs within those surveys is the need for more protected open space, hiking trails, biking trails, and active outdoor recreational opportunities.

The State, as part of its goals for the future of its park development, is to preserve and protect natural and cultural resources. Within that goal they intend to ensure that recreation development recognizes environmental limitations, ensure acquisition of open space in rural and urban communities, and protect parks that are threatened by encroachment. Other major goals include improving water-oriented recreation and developing comprehensive recreation ways, greenways and heritage trail systems. To support their goals and the goals of Orange County, the Parks Plan contains a matrix of indicators that identify recreational needs by county and type of recreation facility. Orange County five recreational uses having needs are swimming, biking, hunting, hiking and boating. All of these recreational needs require water access and large, undeveloped tracts of land.

If Orange County wants to meet these needs for its residents, protective actions are an immediate concern for all levels of government. The Plan recognizes these urgent needs and calls for an active program to locate and protect open space land for present and future residents.

In 2002, the Orange County Legislature accepted the Orange County Parks Plan as a tool to build upon the existing park system and plan for the future park needs of County residents. The Plan outlined goals and strategies to undertake an important task. The Plan surveyed the residents of the County to find out what they viewed as needs and trends for future recreation facilities.

Two important elements discussed in the plan are: 1. Trends in the technological segment of the community and the social makeup of the community, and 2. The services that residents identify as important for future park development.

Park and recreation developments in the past were influenced by dramatic changes in our society that led to the need for active recreational facilities in neighborhoods and communities. Trends in technology, the economy, population diversity, social changes,

consumer needs and political impacts are still influencing future needs and locations for park development.

Although the rise in usable income for leisure activities has allowed families to travel longer distances to recreate, there is still an important need for recreational facilities within local communities to satisfy the need for daily activities. Communities are facing a bulging need for organized recreational programs for adults and children alike. Hiking and biking have grown as a result of the demand for exercising and relieving the stress of every-day life.

A section of the Orange County Park Plan elaborates on the importance of these trends and the ultimate impact that they will have on the way people will recreate and the way park planners will plan.

The second area presented in the Park Plan identifies the needs that residents envision for their future. A series of public meetings were held and surveys were available for interested groups and individuals. The residents identified a large list of needs.

Mayors, supervisors and other elected officials participated as well and provided their input in a similar process. The outcome of the process identified several items at the top of the list that coordinate nicely with the direction that the Open Space Plan is taking. The first ten items on the list in the Park Plan are as follows:

- Preserve open space, unique natural lands and related activities
- Improve recreational opportunities by increasing facilities and services
- Improve the availability of linked, interconnecting trails for local use and for long distance access to cultural and natural resources
- Increase public programming for natural and cultural history programs and services
- Develop countywide facilities for cultural, economic and educational purposes
- Protect and preserve historic properties
- Provide more parks in the cities
- Preserve farmlands and operations
- Use owned but currently unavailable county and state lands for recreational, open space purposes
- Provide public equestrian facilities

It is clear from the responses that outdoor activities are foremost in the minds of Orange County residents and trends toward more free time, local sports activities and the importance of outdoor exercising will encourage park planners and public officials to provide the necessary facilities in response to the needs.

<u>Orange County Park Master Plan</u>
Natural Resources and Open Space Recommendations

1.Connect Hiking and Biking Trails
2. Develop Canoe/Water Trails
3. Negotiate Recreational Use Rights
4. Partner with Equestrian Community
5. Balance Park Distribution Across County

Landforms and Landmarks

Hawk's Nest

Washington's Headquarters

Throughout history, Orange County residents have been significantly influenced by the nature and variety of our regional landscape. Today, a combination of scenic, historic and cultural features combine to form important elements of the County's open spaces. They also define the community character or *sense of place* that has become so important to so many.

Referred to as landforms and landmarks, these features range from National Historic Landmarks to those special places unique to Orange County. Relying on a review of existing inventories and on available documentation including state, regional and municipal plans, this chapter highlights those landforms and landmarks that distinguish Orange County and that deserve additional attention and protection. Later recommended actions offer priorities for how these landforms and landmarks can be protected and buffered from adjoining and competing land uses.

The landforms and landmarks category includes the following priorities: existing historic districts and cultural sites, scenic areas/byways/river corridors identified from State or Federal listings, and certain scenic landscapes originally defined in the 1988 Amendment to the County Comprehensive Plan entitled "Preserving Scenic Qualities in Orange County."

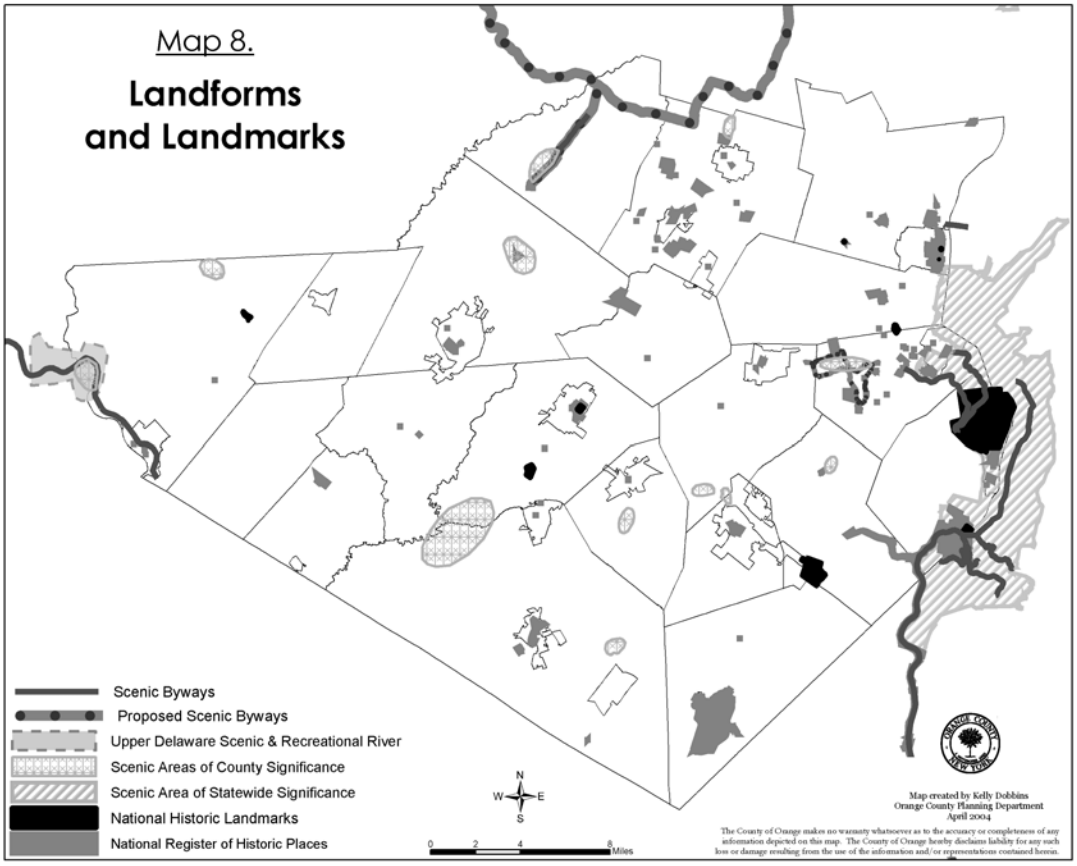
Scenic Byways

Orange County has a number of existing, proposed and potential scenic byways. The New York State Scenic Byways program was created in 1992 by the State Legislature and is administered by New York State Department of Transportation. The program encourages both economic development and resource conservation, recognizing that each of these aspects of a byway must be a part of the goals and strategies of the byway management plan.

In 1992, the State Legislature, as part of the inaugural byways, included several Orange County Routes. These include a series of "scenic roads" originating from earlier partnership work between municipalities, the NYS Department of Environmental Conservation, and the former Heritage Task Force for the Hudson River Valley. Included here are:

NYS Route 302 (Thompson Ridge), Crawford
Old Storm King Highway (NYS Rt. 218), Cornwall/Highlands
NYS Route 9W, Highlands/Cornwall
Bear Mountain Bridge Road (NYS Rts. 2 & 202), Highlands/Woodbury
Bear Mountain State Park Roads (misc. 8.27 mi.), Woodbury/Tuxedo
Newburgh/Beacon Bridge, Newburgh

The State Legislature also included the full 26.58 miles of the Palisades Interstate Parkway, including the short, northern-most segment in Orange County.



Since 1992, additional scenic byways can be proposed and added to the system only with local support, completion of a nomination and corridor management plan, and approval by both the State Scenic Byways Advisory Board and the State Legislature. All byways must also define an organizing theme or themes – scenic, natural, recreational, cultural, and/or historical.

The Upper Delaware Scenic Byway (approximately 71 miles along NYS Route 97 from Port Jervis to Hancock (in Orange, Delaware and Sullivan counties) is a new byway. Roughly paralleling the Upper Delaware River from Port Jervis, the majority of the route is characterized by stunning scenery, a deep history, communities both lively and quaint, and an abundance of recreational opportunities.

The proposed Shawangunk Mountains Scenic Byway is a collaboration between Ulster and Orange counties, two villages and eight towns including Crawford and Montgomery in Orange County. Anchored by the scenic, recreational, and historic dominance of the Shawangunk Ridge, portions of NYS Routes 52 and 302 are expected to be nominated as part of a byway system linking corridors to New Paltz, Ellenville and Stone Ridge.

The Cornwall-Moodna Valley Scenic Byway is also proposed, linking a cluster of town roads and NYS Route 94 in the richly historic and visual Moodna Creek Valley.

Historic Places

Municipalities, property owners and historic preservationists have had consistent success in gaining recognition of places in Orange County that mark and symbolize our rich history. Unfortunately, land demands can occasionally threaten historic sites. These demands more commonly impact the setting or context of such sites, isolating and surrounding them.

Orange County currently has over 180 properties listed on the National and/or State Registers of Historic Places. This includes fourteen (14) National Register Historic Districts in eight (8) separate municipalities, each of which has additional individually significant properties. Historic districts are found in Cornwall (Duncan Avenue District, Mathiessen Park District, Mountainville District, & New York Military Academy District), Goshen (Church Park District), Highlands (Bear Mountain State Park District & Queensboro Ironworks), Monroe (Monroe Village District), Montgomery (Bridge Street District & Union Street-Academy Hill District), Newburgh (City)(East End District & Montgomery-Grand-Liberty Streets District), Newburgh (Town)(Orange Mill Hill District), and Warwick (Warwick Village District).

Highest value is given to National Historic Landmarks. These nationally significant historic places are designated by the Secretary of the Interior because they possess exceptional value or quality in illustrating or interpreting the heritage of the United States. Today, fewer than 2,500 historic places bear this national distinction, with nine (9) here in Orange County.

National Historic Landmarks in Orange County[1]

Landmark	Location	Date Listed
United States Military Academy	Highlands	1960
Washington's Headquarters	Newburgh	1961
Arden (E.H. Harriman Estate)	Woodbury	1966
Historic Track	Goshen	1966
Delaware & Hudson Canal, Cuddebackville Section	Deerpark	1968
Knox Headquarters	New Windsor	1972
Fort Montgomery Site	Highlands	1972
Dutch Reformed Church	Newburgh	2001
Belknap Stone House	Newburgh	2001

Important reference is also made to the Dutchess Quarry Cave Site (also known as Lookout Mountain), property owned by Orange County and listed on the National Register of Historic Places. This internationally known archeological site has yielded stone tools and faunal remains (including extinct caribou bones) dating continuously back for nearly 12,000 years. [2]

Scenic Areas of Significance

The visual or scenic features of a community are increasingly recognized as high value open space features. While the majority of current municipal master plans in Orange County reference the high value of scenic resources, this County Open Space Plan focuses on scenic resources that are already recognized by County, State or Federal efforts.

In August 1988, the Orange County Legislature adopted "Preserving Scenic Qualities in Orange County" as an amendment to the County Comprehensive Development Plan. Eleven (11) Special Scenic Areas, visible from public sites and rights-of-way, were identified as deserving protection. These areas continue to be important and are priorities in this Plan. They include:

- Oxford Depot meadowlands as seen from Route 17.
- Lakes and surroundings on each side of Route 17 near Monroe.
- Wallkill River corridor north of Walden.
- Shawangunk Mountains as seen from Route 302.
- Panoramic views from Scotchtown Turnpike near Circleville.

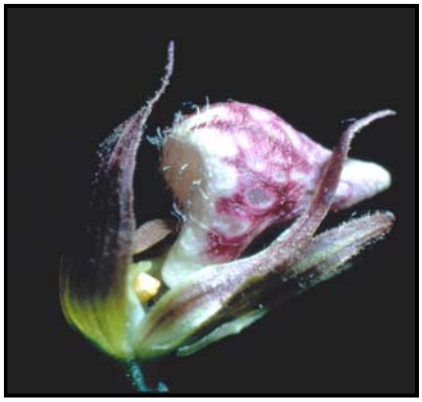
[1] State Historic Preservation Office, NYS OPRHP. See www.oprhp.state.ny.us., State and National Register listing.
[2] Ibid. see also William A. Ritchie & Robert Funk, Aboriginal Settlement Patterns in the Northeast. Albany: NYS Museum, 1974.

- Long views from Route 17A between Sterling Forest and Warwick.
- Woodbury Creek along Route 32.
- Moodna Valley and Viaduct east of Salisbury Mills.
- Black dirt / muckland fields along Pulaski Highway – including views of Mounts Adam and Eve.
- Wallkill River along Route 416.
- Neversink River as seen from Oakland Valley Road.
- Scenic Roads (see above) – notably Hawk's Nest Road, Storm King Highway, Bear Mountain Bridge, and Newburgh Beacon Bridge.
- Views of Sugar Loaf Mountain from Kings Highway (Note – based on substantial citizen interest as well as complementary language in the Town of Chester Comprehensive Plan, this Special Scenic Area has been added to the 1988 listing.)

Finally, two additional scenic landscapes are documented. First, New York State has recognized the Hudson Highlands as a "Scenic Area of Statewide Significance" (SASS).[3] This river corridor landscape, including the majority of lands from the Newburgh Beacon Bridge south and visible from the river in Orange County, is recognized as highly scenic, historic, and cultural. Second, the United State Department of the Interior has included 73.4 miles of the Upper Delaware River and its shoreline corridor, from Port Jervis north well into Sullivan County, as a National Scenic & Recreation River. The National Park Service, as managers of this corridor, notes the scenic, historic, cultural and recreational values of the Delaware. Indeed, the Delaware is cited as the longest, free-flowing river in the Northeastern United States.

[3] see New York State Department of State, Scenic Areas of Statewide Significance. Albany: Division of Coastal Resources and Waterfront Revitalization, July 1993, pp. 355-470.

Biological Diversity



Ram's Head Ladyslipper, orchid

Marbled Salamander

Orange County is a biologically diverse place. It is home to an exceptional variety of plant and animal species as well as an incredible diversity of habitats in which these creatures live. This richness and variety remain despite losses historically and in recent times. The richness of species and the wide variety of geologic, soil, and climate conditions that support our varied habitats are due to an uncommon convergence of factors:

1. The County's diverse **geology** (from limestone outcroppings to glacial deposits) has given rise to many distinctive habitat types, which in turn support many unique and rare species.
2. Orange County is situated at an **ecological crossroads**. The geographic position of the County has enabled many species from numerous regions to thrive here. The assemblage of species in Orange County is unique because it is the northernmost range of many southern species and the southernmost range of many northern (boreal) species.
3. **Low-density development, the historical pattern in Orange County,** has preserved many of the ecological treasures. Although the *status quo* is changing rapidly in some places, large tracts of relatively pristine, interconnected habitats remain in many areas.
4. **Active agriculture** has maintained many of the important grassland and open habitats within the County. The importance of farmland to biodiversity has only recently been recognized.

These characteristics have afforded Orange County and the surrounding region some impressive treasure houses of species and their habitats. For example:

- **Orange County has the second-highest number of dragonfly and damselfly species in the United States.**[i] At 128 species, Orange County is

second in only to Sussex County, N.J., neighboring Orange, where just over 130 of these insects were inventoried.

- **Orange County has the highest diversity of reptiles and amphibians (herps) in New York.**[ii] The County houses 48 species of these cold-blooded animals. Sterling Forest has 37 of these species, many of them rare, making it one of the most critical sites for herp conservation statewide.
- **Orange County has the second-highest number of plant species in New York.**[iii] There are 1,698 different species of plants found in the County. Many of these are found in Orange County's portion of the Highlands, especially in and around Sterling Forest.
- **Orange County has the highest concentration of northern cricket frogs in New York.**[iv] This species is listed by New York State as Endangered, meaning that it is in imminent danger of extirpation or extinction in the State. Despite this precarious status, several hundred are clustered at one location in Orange County, and less dense populations reside throughout other parts of the County as well.
- **The Hudson Valley has the third-highest number of turtles in the world,** after the Irrawaddy-Mekong region and the Suwannee River basin.[v] There are 13 species in the region, one of which, the Bog Turtle, is Federally listed as Threatened.
- **Orange County has two regionally significant wildlife corridors: the Highlands and the Shawangunk Ridge/Allegheny Plateau.** These upland areas are portions of much larger geologic formations that are important because they contain unique collections of species and are major wildlife corridors, allowing for the movement of plants and animals on a regional scale.

Human communities directly benefit in many ways from biological resources and these benefits can often be measured in economic terms. For example, wetlands provide a variety of important functions, including flood control, water quality improvement, aquifer recharge, stream base flow maintenance, recreational opportunities, and more. One published study found that an acre of wetland provides about $150,000 in benefits to the public.[vi]

Productive agricultural lands managed for their biological resources contribute to the County's economy and help maintain the rural character that defines Orange County's

Box 1. Values of Biological Diversity

Natural lands include these many important benefits:

- providing citizens with an attractive, safe, and desirable place to live
- regulating climate
- cleansing and detoxifying air, water, and soil
- pollinating crops
- dispersing seeds
- mitigating drought and floods
- cycling and moving nutrients
- decomposing waste
- preventing soil erosion and maintaining soil fertility
- controlling pests
- moderating weather extremes

landscapes. As discussed later in this section, maintaining open habitats such as fallow fields contributes greatly to local biological diversity.

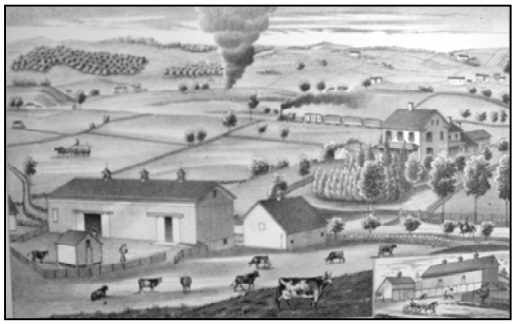
When the services provided by living systems are lost, replacing them with human-made engineered substitutes is enormously costly. No matter how much time and money is spent on them, engineered systems are rarely as efficient as natural systems.

Many species found in Orange County, such as the bog turtle and cerulean warbler, are currently experiencing long-term declines. In many cases, these declines are tied closely to urban, suburban, and rural sprawl. If the habitat and conservation needs of these species are not addressed, these creatures will likely become candidates for listing as State or Federal Endangered or Threatened species.

With the intensifying threats to ecosystems in Orange County, cooperative initiatives and local planning are needed to protect irreplaceable plant and animal life and maintain and enhance the diverse natural landscape of the County. Measures must be taken to keep these species' populations healthy in order to ensure that they remain part of Orange County's environment and are not lost forever. Such measures should include improved land use planning to better balance economic growth with environmental integrity.

Landscape History and the Impacts of Human Activity

While geological forces have shaped Orange County into an area of unusually high biological richness and variety, humans—particularly the European settlers who arrived within the last three centuries—have dramatically altered the resident plant and animal populations via large-scale modifications of the landscape.



Above: Rendering of Minisink & Wawayanda landscape in 1875, showing extensive clearing for farmland.

It was in the 19th Century that humans became the dominant force in shaping the landscape. Settlers believed it was their right—indeed, their duty—to tame the wilderness; natural resources were commonly viewed as inexhaustible. The blossoming of the dairy and horse industries provoked clear-cutting of much of the County's landscape as it was converted to pasture and cropland for livestock. The tanning industry, which harvested hemlock tree bark for its tannic acid, also had a hand in deforesting the County. Although wildlife that requires mature forest declined, species that require more open habitats, such as bog turtles, bobolinks, leopard frogs, and meadowlarks, benefited.

These trends crested during the 1880s and 1890s, which naturalist Kathleen Redmond termed the "really lean years in wildlife populations." [vii] Three-fourths of virgin forest had been cut and converted to farms—leaving us today with no old growth forest in the Orange County landscape. Over-hunting, bounties on wildlife, and habitat destruction eliminated turkeys and wolves from some areas of the County. It was during this time that the passenger pigeon was sighted in Orange County for the last time.

Major impacts that humans have had on Orange County's natural landscape and biological diversity since the late 1600s can be outlined as:

Construction of dams along waterways

Beginning in the late 1600s, dams were installed along many of Orange County's rivers and streams to produce hydropower for mills. Though most were used only for short periods, many were never demolished. Presently, there are at least 280[viii] dams in the County.[1] Dams impede migration of fish and other aquatic species and act as barriers to species dispersal, they increase water temperature, lower the amount of oxygen dissolved in the water, create a water body that is more stagnant, and in other ways change the aquatic environment. Three dams on the Quassaick Creek were built for a historic mill in Newburgh and, though the mill is no longer in use, the dam remains and blocks migration of river herring, which need this Hudson River tributary to spawn upstream. The first Cuddebackville dam was built in 1828 to divert water for the Delaware & Hudson Canal; in the period 1911—1915 a second section of the dam was built to provide hydropower to communities in the Town of Deerpark. Now abandoned, this structure presents a dispersal barrier to many native species.

Drainage of the Atlantic white cedar swamp

The vast swamp that covered sections of the towns of Minisink, Warwick, Goshen, and Wawayanda was drained over many decades by creating channels leading to the Wallkill River. To clear the swampland, the trees were logged, and this extensive cleared area with its highly fertile soil is now the farming district known as the Black Dirt Region. Today, the only known remnant of the forested swamp ecosystem is a small fragment in the town of Warwick. There are only a handful of other Atlantic white cedar swamps in the County and this natural community is extremely rare elsewhere in New York State.

Above: Aerial photo of the Wallkill River, displaying the dramatic alteration of the River's course. The historic riverbed forms the border between the three towns labeled in this image.

[1]Though some estimates are much higher.

Channelizing and degrading the Wallkill River (above)
The Wallkill River has a wide floodplain, especially in the southern part of the County, and as the river overflowed its banks during heavy rains or snowmelts it frequently flooded adjacent land. In the 1940s, the Army Corps of Engineers created an alternate route for the Wallkill's channel, digging a straighter, deeper course that would move water downstream faster and alleviate much of the flooding. Unfortunately, this channelization, among other factors, has reduced species diversity and impaired water quality in the river, aside from *increasing* flooding downstream of the channel. Fish species are few and a high percentage of those present are not native to the river. A recent article by New York State's ichthyologist (fish scientist) Bob Daniels noted the change in fish diversity since the early 1900s. In 1936, there were 48 species of fish in the river, with no one species dominating the system. When he sampled the same areas of the river in the early 1990s, he found only 16 species of fish and only a quarter of the total fish population that was present in 1936. Species lost include catfish, pickerel, minnows, and suckers. Impacts of channelizing are not limited solely to the river body itself; water levels of wetlands flanking the river are low because they have been separated from the water flow, and the biological diversity of these habitats has consequently changed.

Drainage of wetlands
Historically, wetlands have been viewed as inhospitable, useless, and often dangerous pieces of land needing "improvement" by draining and clearing. Still often considered an impediment, wetlands continue to be altered or destroyed. But these ecosystems are exceptionally important not only because of the myriad services they provide to humans but also for their role as transitional zones between land environments and water bodies.

Box 2. Benefits of wetlands
Wetlands benefit Orange County in many ways. They cleanse water of nutrients, toxins, sediment, and other pollutants (and are commonly used to treat both stormwater runoff and sewage). They hold water during storms, thus reducing the frequency and severity of floods; they also recharge groundwater aquifers and help to maintain water levels in streams and rivers during droughts. They provide habitat and sanctuary for many species of plants and animal species. And they reduce atmospheric levels of carbon dioxide (a greenhouse gas) by storing carbon in plant matter and muck soils.

Degradation of habitat
Few, if any, habitats in Orange County are unaffected by the presence of humans. Our roads and parking lots prevent rain and snow from seeping into the ground but instead send the water, often highly polluted, into our rivers and streams. We drain, fill, pollute or otherwise damage wetlands. We degrade soils by applying pesticides and synthetic nutrients to our lawns and crops. Or we eliminate natural cover such as trees or bushes to make way for a building, pavement, or non-native plant life. Erosion runoff into rivers caused by land clearing for development on the surrounding landscape has altered and destroyed mussel beds that are used during trout spawning, leading to lower numbers of trout in many Orange County streams.

Even areas that are out of direct human reach are still vulnerable to acid precipitation, groundwater pollution, and the effects of human-induced global warming (increases in severe weather, elevated levels of carbon dioxide, changes in species composition, irregular pest outbreaks, etc).

Creation of a fragmented landscape
Construction of roads, canals, railroads, airports, drainage ditches, dams, power lines and fences; growth of three cities and 17 villages with suburbia swelling on their peripheries; a dramatic increase in the rate of housing construction and tree removal, notably in the last few decades; increases in the average residential lot size (which spreads the impacts across more area, often into high-quality habitats); and increases in traffic—all have resulted in fragmentation of much of the County's landscape into more or less isolated patches. (The notable exception is the substantial state park system in the Highlands.)

Habitat disturbance is a natural process, but many species are unable to survive in areas that have been disturbed too often or too extensively. Fragmentation reduces both the amount of range area available to a species and the ability of individual animals to move from one place to another.

When barriers totally, or nearly totally, eliminate species' ability to move between areas, habitats may become totally isolated. Wildlife populations in isolated fragments are stressed more readily than populations with more land area, food, water, and habitat. Even with protection of a few thousand acres in, for example, Highland Lakes State Park, the park is limited in the animal species it can support because it is isolated from any network of open space that would support species that must range widely, like the black bear. Except where underpasses allow for movement, the three interstates that slice through the County effectively stall passage of many animals from one side to the other.

Fragmentation and isolation seriously threaten biological diversity and the functioning of natural systems.[ix]

Alteration of species composition[2]
That composition of species in Orange County has changed is evidenced by the recent loss of species that once were found here. Generally speaking, populations of so-called "specialist" species, which require specialized habitats, have declined. Such specialist species are usually relatively rare to begin with, are less resistant to disturbances, and face a lack of alternative habitat in which to reside. Among our specialists experiencing decline are many salamander species, leopard frogs, bog turtles, ribbon snakes, northern copperheads, many forest warblers, grassland birds, bobcats, and freshwater mussels.

In contrast, population numbers of "generalist" species—those that can live in many types of habitats and may actually thrive under disturbed conditions—

[2] Species composition refers to both the number of species present and the population size of each species.

have attained unhealthy levels in Orange County. These species, which prefer the patchwork pattern created by disturbances across the landscape, are usually abundant, common, and resilient to disturbance. Examples include the white-tailed deer, non-migratory Canada goose, white-footed mouse, raccoon, grey squirrel, carp, coyote, bullfrog, American crow, and deer tick. See Box 3 for a discussion on generalist species.

Species composition has also changed because of increasing numbers of species that continue to invade from other areas, often from other countries and continents. These so-called exotic species tend to outcompete native species and decrease overall species diversity. For example, the invasive exotic plant

Box 3. Generalist Species: Causes and Effects

The Biodiversity section of this Plan primarily focuses on those species and habitats that are rare in Orange County (primarily due to a lack of habitat). Certain other species, however, become more *abundant* as the County is developed – the sizes of these populations serve as indicators of landscape fragmentation.

The **white-tailed deer** is considered an "edge species" because it is often found browsing the edges of forests, fields, lawns, and disturbed areas with ample vegetation. As Orange County becomes increasingly fragmented by development, larger tracts of woodlands are broken into smaller woodlots, creating more opportunities for edge species and fewer opportunities for predators who prefer larger tracts of intact forest, such as wolves and coyotes. Unchecked deer populations can alter forest ecosystems by eating saplings and other understory vegetation, which in turn can lead to destruction of certain bird habitats and a decline in plant diversity. Additionally, elevated deer populations are both a nuisance and a hazard to citizens as they eat through gardens and interfere with traffic.

Another indicator of a fragmented landscape is the **Canada goose**. Historically, the entire population of these geese migrated through the County. But with the creation of lawns, golf courses, and other open areas, many geese have chosen to remain in the County throughout the year. As they graze, these geese – often in large flocks -- deposit much waste that pollutes nearby water bodies with nutrients, degrades habitat conditions, and poses a human health concern. They also repel native bird species and can be sources of noise pollution. Measures have been taken in some jurisdictions to manage populations in order to balance the local biological diversity; the only long-term solution is to maintain or restore habitats to conditions that are less desirable to geese. For example, restoring shrubs and other native vegetation to the banks of lakes and ponds, rather than maintaining lawn up to the water's edge, makes an area less attractive to geese.

In terms of human health, recent research done in Dutchess County, N.Y., reveals a connection between forest fragmentation and **Lyme disease**.[1] As the size of forest patches decrease (from 19 down to 2 acres), biological diversity decreases and populations of the **white-footed mouse** increase. The author quotes: "(white-footed mouse) population densities often are considerably higher in small, isolated woodlots embedded in agricultural or urbanized landscapes than they are in continuous forest." Since this mouse is the most effective carrier of the spirochete bacterium that causes Lyme disease, incidence of the bacterium is much higher among ticks in a fragmented setting than those in a more intact landscape.

[1]Allan, Brian; Felicia Keesing, Richard Ostfeld. 2003. Effect of Forest Fragmentation on Lyme Disease Risk. Conservation Biology 17:1, 267-272.

purple loosestrife has come to dominate many wetlands but does not offer food or any other benefit to many types of birds, reptiles and insects. As a result, many loosestrife-infested wetlands have lost their varied plant and animal life.

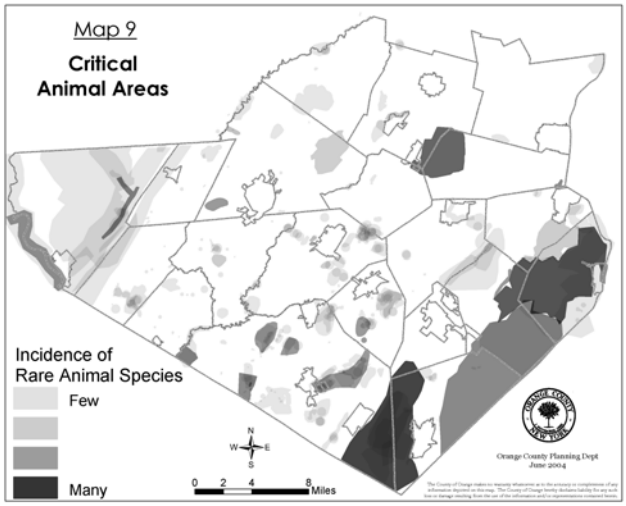
The list of exotic animals that have taken up residence in the County or its waters include the zebra mussel, longhorn beetle, rusty crayfish, gypsy moth, and house sparrow. Non-native plants include: Purple loosestrife, Dutch elm, Japanese knotweed, garlic mustard, water chestnut, Japanese barberry, and common reed (specifically, the Eurasian strain of *Phragmites*).

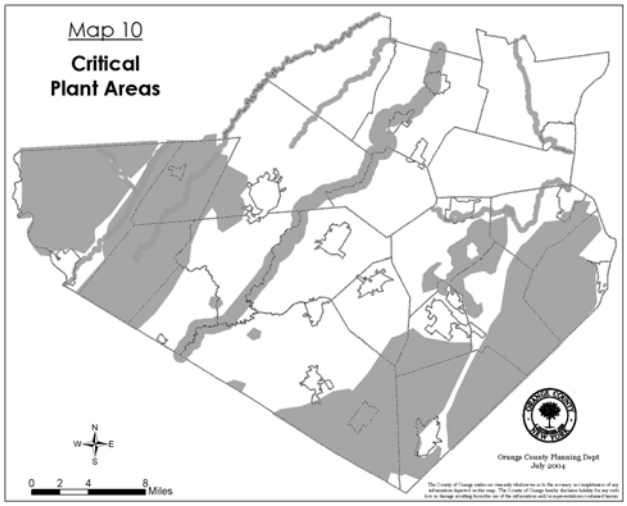
Critical Plants, Animals, and Habitats

While some biologically diverse portions of the County have been permanently protected, many areas with remarkable richness remain unprotected and thus vulnerable to development. The current high and increasing growth rate threatens the remaining biologically diverse region, unless measures to prevent habitat fragmentation and degradation are put into place. Preservation of the County's intact natural communities will assure protection of many species facing decline.

Species

For this Open Space Plan, information on the locations of rare or otherwise critical species sitings was gathered in order to create a geographic database of vital habitats within the County[3]. Since critical species are listed as Endangered, Threatened, or of Special Concern because their low population numbers leave them ultimately vulnerable to extinction, it is especially important that these species have sufficient quality habitat to guarantee their continued survival. And because species population numbers are often low due to insufficient habitat, it is a high priority to locate, map, and ultimately protect the habitats upon which rare species depend. Aside from those on the State and Federal Listings, species that depend on vernal pools (small, seasonal wetlands)





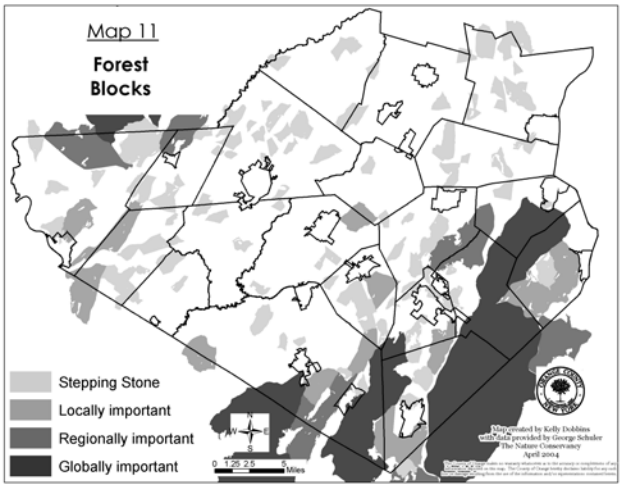
[3] See Appendix 1 for a list of the rare species that can be found in Orange County.

but are unlisted were also included because these wetlands and the surrounding forest receive little or no regulatory protection and are rapidly disappearing. Bobcats, forest-interior birds, and other specialist species were also considered because their presence indicates high quality habitat.

Map 9 (Critical Animal Areas) was generated from known sites of existing critical animal species while Map 10 (Critical Plant Areas) used existing critical plant sites in conjunction with extrapolation of where critical plants are likely to grow. The darker areas on both maps contain more critical species than the lighter areas. White areas on this map should not be interpreted as being void of significant species; critical species may indeed be present in white areas due to the fact that the research that *has* been done in the County is limited and may not have covered these areas. These maps are therefore *not* substitutes for biological inventories; only a thorough study by a qualified professional can reveal the presence or absence of critical species at specific sites. More research and inventories are needed in areas of the County where there are data gaps. Maps 9 and 10 are meant to display areas that are already known to have critical species, making them useful in planning.

Systems

This plan focuses on all aspects of biological diversity, including species, ecological communities, and ecosystems. Understanding these relationships is key to effective conservation.[x] As opposed to the species-specific analysis above, all species are taken into account when examining ecological communities and ecosystems, including known locations of both common and rare species in addition to other areas likely to support biodiversity. Effective conservation will result only from the protection of intact, interconnected communities and ecosystems; the preservation of individual species will naturally follow.[xi] Focusing on biological diversity at this broad scale is a proactive approach to biological conservation because it protects whole assemblages of species before any single species declines into imperilment.



Forest Systems

Map 11 represents areas of the County that are dominated by forested land. These forested areas are expected to contain many habitat types, including swamps, ridgelines, old and new forest, and even meadows. Map 11 divides forests into four size classes, each important for different reasons:

1. Globally important (greater than 15,000 acres). These large and intact forest ecosystems support characteristic, wide-ranging and area-sensitive species, especially those

that depend on interior forest. In Orange County, these species include many birds (broad-winged hawk, barred owl, neotropical warblers), mammals, reptiles and insects. Globally important forests are large enough so over time they will express a range of forest successional stages including areas that have been subjected to recent large-scale disturbance such as *blowdowns* and fire, areas under recovery, and mature areas. These forests also provide sufficient area to support enough individuals of most species to maintain genetic diversity over several generations.

2. Regionally important: (14,999 down to 6, 000 acres) Patches greater than 6,000 acres provide habitat to more area-sensitive species and they can accommodate the large-scale disturbances that maintain forest health over time. Smaller patches are often less able to maintain the entire range of needed habitats and successional stages after large-scale disturbances.
3. Locally important: (5,999 down to 2,000 acres) These smaller but locally important forest ecosystems, often represent the lower limit of intact, viable forest size for forest-dependent birds. Such bird species often require 2,500 to 7,500 acres of intact interior habitat. These forests, like the larger regionally important forests, also provide important corridors and connectivity among forest ecosystems within Orange County.
4. Stepping stone forests: (1,999 down to 200 acres) These examples of smaller forest ecosystems provide valuable relatively broad (not just a narrow strip) corridors and links to larger patches of habitat such as the local, regional, and global forests found in Orange County. These smaller forests, therefore, enable a large array of species, including the County's wide-ranging and area-sensitive species, to move from one habitat to another across an otherwise hostile and fragmented landscape. They also provide important habitat at key times during many animals' life cycles. These forests should be considered the absolute minimum size for intact forest ecosystems. Forests as small as 200 acres will support some forest interior bird species, but several may be missing, and species that prefer "edge" habitats will dominate.

Smaller blocks of habitats are less likely to support many of the significant species discussed throughout this chapter. Priorities for protection therefore range from high to low as forest blocks range from globally important (high priority) to stepping stone (lowest priority). Protection can be accomplished through measures of general land protection such as purchase of forestland, conservation easements, and conservation subdivision design.

Aquatic Systems

The biological health of Orange County's waterways is as important as that of its terrestrial systems. Fortunately, maintaining healthy ecosystems on land helps to keep aquatic systems healthy, too. In fact, how land is used and maintained within a watershed, or drainage basin, is the primary factor that determines water quality and biological diversity of the water body: Impervious surfaces,

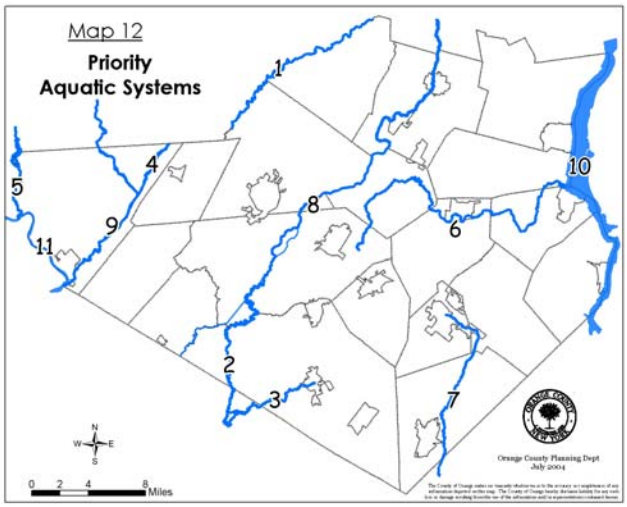
polluting land uses, and sparse vegetation within a watershed will have a negative effect on water quality, while a watershed that is managed for point and non-point source pollution and has ample vegetative buffers will result in healthy waterways.

Orange County contains portions of two ecologically distinct large watersheds: the upper Delaware River and the lower Hudson River. Each of these large watersheds contains smaller watersheds. Because these smaller watersheds are similar in such physical features as elevation, geology, landforms, gradients and drainage patterns, they are expected to contain similar biodiversity patterns.

The County's streams and watersheds of the upper Delaware and lower Hudson were classified by both their living and non-living attributes, in order to make sure we had a representation of the full variety of freshwater biodiversity in Orange County. Each of the following streams thus represents a separate kind of aquatic system and the healthiest stream ecosystem of its class. Map 12 displays these rivers and streams.

They are:

1. Shawangunk Kill
2. Pochuck Creek
3. Wawayanda Creek
4. Basher Kill
5. Mongaup River
6. Otter Kill/Moodna Creek
7. Ramapo River
8. Wallkill River
9. Neversink River
10. Hudson River
11. Delaware River



Protection of these priority water bodies can be accomplished through land use regulations throughout the watershed as well as creating or maintaining vegetative buffers along the water body itself. It is of utmost importance to ensure a maximum of natural land cover within these watersheds and minimize the amounts of runoff and other pollutants that are discharged into the ground or onto the ground surface.

The **Town of Montgomery** has made noteworthy progress towards boosting the health of the Wallkill River. As it flows through Montgomery, the River passes by more than 280 acres of protected land along its banks, 185 of which are owned or safeguarded by the Town. These protective buffers help to stabilize the banks, improve water quality, provide access for recreation, and ensure that the corridor is not developed in an incompatible manner.

Farmland

A third ecosystem type uniquely important to the biological diversity of Orange County is farmland. Both working farms and post-agricultural lands—if managed properly—can support a diverse array of species. Many declining and "listed" species of reptiles, amphibians, and birds depend almost entirely on Orange County's farms because they are one of the few land uses that maintain open grasslands, fields, and shrublands. Because of its agricultural heritage, Orange County is regionally significant for these open habitat types and the species they support.

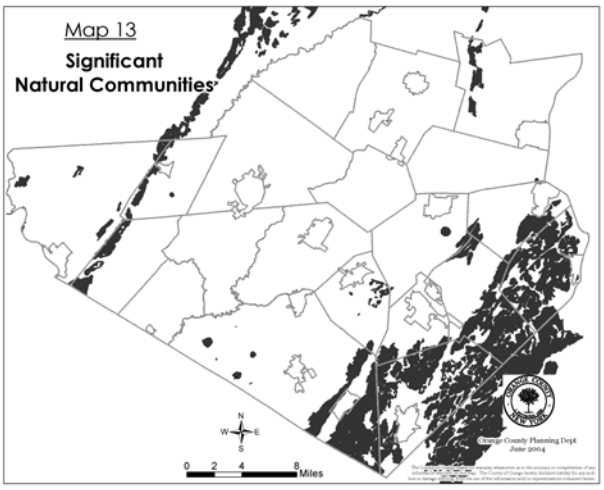
Farm-related habitats are rapidly disappearing throughout the northeastern United States, along with the species that require them. Major causes of these declines include re-growth of forests as fields are abandoned, and urbanization, which fragments and eliminates open habitat. As with forest wildlife, many farm-dependent species must be able to disperse among open habitats; therefore, fragmentation by roads and developments should be minimized in agricultural areas having high biological diversity. Policies and practices that promote the continuation of small-to-medium-scale, ecologically-sensitive farms that are interconnected throughout the County would help to maintain biological diversity and should be actively encouraged.

The KeziahLain farm in Minisink is a 150-acre organic cow and hay farm that provides valuable habitat to many species. Because most of the farm is pasture, hayfields, or wooded and thus not intensively tilled or cultivated, the farm serves as a haven and corridor for both migratory and resident wildlife. Grassland birds, songbirds, waterfowl, amphibians, reptiles, invertebrates, and many species of mammals flourish here.

Other Significant Habitat Types

Map 13 displays natural communities that the New York Natural Heritage Program has identified as being of statewide significance.[4] Other unique Orange County communities, such as limestone outcrops and beds of submerged aquatic vegetation, have also been added to this map because their distinctive character indicates a unique assemblage of species and a unique role in the landscape.

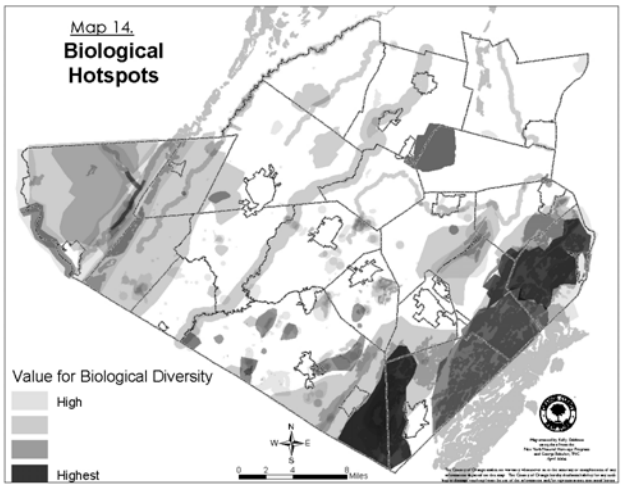
Protection of these important natural communities should occur through measures of general land protection such as purchase of forestland, conservation easements, and conservation subdivision design.

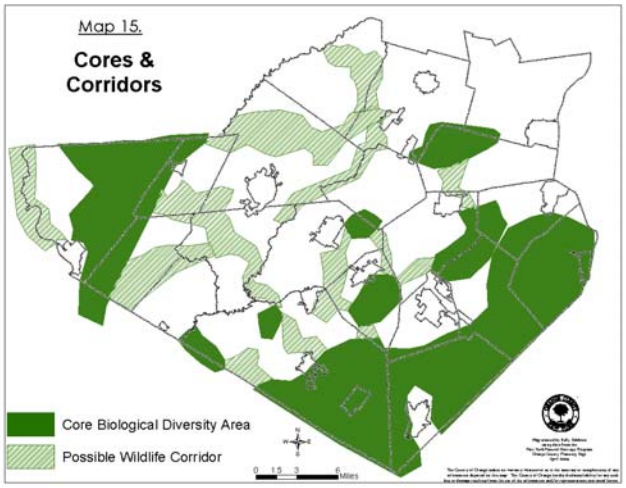


[4] See Appendix 2 for a list of significant natural communities present in Orange County.

Biological Diversity Hotspots

One of the most important actions that both the County and local governments can take to maintain and enhance the County's unique biological diversity is to preserve biological "hotspots." Shown in Map 14, these areas have high concentrations of rare or otherwise critical species, both plant and animal, or contain significant natural communities.





These hotspots were analyzed in conjunction with the map of forest blocks and the Priority Aquatic Systems map to generate a map of Core Biological Diversity Areas (shown in Map 15). Core Biological Diversity Areas are significant because of their species composition and percent of natural land cover. The following Core Biological Diversity Areas were identified:

1. Highlands (including Sterling Forest, Harriman, and Bear Mountain State Parks)
2. Neversink Valley (including the southern Shawangunk Ridge and the Basher Kill)
3. Goosepond Mountain (including Goosepond Mountain State Park)
4. Stewart State Forest
5. Mt. Adam and Mt. Eve
6. Schunnemunk Mountain
7. Purgatory Swamp
8. Upper Wallkill River/Wawayanda Creek

Intense development should be avoided in these areas. If development is proposed in such areas, particular attention should be given, using existing parameters within the SEQRA environmental review process, to ensure that the project has a minimal impact on the biological resources.

Wildlife Corridors

Through the creation of wildlife corridors, Core Biological Diversity Areas can be connected to one another and fragmented habitat conditions can be partially overcome. A wildlife corridor is a broad swath of land that becomes a link from one tract of land to another. Conservation biologists generally agree that species viability and diversity are enhanced by well-connected habitats.[xii] Because small, isolated habitats are unlikely to maintain viable populations over the long-term, and because climate change and disturbances require that

organisms be able to move over large distances, corridors are recommended as an important conservation measure to counter the negative effects of habitat fragmentation and isolation.[xiii] By analyzing where forest blocks and protected open space are located, Potential Wildlife Corridors were devised (shown in Map 15). These Potential Wildlife Corridors are (*****denotes a linear river corridor which includes the river and its adjacent land):

1. *****Delaware/Mongaup River Corridor
2. Neversink Valley to Mt. Adam and Mt. Eve
3. Mt. Adam and Mt. Eve to the Highlands
4. Upper Wallkill River/Wawayanda Creek to the Highlands
5. Goosepond Mountain to the Highlands
6. Goosepond Mountain to Schunnemunk Mountain
7. Black Meadow Reservoir (not a core) to Purgatory Swamp
8. *****Wallkill River Corridor
9. Schunnemunk Ridge to Stewart State Forest
10. Wallkill River/Highland Lakes to the Shawangunk Kill
11. *****Otter Kill/Moodna Creek Corridor (linear along river)
12. *****Shawangunk Kill river Corridor (linear along river)
13. Greenville/Wawayanda Corridor

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[i] Nick Donnelly, Pers. comm.,

[ii] New York State Dept of Environmental Conservation, Amphibian and Reptile Atlas Project

[iii] New York Flora Association

[iv] NYS DEC, Endangered Species Unit

[v] Michael Klemens, Pers. comm..

[vi] Stephen Miller, "The Economic Benefits of Open Space," Islesboro Islands Trust, Islesboro Islands, ME: Islesboro Islands Trust, May 1992.

[vii] Redmond, Kathleen. 1969. Nature and Man: Natural History in Orange County. Booklet No. 4 of the Orange County Community of Museums and Galleries, Goshen.

[viii] NYS DEC Dam Safety database

[ix] Soulé, M. 1991. Land use planning and wildlife maintenance: Guidelines for conserving wildlife in an urban landscape. Journal of the American Planning Assoc. 57(3):313-323. Forman, R. 1995. Land Mosaics: The Ecology of Landscape and Regions. Cambridge University Press, Cambridge.

[x] Poiani, K., and B. Richter. 2000. Functional Landscapes and the conservation of biodiversity. Working Papers in Conservation Science. The Nature Conservancy, Conservation Science Division. Arlington, VA.

[xi] Angermeier, P. L. and I. J. Schlosser. 1995. Conserving aquatic biodiversity: beyond species and populations. American Fisheries Society Symposium 17: 402-414.

[xii]Fahrig, L. and, G. Merriam. 1985. Habitat patch connectivity and population survival. Ecology 66:1762-1768.; Gilpin, M., and M. Soulé. 1986. Minimum viable population: Processes of species extinction. Pages 19-34 *in* M. Soulé, ed. Conservation Biology: The Science of Scarcity and Diversity. Sinauer Associates, Sutherland, MA., Primack, R. 1993. Essentials of Conservation Biology. Sinauer Associates, Sutherland, MA.; Noss, R., and A.Cooperrider. 1994. Saving Nature's Legacy: Protecting and Restoring Biodiversity. Island Press, Washington, DC,; Meffe, G., and C. Caroll. 1997. Principles of Conservation Biology, 2nd Edition. Sinauer Associates, Sunderland, MA; Beier, P., and R. F Noss. 1998. Do habitat corridors provide connectivity? Conservation Biology 12:1241-1252.; Lehtinen, R., S. Galatowitsch, and J. Tester. 1999. Consequences of habitat loss and fragmentation for wetland amphibian assemblages. Wetlands 19(1):1-12.

[xiii] Noss, R. 1991. Landscape connectivity: Different functions at different scales. Pages 27-40 *in* W. Hudson, ed. Landscape Linkages and Biodiversity. Defenders of Wildlife, Washington, DC.

CHAPTER IV
Recommended Actions

The recommendations that follow address specific Orange County government actions and roles that should be taken to address open space needs through 2009. These recommendations are an outcome of a full year of research and analysis. Recommended actions are presented in six (6) categories (see attached maps):

1. County-wide / General
2. Water Resources
3. Agriculture
4. Recreation
5. Landforms & Landmarks
6. Biological Diversity

All recommended actions also include reference to two (2) indicators to guide County leaders in application and priorities:

a. Recommended priority – ranging from highest to lowest – with highest equaling action within one year and lowest within the next five years.
b. Relative cost – from high cost to low cost.

Also included may be reference to Priority Growth Areas (PGA) from County Comprehensive Plan. Where no reference is made, recommendation is equally important inside and outside of PGA's.

1. County-wide Recommended Actions

The following actions are recommended for general application countywide:

A. Continue Monitoring of Land Use Trends.

Highest Priority / Low – No Cost

In cooperation with Department of Real Property and Water Authority, the Planning Department should maintain an inventory of municipal land use and development permits to monitor open space and related needs. This includes use of New York State General Municipal Law §239 reviews by the County Planning Department to ensure that the County's open space priorities are considered in municipal planning and zoning approvals.

B. Technical Assistance to Municipalities.

Highest Priority / Low Cost

The Planning Department and Water Authority should continue to provide direct technical assistance to municipal leaders upon request.

C. Amend County Land Procurement/Disbursement Policies.

Highest Priority / Low Cost

The County must review its current policies for the acquisition, management and disbursement of real property to ensure that open space priorities are met when possible.

D. Establish an OPEN SPACE DEDICATED FUND.

Highest Priority / High Cost

An open space fund, keyed to the priorities of this Plan, should be established using County general revenue in support of general obligation bonds. The goal of such a Fund is to provide critical matching funds to municipalities and/or qualified conservation organizations, both working with willing sellers, to acquire open space or conservation easements consistent with the priorities of this Plan.

This Fund could be initiated with a meaningful investment from the Orange County Water Fund targeted to the first priority of this Plan – the protection of water supply watersheds and wellhead protection areas. Additional funding for all open space priorities would rely on the County's significant bonding authority and would be subject to Legislative approval. After review and approval of annual applications, the County would issue general obligation bonds at an amount needed to fund approved applications keyed to any borrowing ca established by the Legislature. This fund should offer matching funds. Up to 50% County share is recommended with potentially larger County contribution where land protection specifically targets water resource priorities. Any transaction would require willing seller participation as well as municipal sponsorship and/or review. Funding for water resource priorities and recreation priorities would be targeted to resources also outlined in the Plan, with emphasis on sites outside of priority growth areas.

Optional use of a portion of such County Fund might include establishing a County Transfer of Development Rights (TDR) Bank for purchasing development rights when and where a municipal TDR program exists. The Fund could then be used only when a municipality does not have a purchaser for the TDR credits that have been locally authorized for an important open space property.
When setting a Fund commitment, the County should consider the following guidance. Based on national research by the Trust for Public Land, public support for open space protection funding is consistently strong, but wanes as the annual cost for such protection approaches $30 per household per year. With 114,788 households in Orange County (2000 US Census), such a threshold translates to Fund costs of no more than approximately $3.5 million per year.

E. Municipal Assistance for Land Transactions.

Highest Priority / Moderate Cost

Using a portion of the Fund (see above) and/or an annual appropriation, the County should provide matching funds towards transaction and closing costs for municipally-

sponsored open space protection. This could include and/or be modeled from prior financial support to the Orange County Land Trust (currently $100,000/year) for such transactions.

F. **Municipal Planning Grants**.

Highest Priority / Moderate Cost

Starting in 2003 an annual appropriation (ranging from $75,000 to $100,000) has been made to the Planning Department to allow municipalities to apply for small matching funds in support of local planning efforts. This should continue and include the opportunity to support municipal open space planning projects.

G. **Pursue a Hudson Valley Greenway Compact**.

High Priority / Low – No Cost

The Hudson Valley Greenway is a State agency that provides financial and technical incentives for Counties to form "compacts" with municipalities in addressing the goals of the Greenway. Orange County should pursue such a compact, working with a set of willing municipalities that share interest in the priorities of this Open Space Plan.

H. **Adopt a County Official Map**.

High Priority / No Cost

New York State General Municipal Law § 239-e allows a County to adopt an "official map" to "facilitate the planning and development of roads and drainage systems and sites for public development." Learning from Rockland County experiences, Orange County should adopt such an official map showing drainages, trails, rights-of-way and other lead open space resources of intercommunity significance.

2. Water Resources

County support for the protection of water resources, notably land actions to protect public surface- and ground-water supplies, is recommended as the number one priority of this open space plan. Additionally, priority should be given to land protection efforts that help to alleviate water quality problems on twenty (20) rivers or lakes listed as "priority water bodies" in the accepted 2002 County Water Quality Strategy.

A. I**mplement the County Water Quality Strategy**.

Highest Priority/Moderate Cost

This 2002 document, prepared cooperatively by a series of agencies led by the Orange County Soil & Water Conservation Service, calls for a group of activities addressing surface waters with existing water quality problems.

B. New / Updated Municipal Watershed Rules.
Highest Priority/ No-Low Cost

New York State statutes provide all municipalities with the ability to have watershed rules and regulations addressing appropriate and inappropriate land uses in proximity to their public water supply sources. Prior to enactment, the County and the State Health Departments must approve the rules and regulations. While several Orange County municipalities have decade-old rules, more recent attempts to update and/or establish new rules by any municipality have been stalled by New York State. A partnership between the County Departments of Health and Planning should offer municipalities with technical assistance including a model watershed protection rule and regulation keyed to NYS requirements. The County should also advocate to State officials support for municipal partners to advance new or updated rules.

C. Permanent Protection of County Reservoir Lands.
Highest Priority/ Low Cost

A primary feature of prior County actions to expand public water sources was the acquisition of nearly 4,000 acres for possible reservoir purposes. This Open Space Plan, consistent with the 2000 County Park Master Plan, recommends the permanent protection of the majority of those lands for open space, park, and water supply purposes only. Lead options for such protection include either transference of this acreage to the County Parks Department, and/or donation of conservation easements on this acreage to municipalities or a qualified conservation organization.

D. Matching Funds for Resource Protection.
Highest Priority/High Cost,
See 1(d) above.

3. Agriculture

Farmland is the foundation of a vital sector of Orange County's economy and is a commercial land use that can concurrently provide open space, recreational opportunities, watershed protection, and biodiversity protection and enhancement. Lands with agricultural use can also be used to help balance public revenues and expenditures. But for a farmer to stay on the land in the business of farming, he or she must be able to generate sufficient income from the farm operation and not have overwhelming economic disincentives related to agricultural markets, high land values or taxation that force the sale of the farm. If the County is to successfully institute policies to keep substantial areas of land as working farmland, it will be necessary to address both farmland preservation and agricultural economic development through appropriate means.

To preserve critical areas of farmland, the Orange County Open Space Plan recommends the following actions be taken at the County level – focused specifically on lands outside of the County Comprehensive Plan's Priority Growth Areas:

A. Support *Farm-Friendly* Land Use Policies.

Highest Priority/Low Cost

Ensure that all County policies and programs at the County and municipal levels remain *farm friendly*. This can be accomplished by the following actions:

1. Improve interjurisdictional planning efforts to avoid unintended cross-jurisdictional effects such as development spillover, orphaned water and sewer improvements.
2. Improve coordination in the development of regionally significant infrastructure improvements and review compatibility of current infrastructure plans in relationship to their potential impact on the agricultural industry.
3. Reach out to towns during the agricultural district renewal process to inform them about the Agricultural Economic Development Strategy as well as the benefits and requirements of the Agricultural District Law.
4. Develop a mailing list of all district landowners and notify them (perhaps with a newsletter) of their district status, in order to gather information about the current district properties, educate landowners about agricultural exemption eligibility and business development opportunities available to them, and build a constituency to support the district should it ever face a significant challenge at review time. This is particularly important in Orange County where 16% of farmed acres are tenanted.
5. Enhance the statewide "Farm Link" program to reflect regionally significant trends such as the entry of non-traditional populations into farming.
6. Examine alternative funding sources and financing structures for county and local purchase of development rights programs including the use of innovative program structures, such as installment purchase agreements.
7. Support the requirement of buffers and other site design measures as strategies for reducing farmer/non-farm neighbor conflicts.

B. Implement the 2004 Agricultural Economic Development Strategy.

Highest Priority/Moderate Cost

With March 2004 acceptance of this Strategy and on-going support to the County Agriculture and Farmland Protection Board, the County Legislature has initiated this implementation.

C. Invest in Purchase of Development Rights (PDR) and/or Term Easements

Highest Priority/High Cost/Targeted to Outside Priority Growth Areas
See 1(d) above with additional note.

1. County funding should continue to provide matching funds working with willing sellers. However, in this category only, funds could be made directly to property owner / farm owner.
2. The county should develop a matching grants PDR program that provides up to 50% of the funding required to purchase conservation easements on productive farmland.
3. A special committee of Orange County officials, farmers, conservationists and others should be developed to oversee the PDR program with Orange County Department of Planning providing staff support and assistance.
4. The county should select farmland conservation targets; with proposed 10-year goals of 5,000, 10,000 or 20,000 acres.
5. Ranking criteria should be finalized to focus county resources on protecting the most valuable farmland for long-term agricultural use.
6. An Orange County PDR program should compliment existing farmland protection efforts by towns and land trusts within the county. Partnerships with other local, state or federal partners can leverage the county's funding and maximize farmland protection efforts within the county.
7. Significant efforts should be made to educate local officials and agricultural landowners about the PDR program and conservation easements to maximize participation and reduce the likelihood of misperceptions about the program.
8. The Agricultural and Farmland Protection Board should also examine the development of a term oriented affirmative agriculture use covenant to assist local planning efforts. This temporary covenant may include a right of first refusal for purchase of the property in cases where the farm may transition to another agricultural use. The value paid for the covenant may count toward a PDR match.

4. Recreation

Countywide recreation priorities include the expansion and completion of trails and recreation corridors, the preservation of rail rights-of-way for recreation purposes, and the buffering of existing public parkland, and improvements to the in-fill of smaller parks in village and city settings. Additionally, Orange County should improve the deficiency of our limited public access to water for recreation, notably access to rivers and lakes. Finally, as shown on the attached existing land use map, the distribution of parks in the County is unbalanced, with some areas well served and some under served, given the dominance of open space lands in the far southeastern portion of the County.

A. Continue Implementation of County Park Master Plan.

Highest Priority/Moderate Cost

The accepted 2000 Orange County Park Master Plan includes, but is not limited to the following "open space recommendations": connect hiking and biking trails; develop canoe/water trails; transfer to parks of appropriate existing county-owned lands; negotiate recreation use rights on existing State-owned lands; and balance park distribution across Orange County.

B. Expand Trail and Rail-to-Trail Systems.

High Priority/Moderate Cost, see 4(a) above.

Expansion and development of trails and rail-to-trail systems should recognize a variety of users within a multi-use setting. The users may include, but are not limited to, pedestrians, bicyclists and equestrian riders.

C. Use County Reviews to Encourage Access to Water and City/Village Park In-fill.

Moderate Priority/No Cost

Under New York State General Municipal Law §239 the County Planning Department should use its planning and zoning permit review authority to support improved public access to water where development proposals offer potential access.

D. Evaluate Current County Holdings for Recreation.

High Priority/Low Cost

At any given time, the County inventory of real property may include lands suitable for meeting recreation needs. A policy and protocol should be defined to ensure that this inventory is periodically reviewed for such needs. See 1(c) above.

E. Extension of NYS Recreational Rivers.

Moderate Priority/ Low Cost

Both the Ramapo River (Rockland County) and the Shawangunk Kill (Ulster County) have been designated as NYS Wild, Scenic and Recreational Rivers through NYS DEC.

Working with affected municipalities, the County should consider extending those designations into the Orange County contiguous, segments of these two rivers.

5. Landforms and Landmarks

This open space resource category includes the following priorities: buffers to existing historic districts and cultural sites, scenic areas/byways/river corridors identified from State or Federal listings, and certain scenic landscapes originally defined in the 1988 Amendment of the County Comprehensive Plan titled "Preserving Scenic Qualities in Orange County."

A. Scenic Byway Expansion.

Highest Priority/Low Cost

Adding to the existing inventory of scenic roads/byways in the County, efforts are underway with County support to gain scenic byway designation for certain routes near the Shawangunk Ridge and in the Moodna Valley. The County should continue technical and, whenever possible, financial support for these designations.

B. Technical Assistance – Development Site Design.
High Priority/Low Cost
See 1(a) & (b) above.

C. Municipal Planning Grants.
High Priority/Moderate Cost
See 1(f) above.

A portion of these mini-grant funds should be used to help municipalities identify and protect locally important landforms and landmarks.

6. Biological Diversity

The crucial issues of water quality, water quantity, rural aesthetics, and human health are all closely tied to biodiversity (plants, animals and their habitats). If these ecological services are lost, replacing them with human-made substitutes requires the enormous cost of designing, building, maintaining and improving these services - and the outcome is typically less efficient that its natural counterpart. The protection and promotion of biological diversity can be achieved through cooperative initiatives and local planning to regulate impacts on habitats and protect irreplaceable plant and animal life, ultimately maintaining and enhancing the diverse natural landscape of Orange County. A biologically diverse landscape is resistant and resilient to both land

use and natural changes and provides ecological services to our communities, now and into the future.

To preserve areas critical to the continued survival of unique and threatened plants, animals and their habitats, the Orange County Open Space Plan recommends the following actions be taken at the County level:

A. Safeguard Core Biological Diversity Areas

Highest Priority / Low Cost

Core Biological Diversity Areas were established in this Plan in recognition of the significant biological diversity they possess as well as their proportion of natural land cover. The County should strive to safeguard these Areas by:

1. protecting areas with noteworthy biological diversity within and adjacent to these Areas,
2. discouraging intense development within these Areas,
3. requiring the completion of a thorough biological inventory and species impact analysis before site design,
4. requiring that any development in the Area be designed so that the project has a minimal impact on the biological resources of the Area.

B. Protect and Enhance Priority Aquatic Systems

Highest Priority / High Cost

Priority Aquatic Systems are streams and rivers that are notable for both their distinctness and their relative ecosystem health (uniqueness supercedes health in some cases). The County should encourage municipalities that border or contain any of the designated Priority Aquatic Systems to act by:

1. putting conservation easements along the river corridor, as well as its tributaries, to prevent development on or disturbance of the riverbank and floodplain,
2. enacting setbacks from the waterway to prevent bank erosion, destruction of habitat in the river corridor, and water quality degradation,
3. requiring vegetative buffers between land uses that generate non-point source pollution (golf courses, some agriculture, etc) and the riverbank of the Priority Aquatic System or an immediate tributary, while justly and adequately compensating all land owners and/or farmers whose land is involved,
4. partnering with other organizations and governmental agencies (such as the Wallkill River National Wildlife Refuge) to complement and augment efforts along Priority Aquatic Systems,
5. participating in Watershed Plans that include biological diversity components.

C. Promote Biologically-sensitive Land Use Planning

Highest Priority / No Cost

The County should promote land use policies and programs at the federal, state, county and municipal levels that are compatible with the conservation of sensitive or significant biological resources. This can be done by:

1. educating land use decision makers, mainly at the local level, about biodiversity values and planning tools,
2. hosting seminars on biological diversity planning,
3. offering guidance or assistance in biological assessments and inventories,
4. supplying biological diversity language for master plans or open space plans,
5. providing guidelines for inclusion of biological diversity issues in municipal open space planning,
6. providing recommended standards for natural resource surveys,
7. working with and promoting NYS DEC's Hudson River Estuary Program to make more use of Biodiversity Technical Assistance programs and partners,
8. encouraging the application of "Best Management Practices" and "Best Development Practices" that can help to reduce impacts to biological diversity.

D. Foster linkages between Core Biological Diversity Areas

High Priority / Low Cost

Areas within the Potential Wildlife Corridors have a unique opportunity to enhance the biological diversity of the County's most significant biological areas (i.e. Core Biological Diversity Areas). The County should foster the creation of natural habitat linkages between tracts of protected open space by encouraging municipalities to:

1. negotiate with developers to design the development in a manner that provides a habitat linkage, possibly by utilizing conservation subdivision design standards,
2. protect key pieces of land within the Potential Wildlife Corridors,
3. communicate with neighboring towns or villages to coordinate efforts.

E. Increase Biological Research

High Priority / Low Cost / Outside Priority Growth Areas

The County should promote and support biological research and inventory in areas of the County where sufficient research has not taken place or where more research is needed in order to better assess biological conservation needs. Such areas include:

1. the western highland region of the County (Deerpark, Greenville, Mt. Hope) and the Wallkill River Valley,
2. areas at lower elevations that support farming and early successional habitats,
3. county-owned reservoir lands (Dwaar Kill, Indigot Creek, Black Meadow Creek)

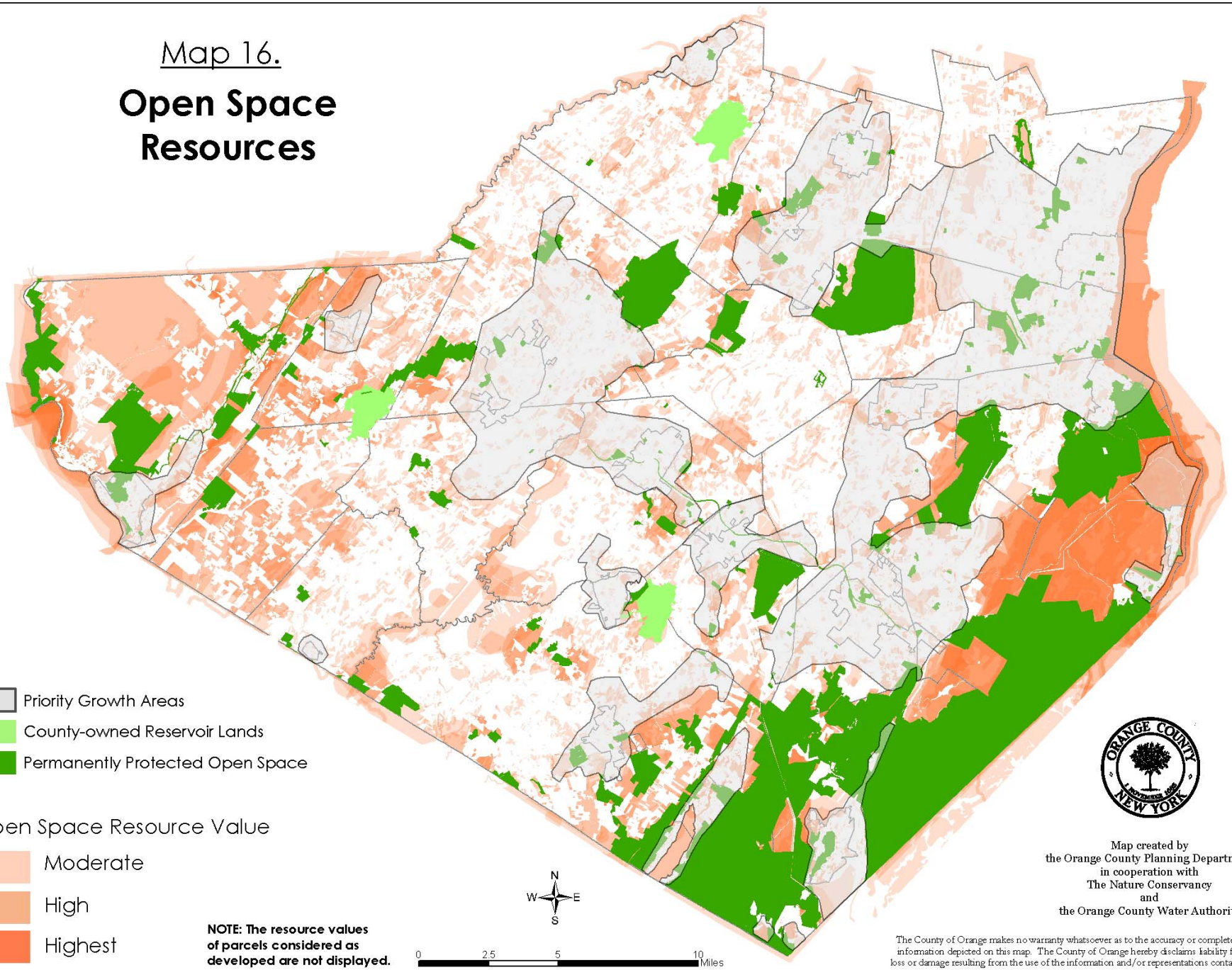
F. Maintain Active Farmland

Moderate Priority/ Low Cost / Outside Priority Growth Areas

The County should promote policies and practices that sustain farms and agricultural practices that are known to contribute to the County's biological diversity.

Map 16.

Open Space Resources



ORANGE COUNTY NEW YORK

Map created by
the Orange County Planning Department
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and
the Orange County Water Authority