

Broome County Natural Resources Inventory

JUNE 2019

Prepared with contributions from:

Broome County Environmental Management Council
Broome County Planning and Economic Development

BROOME COUNTY



**ENVIRONMENTAL
MANAGEMENT
COUNCIL**

Cover Photo Credit:
“Woods Reflected” by Sandra Kirker
First Place, Natural Landscape, 2017
JKLS Environmental Photography Competition

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Introduction

When overlooking the beauty of Broome County's flowing rivers and rolling hills, it is easy to take our vast natural resources for granted. There appears to be no shortage of wild lands to explore, parks to visit, or water to drink. However, as our built environment changes over time, it is important to occasionally take stock of our natural resources and the benefits they provide to guide our policy, planning, management and development decisions into the future.

This document provides a framework for this and helps us plan for communities with a high quality of life that our residents have come to enjoy and that will attract new residents and visitors to our community. It is also valuable to define how natural resources contribute to the larger network of Open Space in a community. In this Plan we define Open Space as:

"Any land that is not intensively developed for residential, commercial, industrial or institutional use, characterized by natural scenic beauty of whose natural condition or present state of use, if retained, would enhance the present or potential value of surrounding development or would maintain or enhance the conservation of natural or scenic resources."

The Environmental Management Council (EMC) has worked within the context of this definition. The EMC recognizes the need for economic development within Broome County and believes that long-term growth is possible while preserving, protecting, and even capitalizing on the area's natural environment, and recognizing that a healthy network of green spaces, parks, and natural areas are a huge asset to the community.

Value of Natural Resources and Open Space

The quality of life benefits of open space lands have been formally acknowledged since the late 19th century, when communities all over America began to establish public greenspaces. Open space pioneers like Frederick Olmstead proposed that public parks should be established within urban areas to promote the physical and mental health of city residents. Similarly, early conservationists promoted the protection of unique or unspoiled natural landscapes for the preservation and protection of wildlife.

One of the earliest local examples is Ross Park. As City of Binghamton officials began to recognize the need for a City Park, a local businessman, Erastus Ross, saw an opportunity to donate 90 acres of land to the City for this purpose. Even then, the multiple benefits of open space were clear, as

Conservation
is a state of
harmony
between men
and land.

Aldo Leopold

he knew that a park would be an attractive place for residents and would help his business interests nearby. The park opened in 1875 and included the Ross Park Zoo, known as the Binghamton Zoo today, demonstrating how prioritizing open spaces can have long-term impacts for the community.

In the early twentieth century the Endicott-Johnson Corporation, specifically George F. Johnson, helped shape the urban area with their investments in the community including many park lands. Johnson believed that providing recreational facilities for his workers would prevent labor problems and increase worker productivity. The parks that they created are still community assets to this day.

All types of communities, from cities and suburbs to rural areas, can benefit from the natural areas, making preservation pragmatic. While larger protected spaces provide the most advantages, even small preserved areas can be beneficial. The social, environmental, and economic benefits include the following.

Social Benefits

When people expand their perspective of natural open spaces by participating in outdoor experiences they begin to make it an important part of their lives. Surrounded by the natural areas of the County, with its many parks and miles of meandering waterways, residents can take part in outdoor recreation and escape their everyday routine. The social benefits of open space include:

- Provide physical and mental health benefits
- Foster community involvement that enhances connection to the spaces
- Enhance aesthetic beauty
- Establish common ground that fosters ethnic and cultural harmony
- Create recreational opportunities for the disadvantaged and those with disabilities
- Encourages interaction with nature and education that instills a sense of environmental stewardship

Environmental Benefits

The provision and preservation of natural areas affords specific benefits that serve to improve the health and well-being of both human and wildlife communities. Environmental benefits include:

- Preserving biodiversity
- Preserve water quality for drinking water, recreation and other uses
- Absorb runoff to reduce flooding.
- Improve air quality
- Enhance groundwater recharge
- Prevent erosion.

Economic Benefits

There is a direct connection between a healthy natural environment, a livable community and a strong economy. Communities around the country are finding that natural areas and open space lands are not an expense but an investment with important economic benefits. Economic benefits include:

- Maintain the quality of life to attract new residents and businesses.
- Support recreation related businesses such as equipment sales and rentals.
- Increase outdoor recreation tourism

- Increases property values
- Decrease the need for expanded infrastructure and utilities, reducing maintenance costs
- Enhances and maintains farmland and timberland for continued agricultural productivity

Intent

The preservation, protection and sustainable management of environmental resources in Broome County is an essential element in planning efforts including comprehensive, sustainability, and hazard mitigation planning. This document aims to promote awareness of these valuable resources, identify where and how these spaces are currently protected and where there is a need to preserve additional lands. Influences such as climate change, development pressure and changing energy infrastructure are expected to have widespread landscape impacts. By outlining areas where significant open space resources are located, municipal agencies and others interested in open space preservation can use this document to inform their planning efforts and apply the tools at their disposal to manage impacts and direct development appropriately.

The goal of this document is not to restrict all development everywhere throughout the county, but to highlight what natural and cultural features make the County unique and special, so that we can plan for strategic growth and development while maintaining its character. Embodied in the general goal are the following specific objectives:

- Inventory and map existing protected open space lands.
- Ensure the quality of water resources.
- Preserve lands of distinctive character having local scenic, historic and heritage value.
- Preserve, protect and promote responsible agricultural and forestry operations in our working landscapes.
- Preserve and enhance the natural and cultural features that uniquely characterize Broome County.
- Provide protection for environmentally sensitive areas such as wetlands, floodplains, steep slopes, wildlife habitat areas and unique geological formations.
- Preserve and enhance key entryways or gateways into Broome County.
- Provide, expand and protect outdoor recreational facilities and opportunities.
- Promote responsible land use and development, maintaining the capacity of our natural resources to provide services.
- Establish and preserve buffers between open space and developed areas.
- Preserve biodiversity of species and habitats.

This document should not be viewed as a static set of information. Periodic evaluation and reprioritization will reflect changing circumstances into the future.

Existing Plans and Initiatives

Many existing state, regional, and local plans include components that address natural resources planning, protection or management. It is essential to review these plans to identify existing data and priorities, determine whether any long-term planning goals will have impacts on the County's natural resources, and to ensure consistency with goals and objectives outlined here. In addition, consistency with existing plans may support efforts to obtain funding for projects and programs to achieve established goals. This document also draws information from a variety of existing data sets from the Broome County GIS Division, New York State,

US Census Bureau, and others. This section provides a summary of the plans, programs and initiatives that have created a context for development of this plan.

New York State Plans

Open Space Conservation Plan

The objectives of this plan are to protect the air and water quality of the State, provide outdoor recreational opportunities while preserving and nurturing the scenic historic and cultural resources of the State. The first Open Space Plan, prepared jointly by the Department of Environmental Conservation, the Office of Parks, Recreation and Historic Preservation and nine Regional Advisory Committees was approved in November 1992. Updates to the plan written prior to the 2009 publication proposed the acquisition of small parcels of land adjacent to Chenango Valley State Park to protect the park from potential private development and allow for expansion of park facilities. However, the 2009 edition of the State Plan excluded this proposal.

State Forest Unit Management Plans

Unit Management Plans (UMPs) are completed and implemented by the NYSDEC to assess the natural and physical resources present within a state forest. They also identify opportunities for public use which are consistent with the classifications of these lands, and consider the ability of the resources and ecosystems to accommodate such use. Primarily state forests in Broome are managed utilizing the Broome State Forest UMP (Cat Hollow, Tracy Creek, Beaver Pond, Whitaker Swamp, Hawkins Pond, Marsh Pond, Skyline Drive, and Cascade Valley State Forests). Additional lands are managed with the Long Pond UMP (Triangle State Forest and Nanticoke Lake Multiple Use Area), Rockefeller UMP (Beaver Dam State Forest), and Treaty Line UMP (Melondy Hill State Forest).

State Parks Plan (SCORP)

Developed by the NYS Office of Parks, Recreation and Historic Preservation, the Statewide Comprehensive Outdoor Recreation Plan (SCORP) provides the State with policy related to its recreation and preservation mandate. The document maintains eligibility for continued funding under the Land and Water Conservation Fund (LWCF), documents status and progress of recreational projects and programs, and serves as an overall guidance document for recreation resource preservation, planning and development of the State's resources. The most recent plan was completed in 2014.

Broome County Plans

The Broome County Comprehensive Plan, 2013

The Broome County Comprehensive Plan is intended to guide County investment and regulatory policy decisions in order to realize the vision for the future of Broome County established through the planning process. The Plan includes a dedicated Open Space chapter that gives an overview of the open space resources. Recommended actions fall under nine vision items including "Take Pride in our Scenic Beauty" that includes measures to protect, promote, and enhance our natural resources.

Susquehanna Heritage Area Management Plan, 2009

The SHA Management Plan was undertaken to identify, promote, and develop the historic, cultural, recreational, and natural resources of the Susquehanna Heritage Area, which encompasses Broome and

Tioga Counties. It identifies a series of strategies for communities in the SHA associated with the preservation and enhancement of their unique resources. One of the overarching goals of the plan is to enhance recreational opportunities, linkages, and access and build upon the community spirit and pride generated by existing special events and festivals. Specifically the plan outlines action items for preservation and enhancement of scenic views, recreational resources and bicycle and pedestrian amenities.

Transportation Planning

Binghamton Metropolitan Greenway Study (1999) and Two Rivers Greenway Signage Plan (2012)

The purpose of the Greenway study was to determine the feasibility of constructing a Greenway system of pedestrian and multi-use trails along the banks of the Chenango and Susquehanna Rivers, the area's most important and underutilized assets. The plan inventoried the existing trails and proposed development of new links that would create the ultimate Greenway network. As several of the sections were constructed since finalization of the Greenway Study, the Signage Study aimed to build upon that progress. The Study includes a branding strategy that integrated extensive wayfinding to increase awareness about and usage of the resource.

Water Resources Planning

Intermunicipal Waterfront Public Access Plan, 2011

This document is a guide for future development activity along the eighty-nine miles of Broome County's riverfronts shaped by the Susquehanna, Tioughnioga, Chenango, Otselic and Delaware Rivers aiming to establish an integrated system of water related facilities and programs. The implemented plan will provide access to the areas' natural, cultural and recreational resources to the county's residents and tourists thereby stimulating broader economic development. An update of the plan is anticipated to begin in 2019.

Broome County Hazard Mitigation Plan, 2019 (draft)

The Broome County Hazard Mitigation Plan to reduce loss of life and property, lessening the impact of disasters including flooding, severe storms, severe winter storms, extreme temperatures and other. The plan is required by state and federal agencies in order for communities in Broome County to be eligible for certain types of non-emergency disaster assistance, including funding for mitigation projects. An update of the plan is currently in the final stages and will be complete in 2019.

Broome County Watershed Flood Mitigation Analysis, 2016

The intent of this project was to provide a broad comprehensive view of the flood hazards in Broome County and their impacts. The expected outcome of this project is a resource tool that local municipal officials can use to make informed decisions on where to locate flood mitigation activities to achieve maximum benefit of their flood mitigation dollars. The project identified frequent flood hazard locations, created a database with pertinent flood hazard characteristics, prioritized the County's watersheds based on the level of deleterious impacts caused by the flooding hazards, developed a standardized approach for the identification and design of flood mitigation activities in the County, and implemented this approach for three of the County's high priority watersheds identified.

Building Resiliency, 2016

Broome County and its municipalities are dedicated to improving safety and creating a flood resilient community. In light of major flood events in 2006 and 2011, local municipalities initiated over 170 large and small-scale flood mitigation projects to strengthen resiliency throughout Broome County. However, in general,

public perception does not reflect the great strides that have been made in improving our flood resiliency. The Planning Department developed the report Building Resiliency to document all of the projects and programs being achieved by the County and local municipalities to address flooding in our communities. The report provides a comprehensive overview in the progress made to date and helps us to continually assess our progress moving forward.

Agricultural Resources Planning

Agricultural Economic Development Plan, 2019

The Agricultural Economic Development Plan was developed through a partnership between Broome County, Cornell Cooperative Extension of Broome County and other relevant stakeholders to establish a commitment to maintaining a viable agricultural sector, and to identify opportunities for county agencies and their local and regional partners to support the growth of farm businesses. The plan outlines a vision for the future of the agricultural industry in the county, along with the resources and funding opportunities to achieve that vision.

Municipal Plans

The Town of Fenton Open Space Plan, 2012

The Town of Fenton Open Space Plan was based largely on the preliminary draft of this county wide plan. The strategy of this plan is to monitor all non-developed parcels in the town that that are 5 acres in size or larger. It performed an analysis of the other plans summarized in this section and defined a series of specific action items for executing the plan, as managed by Fenton's Conservation Advisory Committee (CAC).

Municipal Comprehensive Plans

Broome County Planning works with local municipalities to complete development of their local comprehensive plans. These plans guide growth and development in the community through goals and policies implemented through the local land use code, along with other local codes and ordinances. Comprehensive Plans completed with the assistance of Broome County Planning include an Environment Chapter that serves to outline the significant natural resources in the municipality, and guide recommendations for growth and development with the appropriate management of these resources in mind.

Using the Plan

The preservation, maintenance and management of natural resources and lands requires a comprehensive view of resources on several scales, from lands of regional importance such as state and federal parks, to lands of local significance such as a local nature trail or pocket park. A complete natural resource inventory consists of properties from multiple owners, from municipalities to private landowners. Therefore, comprehensive planning requires coordination between these entities including local governments, state and federal partners, private landowners, conservation organizations and other interested parties. By documenting significant natural resources, protected and not, these groups can leverage resources and develop a network that maximizes environmental, social and economic benefits that they provide.

Municipalities

Protecting and managing significant natural resources can be done through planning for the protection and enhancement of important open spaces, managing growth and development, directly acquiring open space, and by practicing good stewardship. Local governments have an especially important roll due to their existing authority through local land use controls and existing ownership of open space areas such as parks.

An inventory of natural resources at the local scale provides communities with a strong foundation for proactive planning and informed decision-making. While it may be difficult to establish a dedicated funding stream to open space preservation, goals can still be achieved by incorporating open space priorities into existing processes and programming. Some of the activities that may be informed by this plan include:

- Comprehensive Planning
- Other long-range planning
- Water resources management
- Hazard mitigation planning
- Zoning changes and updates
- Site plan and other development approvals
- Environmental reviews
- Capital improvement planning
- Infrastructure investments
- Acquisitions of municipal lands
- Documentation of changes over time
- Facilities management

Private and Nonprofit

An inventory of local natural resources can provide a common baseline on which public private partnerships can be based. Using this plan as a springboard, nonprofit or private entities that share the common goals of open space preservation and sustainability can work for a shared vision, helping to leverage resources not available to the public sector.

The information can help private landowners make informed decisions about managing their own properties and empower them to be more involved in land use decisions affecting their communities. Local businesses and developers can also use this information to inform their activities and assist them in compliance with environmental and land use regulations.

Content of the Inventory

The outline on the following page gives an overview to the content of the document and intent of each section.

Introduction

- Provides information introducing inventory and natural resource benefits, identifies relevant existing plans and initiatives at the local, county and state level, and establishes the context for use of the document.

County Overview

- Provides context. This section lays out the existing demographic and geological conditions within the county and provides a brief overview of the general issues facing the County that impact our resources.

Resource Characterization

- Expands upon the natural resource categories as a framework for the inventory.

Natural Resource Inventory

- An inventory of natural resources found in the County based on the established resource characterization. The inventory outlines the location and protection status of important natural resource and open space areas, identifies sources of data and information, and identifies gaps in the available data. The inventory serves to guide planning, development, and other decisions impacting these resources.

Maps

- Maps depicting the resources identified in the Natural Resource Inventory are included with each resource category.

Tools and Strategies

- An overview of planning tools for protecting natural resources including protective measures, acquisition strategies, regulatory tools, taxation strategies, and land management tools

Goals and Action Items

- Delineates high-level goals and associated action items for managing open space and natural resources in the county.

Broome County Overview

Eons after the glaciers had carved their path through the land, channeling out the riverbeds and forming the valleys and steep hills, the Iroquois Confederacy had established itself in the area encompassing what is known today as Broome County. The tribes of the Confederacy, the Mohawk, Onondaga, Oneida, Cayuga and Seneca, traditionally an agricultural economy, lived on their harvests from the rivers, soil and forest.

In November of 1768 the sale of the land to England by the Iroquois began a sequence of events that eventually resulted in the formation of what is known today as Broome County. Individuals seeking escape from religious persecution in England migrated to the New World to settle on land given to them by King George III. It wasn't until 1806, when after the Revolutionary War and the Treaty of Hartford that Broome County separated from Tioga County and emerged as an entity of its own.

Demographics

Subsequent to a period of growth, when the population reached about 222,000 in 1970, Broome County's population declined by approximately 9.6% to 200,580 people by 2010, a decrease of 21,420 residents. This decline is largely due to a drop in birth rate and migration of individuals out of the County. While the population declined throughout this entire period, the largest loss (5.5%) began in the nineties and continued through the early part of the twenty-first century. The 2010 census indicates that the pattern of decline has eased, with no significant change between 2000-2010. Census data (2012) showed a population decrease of 2540, a -1.3% change, down to a total population of 198,040.

While Broome's population has generally declined, loss is most evident in the Triple Cities urban and fringe areas (with the exception of Vestal) which fell by 13.1% in the 2000-2010 decade. In Northern and Eastern Broome the municipalities of Barker and Lisle were the only towns with an increase.

Considering overall population decline it may appear that Broome has little development pressure. However, decline in urban areas and growth in rural areas suggests a migration of the population to areas where existing open space resources are concentrated. As municipalities try to reverse the trend of population decline and attract more people and businesses to the community, the protection of scenic areas and habitat regions is essential for long lasting positive effects on the quality of life to attract these future residents.

There is a similar trend with the number of households. The number of households in the County increased by 5.1% from 1980-2000. Most of the increase occurred in the eighties, but continued to a lesser extent in the nineties in some areas. The increase is most evident in the rural Northern, Eastern and Urban Fringe Areas which grew at a rate of 38.7, 21.4 and 11.3 percent respectively. During this same period, the Urban Area increased by only 1.0 percent.

From 2000 to 2010, growth in the same areas (Northern, Eastern and Urban Fringe) exhibited growth of only 2.6, 1.7 and 1.5 percent respectively while growth in the Urban Area amounted to 1.7 percent. Overall, the number of households in Broome County grew at 0.4 percent in the twenty- year period of 1990 to 2010.

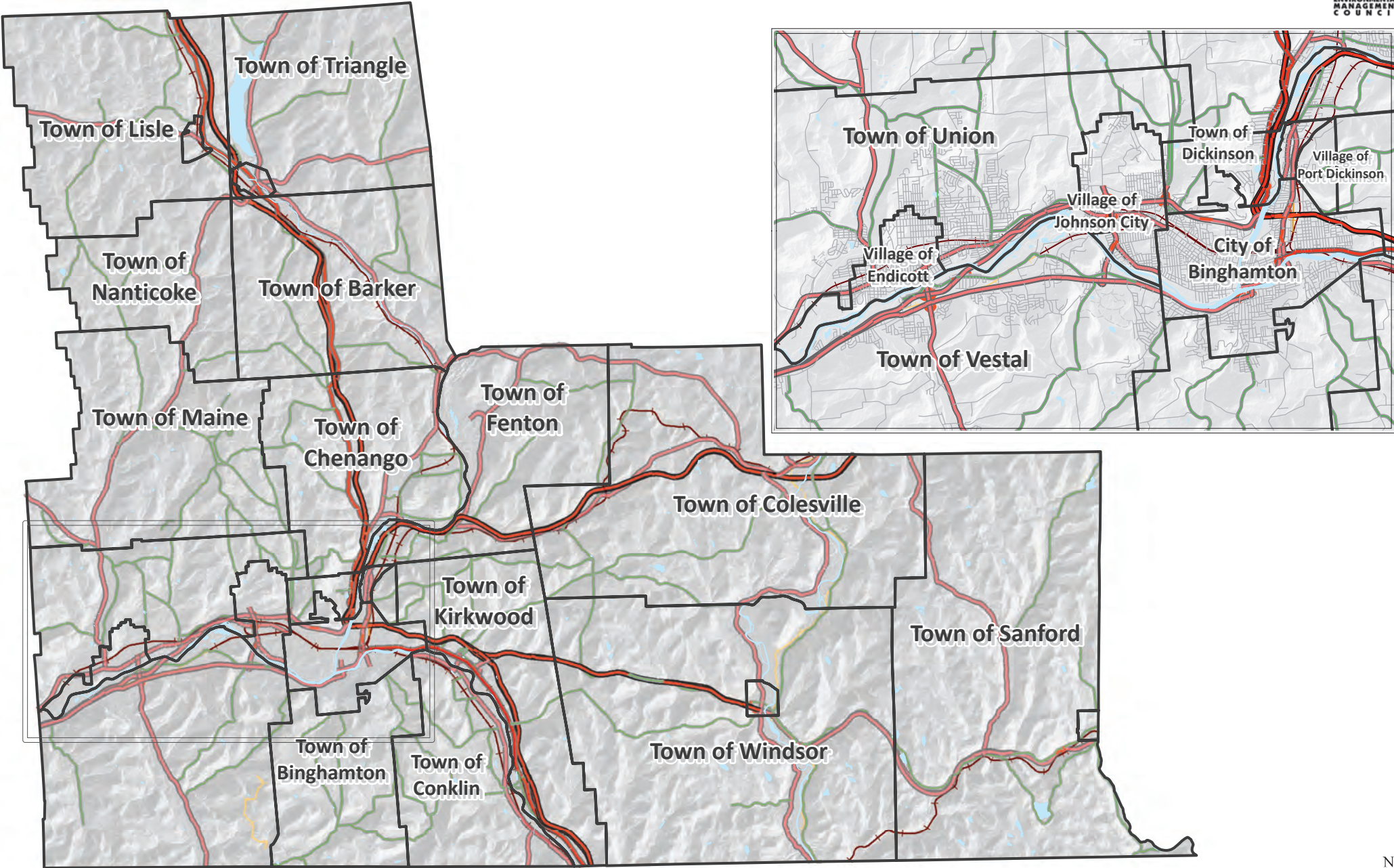
Residential development in the core urban area has declined since 1980. At that time 46% of building permits were located in this part of the County. This number declined to 30 percent in 1990 and even further to only 18 percent in 2011. Many rural towns, particularly in northern Broome had a relatively large number of building permits, with many appearing to be for mobile homes.¹

The patterns exhibited by changes in the number of households seem to reflect the shift in population distribution to the more rural areas of the County. It is important to recognize with the shift to rural areas, land that had remained open space as forest or agricultural land may experience additional development pressures for residential and commercial development. Therefore, preservation of these open spaces may become increasingly important as the number of households continues to grow.

Broome County Population and Percent Population Change

Municipality	Population			Percent Change		
	1990	2000	2010	1990-2000	2000-2010	1990-2010
<u>Northern Broome</u>						
Barker	2,714	2,738	2,732	0.9	-0.2	.06
Lisle	2,486	2,707	2,751	8.9	1.6	10.6
Nanticoke	1,846	1,790	1,672	-3.0	-6.6	-9.4
Triangle	3,006	3,032	2,946	0.9	-2.8	-2.0
SUB-TOTALS	10,052	10,267	10,101	2.1	-1.6	0.5
<u>Urban Fringe</u>						
Chenango	12,310	11,454	111,252	-7.0	-1.7	-8.6
Conklin	6,265	5,940	5,441	-5.2	-8.4	-13.1
Fenton	7,236	6,909	6,674	-4.5	-3.4	-7.7
Kirkwood	6,096	5,651	5,837	-7.3	3.6	-3.9
Maine	5,576	5,459	5,377	-2.1	-1.5	-3.9
SUB-TOTALS	37,483	35,413	34,581	-5.5	-2.3	-7.7
<u>Urban Area</u>						
Binghamton City	53,008	47,380	47,376	-10.6	0.0	-10.6
Binghamton Town	5,006	4,969	4,942	-0.7	-0.5	-1.3
Dickinson	5,486	5,335	5,278	-2.8	-1.1	-3.8
Union	59,786	56,298	56,346	-5.8	0.1	-5.8
Vestal	26,733	26,535	28,043	-0.7	5.7	4.9
SUB-TOTALS	150,019	140,517	141,985	-6.3	1.0	-5.4
<u>Eastern Broome</u>						
Colesville	5,590	5,441	5,232	-2.7	-3.8	-6.4
Sanford	2,576	2,477	2,407	-3.8	-2.8	-6.6
Windsor	6,440	6,421	6,274	-0.3	-2.3	-2.6
SUB-TOTALS	14,606	14,339	13,913	-1.8	-3.0	-4.7
BROOME COUNTY	212,160	200,536	200,580	-5.5	0.0	-5.5

Broome County, New York Open Space Plan



Economic Trends

Broome County has suffered economic difficulties since the early 1990's, similar to many other upstate New York communities. The area's economy has historically, been largely dependent on a traditional and key manufacturing economic base, which has eroded significantly. Significant high tech industries have downsized, closed, or left the County.

The total number of wage and salary jobs in the County has declined significantly since 2000, a major factor in the decline in county population. The total number of employed has decreased from 83,003 in 2000 to 72,363 in 2010, a decline of 12.8%. The manufacturing sector of the County fell from a total of 17,289 in 2000 to 8,869 in 2010, a drop of nearly 50 percent. In the same decade, however, transportation, real estate, health care, professional and food service sectors experienced some growth.

Geography and Landscape

When looking at the geography of the County , it is clear how its natural resources have played a part in the way the County looks today. Understanding this man-made and natural landscape is important when considering the management of our open space resources. Some people may feel there is no threat to the natural and cultural resources or there is already an abundance of open space. However, the improvements to recreational opportunities, aesthetic appeal, and economic growth associated with open space, can help to improve or maintain the character of communities that are fully developed on the urban/rural fringe. By identifying our important open spaces, it will be more apparent where development should occur, thereby helping to shape land use patterns for the benefit of the community.

Broome County, situated in the Appalachian Plateau, is an upland area dissected by numerous stream and river valleys. Millions of years of erosion of the sedimentary rocks and reshaping by ice sheets and their debris have produced a landscape with rolling hills. The highest elevations are in the eastern portion where the hills rise to over 2000 feet. The highest point in the county is Slawson Hill with an elevation of 2087 feet in the Town of Sanford in the northeastern part of the county. To the west, the lowest elevation of 800 feet occurs where the Susquehanna River flows out of the county.

Today, Broome County's landscape consists of a densely populated urban core and associated suburban areas, surrounded by rural landscapes. The natural landscape is defined by the river valleys along the Susquehanna River and the major tributaries, (Chenango, Tioughnioga and Otselic Rivers) as well as a small branch of the Delaware. These river valleys are surrounded by rolling hills, with many steep slopes. The more rural areas of the county are characterized by productive agricultural land or former farmland that is now vacant, and a significant amount of productive timberland.

The majority of the soils in Broome County were formed from the various types of material deposited by the glaciers as they moved across the region 15,000 to 18,000 years ago. This movement brought in some foreign materials which are found to be less plentiful in the higher elevations than in the valleys. However, the larger valley floors have considerable deposits of weathered materials associated with the melting water from an ice sheet north of Broome County. In addition to these materials in the valleys is the more recent alluvium, a soil material such as sand, silt or clay, remaining from the periodic overflow of streams and rivers.

Broome County, New York Slope

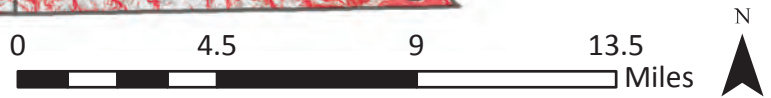


Legend

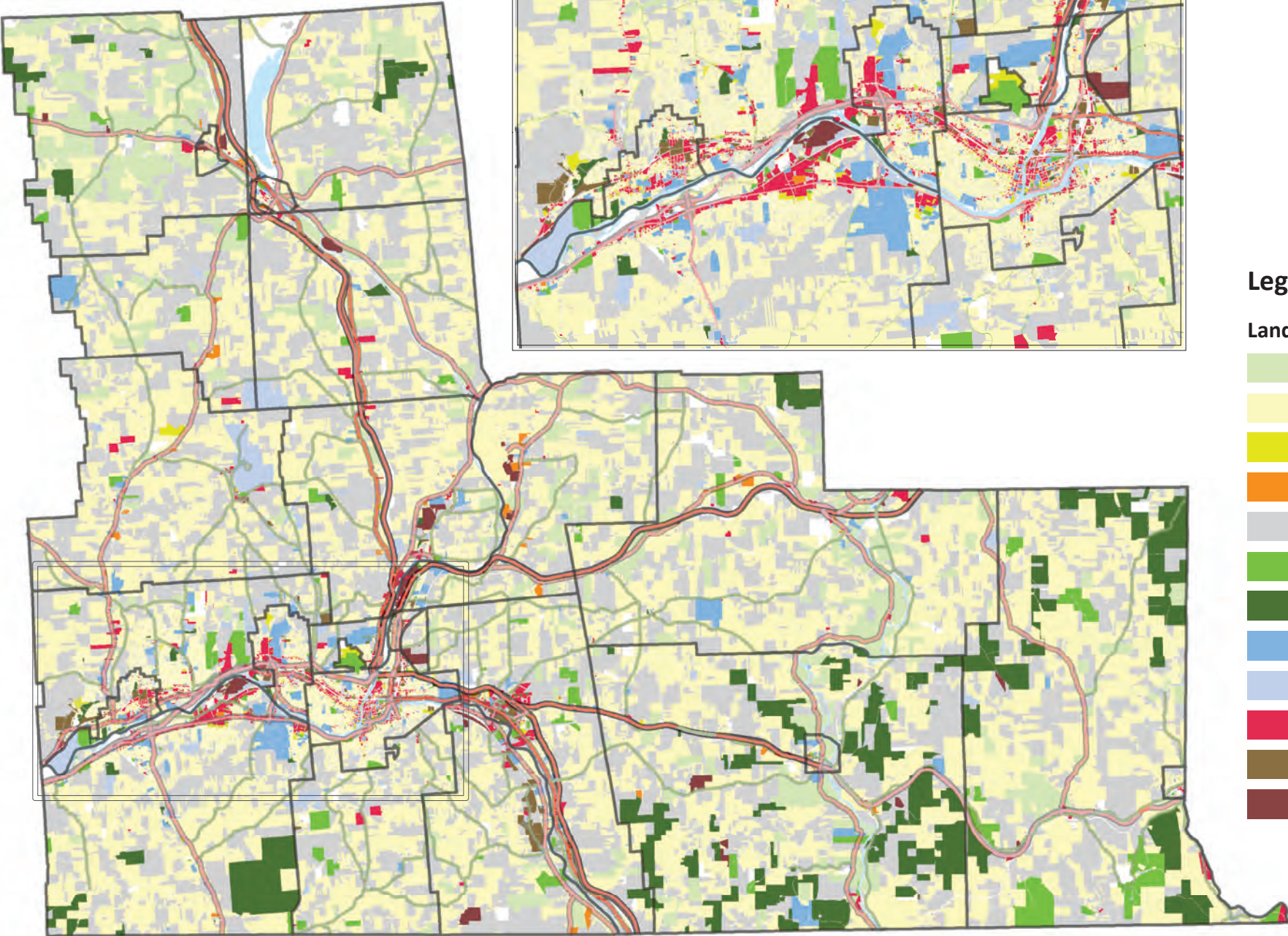
Slope

- Under 5% (Less Steep)
- 5 - 10%
- 10 - 15%
- 15 - 20%
- Over 20% (More Steep)

↓



Broome County, New York Land Use



Legend

- Land Use**
- Agricultural
 - Residential
 - Multi-Residential
 - Mobile Home Park
 - Vacant
 - Recreational
 - Wild/Forest
 - Community Services
 - Public Services
 - Commercial
 - Industrial
 - Mining
 - No Data



Early History

Native American History

The retreating glaciers left a treeless barren landscape. Caribou and other migratory fauna soon entered the region, taking advantage of the expansive grassland and scrub brush that developed in this tundra environment. About 11,000 years ago the early Paleo-Indian hunters appeared on the scene. Entering the region from south, the Paleo Indians exploited the migratory fauna, especially the caribou. They lived a nomadic existence and they never settled down in one place for long, so traces of these early hunters are very scant.

About 9000 years ago as the climate gradually warmed, the tundra environment was replaced by the less diverse coniferous forests. These dense forests of pines and other coniferous trees have among the lowest biological carrying capacities of any temperate ecology. No mast nut producing trees and no fruit bearing trees meant that the forest could not support large populations of deer, turkey or other game. As a result of the fauna poor environment, the human population of the time was very low in the region.

As the climate began to resemble today's, about 6500 years ago, deciduous forests began to dominate the region. The human population in the region was on the rebound, and it was defined by the hunting and gathering lifestyle. There were no villages or permanent settlements yet, rather seasonal encampments. It was about this time that Native Americans first began to change the environment to their advantage. Large tracts of forests were burned to clear the undergrowth of brush and to promote the heat tolerant mast producing nut and fruit trees. This environment drew in many game species and the hunting became a prime source of food for Native Americans.

The development of farming drastically changed the hunting and gathering lifestyle. About 700AD, or possibly earlier, maize agriculture was introduced to the region. Large tracts of forest were slashed and burned to make way for corn fields. Now the inhabitants settled in the first villages and semi-permanent settlements. Farming supported a larger sedentary human population, then in turn fostered oral history, tradition, and finally culture developed. The Iroquois culture would then dominate the landscape until their decline in the late 18th century.

European Colonization

In the late 18th century, shortly after the American Revolution, American settlers began moving into central New York, and displaced the Iroquois tribes that had lived here for hundreds of years. The new settlers found a wealth of mature forests, which provided the raw material for the growing lumber industry. As the land was cleared, European agricultural practices were applied by the settlers. Europeans brought non-native flora and fauna that forever changed the ecology of North America. Gradually, the land was transformed into a mosaic of farmland supporting row crops, pasture for livestock grazing and winter feed production, separated by hedgerows where rocks and stones were placed as fields were plowed. With time, these hedgerows were overgrown by shrub tree species. Few indigenous forest tracts remained by the late 19th century. This predominately agricultural period persisted until the late 1920's, when economic conditions started the decline of the traditional family farm. Starting in the 1930's, government subsidized programs began reforesting vacant agricultural land. However, these resulted in monoculture wood lots comprised of a single tree species which was typically an evergreen species such as red pine. These did not return the land to its historic biological state. However, remnant forest species have re-taken much of the land area once cleared for agriculture.

Current and Future Trends

For the most part, major urban and village centers are located along the rivers, as they have been since early settlers established communities there. Over time, the railroad system, followed by the highway network were developed along the river corridors to move goods and people between these urban and village centers. Today, the hazards and costs associated with development in the floodplains and along the hills' steep slopes shape local development, placing limitations on which areas are desirable for building.

The demographic trends in Broome County over the last several decades, changes in the economy, residential and nonresidential development and the population have reflected a general shift from the core urban areas to the urban fringe and more rural portions of the County. This may have a dramatic impact on open space lands as urban brownfields remain abandoned in the fringe and rural greenfields, that make up a great deal of our open space lands, are more attractive to residents and businesses. If this trend continues, it is essential to establish boundaries and guidelines about where and how development occurs to preserve the economic and ecological benefits of these open space lands.

On the other hand, as railroad use has declined and rails lines have been decommissioned, this has created opportunities for a shift to alternative transportation opportunities through the establishment and expansion of the Two Rivers Greenway and other associated trails. The Greenway and other similar waterfront uses have reflected the recognition that the waterfront areas are a significant asset to the community and maintaining the ecosystem services that these areas provide have benefits for establishing resilient communities.

Into the future, we can expect our landscape to continue to change as we adapt to the impacts of climate change. Some of the trends we anticipate may have impacts on open space and natural resources include:

- Increased frequency and intensity of major storms may lead to increased vulnerability to flooding, and a higher number of repetitive loss properties. Infrastructure will also be increasingly vulnerable to damage due to flooding and erosion.
- Rising Temperatures may lead to increased frequency of drought, with impacts on agriculture.
- Changing energy infrastructure, including expanded installation of large scale renewable energy projects will require appropriate planning to balance these needs with other land uses and demand on infrastructure.

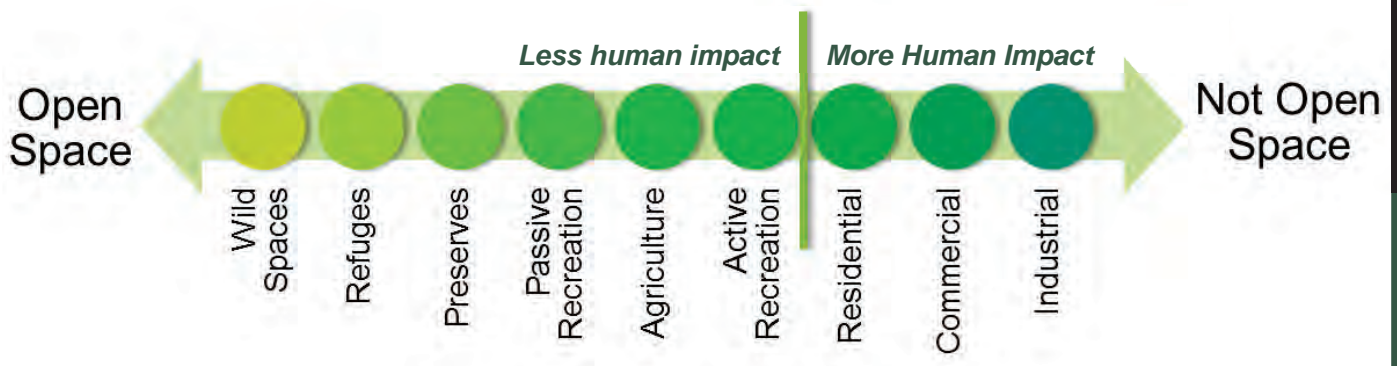
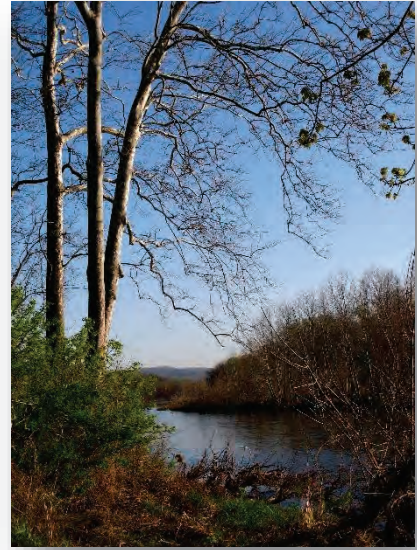
Resource Characterization

The intent is that this document can provide a basis for assessing and enhancing the larger open space network. To effectively utilize this document for planning decisions, it is important to have clear definitions of how we define open space and natural resource categories. This will avoid confusion stemming from varying perceptions. In this section, a framework is established for identifying and categorizing individual parcels or tracts.

Defining Open Space

As previously discussed, open space is land that has experienced little or no development and supports some level of native natural flora and fauna. Open space is best understood in terms of land use. Wilderness areas that are essentially untouched by human development are the most obvious example of open space. Minimally impacted lands, such as refuges and preserves that are preserved for the primary purpose of providing wildlife habitat are next. Recreational and Agricultural lands do see an increased level of human impacts. However, they still provide open space benefits to the community and therefore are considered as open space.

In general, residential, commercial and industrial land uses represent the most invasive human impacts on land since they have the most intense land use. While there may be exceptions for lands that integrate open space preservation into the site design, these lands are not considered as open space. The delineation of open space is depicted in the figure below.



Natural Resource Categories

To frame the discussion surrounding natural resources it can be useful to place them in different categories based on the natural ecosystem services they provide. While there may be some overlap between categories, in general these categories will help to clarify what is being discussed. Therefore, this document will use the categories outlined in the figure below as a framework for the inventory and assessment of natural and open space resources.



BIODIVERSITY AREAS

- Significant Habitats
- Rare and Endangered Species
- Unique Natural Areas
- Sensitive Migratory Routes
- Geologically Significant Areas



WATER RESOURCES

- Waterbodies and buffers
- Drinking Water Sources
- Aquifer Recharge Areas
- Floodplains/Flood Control Areas
- Watersheds
- Wetlands



WORKING LANDSCAPES

- Agricultural Lands
- Working Forests



DISTINCTIVE CHARACTER

- Ridgelines and Significant Peaks
- Historic Areas
- Heritage Areas
- Scenic Areas and Byways
- Archeologically Significant Areas



RECREATION

- Parks and Natural Areas
- Trails & Trail Systems
- Fishing & Boating

Connective Corridors – Trails, Greenways, Scenic Byways, Riparian Areas and Buffers

Natural Resources Inventory

A Natural Resources Inventory (NRI) is a collection of data and information outlining the important natural assets within a locality. The intent of the NRI is to provide the details of these important resources serving as a reference to local municipalities, community members and developers.

The Inventory provides a clear picture of the location, distribution, significance, and connectivity of natural resources and open space assets. With this information, Broome County and the local municipalities are able to integrate the data into comprehensive and conservation planning and consider these resources when making development decisions. The inventory can also provide a starting point for assessing environmental impact of municipal projects, conducting an environmental review of proposed development, and meeting other state and federal requirements,

First it is important to create a context of the existing open space network by identifying currently protected open space. This will help to establish a baseline upon which to base future preservation and management efforts.

Then we will outline the specific resources within Broome County based on the open space categories outlined in the previous section. This includes the following for each natural resource category:

- Description of the resource
- Inventory of resource
- Relevant maps
- Overview of management issues and threats.



Protected Open Space

For sound natural resource management, it is essential to identify what resources are already protected, providing a base for expansion of the open space network. Here, protected open space is defined as:

Protected Open Space - Property where development is limited or prohibited by some legal mechanism due to recreational, educational, historical, or ecological significance.

These include spaces like parks, conservation areas, flood management areas, and recreation areas owned by a municipal agency such as a local, county or state government, including athletic fields and playgrounds owned by public schools.

Private open space may be protected if owned by a conservation group such as a non-profit land trust or other similar entity. Conservation easements on private property as well as subdivision laws requiring open space also afford some level of protection. Broome County contains some of these but they are not documented and therefore are not listed in this document. To find out about these areas, you must refer to a deed for each individual property.

Conservation laws at the state and federal level also provide specific protection for types of land that may be privately or publicly owned. This includes wetlands, river banks and wildlife management areas for example. These lands that offer some level of protection are addressed under other parts of this chapter or the Water Resources chapter.

Temporarily Protected Open Space

The County also contains open space that is only temporarily protected being owned by a non-conservation oriented government institution or belonging to a private land owner who receives non-permanent tax exemption. In addition, private recreational facilities, such as golf courses, campgrounds or hunting clubs can be considered open space, but are not limited from future development. Documenting these temporarily protected open spaces can help to identify them as a priority for permanent protection in the future if there is an identified resource value.

In the list below, protected open space is organized by owner. Protected open space achieves that status due to its recognized value under one or several of the identified resource categories. Therefore, many of the lands listed here will also be documented in the individual resource category sections to follow. To avoid duplication, detailed descriptions are found in the latter sections.

Multiple Agencies

Whitney Point Multiple Use Area

The largest contiguous protected open space area in Broome County is the Whitney Point Multiple Use Area. This area has been recognized as important by Federal, State and County governments, all of which have a stake in some portion of the property. The area extends north into Cortland County and is a total of 4645 acres, 2833 acres of which are in Broome.

This area contains the only federally owned open space in the County, the Whitney Point Reservoir, which is a US Army Corps of Engineers (ACE) flood control structure. Located on the Otselic River, it provides flood

damage reduction for the valley along the Tioughnioga, Chenango, and Susquehanna Rivers. The reservoir and the associated open space areas are operated and managed by New York State. However, the County Parks Department runs the recreational facilities located at Dorchester Park, on the east side of the lake.

While the area is primarily operated for flood control, is also used for upland wildlife management activities such as timber harvest and the construction and maintenance of small marshes and nesting structures. In addition the land provides opportunities for hunting, fishing and boating.

State Land

The table on the right lists the state owned protected areas within Broome County. These include State Parks and State Forests. State Parks serve to provide regional open space and recreational value. They generally serve a large population and provide recreational opportunities that may not be accommodated in smaller local parks such as camping or cross-country skiing. New York State owns and operates two State Parks in Broome County totaling 2176 acres, Chenango Valley State Park in the Town of Fenton and Oquaga Creek State Park in the Town of Sanford.

County Lands	Municipality	Acreage
PARKS		
Aqua Terra	Binghamton	459.27
BAGSAI	Dickinson	31.93
Dorchester Park	Triangle	70.43
Finch Hollow	Maine	19.59
Greenwood	Nanticoke	447.38
Grippen	Endicott	18.71
Hawkins Pond	Windsor	325.66
Nathaniel Cole	Colesville	367.47
Otsiningo Park	Dickinson	149.66
Round Top	Endicott	30.04
	TOTAL	1920.14

Federal Lands	Municipality	Acreage
Parks		
Whitney Point MUA	Whitney Point/ Triangle	2833
State Lands	Municipality	Acreage
PARKS		
Chenango Valley	Fenton	1028
Oquaga Creek	Sanford	1148
	TOTAL	2176
Forests		
Beaver Dam	Lisle	239
Beaver Flow	Colesville	726
Beaver Pond	Sanford	785
Cascade Valley	Windsor	534
Cat Hollow State	Sanford	761
Hawkins Pond	Windsor	536
Marsh Pond	Sanford	896
Melody Hill	Sanford	1395
Nanticoke Lake	Lisle	331
Skyline Drive	Kirkwood	531
Tracy Creek	Vestal	432
Triangle	Triangle	654
Whittaker Swamp	Sanford	805
	TOTAL	8625

The County contains 8630 acres of State Forest lands that typically include Reforestation Areas, Multiple-Use Areas, Unique Areas and State Nature and Historic Preserves. These lands are protected primarily for their natural resource value but are open to the public to provide passive recreation opportunities such as recreational trails, camping, and hunting. Management is guided by DEC's Strategic Plan for State Forest Management and by individual unit management plans.

County Land

Broome County has 1920 acres of park lands with the primary goal of providing high quality facilities with a wide range of activities, including swimming, camping

and trail activities. Most of the parks are maintained for active recreation purposes, but there are two parks, Aqua Terra and Hawkins Pond that are considered as natural areas for passive recreation such as hiking. Broome Community College, which is County owned also has associated open space areas and athletic fields.

In addition, Broome County operates and maintains 24 Watersheds constructed for flood control, totaling 707 acres. These are listed above. The County Watersheds are also used for recreation by the general public for hiking, sporting events and other activities. Their use for flood control is discussed in further detail in the Water Resources Chapter.

Municipal Lands

The majority of municipally owned open spaces consist of municipal parks that range from large parks with athletic fields, playgrounds and trails to small parks or courtyards with a few trees and benches. These parks enhance neighborhoods, provide aesthetic benefits and ensure access to outdoor recreational opportunities. They are especially important in urban areas with high density residential development that affords little greenspace on individual lots. In Broome County these parks total 1794 acres. Other types of protected open space under municipal ownership include community gardens that provide the opportunities for urban gardening, and recreational areas associated with schools.

County Lands	Municipality	Acreage
WATERSHEDS		
NYS Route 26	Nanticoke	53.4
Mount Hunger Rd	Nanticoke	10.67
Roat Drive	Nanticoke	19.58
Howland Hill Rd	Nanticoke	22.76
Tiona Road	Maine	2.45
Caldwell Hill Road	Lisle	24.07
Caldwell Hill Road	Lisle	10.17
Laurelton Road	Union	11.91
Glenwood Road	Binghamton (City)	4.32
Second Street	Deposit	0.38
Wittman Road	Dickinson	84.04
Oakdale Road Rear	Johnson City	37.36
Pine Street	Deposit	17.47
East Maine Road	Union	18.44
Utica Street	Union	30.46
Bailey Hollow Road	Maine	46.75
Upper Stella Ireland	Maine	57.58
Airport Road	Maine	30.86
Oakdale Road Row	Maine	18.44
Avery Road	Maine	49.76
Dimmock Hill Road	Chenango	15.37
Airport Road	Dickinson	76.61
Struble Road	Union	64.54
	TOTAL	707.39

Some local municipalities also have acquired open space through the flood buy-out process. These are lands that were substantially damaged due to flooding and transferred to public ownership for the purpose of flood mitigation under the Federal Emergency Management Agency process and are restricted for any future development. These lands total 111 acres county-wide. The flood buyout process presents an opportunity for expanding upon the open space network, while contributing to local flood mitigation efforts. Goals for improving the flood mitigation potential of these lands should be a prime consideration for the open space network.

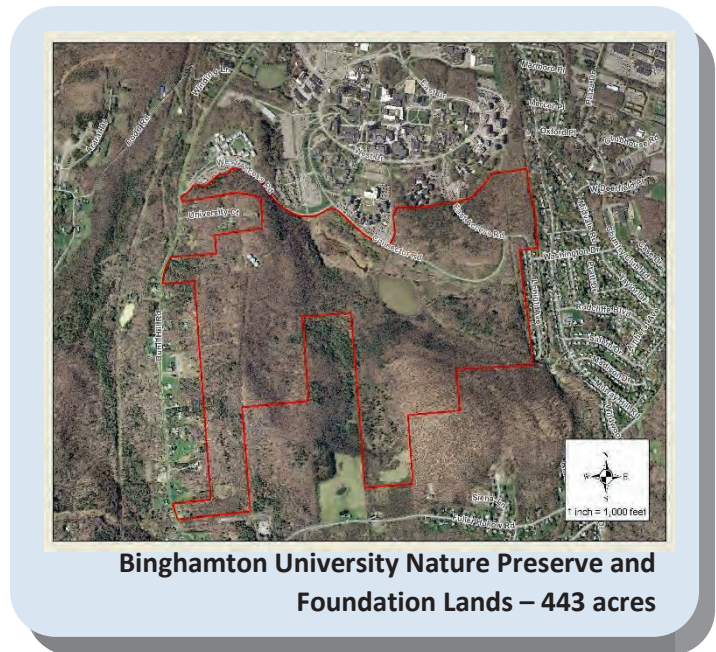
Private and Institutional Conservation Lands

Broome County is also home to a couple of significant properties that have been purchased by conservation groups for their preservation. The Binghamton University Nature Preserve is a significant natural area. The University owns and manages the 182 acre preserve on the University grounds. However, the Binghamton University Foundation has also acquired additional acreage adjacent to the University property for a total of 443 acres. The property consists of a beaver pond, state and federal wetlands, nature trails and various types of wildlife habitat. The preserve is used for education, research, recreation and aesthetic purposes.

There is also a significant natural area on the SUNY Broome Campus. This area spans 125 acres and features 3.8 miles of trails that cross a variety of terrain. The site is used as a living laboratory for students on campus but is also open to the public for recreational use.

The IBM Glen is a 205 acre property in the Town of Union. The property was once owned by IBM as a recreational amenity for its employees at the IBM Country Club. Upon its closing, local conservation groups worked with the company who donated the property for preservation. Now it is under the ownership of the Chenango Land Trust and managed by the Waterman Conservation Center, two local nonprofits with properties throughout the Southern Tier region. In addition to its historic value, it is a locally unique natural area with significant mature tree communities and a cascading gorge. Waterman also owns a 107 acre property in eastern Broome called the Pettis Hill Preserve.

The Chenango Land Trust also has conservation easements on three properties in eastern Broome County. (480 acres in the towns of Sanford, Maine and Union).

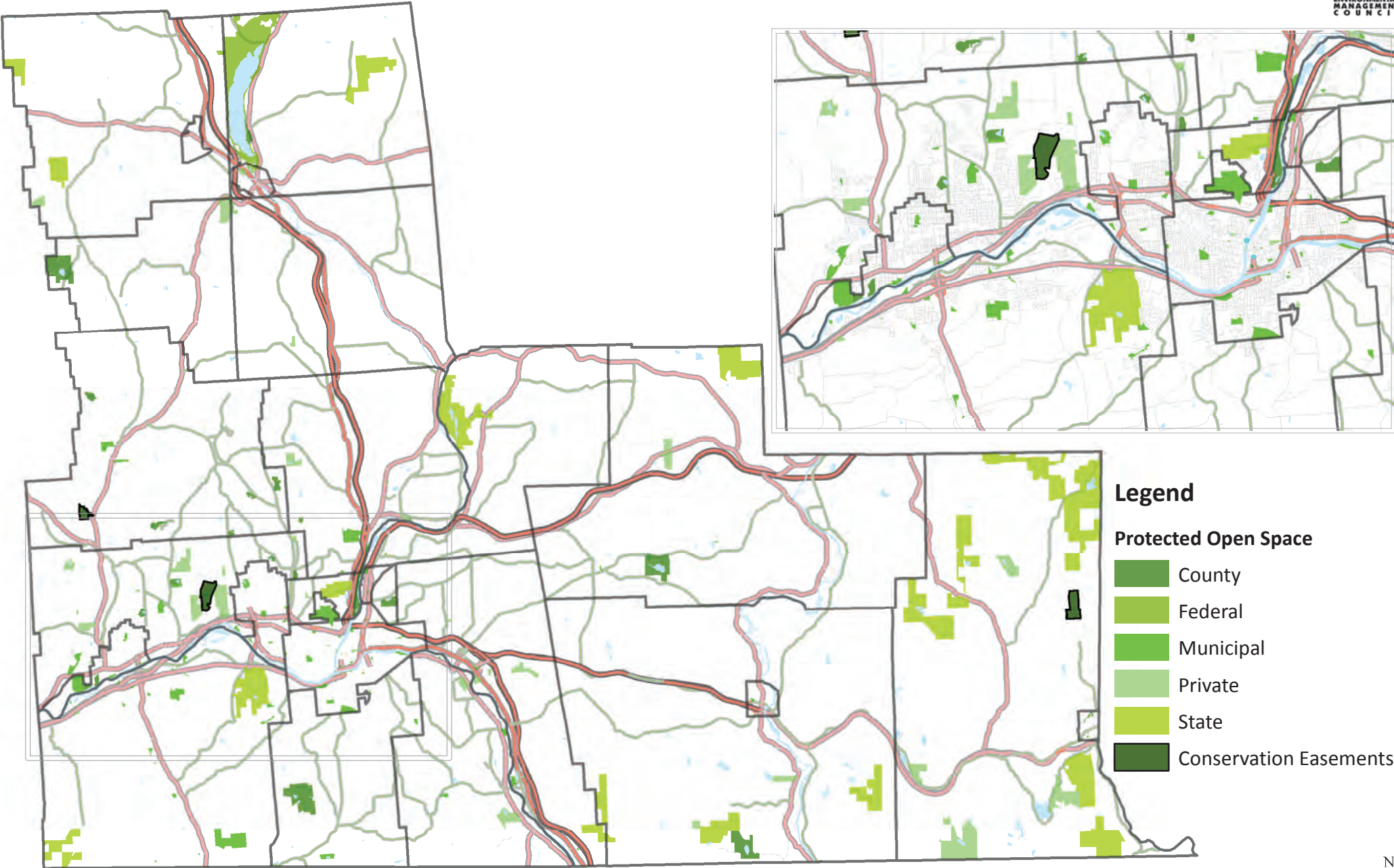


Connectors

Connections and linkages between open space areas or between open space and major activity centers are an integral part of the open space network. These connections, or corridors, include linear greenways, trails, wildlife corridors, waterway systems, and urban/rural boundary separators.

While they are typically included under other categories of open space, it is worth noting the unique value that these areas provide. The most notable connectors in the County include components of the Two Rivers Greenway, the Susquehanna, Chenango, Tioughnioga, Otselic and Delaware Rivers along with their tributaries, Critical Environmental Areas such as the French Tract in Vestal, and the Whitney Point Wildlife Management Area.

Broome County, New York Protected Open Space



Legend

Protected Open Space

- County
- Federal
- Municipal
- Private
- State
- Conservation Easements



Biodiversity Areas

Biodiversity Areas are those regions which support significant ecosystems, habitat, flora and fauna or geological features. The extent of these attributes is commonly referred to as the biodiversity of an area. Biodiversity is a relative measure of the magnitude or variety of living organisms within an area and is a significant factor when assessing an ecosystem's biological health.

Biologically diverse ecosystems tend to be stronger and more resilient to outside stresses. Therefore, they can recover more quickly when faced with disaster, are less susceptible to invasive species, and are more productive, providing useful products like medicines. These healthier ecosystems are better able to provide vital ecosystem services like climate regulation, water retention, air quality protection, sediment and erosion control, soil fertility improvement, protection of pollinating species, and recreational opportunities, like wildlife observation and hunting. Therefore, the preservation of biological diversity is both a near-term and a long-term investment in the community.

The goal of integrating significant biodiversity areas in the open space plan is to identify locations that provide a habitat where rare or endangered species reside, regions where a significant variety of species exist, or tracts that encompass complete ecosystems. Land areas specifically recognized for their biodiversity are often referred to as Unique Natural Areas or Ecologically Sensitive Areas.



Broome County Ecosystems

Upland Ecosystems

The two major ecological communities indigenous to New York State are the eastern deciduous forest biome and the northern hardwood/coniferous forest biome. However, the specific local ecosystem found within either of these can depend upon a number of factors, including the type of local water resource, the geology of the area (soil composition, terrain elevation, slope, etc.), and the average age and health of the trees.

Succession is the sequential change in the composition of the plant community from grasslands to mature forest as combinations of light moisture and soil change over time determining the species that thrive there. However, forests are not static and major and minor disturbances over time, both natural and man-made permit a diversity of structures and species compositions. Therefore, the preservation of ecosystem diversity in these upland ecosystems is key to preserving the biodiversity of plant and wildlife communities, and thus maintaining forest health.

Water Ecosystems

Broome County has significant water resources with the Susquehanna, Chenango and Delaware Rivers and their tributaries, Whitney Point Lake, and other smaller lakes and ponds. The water depth and temperature, bottom soil composition, salinity, and acidity will influence the type of freshwater ecosystem found there. These factors and water flow similarly influence the type of freshwater ecosystem within a river or stream, determining which species will thrive there. The health and biodiversity of species in these ecosystems can be a key indicator of water quality. Therefore, proper management of these systems is vitally important in meeting the health and safety needs of County residents.

This is especially important when considering trout streams which have special protection by New York State. Due to the recognized important of trout species in the State's fisheries programs, maintaining the ecological

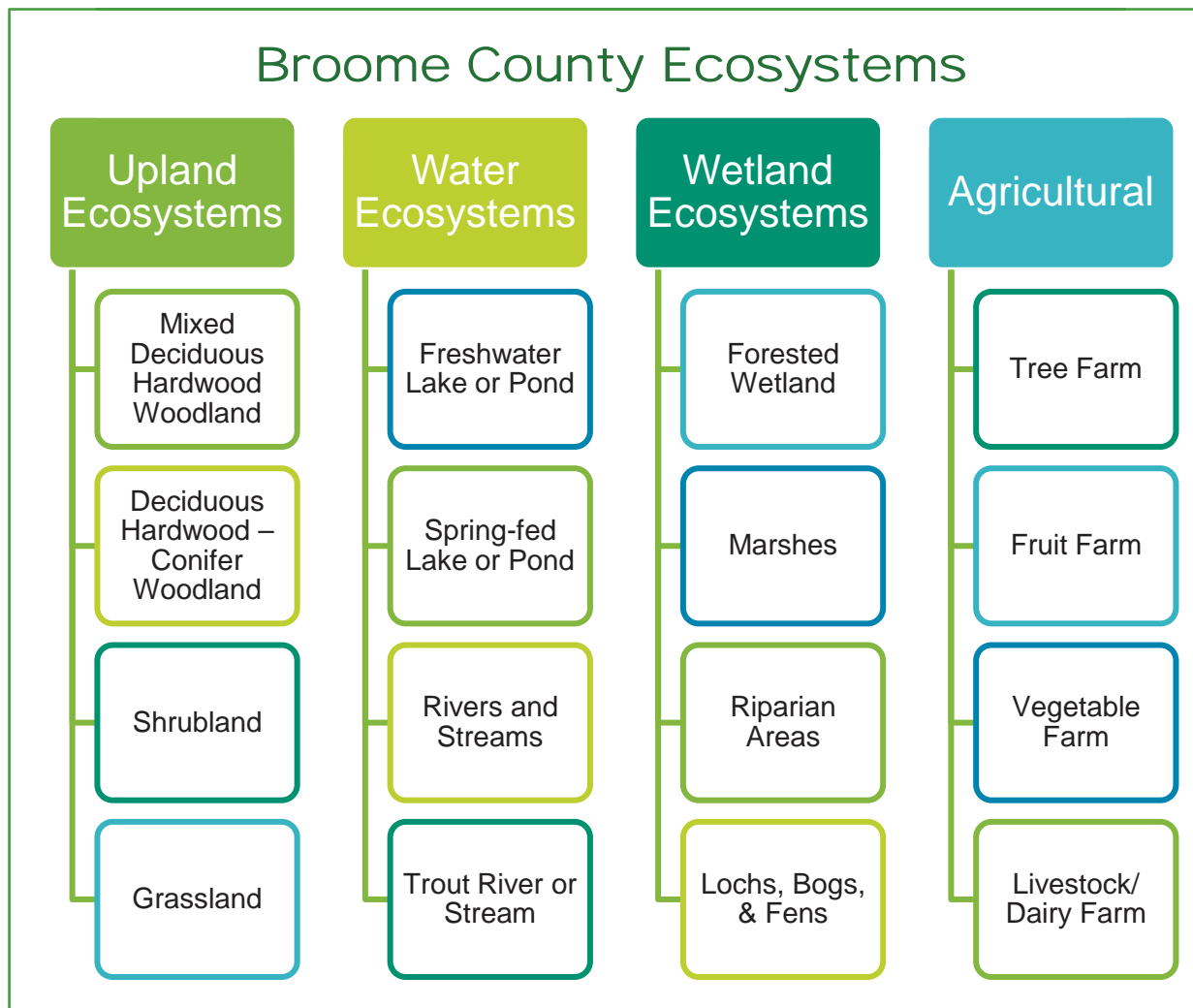
characteristics necessary to trout and the productive capacity of these streams has identified as a priority. The following chart from the NYSDEC shows trout streams in Broome County.

Water	Section	Miles	Public Access	Species
Dudley Creek	0.5 miles below Center Lisle	2.6	Open by Owners	Brown Trout
East Branch Nanticoke Creek	Mouth - 0.5 miles above mouth	0.5	Public Fishing Rights	Brown Trout
Nanticoke Creek	0.5 miles above mouth	11.4	Public Fishing Rights	Brown Trout
Oquaga Creek	Mouth - North Sanford Road	6.1	Public Fishing Rights	Brown Trout

Wetland Ecosystems

Beside open bodies of water, including lakes, ponds and streams, several forms of wetland ecosystems are heavily dependent upon the nature of the water resource. From forested wetlands or expansive marshes to highly localized groundwater-fed fens and precipitation-fed bogs, there exists a large number of wetland ecosystems found throughout New York State and Broome County.

Boundaries between major water bodies and upland habitats are locations for other significant ecosystems. The most significant ecosystems in this category found in Broome County are various forms of riparian areas, which are the upland habitats found along streams and rivers. Riparian areas can be composed of wetlands, grasslands, or woodlands.



Agricultural Ecosystems

In the 18th and 19th centuries when most of New York's forested lands were clear-cut by settlers for wide-scale agricultural use. Subsistence and market hunting led to the extermination of several animal species while European diseases caused the extinction of a number of plant species. With the introduction of hunting regulations in the late 19th century and the reduction in the number of farms in the 20th century, many game populations rebounded. However, the old growth forests, with large prolific trees, disappeared and the increased population adversely impacted the available habitat for wildlife. Without the food available to wildlife on the remaining farmland, there would be little opportunity for animal species to recover to their historic populations. Agricultural practices also create grasslands and early-succession woodlands, which are the basis for specialized ecosystems that support specific species. Environmentally responsible agriculture can be a significant contributor to a region's biodiversity, particularly when the native ecosystems have been severely altered or lost.

Biodiversity is critical for thriving agricultural systems. It is necessary to support beneficial species like pollinators and soil biota, and to protect against harmful impacts of invasive species. In turn agricultural productivity greatly benefits from healthy biodiversity ensuring active production, maintaining other ecosystem services, improving resiliency to stressors including climate change, and sustaining rural livelihoods. Of those ecosystems important for maintaining local biodiversity, the active use of agricultural ecosystems ties them closely to active sustainable development.

Endangered and Threatened Species

New York is home to several plant and animal species that are classified as endangered or threatened, as defined by either the federal Endangered Species Act or by the New York Environmental Conservation Law section 11-0535. Further, New York conservation law identifies species of special concern and protected species. General definitions for these classifications are as follows:

- Endangered – Species in immediate danger of extirpation from a significant portion of its range or in immediate danger of extinction
- Threatened – Species that, if current trends continue, may become endangered in the foreseeable future
- Special Concern – Species that are not yet classified as endangered or threatened but available evidence suggests that there is scientific concern for their continued welfare.
- Protected – New York State classification pertaining to species that may not be harvested or disturbed, with the exception of game animals and then only with the appropriate license and during the prescribed season.
- Rare - New York State classification that pertains to plant species that exist in very small numbers or in extremely limited ranges within the state
- Vulnerable – in New York this classification pertains to plant species that will become threatened if current activities or factors persist unchecked.

Refer to NYSDEC website, Natural Heritage Program, New York Nature Explorer for a comprehensive listing of endangered, threatened and special concern species in Broome County.

Critical Environmental Areas

Another tool that local agencies can utilize is the designation of Critical Environmental Areas (CEAs). To be designated as a CEA, an area must have an exceptional or unique character with respect to certain criteria, which include value as a natural setting or open space and inherent ecological, geological or hydrological sensitivity to change. Similar to the natural heritage areas, impacts to CEA lands are subject to mitigation

through the SEQR process. There are two of these areas located in Broome, both in the Town of Vestal. One is designated as having value for well recharge, but the other which is known as the French Tract was designated in part due to its ecological significance. Designation of additional areas of significant natural resource value may be a way of affording them some level of protection as part of the open space network, without outright acquisition of the properties.

Unique Natural Areas

At a local level, through a partnership between faculty at Binghamton University and the Broome County Environmental Management Council, a Unique Natural Areas Inventory has been developed County-wide. While the State keeps track of rare and endangered species that are of interest to them on a state-wide level, there may be natural communities that are not of interest to them, but are rare or significant from a local perspective. This database includes these significant natural communities that have been noted due to identification in the field or submission by local residents that have recognized their value. Currently this information is not publicly available, but it is housed in the County's Planning Department for reference as needed

Geological Features of Significance for Biodiversity

Geologic features found within an ecosystem can be beneficial to the local plant and animal species. Ridgelines oriented with the region's prevailing winds provide updrafts that assist migrating birds, particularly falcon, hawk, and eagle species. Cliffs provide secure nesting habitat for specific birds and provide safe habitat for plant types by providing limited access to animals that may feed on the plants. Caves provide roosting sites for bats, shelter for hibernation by certain mammalians and habitat for species that require protection from direct sunlight and weather. Ravines afford sheltered areas and those with mature hardwood areas are a favored roosting site for wild turkeys, and several species of songbirds.

The most significant geological features within Broome County are undoubtedly its major rivers: the Susquehanna, Chenango, and Tioughnioga as well as the small parts of the Otselic and Delaware Rivers. There are many secondary streams or creeks which feed into these rivers. The major rivers provide migratory paths for migrating waterfowl, and are crucial for the riverine ecological communities, and also indirectly important to a portion of the palustrine (wetland) ecological communities.

Broome County is located in the Appalachian Plateau, which is an upland area with many rivers and streams that create topography consisting of rolling, steep hills and flat river valleys. The ridgelines that run approximately north and south tend to be nearly perpendicular to the prevailing west/northwest wind. This creates updrafts (ridge lift) that support the migration of soaring birds such as eagles, falcons, hawks, owls and vultures. There are very few cliff communities within the county, but numerous ravines that can provide shelter from cold, windy weather for many wildlife species.

The soil types found within Broome County were formed in part by glacial action, which deposited the sand and gravel deposits, and the very fine silts and clays that predominate the county's soils. Alluvial and organic materials represent the minority of soil materials in the county. There are very few highly concentrated organic deposits that have formed peat or muck soils, which are integral to the formation of specific wetland types. Most of the better soils are found in alluvial sediments, and therefore are found in the valleys near the major rivers and streams. For purposes of agricultural use, only 18% of the soil in Broome County is characterized as excellent or good, 62% as fair, and 20% as poor or very poor. The poor soils are suitable for woodland and pastures (or meadows). Since the best soils are found in the valleys where flooding can cause significant erosion and soil loss, and the higher elevations with poorer soil types are on steeper slopes where disturbed vegetation (that can only slowly re-establish itself) cannot prevent the erosion associated with rainwater run-off, it is crucial that the open space plan consider soil conservation as a part of habitat protection.

Management Issues

As discussed generally above, several types of ecosystem often contribute to a region's biodiversity. With respect to Broome County, this section provides a comprehensive list of ecosystems that may exist, and should be considered in for open space preservation.

The NYS Department of Environmental Conservation's (DEC) Natural Heritage Program is chartered with enabling and enhancing conservation of our state's rare plant and animal species and our significant ecosystems. This program has organized the numerous ecosystem types into five main categories:

1. Lacustrine (open bodies of water such as lakes or ponds)
2. Riverine (rivers, streams, and springs)
3. Palustrine (non-tidal perennial wetlands with emergent vegetation)
4. Terrestrial (upland ecosystems whose dominant feature is not a significant open water body)
5. Marine and Estuary, oceans and coastal ecosystems - not applicable to Broome County

The Broome County Land Cover Map at the end of this section depicts the location of these important ecosystems and can be used to determine where we would expect those lands that are significant from a biodiversity standpoint to occur. The presence of these ecosystems doesn't necessarily warrant that development be fully limited on those sites. However, there should be special consideration of potential impacts to biodiversity in these areas, and efforts to mitigate any impacts when practicable.

Many current land use practices in Broome County can have an adverse impact upon the local biodiversity. The most prevalent practice is the unchecked residential and recreational development throughout the green space of the county, which is commonly referred to as suburban sprawl. The negative impact of development is not solely the result of an increase in the number of homes or businesses, but is also the consequence of the infrastructure growth associated with development. Other activities include environmentally unsound agriculture and logging, excessive or careless mining of all types, highway maintenance practices for snow removal and weed control, intensive off-road vehicle activity, and even increased domestic pet activity in open green space. These activities cause habitat destruction, fragmentation, create pathways for invasive species establishment, disrupt wild species population dynamics, increase non-point source pollution, increase soil erosion and run-off, and contaminate water resources.

Development and Fragmentation

Suburban sprawl replaces natural landscapes with cultural landscapes, which are unable to support the same level of biodiversity. Further, suburban development fosters growth in the number of roads and right-of-openings cut through open space for energy transport via power lines and gas lines. All of these factors result in a net loss of open space and also cause fragmentation of larger tracts of particular ecosystems. This fragmenting of large, unspoiled tracts creates a larger number of borders referred to as "edge", which serve as artificial corridors that increase contact between mobile species such as birds and mammals. This creates a favorable opportunity for the parasitic and predator species, resulting in increased mortality for specific prey species. A reduction in prey species populations ultimately leads to a crash in the predator species. The introduction of domestic pets that are a predator species can, and often does, exacerbate this trend. This illustrates how fragmentation adversely impacts population dynamics, and therefore, biodiversity.

Off-road vehicles

Off-road vehicles, can stress wildlife species in two manners. These vehicles emit roughly ten times the pollution per gallon of gasoline consumed than a standard passenger car. This pollution can weaken plant-life in the vicinity of frequently used trails. Their noise and motion can startle animal species, which will naturally flee, which causes the animals to consume more energy than during their normal routine, increasing their food requirement. This may be difficult to overcome during the lean winter months. In the summer this additional activity interferes with the animals' caring of their young. Off-road activities can also destroy fragile under-

story plant life and damage fragile soil deposits. The soil damage often leads to erosion, which can also spoil nearby streams, lakes, and ponds. Unsound agricultural and logging practices also lead to soil loss; and agriculture based upon heavy use of herbicides and pesticides will causes losses of desirable species as well. Logging, if not accomplished in a sustainable manner, can impact the diversity in a forested region. Too much soil exposure can create pathways for invasive plant species to become established. Thinning trees excessively at sites where there is frequent exposure to stronger than average winds can cause tree loss, since the tree density is not high enough to allow the trees to inter-twine branches and support each other.

Invasive and Nuisance Species

The impact of invasive species has been identified as a close second behind habitat destruction as a major cause of the loss of biodiversity in New York. Many introduced plant and animal species have found this region to be an area where they can thrive with virtually no natural enemies. Many invasive species have been introduced by accident, but many others have been intentionally brought from overseas to this continent. The European Starling and the English sparrow are two animal species that have far greater populations here than they currently do in their native habitats. Broome County's roadsides, stream banks, and other areas in which the ground has been substantially disrupted due to development or off-road activities provide ample evidence of the extent of invasive plant species proliferation. Wetlands, roadsides, woodlots, shrub lands, fields and rivers are being seriously threatened by invasive species.

Due to their lack of natural predators, the population of an invasive species can increase at an unnatural rate, and displace native species. This leads to a loss of biodiversity as these native species disappear, and then as the habitat is altered, further damages the integrity of the ecosystem. As the content of the ecosystem is altered, the suitability of the habitat for other species is lost. Consequently, additional species populations decline, due to loss of food and/or shelter, and the loss of biodiversity is furthered.

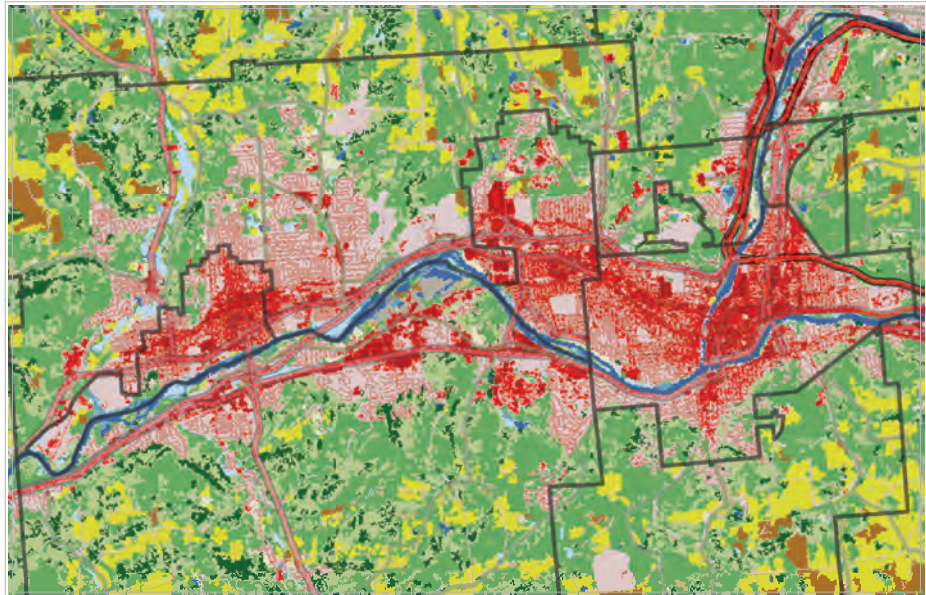
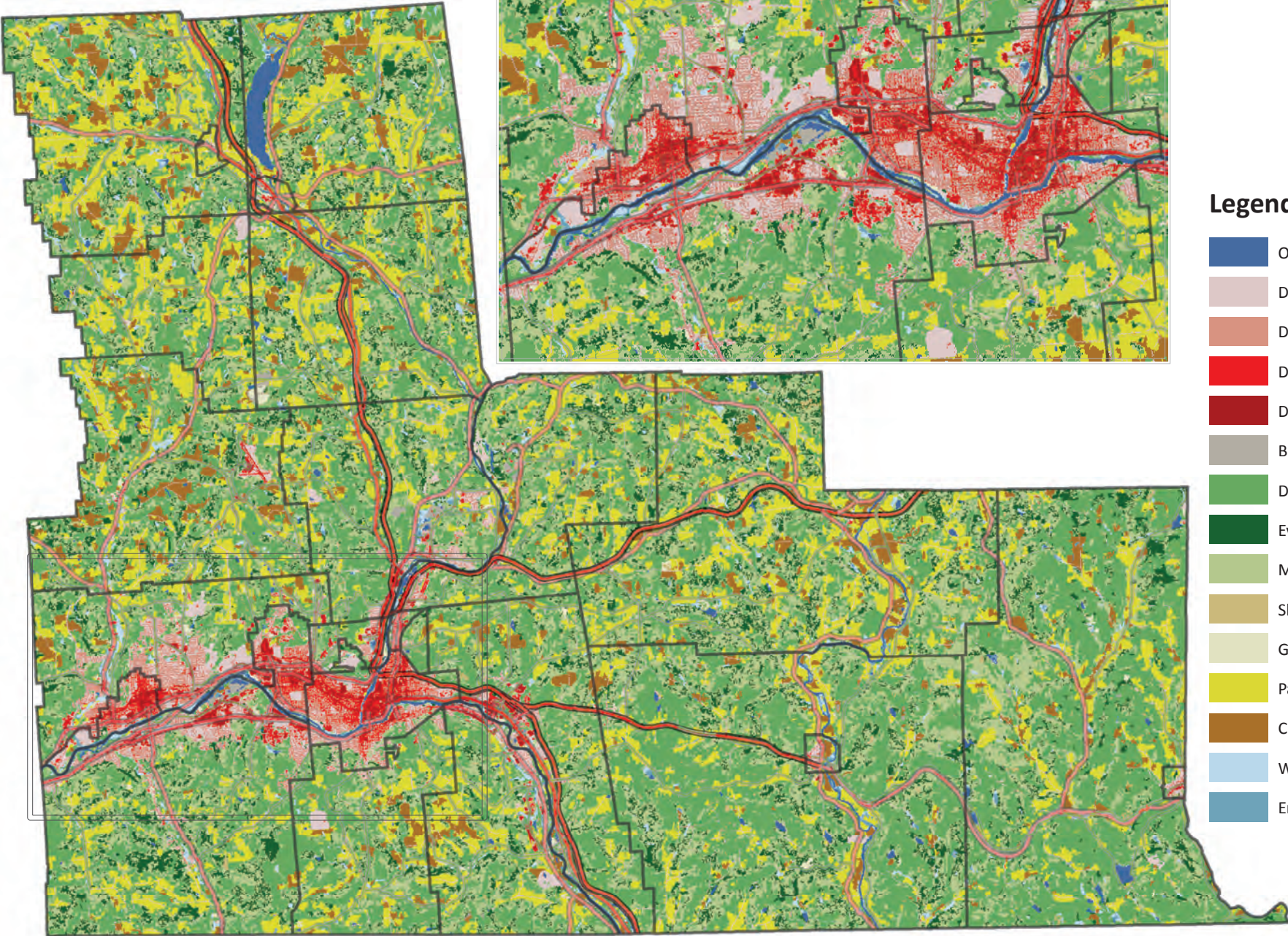
Unique natural areas need to be monitored to detect any trends of invasive species establishment. Human activities that can support invasive plant introduction need to be addressed. Borders, access roads, buffers, and greenways in the vicinity of a Unique Natural Area (UNA) should be similarly monitored, and a plan for controlling invasive plants should be established. In the case of invasive animal species, activities that swing the survival pendulum in the favor of a competing native animal species need to be fostered.

Nuisance species also can pose a threat to biodiversity. Most common in this area is the impact of the high deer population. Deer selectively feed on plant species in the understory and therefore affect the kinds and numbers of plants present, can impair the growth of new trees, and shape the overall look or structure of the forest. In addition, Canada Geese can become a nuisance as their waste impacts water quality. Geese populations are enhanced by the presence of highly manicured lawns along waterways that are attractive to them.

Water Quality

Water pollution can have major impacts on biodiversity. Excess nutrients leading to algal blooms can lead to oxygen depletion that makes water inhabitable by many species. Pollutants like heavy metals can be absorbed by plant and animal species. On the other side of the token, high diversity can enhance an aquatic ecosystem's ability to deal with outside stressors such as pollutants. When considering the services provided by our waterbodies for drinking water, recreation, and other uses, it is clear that that it is important to consider the impacts of water quality on the aquatic species themselves, but also the value of maintaining highly diverse ecosystems for our own continued use as well.

Broome County, New York Land Cover

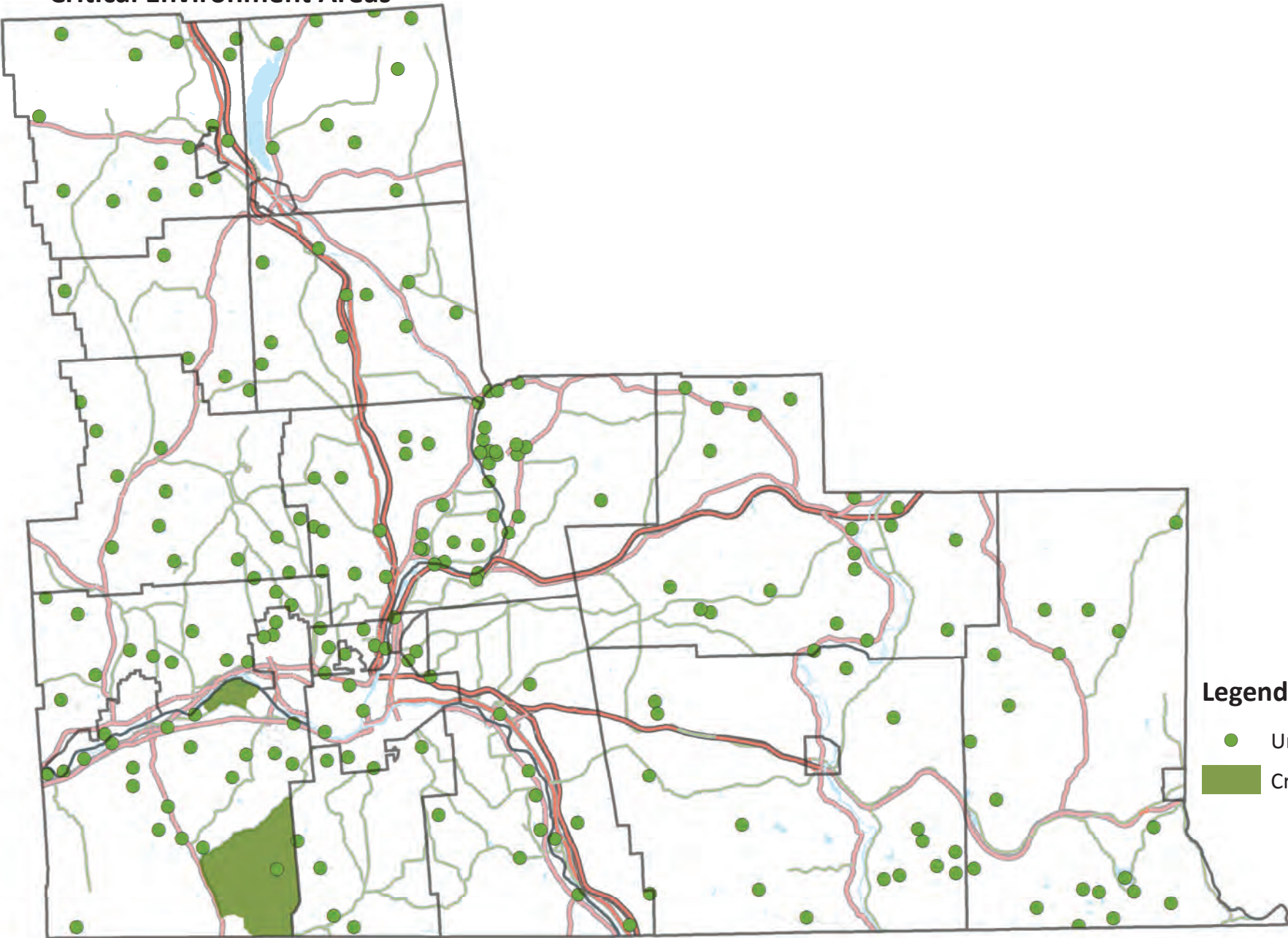


Legend

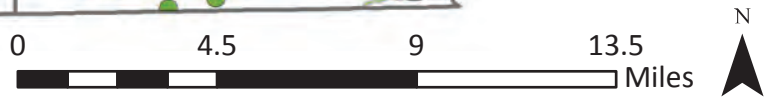
- Open Water
- Developed, Open Space
- Developed, Low Intensity
- Developed, Medium Intensity
- Developed, High Intensity
- Barren Land
- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Shrub/Scrub
- Grassland/Herbaceous
- Pasture/Hay
- Cultivated Crops
- Woody Wetlands
- Emergent Herbaceous Wetlands



**Broome County, New York
Unique Natural Areas
Critical Environment Areas**



- Legend**
- Unique Natural Area
 - Critical Environment Area



Water Resources

Broome County depends on water resources, including rivers and streams, lakes and ponds, and aquifers, for drinking water, recreation, industry and agriculture. Water resources and their associated features provide significant resources for the community including public water supply, groundwater recharge, sediment and erosion control, flood protection, scenic enhancement, recreation, and agricultural productivity, among others.

Inappropriate development and land use activities can negatively impact water quality which can pose a threat to public health and safety, mar scenic views and lead to costly problems, such as flooding. Conversion of vegetated areas to paved surfaces increases the amount and velocity of runoff resulting in stream channel damage, erosion and sedimentation, and aquifer depletion. In addition, water that flows across paved surfaces accumulates pollutants and debris, which then enter water resources, resulting in pollution that is extremely costly to repair.

The preservation of vegetated areas can significantly minimize the adverse impacts on water quality from land use practices and development, increasing permeability and decreasing the amount and speed of storm water runoff. This filters pollutants, prevents stream damage and mitigates flooding. These areas include floodplains, stream buffers, wetlands and their buffers, groundwater recharge areas, lake shores, drinking water sources and headwater areas.

This section addresses the following subcategories of water resources: surface waters, aquifers, floodplains, wetlands, and stream buffers.

Surface Waters

There are two major watersheds located in Broome County. The majority of the County, nearly 90%, drains to the Susquehanna River, the largest river basin on the Atlantic Seaboard. Major tributaries in Broome include the Chenango, Tioughnioga and Otselic Rivers and major streams such as Occanum, Choconut, Nanticoke, and Castle Creeks. The remaining 10% of the County is the Delaware River watershed, a small portion of Broome's south-eastern boundary. The Delaware's main tributary in Broome is Oquaga Creek.

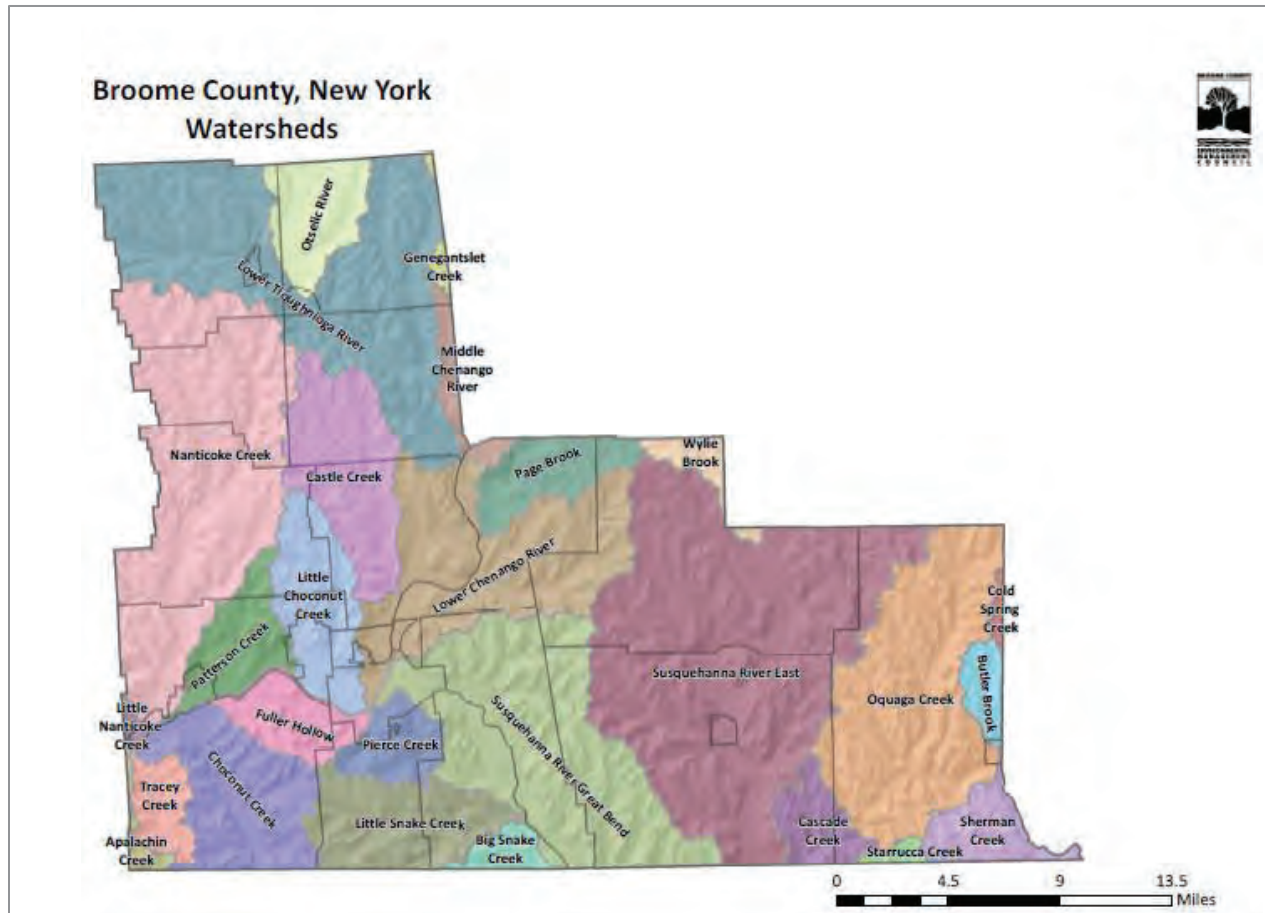
The NYS DEC has designated parts of the Susquehanna River in Broome County as "Class A" indicating that its highest and best use is for water supply for human consumption. A significant portion of the City of Binghamton depends on the river for drinking water, about 20% of public water use in the County.

Lakes can provide recreational opportunities, scenic views and water supplies, especially when development around them takes place in a responsible manner. Lakes are particularly sensitive to water quality impacts from non-point source pollution commonly associated with poor lakefront development and encroachment, such as nutrients and fertilizers from lawn maintenance or failing septic systems. Maintaining vegetated buffers around lake shores can help reduce or prevent some of the impacts of non-point source pollution, as well as provide important habitat and prevent erosion.

River or Stream	Class
Chenango River	B
West Susquehanna River	A
Phelps Creek	C
Osborne Creek	C
Ballyhack Creek	C
Brooks Creek	C
Tioughnioga River	C
Otselic River	C
Page Brook	C(T)
Dudley Creek	C(T)
Big Choconut Creek	C
Bradley Creek	C
Brandywine Creek	C
Finch Hollow Creek	C
Patterson Creek	C
Pierce Creek	C
Bayless-Park Creek	C
Little Choconut Creek	C
Nanticoke Creek	C(T)
Occanum Creek	C
Castle Creek	C
Oquaga Creek	C

There are two significant lakes in Broome County. Whitney Point Reservoir, the largest lake in the County draining 255 square miles, is a US Army Corps of Engineers (ACE) flood control structure located on the Otselic River. Oquaga Lake, located in the eastern portion of Broome, is 134 acres. Other small lakes and ponds are scattered throughout the area.

Lake or Pond	Acres
Chenango/Lily Lakes (CV State Park)	40
Nanticoke Lake	46
Oquaga Lake	134
Arctic Lake (Oquaga Creek State Park)	60
Whitney Point Reservoir	1,200



Aquifers

In Broome County, about 80% of water for public use in comes from ground water sources. There are several aquifers located beneath the Susquehanna River, the Chenango River and their surrounding floodplains. These are referred to as unconsolidated aquifers, characterized as having frequent discharge/recharge with the streams that lie above them. Bedrock aquifers are common in rural parts of the County, which are hydrologically isolated from large streams and hold water in fractures in the bedrock.

Aquifers are classified based on importance as a public water supply, productivity, and vulnerability to pollution. Johnson City, Endwell, Endicott, Hillcrest (in the Town of Fenton) and Vestal are dependent on primary aquifers (highly productive, vulnerable aquifers being used, mainly as a water supply, by a large percentage of residents).

In addition, all of Broome County, except a small portion in the Town of Sanford, is designated by the Environmental Protection Agency (EPA) as a sole source aquifer, the Clinton Street-Ballpark Aquifer System. Sole source aquifers are those supplying 50 percent or more of the area's drinking water, which, if contaminated, would create a significant hazard to public health and could not be replaced by another source.

This designation ensures that an environmental review will occur for development projects involving federal financial assistance.

Aquifer protection involves protecting the land in recharge areas where water enters the soil and replenishes an aquifer. This can be accomplished, in part, by limiting or restricting development in aquifer recharge areas and in the watersheds where groundwater may play a major part in replenishing a reservoir. Preserving lands in these areas will help protect the community's drinking water.

Floodplains

Flooding has historically been a significant threat to property in Broome County, with multiple significant flooding events. In 2006 and 2011 the County experienced flooding events which caused millions of dollars in damage. About 4.5% (32.09 sq. mi.) of the total area in Broome County lies within the 100-year floodplain, the area inundated by a flood having a 1-percent chance of occurring in any given year. Development in the 100-year floodplain increases the peak discharge associated with the 100-year storm. As a consequence, the elevation of the floodplain becomes higher and its boundaries expand, potentially putting property and structures that had not previously been subject to flooding at risk.

All 24 jurisdictions in Broome County participate in the National Flood Insurance Program, which requires the adoption of FEMA floodplain mapping and certain minimum construction standards for building within the floodplain. Jurisdictions have land use review programs in place to determine if proposed projects are in compliance with local floodplain regulations

Wetlands

Wetlands are periodically or permanently flooded areas that support plant and animal species adapted to living in those conditions, including swamps, bogs, marshes, and ponds. They function to trap and slowly release surface water, rain, snowmelt, ground water and flood waters. Preserving and restoring wetlands, together with other water retention, can provide the level of flood control otherwise provided by expensive dredge operations and levees. The protection of wetland buffers is also important to protect water quality and hydrology and to ensure that a wetland will continue to provide these ecological services.

New York State protects all wetlands at least 12.4 acres in size. Smaller wetlands may be protected by the State if deemed locally unusual or important. The NYS DEC protects approximately 2,190 acres of wetlands in Broome County. At the federal level, the US Army Corps of Engineers (ACE) has the authority to protect wetlands in NYS that are larger than 1 acre. There are about 13,600 acres listed on the National Wetlands Inventory, protected by the federal government, including the Susquehanna, Chenango and Tioughnioga Rivers which comprise 3700 acres. The surface acreage of all other federally protected wetlands is about 9900 acres. Any development impacting wetlands requires a permit from the state or federal government.

Wetland Location	Municipality	Acreage
Whitney Point Lake WMA	Triangle	4,645
Oquaga Creek State Park	Sanford	1,148
Chenango Valley State Park	Fenton	1,028
Whittacker Swamp State Forest	Sanford	805
Greenwood County Park	Nanticoke	447
Nathaniel Cole County Park	Colesville	367
Bing Univ Nature Preserve	Vestal	182

Stream Buffers

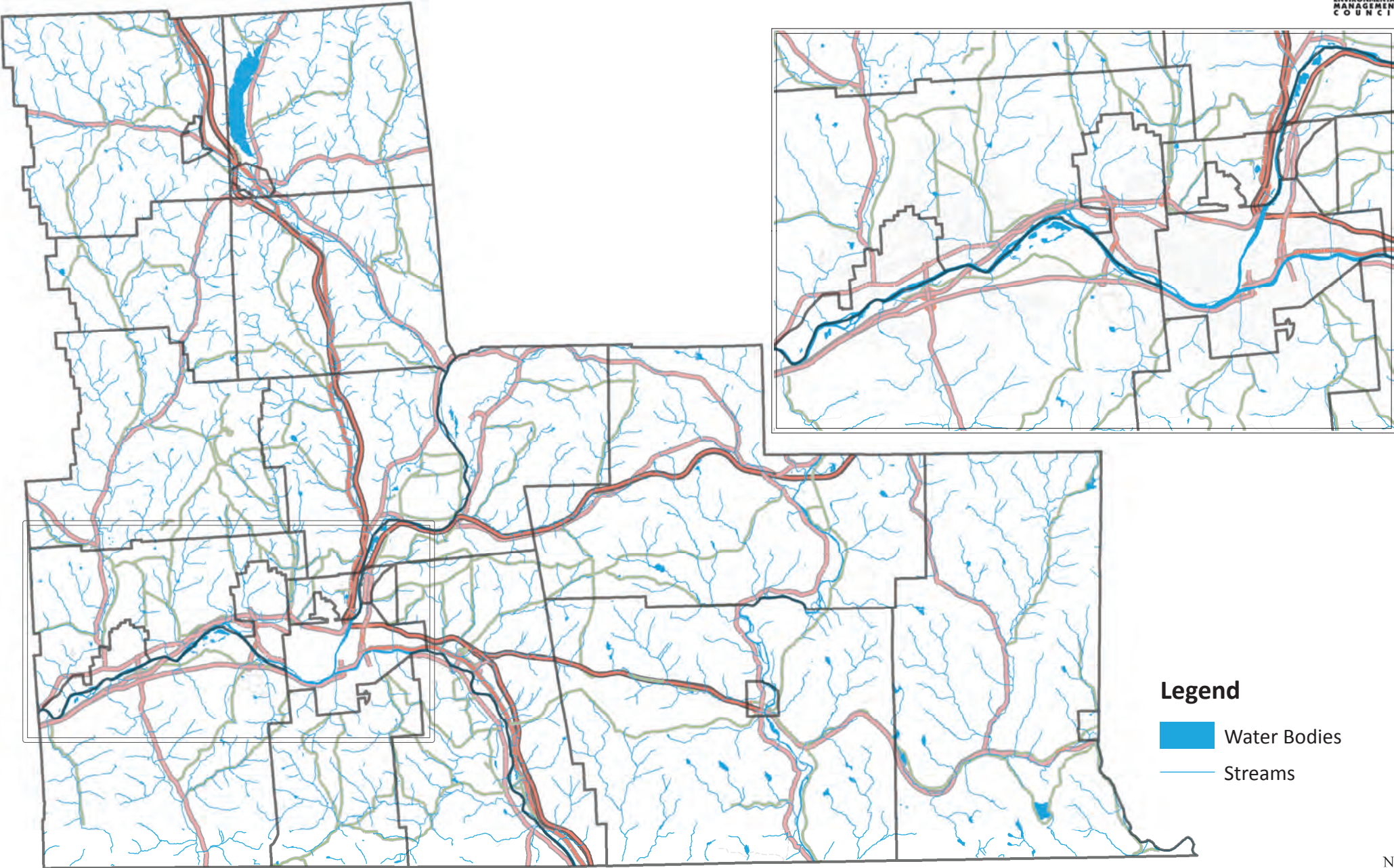
All waters of the state are provided designation based on best usage of each waterway. **AA** or **A**, are waters best used as drinking water, **B** for swimming and other recreation, **C** for waters supporting fisheries and the lowest classification is **D**. The NYS DEC requires a permit to alter the banks or bed of a protected stream,

those classified as **C** or better. These waters may also have a standard of **(T)** or **(TS)**, indicating that they may support a trout population or trout spawning. These waters may have additional permitting requirements.

Vegetated buffers along stream corridors can help protect the ecological values of streams as well as provide recreational opportunities. Protecting these areas has multiple benefits including wildlife habitat, improved water quality through shading/cooling the water, filtering excess nutrients, sediment and other harmful pollutants, and the addition of woody debris to the aquatic ecosystem. In addition, vegetated buffers reduce the volume and velocity of runoff and floodwater, allowing increased infiltration to groundwater aquifers that replenish surface water during drier months and reduce adverse conditions during periods of low flow.

In general, a minimum base width of at least 100 feet is recommended to provide adequate stream protection. The three zone buffer system is an effective technique for establishing a buffer, consisting of inner, middle, and outer zones, each distinguished by function, width, vegetative target, and allowable uses. About 10,746 acres in the County are encompassed in the zone within 100 feet of major streams. Only about 18% (1907 acres) of that area is open space that is not used for agriculture.

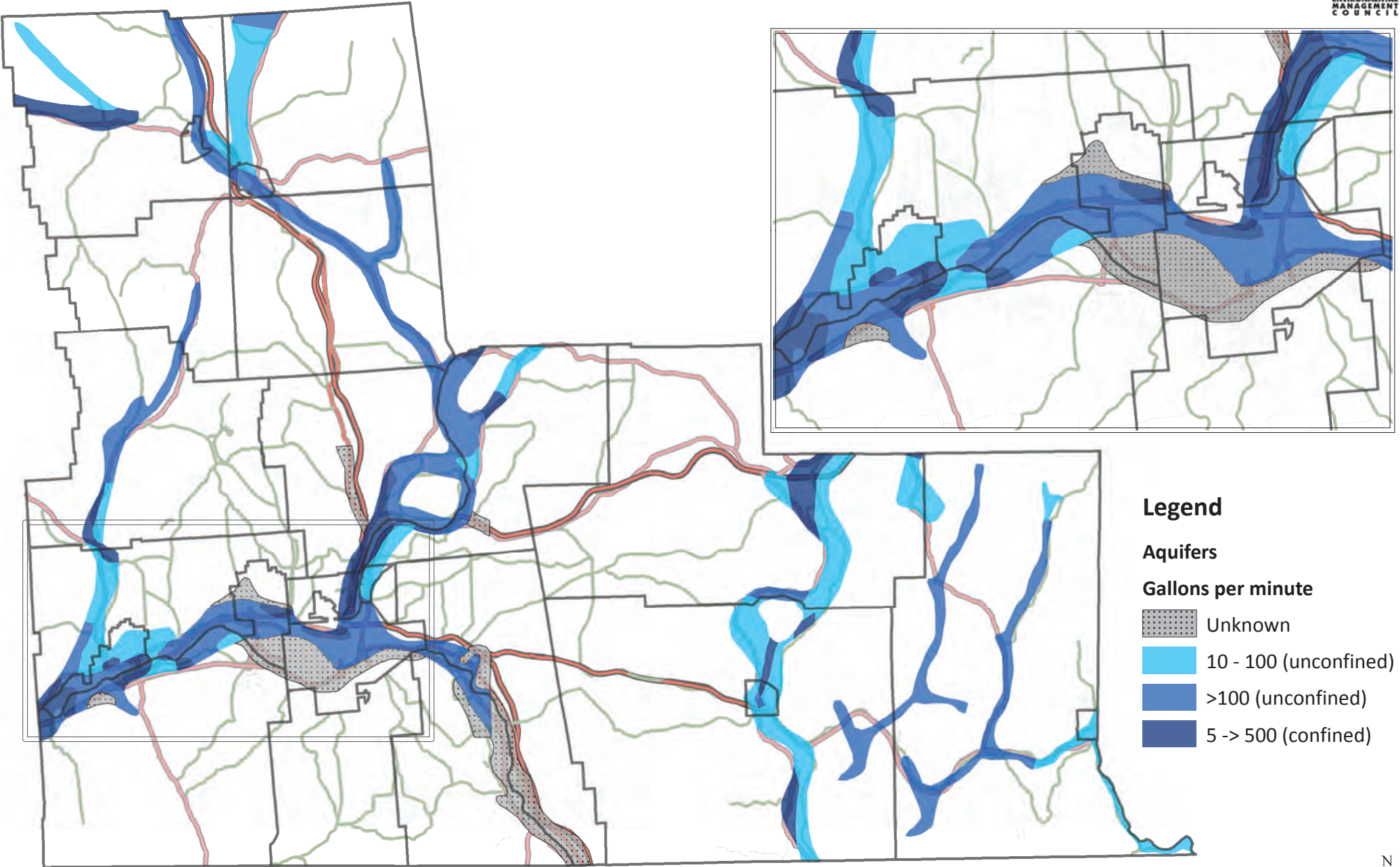
Broome County, New York Surface Waters



- Legend**
- Water Bodies
 - Streams



Broome County, New York Aquifers



Legend

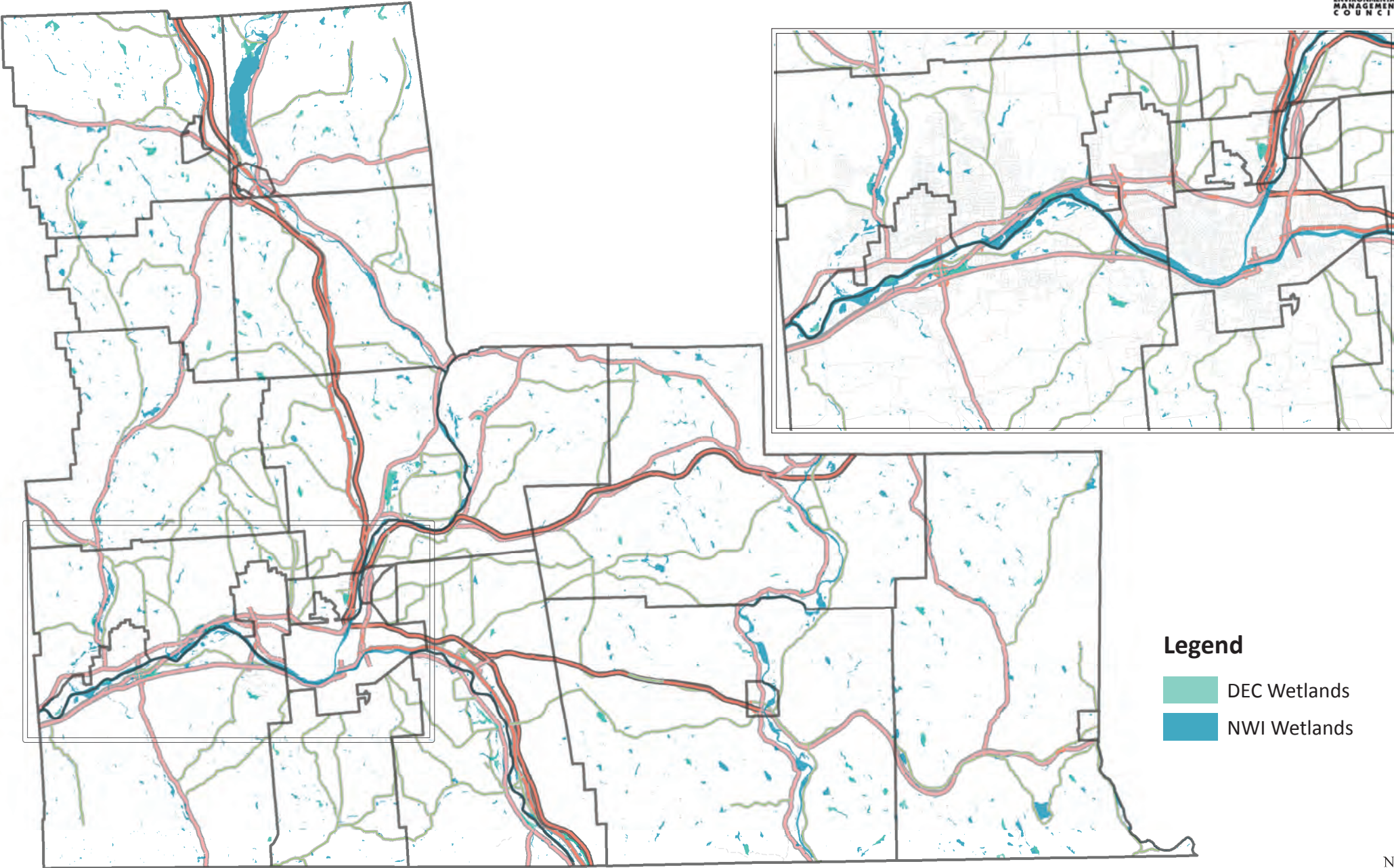
Aquifers

Gallons per minute

- Unknown
- 10 - 100 (unconfined)
- >100 (unconfined)
- 5 -> 500 (confined)



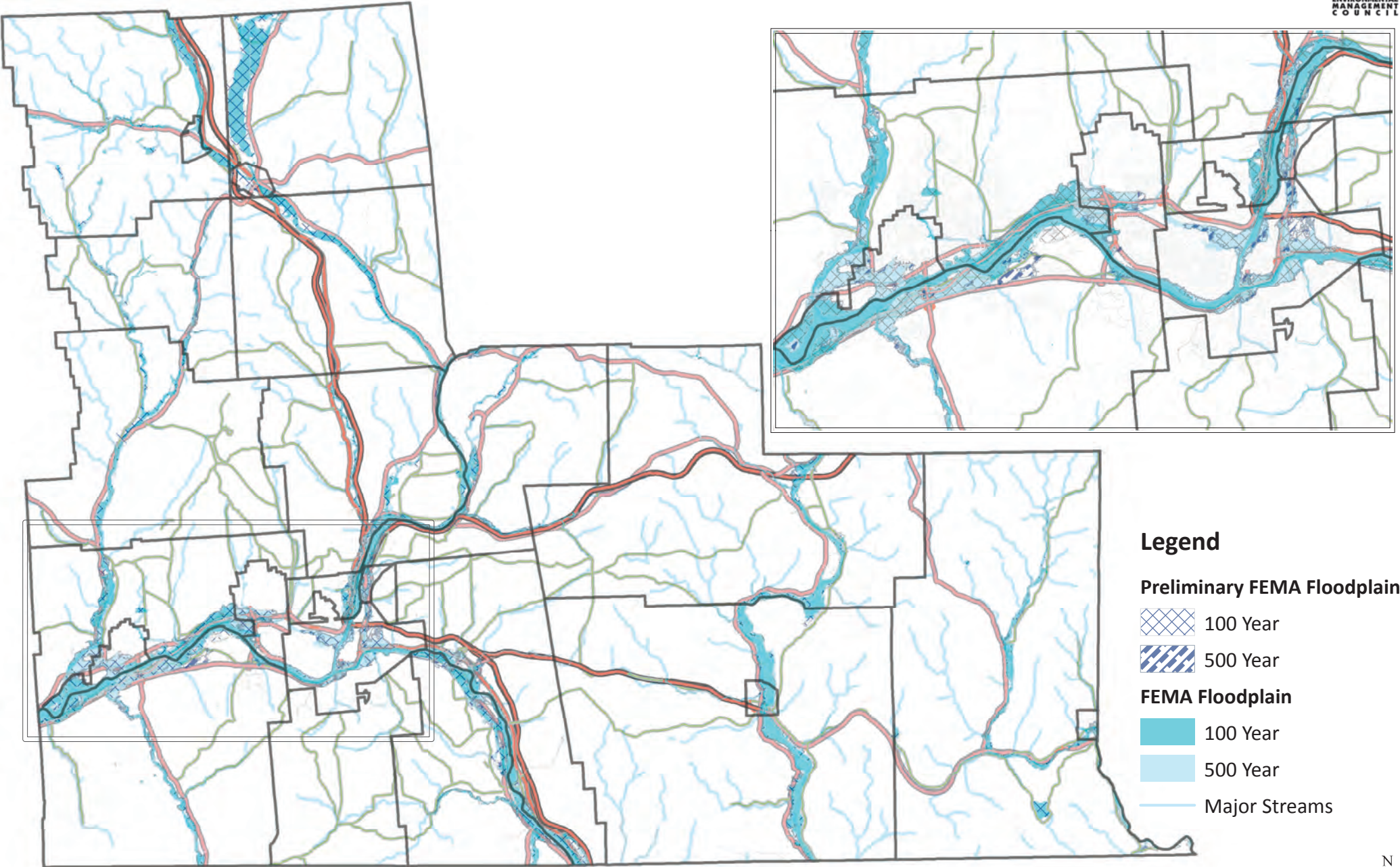
Broome County, New York Wetlands



- Legend**
- DEC Wetlands
 - NWI Wetlands



Broome County, New York Floodplains



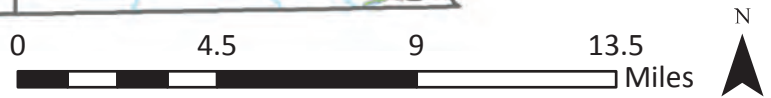
Legend

Preliminary FEMA Floodplain

- 100 Year (Cross-hatched pattern)
- 500 Year (Diagonal hatched pattern)

FEMA Floodplain

- 100 Year (Dark blue)
- 500 Year (Light blue)
- Major Streams (Light blue line)



Management Issues

When considering water resource management, it is important to remember that the relationship between surface water and groundwater are not isolated from one another. Water moves through gravel layers underlying the river or stream beds between the two. Similarly, land is connected to water systems through wetlands and floodplains. These provide valuable services that help to naturally maintain healthy water resources including storing and slowly releasing surface water, reducing flood peaks and velocities, reducing erosion, reducing sediment and filtering nutrients and impurities, promoting infiltration and aquifer recharge, and reducing the frequency and duration of low flow. In turn, they enhance wildlife diversity and increase recreation and tourism opportunities.

This section aims to identify those management issues that are currently facing Broome County. It also examines the actions being taken to deal with these issues by various agencies or organizations at all levels from local to federal initiatives.

Point Source

Mitigation of point source pollutant discharges to water resources is accomplished through the State Pollution Discharge Elimination System (SPDES) permit program. Any individual wishing to discharge wastewater effluent to surface or ground waters must have a permit. In addition to facility-specific SPDES permits, NYSDEC also issues general permits for 5 specific activities; Municipal Separate Storm Sewer Systems (MS4s), Construction Storm water Runoff, Storm water Runoff associated with Industrial Activity, Sanitary Discharges to Groundwater, and Concentrated Animal Feeding Operations (CAFOs). Discharges must meet requirements in the appropriate general permit rather than in individual discharge-specific permits.

Non-Point Source

Water quality issues within Broome County are primarily from diffuse non-point pollution sources. Stream bank erosion and agricultural activities result in riparian buffer loss and excessive nutrient and sediment loadings. Failing and/or inadequate on-site septic systems significantly impact lakes and reservoirs, many of which are small, shallow and eutrophic. Flooding and the impact of flood control efforts on other water uses are also a concern. The majority of water quality impacts result in “stressed” or “threatened” uses. Most waters with more severe “impaired” uses are limited by fish consumption advisories, thought to be primarily the result of atmospheric deposition of mercury, or by localized impacts of failing/inadequate on-site systems. Table 3.5 further addresses these impacts.

Threat	Description
<i>Failing and/or Inadequate On-site Septic Systems</i>	Recreational uses in some portions of the basin are restricted by pathogens and aesthetics (odors, floatables) from failing and/or inadequate on-site septic systems, the result of poor soils and inadequate lot sizes. In smaller hamlets and villages septic tank effluent is discharged to storm sewers, the ground surface or directly into waterways. In most of these cases problems are well documented and efforts underway to develop appropriate collection and conveyance systems. However, funding for the construction of these facilities is needed.
<i>Nonpoint sources of Nutrients, Sediment and Siltation</i>	Nonpoint source loadings of nutrients and silt/sediment stress aquatic life support and various recreational uses. Stream bank erosion is exacerbated by loss of riparian vegetation buffers. Poor farming practices (barnyard runoff, manure spreading, livestock access to streams) in some portions of also contribute to thermal stress and other water quality problems.

Excessive Aquatic Weed Growth

Recreational uses (swimming, fishing, boating) and aesthetics in the primarily small, shallow lakes are restricted by high nutrient loads and resulting algal blooms, and high suspended solids. Algal blooms limit dissolved oxygen which impacts aquatic life. Nonpoint sources, such as agricultural activity, stream bank erosion, failing and/or inadequate on-site septic systems as well as residential development and construction

Fish Consumption Advisories

Consumption of some fish species from the Susquehanna and Chenango Rivers is restricted by a NYS DOH health advisory due to mercury contamination. The exact source of contamination is unknown but atmospheric deposition is considered a likely contributing source.

Water Monitoring and Reporting

At the state level, New York maintains several reports intended to track the status of water quality and meet Federal requirements. They use these to set statewide priorities for programs and funding. Therefore, when setting local priorities, it is prudent to take these into consideration as they may be priorities for state programs and funding opportunities. Furthermore, some of the listings may be associated with regulatory requirements intended to improve identified water quality issues. While these reports are important, local municipalities must also look at their own priorities and local knowledge when considering associated actions. Often additional requirements are integrated into existing water quality programs that are included in this chapter. Therefore, programs are ever changing to meet varying circumstances and new issues as they arise.

State programs intended for the assessment and monitoring of water quality issues include the following:

- Priority Waterbodies List (PWL) – This list characterizes information on general water quality, the degree to which designated uses are supported and identify water quality issues. It is important to note that the information posted for the Susquehanna watershed is from 2009, so may not reflect changes in water quality since that time. Delaware watershed data is from 2016.
- List of Impaired/TMDL Waters (Section 303(d) List) – Section 303(d) of the Clean Water Act requires states to compile and submit a list of waters that do not meet water quality standards and thereby do not support their designated uses. This results in the development of a Total maximum Daily Load (TMDL) or other appropriate strategy to restore the water use.
- NYS Water Quality Report (Section 305(b) Report) – This document is based on a federal requirement that states are to submit a report on the quality of waters in their state every two years. It is a compilation of water quality assessment information contained in all PWL Basin Reports. Because the Section 303(d) List is concerned with only impaired waters the Section 305(b) Report provides a more comprehensive assessment of statewide water quality.

The table below outlines the Broome County waterbodies that have been identified to have some level of impairment within these state reports.

Waterbody	Watershed	Status/ List	Pollutant(s)	Source(s)
Susquehanna River, Lower, Main Stem (Ross Corners to Bing)	Choconut Creek	Impaired; PWL	Phosphorus, Mercury, Pathogens*	Municipal WWTP, Atmospheric Deposition*, Agriculture*, Urban Runoff*
Minor Tribs to Lower Susquehanna (End/JC)	Lower Susquehanna	Impaired; PWL 303(d)	Oxygen Demand, Phosphorus*	Agriculture*, Urban Runoff*
Whitney Point Lake	Otselic River	Impaired; PWL 303(d)	Algal Growth, Phosphorus, Sediment	Agriculture, On-site septic*
Dudley Creek and tribs	Tioughnioga	Minor Impacts; PWL	Sediment*, Nutrients*, Thermal Changes*	Habitat Modification, Streambank Erosion, Agriculture (cattle)*
Chenango River, Lower, Main Stem (mouth to Chenango Forks)	Lower Chenango	Impaired; PWL	Mercury, Sediment, Nutrients*, Thermal Changes*	Agriculture, Combined Sewers, Habitat Modification, Urban Runoff, Atmospheric Deposition*, Hydro Modification*
Castle Creek, Lower, and minor tribs	Lower Chenango	Minor Impacts; PWL	Sediment	Streambank Erosion, Roadbank Erosion
Susquehanna River, Main Stem (Bing to PA)	Lower Susquehanna	Impaired; PWL	Mercury	Atmospheric Deposition
Park Creek and tribs	Lower Susquehanna	Impaired; PWL 303(d)	Aesthetics, Pathogens Phosphorus, Oxygen Demand*	On-site Septic
Bluberry, Laurel Lakes	Lower West Branch Delaware	Impaired; PWL	Phosphorus, Chlorophyll a	Unknown
Fly Pond, Deer Lake, Sky Lake	Lower West Branch Delaware	Impaired; PWL 303(d)	Algal Growth, Phosphorus	On-site Septic*
<i>*Indicates "suspected" pollutants/sources. All others are "known". Items listed by DEC as "possible" are not included.</i>				

Chesapeake Bay TMDL

The Chesapeake Bay watershed covers 64,000 mi² and includes portions of 6 states and the District of Columbia. The headwaters in the Upper Susquehanna watershed in New York include Broome County. Due to significant degradation from excess pollutants, a federal executive order was issued directing the US Environmental Protection Agency (EPA) to reduce pollution entering the Bay. The EPA, through the Chesapeake Bay Program, developed a total annual allocation for nitrogen (N), phosphorus (P) and sediment considered the maximum that the Bay can receive and meet water quality standards, a Total Maximum Daily Load or "TMDL".

Primary nutrient sources are sewage, cattle manure, inorganic fertilizer and atmospheric nitrogen, and primary sediment sources are agriculture, stream bank erosion and construction. All states (and the District of Columbia) in the watershed were required to submit Watershed Implementation Plans (WIP) to meet the target allocations and provide reasonable assurance that reductions will be achieved and maintained by

2025. If not, the EPA may institute backstops (actions to ensure progress), including program review, denying permits, and targeting compliance and enforcement actions as necessary to meet water quality goals.

New York's Phase I WIP was developed and submitted by the DEC in cooperation with the Upper Susquehanna Coalition (USC) in September 2010, and in January of 2013 New York's final Phase II WIP was submitted to the EPA. The DEC and USC are currently leading the effort for development of the Phase III WIP, as required by the EPA. The intent of this document is to assess New York's progress toward meeting the pollutant reduction goals for this portion of the Susquehanna River watershed and to reassess priorities for continuing progress toward achieving the established 2025 targets.

USC, DEC, Soil and Water Conservation Districts and other agencies have been leading the effort for implementing the WIP, tracking progress and reporting to the EPA. Reductions in agricultural loads represent the greatest proportion of the total controllable load from New York and the most cost-effective reductions. Wastewater reductions are being implemented through robust legal requirements to meet numeric nutrient criteria. Reductions in stormwater load through retrofit requirements are by far the most cost intensive and are a very small proportion of the total New York load. Management efforts in these areas are discussed in further detail below.

Aquifer Protection

As a result of the Safe Drinking Water Act of 1996 the New York State Department of Health (DOH) requires the evaluation of each source of water used by a public water system to identify possible contaminant threats to the source water quality, referred to as the Source Water Assessment. The Source Water Assessment Program (SWAP) compiles and organizes information for better decisions regarding source water protection.

Both industrial land uses and local geology render many public and private water supply wells vulnerable to contamination. Because of pollution from organic chemicals, such as industrial solvents and other volatile organic compounds (VOCs), a number of public water supply wells in the urban area are being treated with air strippers. In particular, Endicott, Johnson City, Kirkwood, Conklin and Vestal have all had treatment systems installed on at least one of their wells. VOC levels have, however, decreased greatly in recent years due to sustained clean-up efforts by state agencies and the enactment of municipal groundwater protection ordinances including Kirkwood, Conklin, Union, Johnson City, Endicott, Vestal, Chenango and Fenton. Fortunately, in Broome County groundwater pollution has been localized.

Flooding

While being a scenic river valley is a valuable asset to Broome County, increased vulnerability to flooding creates a hazard to its communities. History has shown the Susquehanna River Basin to be one of the most flood-prone regions in the nation. Higher gradient streams in the lower basin and highly erodible soils result in frequent flash flooding and excessive erosion. Broome County has been subject to multiple major flooding events which have received federal disaster declarations. Most recently, the County suffered historic river flooding in June of 2006 and again, only five years later, in September of 2011, both of which received a federal disaster declaration. Flooding due to high river levels is not the only concern, there have also been impacts related to ineffective drainage and flash flooding, most significantly during November of 2006 and August of 2018, which also received a federal disaster declaration.

Locally, flooding events have had devastating community impacts. These include immediate impacts such as the displacement of residents and business, and the endangerment of public health and safety. There are long term impacts including economic hardships for residents, businesses and local municipalities, damage to local infrastructure and negative impacts on local economies. Environmental impacts include disrupted wastewater treatment for treatment plants and private septic systems, as well as the threat of chemicals and other pollutants washed away from flooded commercial and industrial properties.

Broome County Planning coordinates a group called the Flood Task Force with representatives from local, state and federal government, including engineers, Soil and Water Conservation District staff, code officers and elected officials. The group serves to educate members on topics related to flooding such as levee assessments and flood map amendments, flood insurance, and mitigation funding programs, advocate for changes in federal and state regulations related to flood policy and hazard mitigation, and coordinate efforts for comprehensive, regional flood mitigation.

Flood Control Infrastructure

There is a significant system of publicly owned flood control structures that are operated and maintained within the County. There are federally owned flood control structures located in the City of Binghamton, Towns of Union and Vestal, and the Villages of Endicott, Johnson City, Lisle, Port Dickinson, and Whitney Point. These structures were federally built by the US Army Corps of Engineers and are maintained by the NYS DEC. Recently, FEMA undertook a process to evaluate the flood risk for properties located behind these levees and flood walls called the Levee Analysis and Mapping Procedure (LAMP). The goal of this process was to provide data to enhance future floodplain mapping efforts in the County, account for the hazard reduction impacts of non-accredited levees, and to provide local communities with tools to make decisions related to the reaccreditation of the structures and other mitigation actions in those areas.

In addition, Broome County owns and maintains twenty-four flood control structures, referred to as “watersheds”, a series of ponds that provide upstream flood protection on several major streams. The County continually performs operations and maintenance services on these structures. Recent efforts include dredging and cleaning to maintain storage capacity, assessments and upgrades related to scour and erosion protection, and evaluation of potential upgrades to increase storage capacity.

In addition to these structural flood mitigation measures, local communities have also incorporated floodplain ordinances into their local code. These ensure that development within the floodplain is built to acceptable standards, minimizing impacts to the structure or neighboring properties, and discourage inappropriate land use in the floodplain (i.e. businesses dealing with hazardous chemicals). Local communities have also participated in the acquisition of properties substantially damaged during flooding events. Development is prohibited on these properties, thus removing vulnerable structures and aiding in flood mitigation.

Flood Mitigation Studies and Reports

Broome County and our local, State, and Federal partners have worked together to develop several plans and reports that help expand our knowledge of our flood vulnerabilities and to prioritize and assess flood mitigation efforts.

The County recently completed an update to the **Broome County Hazard Mitigation Plan**. To receive funding for mitigation projects from FEMA, communities are required to have an approved hazard mitigation plan in place outlining a strategy for reducing vulnerability to hazards. While the plan addresses all hazards, the primary focus is on flooding and identifies specific flood mitigation projects in each jurisdiction.

The **Broome County Watershed Flood Mitigation Analysis** was developed by the County as a comprehensive watershed-based flood assessment. The goals of the plan were to gain a better understanding of the nature of flooding, provide municipalities with a tool for coordinated, informed decisions about flood management, and identify implementable flood mitigation solutions in priority watersheds. Communities can use this plan to prioritize funding and address intermunicipal impacts of flooding. One project being implemented as a result of the plan is the raising of the Juneberry Road Bridge, a County bridge that crosses Choconut Creek. Raising the bridge increases the capacity for water to flow under the bridge, reducing flooding of residences upstream.

Broome County participated in a project being undertaken by Abt Associates through a NYSERDA funded study to evaluate **Climate Based Flood Projections** for inland waterways. The intent of that project is to implement a framework for using multiple sources of data to estimate potential changes in flood risk and provide information to communities, so they can consider changing flood risk in decision making. The

study (still being finalized) found that the projected 1% flood flow corresponds to an increase in flood depth of 2-4 ft, very close to the 0.2% flood magnitude. This suggests current 0.2% flood is a reasonable proxy for future 1% flood and is useful as a first order screening of potential vulnerabilities to future flood risk.

Broome County also has developed the report **Building Resiliency** to highlight the County's history of flooding, as well as projects, programs and initiatives by local municipalities and our partners to reduce flood vulnerability in our communities. Projects documented in the report include property buy-outs, home elevations, storm sewer upgrades, critical facility upgrades and more.

Through an effort of the Army Corps of Engineers (ACE) the **Upper Susquehanna Regional Watershed Study** is currently in development. The goal of this study is to identify and evaluate flood risk to communities within the Upper Susquehanna River Basin and identify flood risk management strategies and alternatives to manage and reduce flood risk, including residual risk in areas with existing flood risk management infrastructure.

The **Broome County Communities New York Rising Community Reconstruction Plan** was developed as part of a NYS program to provide assistance and funding to communities that have been severely damaged by flooding across the state. The plan includes a series of comprehensive reconstruction and resiliency strategies and identifies projects and implementation actions.

The **Susquehanna Regional River Initiative** being developed by the Upper Susquehanna Coalition was also funded through the NY Rising program. The purpose of this project is to build resilience and capacity in the Broome, Tioga and Village of Sidney NY Rising Communities. The project will link the local communities together with a consistent comprehensive watershed approach to understand and address flooding issues in the Upper Susquehanna River.

Stormwater

There is a history of flash flooding and poor drainage in Broome County which exacerbates flooding events due to high river levels. Furthermore, localized flooding and erosion problems lead to significant damage to infrastructure and property during less significant storm events, most notably in the federally declared events in November of 2006 and August of 2018. Improperly managed stormwater is a leading cause of flooding and erosion, which can lead to property damage, cause road safety hazards, and clog catch basins and culverts with sediment and debris. In addition, it carries materials and pollutants from paved surfaces to our waterways. This can degrade the quality of drinking water, damage plant and wildlife habitat, and makes water resources generally unsuitable for consumption, recreation, or other uses.

To minimize these stormwater impacts New York State, as a requirement under federal regulations, has issued three State Pollutant Discharge Elimination System (SPDES) general permits required for activities associated stormwater discharges.

One of these requires permits for stormwater discharges from Municipal Separate Storm Sewer Systems (MS4s) in urbanized areas. MS4 refers to a stormwater conveyance or system of conveyances owned or operated by a public body (i.e. state, city, county, or district). Permittees are required to develop Stormwater Management Program (SWMP) and submit annual reports to the State. There are 14 municipally operated MS4s in Broome County; City of Binghamton, Town of Binghamton, Chenango, Conklin, Dickinson, Endicott, Fenton, Johnson City, Kirkwood, Maine, Port Dickinson, Union, and Vestal. Broome County is identified as a "traditional non-land use Ms4", meaning that the requirements are slightly different than the other communities due to a lack of land use authority at the county level.

Construction activities disturbing one or more acres of soil must be authorized under the General Permit for Stormwater Discharges from Construction Activities. All municipalities are responsible for ensuring that local projects are adhering to the conditions of the general permit.

The Multi- Sector General Permit for Stormwater Discharges Associated with Industrial Activities (MSGP) addresses stormwater runoff from industry specific activities, including wastewater treatment plants.

Special requirements apply when stormwater is discharged to a water body identified on the New York State 303(d) list or covered by an EPA-approved Total Maximum Daily Load (TMDL), used to identify waters where designated uses are not fully supported by existing water quality. Water bodies in Broome County that are currently listed on the 303(d) list are Whitney Point Lake (Triangle), Fly Pond and Deer Lake (Sanford).

Broome County and all other municipally operated MS4's, as identified above, along with Tioga County and the Town of Owego have an intermunicipal agreement in place to work together on stormwater issues through the Broome-Tioga Stormwater Coalition. The group works together to share information and collaborate on ways to meet the requirements set forth in state and federal stormwater regulations. This includes utilizing mapping resources, collaborating on annual reporting, working together to develop education and outreach materials, and the development of local laws and ordinances.

One of the most recent issues is the pending update to the New York State MS4 permit (described above). Some changes include the following (among others):

Update the Local Law for Stormwater Management and Erosion & Sediment Control. The new version now includes green infrastructure practices as required in the New York State Stormwater Management Design Manual.

- Enhanced requirements for discharges to impaired waters.
- Develop and maintain a stormwater system map
- Develop and implement an enforcement response plan for illicit discharge violations
- Updated requirements for the inventory and assessment of good housekeeping practices, as well as updates to best management practices.

Once the updated permit goes into effect Broome County and other regulated municipalities will need to update their Stormwater Management Program Plans to integrate the new requirements.

Wastewater

Wastewater consists of domestic or sanitary wastewater, coming from residential sources with the primary concern being disease organisms, and industrial wastewater, discharged by manufacturing processes and commercial enterprises, potentially containing chemicals and other waste products used in their processes. Effective wastewater treatment is essential to ensure that these waste products do not reach local water bodies, creating concern for public health and safety and other water quality problems.

Wastewater treatment plants in Broome County primarily serve the metropolitan area with the exception of several small systems in the eastern part of the county. There is a total of ten wastewater treatment plants located in the County, the Binghamton-Johnson City Joint Plant having the largest capacity. There are also plants located in the Village of Endicott, Town of Chenango, Village of Deposit, Town of Sanford, Town of Windsor, Town of Fenton, Town of Binghamton and Village of Whitney Point.

A major issue for the communities dependent on these treatment facilities is proper planning and decision making to ensure the plant's capability to discharge increased volumes of wastewater necessary for growth. This is especially an issue for the Binghamton-Johnson City plant which services a large portion of the population and has a system with several Combined Sewer Overflows (CSOs). CSOs collect runoff, domestic and industrial wastewater in the same pipe. As a result, during periods of heavy rainfall, capacity may be exceeded causing the excess to overflow directly into the receiving waterbody without treatment.

Another major issue for local wastewater treatment plants is ensuring that systems are upgraded to accommodate changing and new State and Federal regulations regarding new contaminants or acceptable levels of known contaminants. This can be a very costly endeavor, especially for the smaller, more remote plants.

A major wastewater management issue that is being dealt with at the Binghamton-Johnson City Joint Sewage Treatment Plan (B-JC STP) was the development of the Flow Management Plan, completed in 2012. The Flow Management Program as described in the plan is in response to a 2007 Consent Order from the DEC. While the plan found that the collection systems are currently in compliance with NYS permits, the purpose of the program is to proactively manage wet-weather wastewater flow so that levels do not exceed the design and treatment capacity of the plant in the future.

The plan is intended as a tool to enhance economic development opportunities and community growth while promoting more efficient use of current capacity. The four major components of the plan to remain in compliance with discharge permits are a sewer connection application program, an offset program requiring an equal amount of infiltration and inflow removal for any added flow, a Capacity, Management, Operation and Maintenance Program to help municipal users operate and maintain their sewage collection systems, and a Treatment Management Plan to forewarn of potential noncompliance events and correct them.

Private septic systems are the primary method for sewage disposal in more rural and suburban parts of the County. The Broome County Health Department permits, monitors and documents all new and replacement septic systems to ensure they function according to the Broome County Health Code. A faulty septic system can cause impairments to water quality and aesthetics. Violations due to faulty septic system are regulated by the Health Department who ensures that these systems are brought back up to code.

Agriculture

Poor agricultural practices can pose a threat to water bodies through the discharge of fertilizers, wastes and chemicals from farming operations to surface waters or through the loss of soils most suitable for farming. New York's Agricultural Environmental Management (AEM) program was developed to identify and correct environmental risks to watersheds and promote public understanding and support for agricultural and environmental initiatives. The AEM program consists of problem identification, planning, and implementation of environmental stewardship practices, effective and confidential environmental risk assessments, and cost sharing for implementation of best management practices to correct identified environmental risks.

AEM not only promotes environmentally sound agricultural practices, but aids compliance with water quality regulations impacting agriculture. Concentrated animal feeding operations (CAFOs) are agricultural facilities where large numbers of animals are kept within a much smaller area than traditional pasture operations. The concentration of the wastes from these animals increases the potential to pollute water and impact the environment. CAFOs are point sources under the federal Clean Water Act, and thus, must obtain a discharge permit. The DEC has agreed to implement a general SPDES permit program for regulating CAFOs. All CAFOs covered by a general permit are required to have a site specific Certified Nutrient Management Plan (CNMP) developed in accordance with the Natural Resources Conservation Service (NRCS) that must be certified by the DEC.

Waterfront Development

Projects that enhance use of and access to our waterfront areas can provide significant long-term economic and quality of life benefits to local communities, especially urban areas. Recent efforts have focused on reconnecting communities to their riverfronts. However, the long-term sustainability of these efforts relies on maintaining the quality of those water resources. To preserve benefits that include aesthetics, flood mitigation, recreation, and public services, it is essential to prioritize protection and enhancement of water quality as a component of waterfront planning and development projects. This can be achieved by the following: identify and protect areas of special significance to water quality protection; regulate the location, form and use of projects in the waterfront area and permit only those that protect and enhance the character of the waterfront, and; integrate high-quality, innovative practices into development projects such as green infrastructure and enhanced flood-proofing and flood mitigation measures.

The Broome County Intermunicipal Waterfront Public Access Plan was developed in 2011 in partnership with Broome County's waterfront municipalities. This plan serves as a resource to guide future development activity along Broome County's riverfronts. The plan focuses on establishing a united vision for economic development, riverfront access and environmental stewardship. Principles in the Plan include the following:

- Promote compatible land uses
- Protect natural heritage features and environmental significant lands
- Promote biodiversity, clean water and healthy habitats
- Provide a sound basis for sustainable ecological, agricultural and heritage-based tourism
- Provide ecologically sensitive public access to the riverfront
- Revitalize Broome County riverfront communities

The plan provides information and a framework that can be utilized by local municipalities in their individual waterfront revitalization planning efforts, while contributing to a more comprehensive regional planning approach. The County is currently undertaking an update of the Plan including development of a River Trail Plan to enhance recreational uses of the waterways. In addition, the City of Binghamton and the Village of Whitney Point are currently developing their own municipal Local Waterfront Revitalization Plans that establish policies for waterfront development in those communities. The county-wide plan update will be coordinated with these efforts.

Resilient Design

Local communities have recognized the importance of the integration of resilient design features into public projects and private development to protect water resources and reduce our vulnerability to flooding. The integration of green infrastructure features and bluefield development planning are important tools for achieving this.

Including green infrastructure practices in the design of County facilities is an important component of establishing sustainable and modern public facilities. This practice also can serve as a demonstration for other public and private development in the community and open funding opportunities for needed capital improvements. Recent Broome County projects that have integrated green infrastructure include parking lot upgrades at the Public Safety Facility using porous asphalt, pervious pavers, vegetated swales and stormwater wetlands, and the Airport Road Reconstruction that included bioretention, vegetated swales, and pavement reduction.

A major green infrastructure project is in progress currently as part of the Government Plaza redesign. That project aims to improve water management at the site through green roofs, cisterns, and bioretention. This is part of a larger project that aims to improve the flow of pedestrian traffic through the space and make the space more amenable as a public space for daily use and events.

"Bluefields" are sites where the expansion, redevelopment, or reuse may be complicated by damage, contamination, or other impacts resulting from a history or risk of flooding. These require higher level of analysis and design to bring back to productive use and in some cases may be blighted properties. Bluefield development planning focuses on addressing flooding impacts and issues at sites while ensuring that they contribute to the local economy.

It is important to recognize that some sites may not be suitable for development or redevelopment if the flood risk is too extreme or resilient design not cost effective. However, a Bluefield Plan at these sites may consist of an assessment of potential flood mitigation projects or appropriate uses such as recreation. For those sites where redevelopment may be possible components of design may include strategic building siting, floodproofing, flood mitigation features, elevation or raised pillars, green Infrastructure, and other sustainable design features (i.e. alternative energy).

A great example of a bluefield redevelopment in Broome County is the reconstruction of MacArthur Elementary School in Binghamton. After being severely damaged during the 2011 flood the school district

did a total reconstruction of the school on the same site, integrating resilient design including relocation of the main building to higher ground above flood level, green infrastructure (rain gardens, bio-swales), a community walking trail, raised columns to allow flood waters to flow underneath, and orientation ideal for photovoltaic panels.

Broome County and the Town of Union are working with The Agency (Broome County IDA) on a bluefield redevelopment plan for the former BAE Systems site. After severe damage in the 2011 flood, BAE moved its operations to the Huron Campus in Endicott. The site had been leased by BAE from the federal government who demolished the plant. The site is now owned by the Agency. Recognized as an important economic development site for the community, the redevelopment plan aimed to identify potential uses for the site, while integrating flood mitigation components to ensure that any use would be resilient in the face of flooding. These included elevation of the developed area, green infrastructure, additional flood storage areas, and levee improvements. Using the plan, the Agency, Town, and County aim to revitalize that neighborhood in a sustainable, resilient manner.

Working Landscapes

Working landscapes are those in which an individual landowner provides for their own economic well-being through agricultural or other natural resource-based commodities, while at the same time enhancing their community's environmental, economic and social well-being. Included are farmlands and managed forests ranging from large, contiguous acreage devoted to a specific use, to smaller farms or niche markets.

These lands provide several economic benefits through investment in community infrastructure, economic development and contribute to local economies directly through sales, job creation, and support services. They often supply lucrative secondary markets such as food processing and agri-tourism. Social benefits include maintaining scenic, cultural and historic landscapes, enhancing local heritage, and providing a variety of recreational opportunities. The ecological benefits include the provision of food and cover for wildlife, flood control, wetland protection, and air quality protection. While operating mines don't provide ecological benefits, those that are properly reclaimed can provide valuable services such wildlife habitat (i.e. birding areas) and flood control.

Long-term productive land use is highly dependent on effective stewardship and conservation through sustainable land management. Increased public awareness of the many public benefits provided by working landscapes has fostered greater community appreciation for the importance of their preservation. This view challenges the perspective that new development is the most desirable use of agricultural land, especially in rural communities and those transitioning from rural to suburban.

Agricultural Lands

The most recent Agricultural Census data of 2012 indicates a trend similar to that of New York State. Although the number of farms is on a decline, the total production is on the increase. In 2012, 563 farms (decrease of 3%) in Broome County with an average market value of \$54,553 (increase of 6%) have produced a total of \$30,713,000 in sales, a 3% increase. Statewide, production increased by 18% despite a slight decrease of 2% in the number of farms. The Broome County Agricultural Economic Development Plan (2019) gives a more detailed overview of the local trends in agricultures, but the table below gives a short summary of some of the major details.

Year:	2012	2007	2002	1997	1992
Number of Farms:	563	580	588	511	517
Land in Farms (acres)	79676	86,613	98,276	85,804	97,869
Average Farm Size:	142	149	167	168	189
1 to 9 acres	55	40	25	31	27
10 to 49 acres	137	127	114	105	72
50 to 179 acres	251	288	285	232	247
180 to 499 acres	103	104	132	118	135
500 to 999 acres	12	15	23	18	27
1,000 acres or more	5	6	9	7	9
Average Market Value of Production per Farm	\$54,553	\$51,526	\$48,966	\$46,977	\$47,881
Total Value Ag Products Sold per Year:	\$30,713,000	\$29,885,000	\$28,792,000	\$24,016,000	\$24,754,000
• Livestock Sales	\$23,673,000	\$24,337,000	\$23,026,000	\$19,347,000	\$21,732,000
• Crop Sales	\$7,040,000	\$5,447,000	\$5,766,000	\$4,668,000	\$3,022,000
Farms Gross Sales Over \$10,000/yr	193 (34.3%)	155 (26.7%)	180 (30.6%)	165 (32.2%)	197 (38.1%)
Farms Gross Sales under \$10,000/yr	370 (65.7%)	413 (71.2%)	408 (69.4%)	346 (67.8%)	320 (61.9%)

Farmland Geography

Approximately 18% of the total land mass of Broome County (more than 79,000 of approximately 452,000 total acres) is used for agricultural purposes. The Farmland Soils map shows the distribution of agricultural land cover throughout Broome County. Although there is farmland located in each of towns throughout the county, there are two primary clusters that contain the majority of the agricultural operations. One is the northern portion of the county (Lisle, Nanticoke, Barker and Triangle), where the gently rolling topography divides the Owego-Wappasening and Chenango watersheds. This area generally features larger, more contiguous fields than other portions of the county, owing in part to more moderately sloped hillsides. The second cluster of farmland is in the eastern portion of the county, split among the Upper Susquehanna and Upper Delaware watersheds. This concentration stretches north along the Susquehanna River corridor from the Pennsylvania border through the towns of Windsor and Colesville. Although the steeper slopes in this area preclude the contiguity found in the northern part of the county, this cluster features a greater degree of prime agricultural soils that generally coincide with the floodplains of the Susquehanna River.

Agricultural Districts

Broome County's Agricultural Districts are certified per Section 300 of Article 25-AA of the New York State Agriculture and Markets Law. The boundaries of these districts are renewed every eight years. Enrollment in the Agricultural Districts program is voluntary, and open to qualified landowners on an annual basis. Enrollment in the Agricultural Districts program has a number of advantages for agricultural landowners. Participants are eligible for: partial property tax relief through agricultural use value assessment and special benefit assessments; protections against overly restrictive local laws and nuisance complaints; and funding programs for acquisition or construction projects.

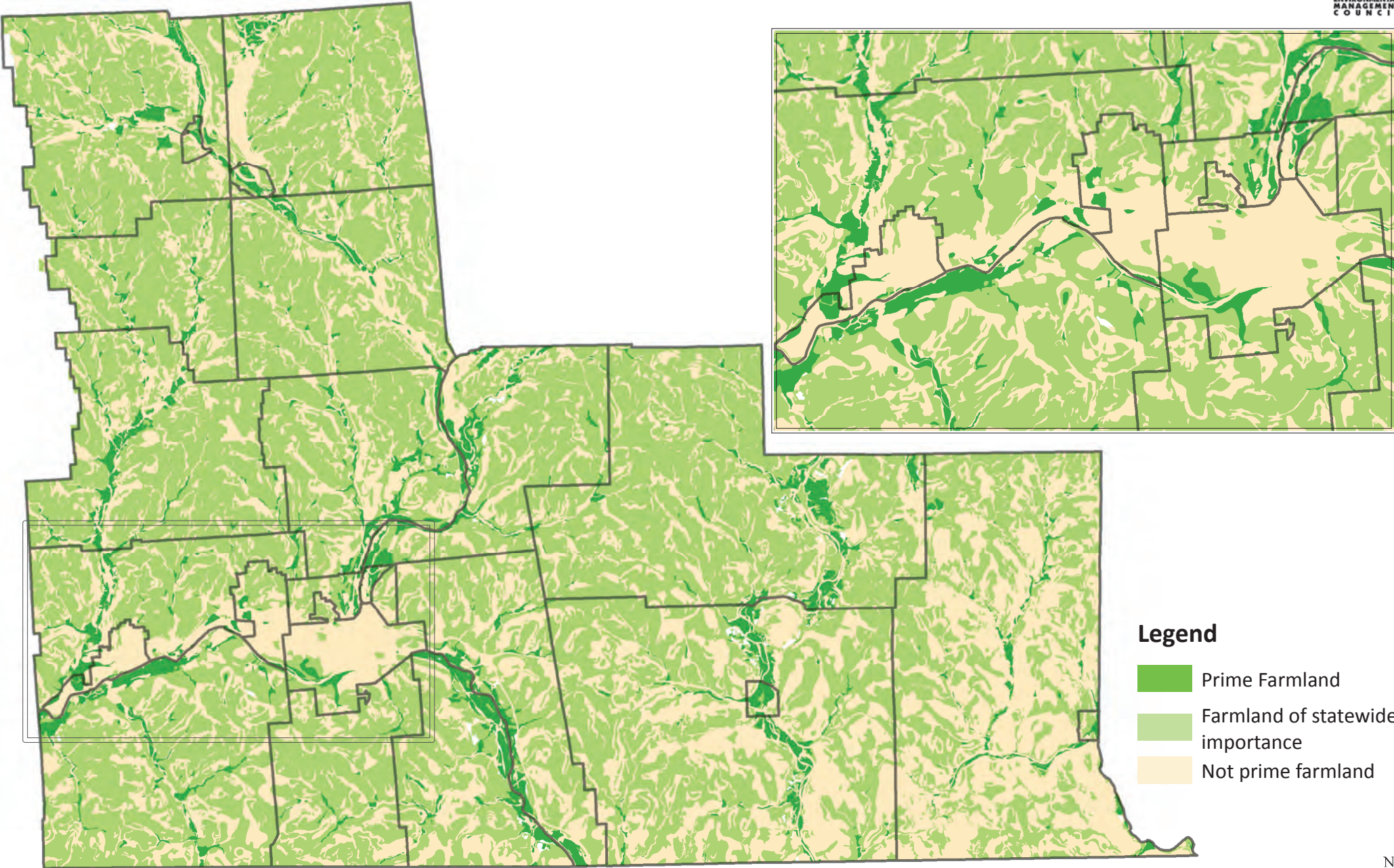
Prime Soils

Soil characteristics are a critical factor in the distribution of farmland across the landscape. Young, acidic soils are found throughout much of the county. Many upland soils are considered "soils of statewide importance", indicating that they can be farmed economically with proper care and management. However, these soils are generally shallower and more prone to drying – meaning that they are riskier and more expensive for farmers to work with and profit from. Prime soils are generally deeper, well drained (but not dry), and feature combination of biophysical and chemical properties (e.g., acidity, alkalinity, sodium content, permeability) that are most conducive to the production of food, feed, forage, and fiber. In Broome County, prime soils are generally used to support dairy operations.

Managed Forest Lands

In contrast to these agricultural land covers, forestland comprises a much larger portion of the county's land mass. In 2016, forests covered more than 320,000 acres, or approximately 70% of all land in Broome County. While some of these lands are under public ownership (State Forests), 90% of the forest lands are privately owned. Many of these lands are actively managed for timber and maple syrup harvesting, both of which are agricultural products. The Working Landscapes Map shows the distribution of forestlands and actively managed forest properties (as indicated by enrollment in the New York State Forest Tax Law Program, commonly known as the 480-a program).

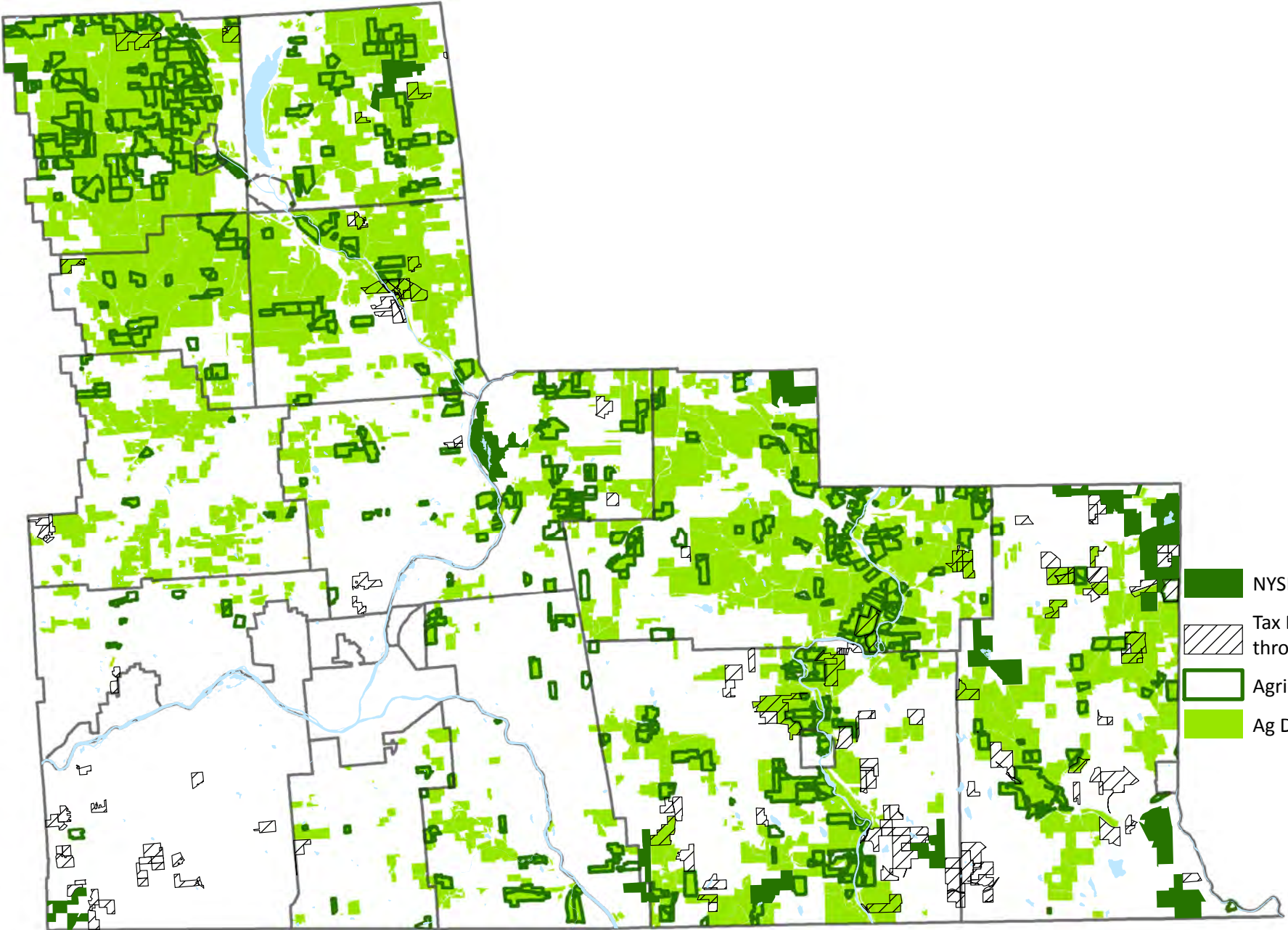
Broome County, New York Farmland Soils







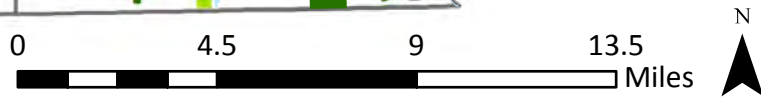
- Legend**
- Prime Farmland
 - Farmland of statewide importance
 - Not prime farmland



Broome County, New York Working Landscapes



-  NYSDEC Forests
-  Tax Exempted Properties through FTL (480-a) Program
-  Agricultural Land Use
-  Ag District Parcels



Management Issues

Economics/Tax Burden and Development Pressure

Many retiring farmers find that their land is their principal store of equity. In the absence of a buyer for the entire farm at a price that competes with other offers, they must tap into this “retirement fund” by selling to a developer. Those who rent land to farmers must confront the tendency of local assessors to value even idle farm buildings as if they were productive assets, while per acre rental values fail to cover property tax bills. Farmers can “cash out” of their farms without taking the land out of the state’s agricultural land base by selling their development rights through the State’s Farmland Protection Program, but available funds can cover only a very small proportion of the farmland that is at risk. To get farmers and other landowners who cannot participate in the Purchase of Development Rights (PDR) program to keep their land in agricultural production, meaningful new incentives must be created and promoted. Local understanding of the value of protecting agriculture and farmland is an essential precondition of maintaining a viable agricultural industry, but it cannot do the job in the absence of inducements to landowners that will encourage them to make individual decisions to keep their good farmland in production.

Individual members of town planning boards, supervisors and others may come to understand over time the critical role that farming plays in maintaining a “quality community,” but local offices turn over rapidly. Moreover, the decline in numbers of people directly involved with farming means that fewer and fewer local officials have any personal experience with agriculture. The State and the agricultural industry are therefore challenged to undertake a well-planned and efficient program of educating local officials about everything from the mechanics of the Agricultural Districts Law, to the dynamics and challenges of modern agriculture, to the benefits that farms provide to their communities.

Local leaders, who would appear to be most interested in maintaining the rural character of their communities, sometimes fail to recognize the need to actively support the industry that is the key link in maintaining open space and attractive view sheds. Even members of the farm community sometimes take the Agricultural Districts Law and the protections that it offers for farms for granted, and make little investment in cultivating community support for their industry.

Although study after study has demonstrated that residential development consumes far more in tax revenues than it generates – while farms consume far less – town officials tend to treat any new construction as a net gain for the community.

Fragmentation

Since agricultural lands are also associated with the larger expanses of habitat for wildlife, preserving large tracts are crucial for maintaining the health and productivity of these lands with respect to wildlife populations. Most people recognize the importance of maintaining large tracts of forest to minimize predation of woodland species. However, this is equally important for grassland habitats. As farmland is parsed and sold off for development, it is highly unlikely that the land will ever be reclaimed for agricultural enterprise.

Erosion and Loss of Soils

Broome County is not blessed with the most productive soil types and the best soils tend to be in the valleys near the main rivers and streams. The soils on the hilltops are shallow and sustainable farming and forestry practices must be employed to preserve the existing soils and avoid losses due to winds, heavy rains and flooding. Steep slopes are particularly at risk.

Invasive and Nuisance Species

In agriculture, invasive species applies to any non-indigenous pests, weeds, plants, insects, fungi, bacteria and any other disease-causing agents that can interrupt the production of livestock, crops, ornamentals and

rangeland. There is renewed interest in invasive species today for two key reasons. First, scientists believe that the speed and distribution have increased due to population growth, the alteration of the environment and globalization. Globalization has led to the growing volume of international trade which becomes a common pathway for introduction of invasive species.

The forest landscape in Broome County has recently been beset by the confirmed sightings of the Emerald Ash Borer (EAB-photo) within the County. The appearance of the EAB, coupled with the known presence of the Hemlock Woolly Adelgid (HWA,) could generate substantial costs for eradication and control along with loss of revenue.

Nuisance species also can pose a threat to working landscapes. Most common in this area is the impact of the high deer population. Deer selectively feed on plant species in the understory and therefore affect the kinds and numbers of plants present, can impair the growth of new trees, and shape the overall look or structure of the forest.

Farmland and Forest Protection Programs

Private land stewardship, with the support of science, financial incentives, and technical and regulatory assistance can be an effective means of open space preservation when it comes to working landscapes. Through partnerships with public agencies, private land owners and managers can be recognized and fairly compensated for the public benefits they provide.

Agricultural Districts

The purpose of agricultural districting is to encourage the continued use of farmland for agricultural production. The program is based on a combination of landowner incentives and protections designed to forestall the conversion of farmland to non-agricultural uses, including preferential real property tax treatment (agricultural assessment and special benefit assessment), and protections against overly restrictive local laws, government funded acquisition or construction projects, and private nuisance suits involving agricultural practices. Broome County, like many others, has consolidated its New York State approved Agricultural Districts over the years for purposes of producing more efficient administration of the program. There are presently three such districts within the County, District No.'s 3, 4 and 5.

Farmland Protection Program

The State's Farmland Protection Program provides two funding sources, planning grants and implementation grants. The implementation grants are used to help purchase the development rights on viable farmland. The planning grants provide local municipalities with an economic incentive to develop local agricultural and farmland protection plans. These plans help maintain the economic viability of the State's agricultural industry and its supporting land base and to protect the environmental and landscape preservation values associated with agriculture. Any municipality, including cities, towns and villages, that are located within a county which has established an agricultural and farmland protection board, are eligible for farmland protection planning funds. Farmland protection plans should identify the location of farmland proposed to be protected, the value of that land to the local economy, the value of that land as open space, consequences of possible conversion, and the level of conversion pressure on the proposed land.

Agricultural Environmental Management

New York's Agricultural Environmental Management (AEM) program is a statewide, locally run program of voluntary pollution prevention that helps identify and correct environmental risks to watersheds and promotes public understanding and support for agricultural/environmental initiatives. The AEM program consists of problem identification, planning, and implementation of environmental stewardship practices. Participation in the program provides effective and confidential environmental risk assessments. Farmers and ranchers

participating in AEM may receive cost sharing for implementing recommended best management practices (BMPs) that correct identified environmental risks.

480a Tax Law

In 1974 Tax Law 480A was enacted by the State to encourage the long-term ownership of woodland properties and continued production of forest crops. An owner of 50 acres or more would receive property tax relief by enrolling and following a forest management plan prepared by a forester and approved by the NYSDEC. Upon enrollment the owner must commit to following the plan for ten years. The law has an annual recommitment wherein each year that you receive a tax break the owner must follow the plan for ten years afterward.

Distinctive Character

Lands that are valued for historical or cultural significance may help to ensure their preservation through some mechanism. The preservation of these lands may provide some additional natural resource benefit as well. Therefore, it is beneficial to document them so you can assess how they fit within and enhance the open space network. These Distinctive Character lands while not directly preserved for open space value may play a part in achieving established open space goals.

Historic and Heritage Areas

Historic properties provide a perceptible link with the past and a sense of identity and stability for the community. Historic resources include a wide variety of property types, buildings and structures, historic districts, archeological and paleontological sites and natural heritage areas. New York's State Historic Preservation office is the source for the State and National Register Listing and has identified sixty sites and historical districts in Broome County. Examples of sites on the listing include carousels at Recreation, Highland and Ross Parks, churches in Binghamton, Whitney Point and Colesville, commemorative arches and the Binghamton Psychiatric Center. A complete list can be found on the N. Y. State Office of Parks Recreation and Historic Preservation (NYSOPRHP) website. This listing, however, applies only to the listed structures and does not include the open space in which they are situated. Municipalities have enacted local historic preservation legislation, established park boundaries and identified historical and cultural sites for preservation and protection of these areas.

In 1986, through a joint venture that included the City of Binghamton and the villages of Johnson City and Endicott, the Susquehanna Urban Cultural Park was formed. Now known as the Susquehanna Heritage Area (SHA) the organization has directed its attention to the industrial, cultural and social aspects of the community that evolved in this region during the nineteenth and early twentieth centuries. The Goodwill Theater in Johnson City, Roberson Mansion and Museum in Binghamton and Little Italy and other projects have benefitted from the efforts of the SHA to preserve the heritage of Broome County.

The involvement of corporations in the development of Broome County has been significant in both a historical and heritage sense. The contributions of Endicott Johnson and others have been of great importance in the progress of the County. In March 2005, IBM donated over two hundred acres of open Space in the Town of Union to the Waterman Conservation and Education Center. "The Glen," as it is known, is an area of mature forest and trails now available for public recreational use.

A major factor in the earlier growth of the County, was the opening of the Chenango Canal in 1836. Linking the Susquehanna River to the Erie System at Utica, the canal crossed Chenango County and ran 97 miles long, parallel to the present Route 12 and shortened the freight shipping time between Albany and Binghamton by five to nine days. A business boom began in Broome County. The canal closed in 1878, the site's historical significance enhances its value as an open space. Portions of the structures remain along its route, in particular, at Chenango Valley State Park. In 2010 the Chenango Canal Prism and Lock 107 was listed in The National Register of Historic Places.

Archeological Areas

Archeological resources are important to consider when identifying and protecting historic resources because they can reveal otherwise unobtainable information about a community's past and contribute to the community's understanding of itself.

Archeological searches in Broome County have unearthed remnants of early Native American sites and 19th century residents of the City of Binghamton. Artifacts dating from the Paleo-Indian period through the Archaic, Transitional and Owaca (1000 AD - 1200 AD) phases have been uncovered throughout the County. The most recent occurred in April and May of 2014 during an archeological study conducted by Binghamton University's

Public Archeology Facility (PAF). The PAF studied three sites located at Traditions at the Glen property and reported finding artifacts from Native American tribes that most likely dated back as far as 1700 B.C. Some of the artifacts found on the Traditions property included a fire-cracked rock, hammer stones, and projectile point tips. The PAF recommended that all three sites be eligible for the National Register of Historic Places and also recommended mitigating any further impacts to the sites. In May of 2014, the NYSOPRHP also proposed that the three sites be nominated for listing on the State and National Register.

Artifacts were also discovered during the construction of a Binghamton University building on Washington Street in downtown Binghamton where spear and arrowheads, pottery and the outline of a Native American long house were found. Another downtown Binghamton “dig” at the site of the Mall Project in 1990-1991 revealed the household goods used by some of the early city families who lived near the confluence of the rivers.

The National Historic Preservation Act and the State Historic Preservation Acts extend the same protection and benefits to archeological resources as they do to historic buildings, structures and districts. Some communities have comprehensive archeological survey programs, while others provide for surveys in advance of any development that will disturb the ground.

A 2006 event in the Town of Binghamton is indicative of the effort communities make to protect archeological resources. A water line project on Lillian Drive in the town was interrupted for a three month period upon discovery that the area was archeologically sensitive and was located within the aboriginal territory of the Onondaga Nation. Construction came to a halt while personnel of the Public Archeology Facility of Binghamton University conducted its tests. The findings were negative and construction resumed. Subsequent construction projects have unveiled many artifacts, the most recent at the MacArthur School in Vestal, where remnants of a prehistoric settlement were found.

Geologically Significant Areas

During most of our 350,000 year pre-history our entire region, which eventually became known as the Appalachian Plateau, was submerged under vast inland lakes. Layers of sediment built up to become the stratified rock that we see today wherever a roadside cut has been made. After the area dried, vast ice sheets began moving in from the north covering the plateau with up to 3,000 feet of ice and debris. As the ice melted and the water receded, channels were cut into the terrain forming our rivers and valleys. This sequence repeated itself several times and resulted in the formation of our landscape of ridges, valleys and well-rounded hills. These hills rise to their highest elevation in the eastern part of the County at 2,000 feet above sea level. The lowest elevation of 800 feet occurs where the Susquehanna River flows westward out of the County.

Prior to the Wisconsin Glacier the Susquehanna flowed over the area currently occupied by a portion of Binghamton University. The unrelenting action of the glaciers blocked this channel and ultimately diverted the river from their course to its present path north of Round Top Hill, on which the Vestal Hills Cemetery is located. When the river was at its highest and covered the entire valley, Round Top Hill at 1,340 feet above sea level became what geologists call a “floating mountain” as it appeared to drift on the surface.

At Chenango Valley State Park we have an example of what remains after stagnant glacial ice has thawed. The glacier left behind two huge chunks of ice which melted and formed two hollows or “kettle” Lakes Lily and Chenango. The dirty water flowing down the sides of each mass left deposits that shaped the rim around the lakes as continuing glacial activity pushed into place the dirt and gravel which formed the hill that remains separating the lakes.

Scenic Viewsheds and Byways

The County-wide LWRP has identified several areas that are significant viewsheds and scenic areas within the LWRP boundary. According to the plan, many areas along the roadways in Broome County that offer great vistas and scenic overlooks take advantage of these areas and offer visitors and residents the opportunity to experience the beautiful scenery and geography of the area. For this context, scenic overlooks are specific to roadside pull-offs, with or without formal parking. They may be associated with trailheads, parks, or other features and offer no amenities other than informational or interpretive signage. They are typically for the enjoyment of the road traveler and help to promote the area. The recommended sites can be found in the LWRP document. Those identified focus on scenic overlooks in relation to the rivers, and therefore identification of scenic areas outside of the boundary established in that plan warrants further exploration.

State Scenic Byways, an initiative of the NYS DOT, are transportation corridors that are of particular statewide interest, representative of a region’s scenic, recreational, cultural, natural, historic or archaeological significance. Its purpose is to create themed corridors across the state with the intent of fostering economic growth and resource conservation. Currently none of the three byways in the state run through Broome County.

Several of the County’s rural routes that serve as gateways between Broome and other Counties have potential as scenic corridors. These include Routes 11, 12 and 79. The Route 17 corridor has also garnered some support for recognition as a scenic byway, however, at this stage that process hasn’t moved forward. While none of these are currently designated as byways, open space considerations along these corridors should be taken into consideration in recognition of their potential for such designation in the future.

Steep Slopes and Ridgelines

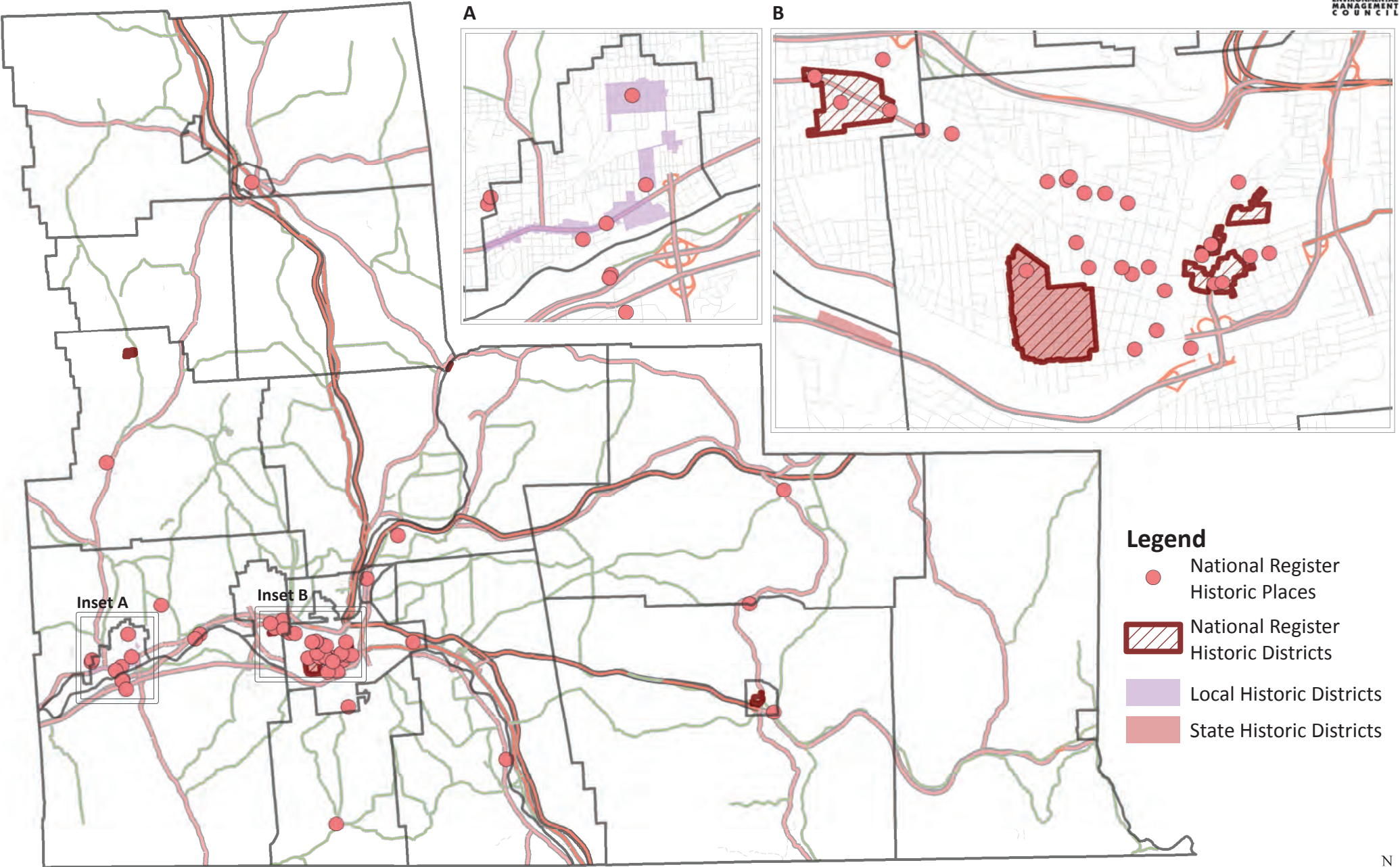
The rolling hills of Broome County are a major component to the scenic landscape that is an asset to the community and significant summits are attractive destinations for hikers and other types of outdoor enthusiasts. These areas are typically not attractive for development due to the plentiful steep slopes. Disturbance of steep slopes for development can be costly including increased property damage, public safety hazards and water quality issues due to erosion and sedimentation, mudslides, or localized flooding. Maintaining and repairing stressed infrastructure, demand for emergency services and expansion of municipal infrastructure are all additional costs that may result from developing in steep areas. In addition, development on steep slopes, significant summits and ridgelines may impact the beauty of our landscapes and scenic vistas by fragmenting the view of the natural landscape from key vantage points.

Despite these costs there is some development pressure on these areas as a result of the floodplain discouraging development closer to rivers and streams. Therefore, it is important to document these significant areas in an effort to direct development to minimize the impacts. There are a variety of methods

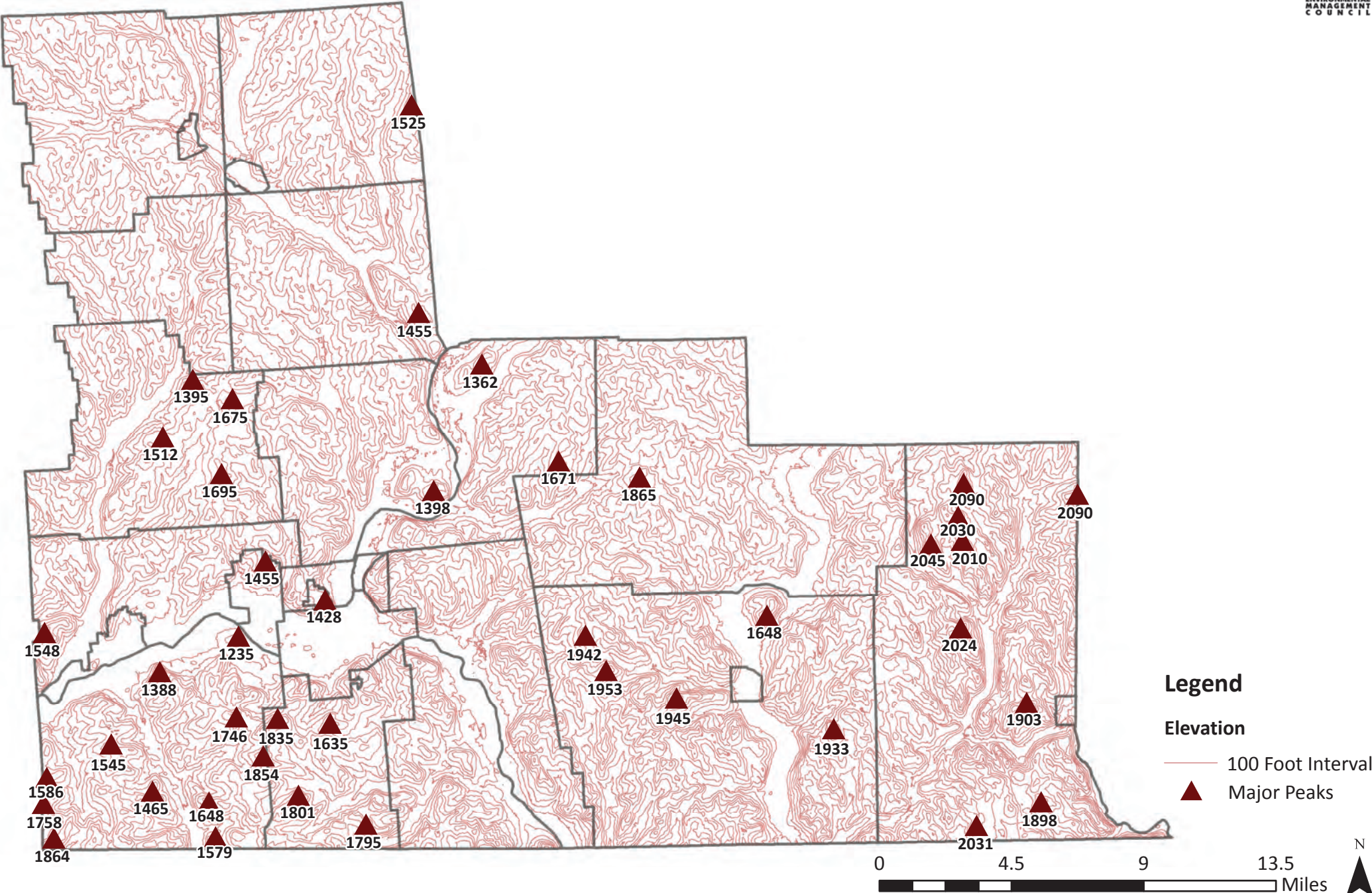
Significant Summit	Municipality	Elevation (ft)
Baker Hill	Vestal	1585
Beaman Hill	Triangle	1424
Bolles Hill	Vestal	1755
Bornt Hill	Union	1549
Brady Hill	Binghamton (T)	1788
Bunn Hill	Vestal	1745
Deyo Hill	Johnson City	1450
Grippen Hill	Vestal	1503
Hardy Hill	Maine	1391
Hunt Hill	Fenton	1670
Ingraham Hill	Vestal	1824
Lucky Hill	Binghamton (T)	1804
Mount Prospect	Binghamton (C)	1424
Page Pond Hill	Sanford	2008
Pierce Hill	Vestal	1385
Pierson Hill	Vestal	1644
Pigeon Hill	Fenton	1358
Pollard Hill	Maine	1512
Roundtop Hill	Vestal	1234
Slawson Hill	Sanford	2087
Tarbell Hill	Sanford	1903
West Hill	Vestal	1460
Wildcat Hill	Vestal	1575

including design guidelines through overlay districts or other zoning mechanisms, establishment of critical environmental areas, utilization of planned unit development districts, and preservation through acquisition or conservation easements. From an open space planning perspective, preservation of these areas provides an opportunity for expansion of the open space network for recreation or ecosystem services, while protecting against the potential impacts of development there.

Broome County, New York Historic Resources



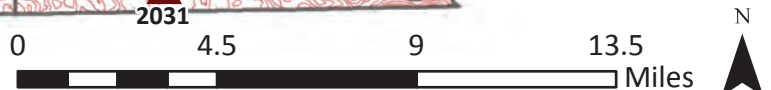
Broome County, New York Elevation



Legend

Elevation

- 100 Foot Interval
- Major Peaks



Recreational Areas

There are over 17,000 acres of land available for public recreation in Broome County, comprising almost 4% of its total area, as well a large number of private lands dedicated to recreational activities. These lands provide a diverse array of recreational opportunities, from year-round activities such as fishing, hiking, camping and nature watching to the seasonal activities, boating, hunting and fishing, cross-country skiing and snowshoeing.

Residents continually identify the County's recreational facilities as one of its primary strengths. The quality and quantity of these areas are significantly important in relation to economic development in Broome County. These facilities not only provide social benefits by improving the quality of living for residents, but they also provide economic benefits as a major part of the local tourism industry. There are several groups, clubs and organizations that take advantage of these recreational areas, including the Triple Cities Hiking Club, the Ahwaga Canoe and Kayak Club and several sports teams which include professional, school and recreational leagues. Furthermore, these recreational spaces serve as sites for a variety of special events and festivals including the annual Spiedie Fest and Balloon Rally and the annual golf and tennis tournaments. These activities and events draw visitors and residents to the public recreation lands, enhancing economic development in the communities where they lie.

Federal Recreational Lands

The only federally owned recreation area in Broome is the Whitney Point Reservoir (photo), a US Army Corps of Engineers (ACE) project. The dam and reservoir, located on the Otselic River, provides flood control for the valley along the lower Tioughnioga, Chenango and Susquehanna rivers. Along with the mission of flood control, the area surrounding the dam provides ample recreational opportunities and flourishes as the only Wildlife Management Area in Broome County. The Broome County Department of Parks manages the recreational facilities at Dorchester Park on the east side of the lake where swimming, boating fishing and other activities are available. In May, 2009 the Susquehanna River Basin Commission (SRBC) and the Army Corps of Engineers completed a 7.1 million dollar project which augmented low water flow conditions downstream and made significant improvements to Dorchester Park recreation areas and enhanced an existing wetland area in the north end of the lake Table 5.6.1 outlines the federal-owned lands in Broome County.

Federal Recreational Lands	Municipality	Acreage
Whitney Point Reservoir	Triangle	1,200
	Total Acreage	1,200

State Recreational Lands

There are over 15,000 acres of state owned lands in the county that are available for public recreation including state parks (2175 acres), state forests (8625 acres), and a wildlife management area.

State and county parks are important for open space and recreational value, as well as environmental education, research and habitat protection. They generally serve a large population and provide opportunities that are not feasible in smaller municipal parks. There are two state parks located in Broome, operated by the New York State Department of Parks, Recreation, and Historic Preservation (OPRHP), Chenango Valley State Park and Oquaga Creek State Park. Chenango Valley has two lakes, Lily and Chenango with a public beach area, and offers recreational opportunities such as swimming, fishing, hiking, camping and golfing. Oquaga Creek State Park has one lake, Arctic Lake, also with a beach area, and offers recreational opportunities that include swimming, fishing, hiking and winter sports such as cross-country skiing.

State Forests

Under the administration of the DEC Office of Lands and Forests, include Reforestation Areas, Multiple Use Areas and Unique Areas, as well as parcels acquired under Bond Acts and conservation easements. There are 13 state forests located wholly or partially within Broome County that serve multiple purposes including the preservation of scenic areas, watershed protection, forestry and recreation.

Wildlife Management Areas (WMAs)

These are lands managed by the DEC Division of Fish, Wildlife and Marine Resources, are acquired primarily to encourage the protection and promotion of fish and wildlife resources. The Whitney Point Lake WMA, is the only WMA located in Broome County. The 4645 acre area encompasses the Whitney Point Flood Control Dam and a large area to the north into Cortland County. While the emphasis is on game species there are also opportunities for hiking, cross-country skiing and bird watching, as well as wildlife research.

State Recreational Lands	Municipality	Acreage
State Parks		
Chenango Valley	Fenton	1,027.87
Oquaga Creek	Sanford	1,147.85
State Forests		
Beaver Flow	Colesville	726.01
Skyline	Kirkwood/Windsor	531.01
Beaver Dam	Lisle	238.69
Nanticoke Lake	Lisle	331.10
Beaver Pond	Sanford	784.89
Melondy Hill	Sanford	1,395.37
Marsh Pond	Sanford	896.09
Whittacker Swamp	Sanford	805.00
Cat Hollow	Sanford	760.50
Triangle	Triangle	654.03
Tracy Creek	Vestal	432.45
Hawkins Pond	Windsor (T)	535.71
Cascade Valley	Windsor (T)	533.94
Management Areas		
Whitney Point Lake WMA	Triangle	4,645
Recreation Area	Kirkwood	5.49
	Total Acreage	15,451

County Recreational Lands

Broome County Parks and Recreation has the primary goal of providing high quality facilities with a wide range of activities for individuals and families to enjoy. This system, outlined below, includes an eighteen-hole golf course, three beaches, a campground, a performing arts theater, a 7200-seat arena, cross-country skiing, swimming, an ice rink, boating, professional hockey, and many other leisure activities.

The department also manages 466 undeveloped acres in the Town of Binghamton as well as softball fields and community garden plots in the Town of Dickinson. BC Public Works also operates and maintains several watersheds. These are dams, levees, and flood walls constructed by NYS and the US for flood control, 13 of which are open to the public for recreational use. Some spillways also serve as sports and recreation fields. In addition, several of these areas are stocked for fishing. Maintenance crews mow the levees and attend to any significant erosion and debris.

County Lands	Municipality	Acreage
<u>PARKS</u>		
Aqua Terra County Park	Binghamton	459.27
Nathaniel Cole County Park	Colesville	367.47
County Park	Colesville	0.99
Otsiningo Park	Dickinson	149.66
BAGSAI Softball Complex	Dickinson	31.93
Finch Hollow Nature Center	Maine	19.59
Greenwood County Park	Nanticoke	447.38
Dorchester County Park	Triangle	70.43
Grippen Park	Endicott	18.71
Round Top Park	Endicott	30.04
Hawkins Pond County Park	Windsor (T)	325.66
	TOTAL	1921.13
<u>WATERSHEDS</u>		
NYS Route 26	Nanticoke	53.4
Mount Hunger Rd	Nanticoke	10.67
Roat Drive	Nanticoke	19.58
Howland Hill Rd	Nanticoke	22.76
Tiona Road	Maine	2.45
Caldwell Hill Road	Lisle	24.07
Caldwell Hill Road	Lisle	10.17
Laurelton Road	Union	11.91
Glenwood Road	Binghamton (City)	4.32
Second Street	Deposit	0.38
Wittman Road	Dickinson	84.04
Oakdale Road Rear*	Johnson City	37.36
Pine Street	Deposit	17.47
East Maine Road	Union	18.44
Utica Street	Union	30.46
Bailey Hollow Road*	Maine	46.75
Upper Stella Ireland	Maine	57.58
Airport Road	Maine	30.86
Oakdale Road Row	Maine	18.44
Avery Road	Maine	49.76
Dimmock Hill Road*	Chenango	15.37
Airport Road	Dickinson	76.61
Struble Road*	Union	64.54
	TOTAL	707.39

*Watersheds that have been stocked

Municipality	Parks & Acreage	
Binghamton (C)	Alfred Street Park, 2.06 acres Baseball Stadium, 10.92 acres Boland Park, 2.75 acres Burton Park, 1.38 acres Cheri Lindsey Park, 9.89 acres City Park, 2.61 acres City Park, 0.28 acres Columbus Park, 3.59 acres Confluence Park, 0.92 acres Ely Park Golf Course, 221.63 acres Fairview Park, 7.13 acres	First Ward Park, 6.13 acres Fourth Ward Park, 4.16 acres Kennedy Park, 0.61 acres MacArthur Park, 23.84 acres Recreation Park, 23.02 acres Ross Park, 66.38 acres Sandy Beach Park, 15.52 acres South Side Park, 6.09 acres Valley Street Park, 3.22 acres Webster Street Park, 3.36 acres
Binghamton (T)	Jackson Pond Town Park, 49.76 acres	
Chenango	Hyder Park, 4.59 acres Riverfront Park, 11.80 acres	Wolfe Park, 143.58 acres
Colesville	Town Park, 1.50 acres	Town Park, 4.01 acres
Conklin	Conklin Forks Park, 16.49 acres Schnurbusch Park, 23.82 acres	Sullivan Park,
Endicott	G. W. Johnson Park, 9.63 acres En-Joie Golf Club, 132.96 acres	Riverview Park, 6.35 acres Mersereau Park, 14.75 acres
Fenton	Park, 3.03 acres	Town Park, 1.33 acres
Johnson City	Boland Park, 38.32 acres CFJ Park, 5.50 acres Courtyard, 0.10 acres Courtyard, 0.32 acres Courtyard, 0.35 acres	Floral Ave. Park, 5.11 acres North Side Park, 21.75 acres Vacant lots, 0.37 acres Virginia Ave. Park, 6.05 acres
Kirkwood	Veterans River Park, 26.86 acres	Valley Park, 9.72 acres
Maine	Finch Hollow Park, 39.99 acres Maine Town Park, 64.63 acres	Town Park, 24.44 acres
Port Dickinson	Port Dickinson Park, 17.12 acres	
Union	17C Sports Complex, 27.08 acres Boswell Hill Park, 3.01 acres Brixius Creek Park, 30.46 acres Flood Control Dike, 15.81 acres Glendale Park, 24.41 acres	Highland Park, 52.83 acres Struble Sports Complex, 17.58 acres Taft Heights Park, 3.99 acres West Endicott Park, 2.86 acres William Hill Park, 13.13 acres
Vestal	African Road Park, 4.01 acres Arnold Park, 86.26 acres Barlow Park, 5.05 acres Castle Gardens Park, 3.20 acres David Ave. Park, 1.55 acres Ethel Place Park, 0.34 acres Fuller Hollow Park, 14.92 acres Harold Moore Park, 15.36 acres	Jones Park, 305.35 acres Magnolia Drive Park, 5.42 acres Memorial Pool, 4.69 acres Middendorf Park, 11.33 acres Richards Ave. Park, 1.82 acres Ross Corners Park, 11.14 acres Stair Park, 16.12 acres Vestal Center Park, 10.16 acres
Windsor (V)	Klump Park, 6.42 acres	

Municipal Recreational Lands

Municipal parks can range, in size, from large parks which feature athletic fields, hiking trails to smaller play areas. These parks can greatly enhance neighborhoods, providing aesthetic benefits and ensuring that residents have access to outdoor recreational opportunities while also serving as sites for local charitable events and festivities. In addition to the municipal parks listed in the table on the next page local schools also furnish additional open spaces which include athletic fields and play areas available to residents.

Nonprofit and Institutional Preserves

There is a large expanse of undeveloped land on the Binghamton University campus. BU is unique among schools in having such a large on-campus resource. Of the over 600 acres of natural lands on the BU campus, 190 are recognized as Nature Preserve. However, the remaining areas are widely recognized as important Natural Areas. The area is used for passive recreational enjoyment, relaxation, and education for the university and local communities. There is also a significant natural area on the SUNY Broome Campus. This area spans 125 acres and features 3.8 miles of trails that cross a variety of terrain. The site is used as a living laboratory for students on campus but is also open to the public for recreational use.

The IBM Glen is a 205 acre property in the Town of Union. The property was once owned by IBM as a recreational amenity for its employees at the IBM Country Club. Upon its closing, local conservation groups worked with the company who donated the property for preservation. Now it is under the ownership of the Chenango Land Trust and managed by the Waterman Conservation Center, two local nonprofits with properties throughout the Southern Tier region. In addition to its historic value, it is a locally unique natural area with significant mature tree communities and a cascading gorge. Waterman also owns a 107 acre property in eastern Broome called the Pettus Hill Preserve.

The Chenango Land Trust also has conservation easements on three properties in eastern Broome County. (480 acres in the towns of Sanford, Maine and Union).

Nonprofit and Institutional Lands	Municipality	Acreage
Binghamton University	Vestal	600
SUNY Broome Natural Areas	Dickinson	125
IBM Glen	Union	205
Pettus Hill Preserve	Windsor (Town)	107
Chenango Land Trust	Sanford, Maine, Union	480

Privately Owned Recreational Lands

In addition to the various government owned and maintained recreational resources, a number of private organizations/businesses rely on open space resources for recreational activities. These include golf courses, private campgrounds, hunting and fishing clubs, and other similar uses. Privately owned recreation lands typically hold value to the community and tend to be taken for granted for the benefits they provide. We have included a list of all of these resources in this document, however, it should be noted that completeness of the land use data upon which it was based may vary in accuracy.

Private Recreational Lands	Municipality	Acreage
Vestal Hills Country Club	Binghamton (T)	214.51
Binghamton Tennis Center	Binghamton (T)	8.0
Dimmock Hill Golf Course	Chenango	105.18
Chenango Commons Golf Course	Chenango	15.43
Belden Hills Golf Course	Colesville	102.70
Belden Hills Campgrounds	Colesville	71.62
Conklin Players Club	Conklin	173.71
Conklin Sports Park	Conklin	42.51
Five Mile Point Speedway	Kirkwood	14.92
Binghamton Boys Club Camp	Kirkwood	79.46
Sokel Camp	Kirkwood	11.02
Grandview Farms Golf Course	Lisle	75.53
Ford Hill Country Club	Nanticoke	250.56
Scott's Golf Course	Sanford	281.09
Trade Winds Lake Camp	Sanford	148.17
Girl Scout Camp	Sanford	192.78
Boy Scout Camp	Sanford	763.37
Scott's Oquaga Lake Resort	Sanford	68.36
Broome County Fair Grounds	Whitney Point	29.51
Binghamton Country Club	Union	172.84
Endwell Greens Country Club	Union	176.80
Pine Valley Campground	Union	61.21
Fairmount Park	Union	273.71
The Homestead	Union	158.46
IBM Glen	Union	207.33
Southern Tier Sports Center	Union	16.1
Golden Oak Golf Course	Windsor (T)	105.53
Lakeside Camp Ground	Windsor (T)	42.09
	Total Acreage	3863

Trails

Individual trails and interconnecting regional systems provide linkages between natural or cultural resources, recreation facilities or other public access areas. They provide recreational opportunities including cross-country skiing, nature study, hiking, bicycling and horseback riding. There are several existing trail systems in Broome County that allow public access for recreational opportunities. These include state parks, county parks and watersheds, municipal parks and areas owned by private/non-profit organizations. The Binghamton Metropolitan Greenway Study and Implementation Plan, along with the more recent Two Rivers Greenway Signage Plan and Design Guide, emphasize improvements to enhance trail development along the County's rivers and will eventually traverse much of Broome County. Trails are covered in more detail in the Connectors section.

Public Fishing and Boating

The DEC operates 12 fish hatcheries, each specializing in raising one or more species of fish. Each year DEC releases over one million pounds of fish into more than 1,200 public streams, rivers, lakes and ponds across the state. These fish are stocked for two main purposes, to enhance recreational fishing and to restore native species to waters they formerly occupied. Thirteen of these fish stocking sites are located in Broome County.

Public Fishing Rights (PFRs)

These are permanent easements purchased by the NYSDEC from willing landowners giving anglers the right to fish and walk the bank (usually a 33' strip on one or both banks of the stream). This right is for fishing only and not to be used for any other purpose. Landowners maintain ownership and use of the land, and anglers gain access to the river. The rights are permanent and apply to all future owners of the property. The only Broome County PFR's are on Oquaga/Fly Creeks near the town of McClure and Nanticoke/East Branch Nanticoke Creeks near the Town of Maine.

Trout Fishing

Designated Trout Streams

Water	Section	Miles	Public Access	Species
Dudley Creek	0.5 miles below Center Lisle	2.6	Open by Owners	Brown Trout
East Branch Nanticoke Creek	0.5 miles above mouth	0.5	Public Fishing Rights	Brown Trout
Nanticoke Creek	0.5 miles above mouth	11.4	Public Fishing Rights	Brown Trout
Oquaga Creek	Mouth - North Sanford Road	6.1	Public Fishing Rights	Brown Trout

Stocked Trout

Water (Municipality)	Species
Arctic Lake (Sanford)	Rainbow Trout
Chenango Lake (Fenton)	Rainbow Trout
Chenango Lake (Fenton)	Rainbow Trout
Dudley Creek (Lisle)	Brown Trout
East Branch Nanticoke Creek (Maine)	Brown Trout
East Branch Nanticoke Creek (Maine)	Brown Trout
Finch Hollow Site 1 (overbrook (Union))	Rainbow Trout
Greenwood Lake (Nanticoke)	Rainbow Trout
Little Choconut 2e (Chenango)	Rainbow Trout
Nanticoke 7a (Maine)	Rainbow Trout
Nanticoke Creek (Maine)	Brown Trout
Nanticoke Creek (Maine)	Brown Trout
Nanticoke Creek (Union)	Brown Trout
Nanticoke Creek (Union)	Brown Trout
Nanticoke Lake (Lisle)	Rainbow Trout
Oquaga Creek (Sanford)	Brown Trout
Oquaga Creek (Sanford)	Brown Trout
Palmers Pond (Sanford)	Rainbow Trout
Patterson Pond (#1) (Union)	Rainbow Trout

Streams with the ecological characteristics necessary to support brown trout, rainbow trout and native brook trout are not uniformly distributed and the productive capacity of these streams varies widely. Trout stream management means maintaining and, where possible, increasing the value of this resource to the recreational users and to the general public. The table above lists the designated Trout Streams located in Broome.

Each year DEC releases fish into public streams, rivers, lakes and ponds across the state. These fish are stocked to enhance recreational fishing and to restore native species to waters they formerly occupied. The Stocked Trout table list those waters in Broome that have been stocked in recent years.

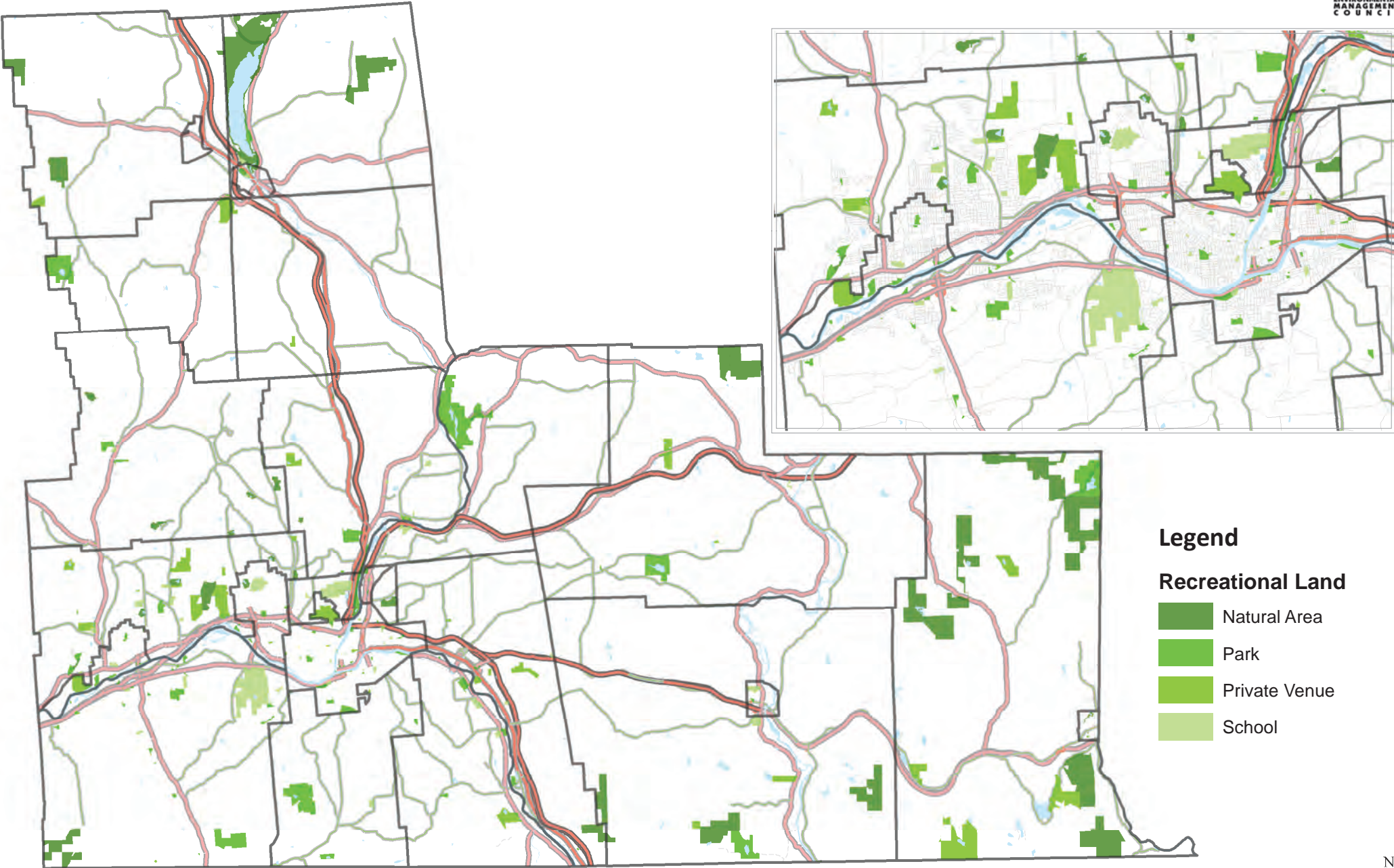
Boating

Public access to the waters of Broome County is a necessity for fishermen and boaters. To accommodate this need, the New York State Departments of Conservation and Transportation along with municipalities which front on the waterways, have worked to provide access sites to the rivers for recreational use. The table on the next page shows the boat access sites in the County. These locations can be either one of two designs, hard surface or concrete ramps or the hand carry type. The latter, or hand carry, requires that the boat be carried from the vehicle to the shoreline and are used in locations where shallow draft boats are a requisite. The former, or hard surface ramp, provides access via trailer or direct move from car top to ramp. The Local

Waterfront Revitalization Plan (LWRP) of 2011 was developed in part to guide enhancements to public water access at these and new sites throughout the County.

Water Body	Site	Municipality	Location
Otselic River	Upper Lisle	Triangle	Rte.26 to Upper Lisle Rd. over 1 lane Bridge
	Dorchester	Whitney Point	Dorchester Park
Tioughnioga River	Killawog	Lisle	Jennings Creek Rd. at Bridge
	Lighthouse Landing	Lisle	Private, Rte.11, 4 mi. N/O Whitney Pt.
	Itaska	Barker	Rte.79 & Barker Rd., Itaska
	Chenango Forks	Chenango	Rte.12 to Chen. Forks
Chenango River	Chenango Forks	Barker	Rte.12 to Chen. Forks
	Chenango Bridge	Chenango	Rte.12A Park/Ride
	Port Dickinson	Dickinson	Port Dickinson Community Park
	Otsiningo Park	Dickinson	Otsiningo Park (County Owned)
Susquehanna River	Nineveh	Nineveh	At county bridge in Nineveh Hamlet
	Ouaguaga	Ouaguaga	Dutch Hill Rd. Ouaguaga
	Kirkwood	Private	Pvt. Home /Gorman Rd./ Rte.11
	Kirkwood Park	Kirkwood	Veterans River Park
	Schnurbush Park	Conklin	Schnurbush Park, Rte.7
	Sullivan Park		Rte.7 (no trailered boats)
	Sandy Beach	Binghamton	Sandy Beach Park , Rte.7
	Rock Bottom	Binghamton	Dam off Rte. 363
	Washington Street	Binghamton	S/W corner of bridge @ Conklin Ave.
	Boland Park	Johnson City	Boland Dr./Chrisfield Ave. Under Rte. 201
	William Hill Park	Union	Informal natural bank access
	Moore Park	Vestal	Harold Moore Pk. Old Vestal Rd. (T)
	Riverview Park	Union	Riverview/Roosevelt Aves/Veterans River Park
	Grippen Park	Union	Grippen Ave. Grippen Park
Nanticoke Lake	Center Lisle	Lisle	Squeedunk Rd. 4 mi. s/o Ctr. Lisle

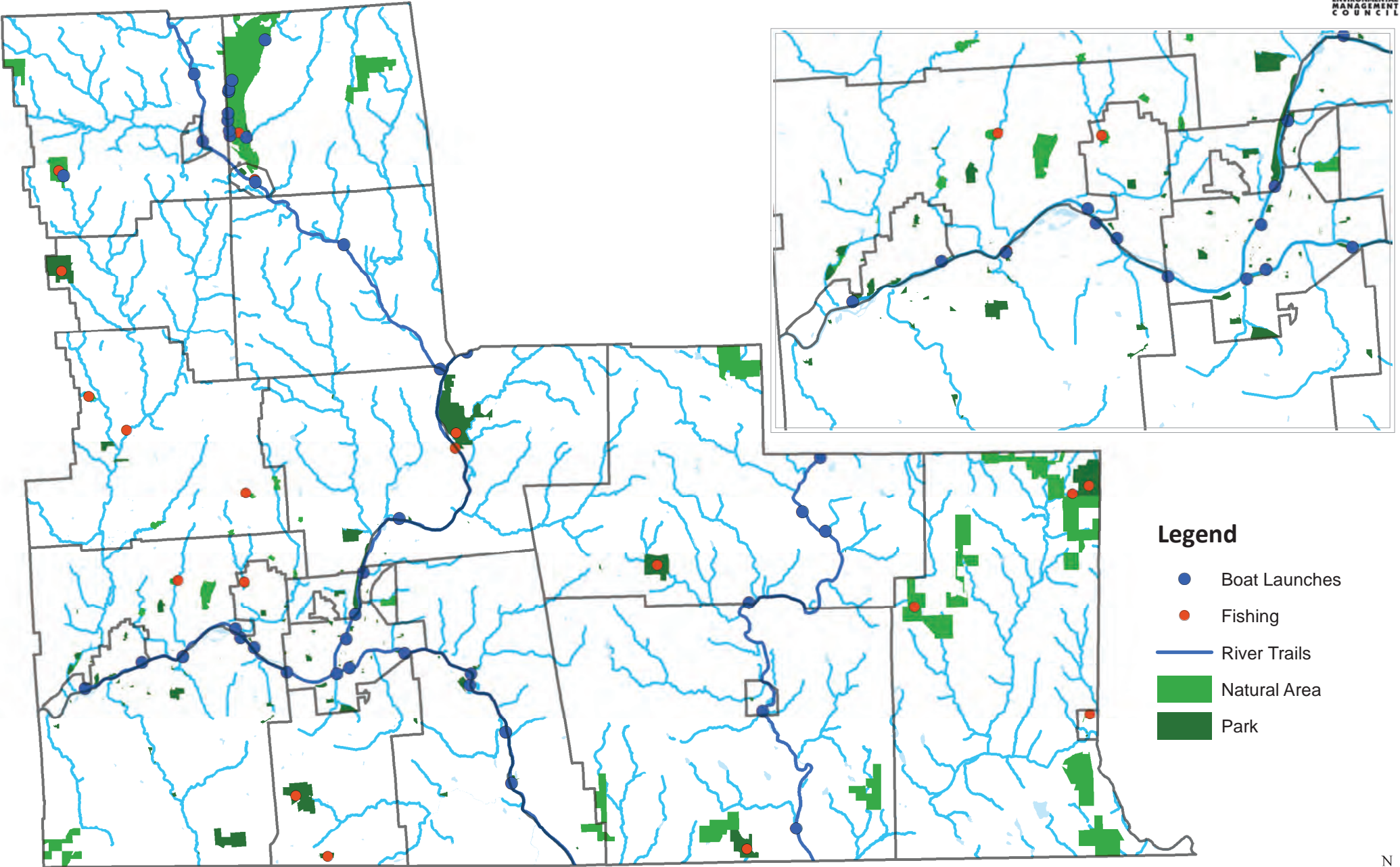
Broome County, New York Recreational Land



- Legend**
- Recreational Land**
- Natural Area
 - Park
 - Private Venue
 - School



Broome County, New York Fishing and Boating



- Legend**
- Boat Launches
 - Fishing
 - River Trails
 - Natural Area
 - Park



Management Issues for Recreational Lands

Utility Corridors

Utility corridors, such as high voltage power lines that are located in the vicinity of recreational resources, can have a large impact on their scenic beauty. This may interfere with the site characteristics that draw many patrons to these areas, thus negatively impacting their value as a recreational resource for county residents and recreational enthusiasts, who may travel from outside, thereby impacting tourism.

Unauthorized Uses

Enjoyment of recreational open spaces can also be limited by individuals that partake in unauthorized uses. Use of motorized vehicles, where they are not permitted, can have negative aesthetic impacts and also degrade the quality of recreational areas that are not designed to handle that intense type of use.

Invasive/Nuisance Species

Since parks are often highly maintained for manmade uses, they may also become vulnerable to the threat of invasive species. For example, parks are often a haven for Canada Geese that like the well-manicured lawns. A large population of geese can create a mess in walkways and athletic fields with their feces and alarm patrons with their aggression. This makes the parks less enjoyable for their intended use.

Invasive species of concern include the Emerald Ash Borer and Hemlock Woolly Adelgid. These invasive insects damage Ash and Hemlock trees, respectively, eventually leading to their death. This is an issue for maintaining ecological biodiversity at our recreation areas, and also creates a management issue as communities must deal with removal of dead and fallen trees to prevent damage to parks infrastructure.

Aquatic invasive species are also an issue in areas that are along rivers and streams or that have lakes or ponds on site. The presence of invasive species can have negative impacts on enjoyment of these areas by creating conditions less favorable for swimming or boating. They may also impact fish health and impact water quality, with negative effects on biodiversity overall.

Commercial Development

Private recreational open spaces that go up for sale are attractive to commercial development as well as residential subdivisions. Municipalities should keep abreast of these areas and assess their value as open spaces when they become available for sale. Furthermore, municipalities should try to avoid the loss of any municipally owned recreational open spaces.

Loss of Buffer Areas

Many of the natural areas and features within parks are fragile and depend on adjacent areas to remain viable and healthy. When development encroaches upon parkland, either directly or indirectly, the environmental quality of the resources within the park may be threatened. Municipalities should consider the need to buffer parks and protect their ecosystems by strategically acquiring adjacent land or by effectively regulating land use around the park. The fragile resources within parks can only withstand intensive use and be enjoyed if the quality of the surrounding environment remains high.

Connective Corridors

Connective corridors are areas in the landscape that contain and connect natural areas, open space, and scenic or other resources. They often lie along streams, rivers, or other natural features and provide linkages in the landscape and potential buffers between natural and/or human communities. Corridors provide an area for wildlife movement, protection of natural resources, and green space buffers for humans.

Natural resources such as wetlands, forests, lakes, and others, are even more beneficial and functional when linked by corridors. Fish and wildlife populations, native plant distribution, and clean water all depend on movement through these areas. Corridors can also help define a sense of place and provide additional benefits such as hazard protection, recreation, or stormwater management. Corridors may also help maintain aesthetic or heritage features, preserving rural character in some areas, and highlighting how these areas shaped the evolution of urban areas. Economic benefits may include increased property values, reduction in the number of properties vulnerable to hazards (i.e. flooding) avoiding costly infrastructure by preserving natural ecosystem services, and minimizing the potential for costly contamination issues.

In Broome County some of the major types of corridors include trails and greenways, scenic byways, riparian areas along river and stream corridors, and other buffer lands. Many corridors are located within natural resource areas that fall under other sections of this inventory. Therefore, this section doesn't go into great detail about individual sites, but more generally about how they fit into the overall natural resource network.

Major Corridors

Trails and Greenways

In many cases the environmental benefits and ecosystem services provided by corridors is clear, such as with flood protection, making these areas a priority for preservation. However, in areas that have more demand for development, an emphasis on the the economic and social benefits provided may help build broader support for maintaining and establishing these connectison. Trails and greenways are often recognized primarily for their value for recreation and transportation uses, but they are typically located in areas that serve a broader ecological benefit to the community, providing multiple benefits to the community.

The Two Rivers Greenway is s system of multi-use trails across much of Broome County. The Greenway is intended to provide safe and efficient transportation corridors for bicyclists and pedestrians. Segments of the Greenway are typically constructed and managed by the local municipality in which they are located, with Broome County managing segments that go through County parks, properties and/or rights-of-way. Existing segments include the Vestal Rail Trail, Chenango River Trail, Chugnut Trail, Otsiningo Park Trail, and others. Additional segments are currently in some stage of development including the major Route 434 greenway segment. While not all sections have been implemented, the overall greenway plan has established a conceptual route that will connect the Greenway along the Susquehanna and Chenango Rivers throughout Broome County, and into Tioga County to Owego.

In addition to the formalized greenway trails there are additional paved and natural surface trails throughout the County, typically located in existing parks and preserves. There are also opportunities to connect with larger regional trail systems nearby including the Fingerlakes Trail, just outside the eastern border, or the D&H Rail-Trail in Pennsylvania that comes up to the southern County border at Windsor. Exploring opportunities for interconnections between these trails as well as with the larger greenway network may help to expand upon their value as connective corridors.

Scenic Byways

Scenic byways are transportation corridors that are of particular interest, representative of an area's scenic, recreational, cultural, natural, historic or archaeological significance. Its purpose is to create themed corridors with the intent of fostering economic growth and resource conservation. Enhancements to the natural landscape in these areas help to bolster the tourism and quality of life benefits recognized in these corridors, making them a priority for appropriate preservation or management.

Currently there are no designated byways in Broome on the state or federal level. However, several of the County's rural routes that serve as gateways between Broome and other Counties have potential as scenic corridors. These include Routes 11, 12 and 79. The Route 17 corridor has also garnered some support for recognition as a scenic byway, however, at this stage that process hasn't moved forward. While none of these are currently designated as byways, open space considerations along these corridors should be taken into consideration in recognition of their potential for such designation in the future.

Waterways and Riparian Corridors

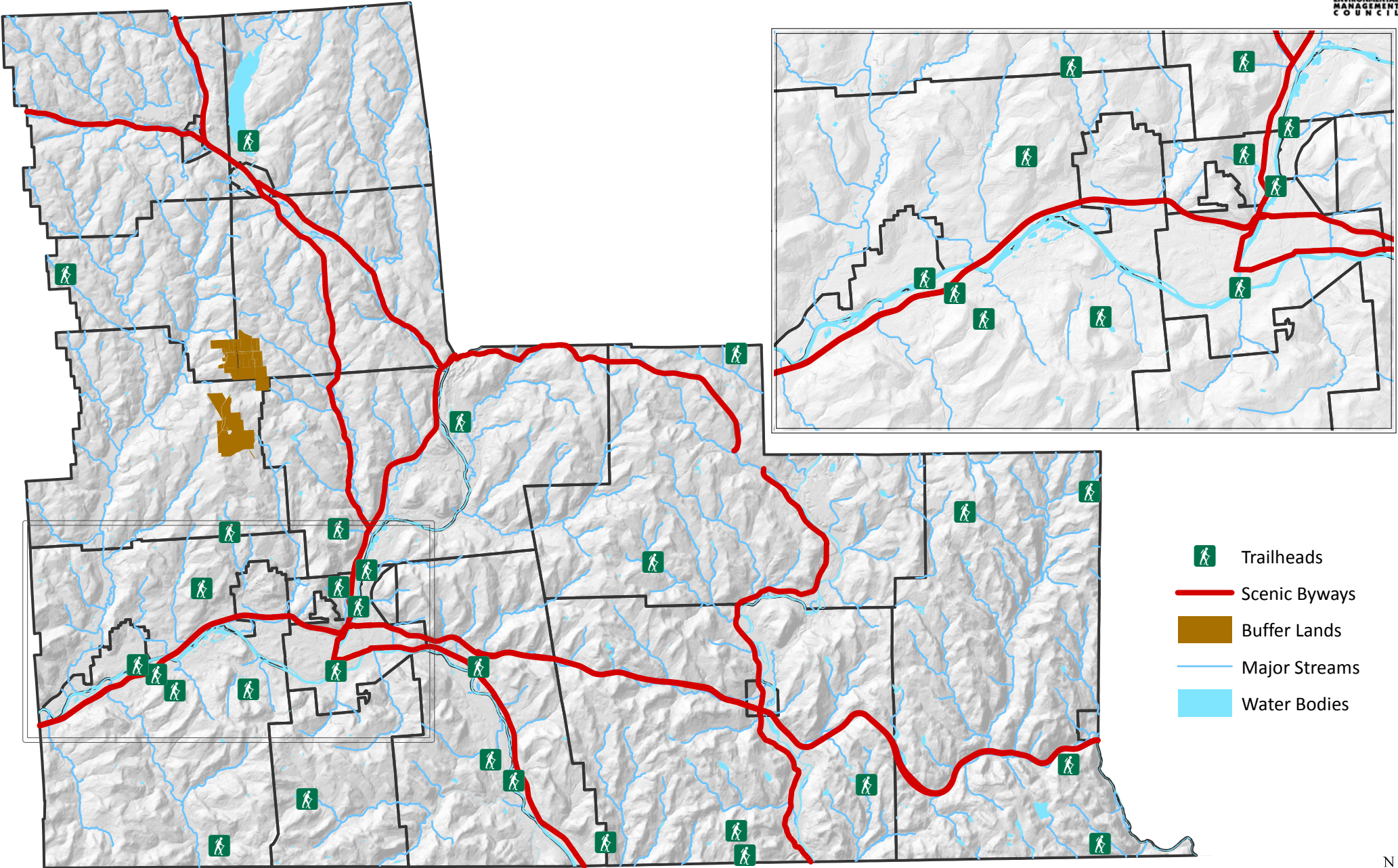
Riparian Areas are those associated with aquatic ecosystems and the portion of the terrestrial ecosystem that is substantially affected by the presence of surface and groundwater. Riparian areas consist of perennial streams, natural ponds, lakes, wetlands, and adjacent lands with soils, vegetation and landform indicative of high soil moisture or frequent flooding. Riparian areas have variable widths that are determined by ecologically significant boundaries. Riparian areas and stream buffers provide significant habitat and ecosystem benefits, including protecting water quality, stabilizing streams, minimizing flood damages, and enhancing ecological diversity. It is extremely important to fully understand the full extent and function of these areas when making development decisions in their vicinity. This will prevent costly engineering solutions later on to remedy issues that arise due to the loss of natural riparian functions.






Broome County contains five rivers and a large network of tributaries, ponds and lakes that feed them. Therefore, waterways and natural riparian areas are significant connective corridors in the County. The Broome County Intermunicipal Waterfront Access Plan is a detailed overview of the river resources in our community, identifying opportunities for enhancing riverfront access and waterfront uses in a manner that preserves the ecological benefits that these areas provide. Furthermore, with a history of flooding, there have been a substantial number of properties bought out by local communities. These lands must always be green for the purposes of flood mitigation and therefore enhance the connectivity along these waterways.

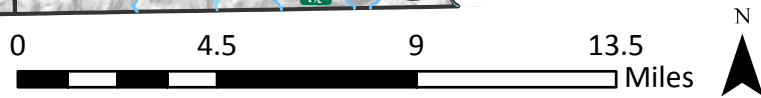
Buffer Lands

Conservation land buffers may be integrated on sites that may have conflicting uses with nearby lands. Examples in Broome include buffer lands surrounding the Broome County Landfill and the Greater Binghamton Airport. These buffers minimize any negative impacts to nearby residents, but they also serve as typically unmanaged natural areas that enhance biodiversity and wildlife habitat. Species may also use the lands for migration, traveling to food and water, shelter or mating opportunities.

Broome County, New York Connective Corridors



-  Trailheads
-  Scenic Byways
-  Buffer Lands
-  Major Streams
-  Water Bodies



Management Issues

Fragmentation

Similar to agricultural and forest lands, fragmentation of the landscape is a major management issue for connective corridors (which may also integrate the aforementioned land uses). This may be especially important in these areas as they function as migratory pathways. Fragmentation of these lands can create physical and functional barriers to wildlife species, and humans as well. Therefore, it is important to seriously consider adjacent land uses and land cover when looking at proposed development on individual sites. By encouraging site design that preserves natural features to the greatest extent practicable, we can still enhance economic development in a way that balances the value of the ecosystem services they provide.

Stream Management

Historically, development in local communities has encroached upon streams and their surrounding riparian areas in urban and suburban settings. As a result, there isn't much room available for these streams to naturally change and migrate over time, leading to localized and watershed wide flooding and erosion issues. This diminishes water quality, suitability for fish and wildlife, and causes damage to property and infrastructure.

Streams and associated lands can be managed in ways that works toward finding and maintaining healthy balances between our various land uses and preserving the ecosystem services they provide. The Broome County Soil and Water Conservation District and the Upper Susquehanna Coalition provide resources and technical assistance for municipalities in Broome County to achieve this. It is important that any development in these sensitive areas take the broader, cumulative impacts to the watershed into consideration.

Waterfront Development

Projects that enhance use of and access to our waterfront areas can provide significant long-term economic and quality of life benefits to local communities, especially urban areas. Recent efforts have focused on reconnecting communities to their riverfronts. However, the long-term sustainability of these efforts relies on maintaining the quality of those water resources. To preserve benefits that include aesthetics, flood mitigation, recreation, and public services, it is essential to prioritize protection and enhancement of water quality as a component of waterfront planning and development projects. This can be achieved by the following: identify and protect areas of special significance to water quality protection; regulate the location, form and use of projects in the waterfront area and permit only those that protect and enhance the character of the waterfront, and; integrate high-quality, innovative practices into development projects such as green infrastructure and enhanced flood-proofing and flood mitigation measures. This issue is discussed in further detail in the Water Resources section.

Tools and Strategies

In this chapter, a strategic tool kit is defined from which selected tools may be employed to protect, maintain or enhance the identified open space throughout a municipality. This tool kit is comprised of:

1. Natural resource/open space identification tools
2. Acquisition and protection tools for landowners,
3. Acquisition and protection tools for the municipality,
4. Maintenance plans,
5. Best practices for targeted open space.

Identifying Open Space

Each land parcel may be classified into one or more natural resource categories, which is a useful first step when attempting to prioritize open space parcels. A further assessment is conducted to provide some qualitative review of each identified parcel, including an evaluation of the resources' health and current threats for a given parcel.

Identification Tools

The following tools can be used in identifying and evaluating a site's open space value.

Broome County GIS

The **Broome County GIS** Division stores a large database of data that can be utilized to assess a community's natural resources. A significant portion of this data is published and publicly available via the website www.bcgis.com through the interactive map available in the "Parcel Information System". Data sets include soil types, topography, wetlands, water bodies agricultural districts, land cover and parcels. In addition, the site has several years of aerial photographs. Utilizing this data allows a convenient first order assessment of natural resources on a site or in larger area.

New York State Mapping Applications

The **New York State GIS Clearinghouse** is a significant resource that can provide data and information to assess natural resources in an area, similar to Broome County GIS. This site provides one central location where State agencies and local governments can list the GIS data sets that they have. GIS users can browse the list, or search for specific keywords, to find out what data is available, who holds it, and how it can be obtained. While this is useful, a user must have the tools to view and assess the data which may include Geographic Information Systems software which requires advanced expertise. However, some data may be viewable in Google Earth in some cases.

The NYS Department of Environmental Conservation also has a number of data viewers that help users view information about various types of natural resources, state facilities, environmental remediation sites, and other related items. These include the following:

- **State Lands Interactive Mapper** - Recreational trails on DEC lands and outdoor activities.
- **Environmental Resource Mapper** - Interactive mapping application used to identify natural resources and environmental features that are state protected or of conservation concern.
- **New York Nature Explorer** - Gateway to biodiversity information, is an online tool for finding out about the animals, plants and habitats in your neighborhood or area of interest.
- **Environmental Facilities Navigator** - Accesses an interactive utility to locate facilities of environmental interest. These include: superfund sites, facilities with significant SPDES discharges,

air emission sources, active solid waste management facilities, facilities discharging certain types of wastes, major electric generation facilities, mines, state recreational lands and other recreational features.

- **Mineral Resources Navigator** - Interactive utility to locate mines and oil, gas and other regulated well types.
- **Stormwater Interactive Map** - Interactive mapping application to look up information related to the Phase II Stormwater Program, useful for construction projects.
- **EAF Mapper** - Interactive tool that helps answer questions in the Environmental Assessment Form, required as part of the State Environmental Quality Review.

Site Visits

Actual visits and surveys of candidate parcels by experienced naturalists and other practitioners will provide the most comprehensive data; habitats, flora and fauna, water resources, locally significant geologic features, and any associated deficiencies or threats, can be identified in detail and the data captured in a disciplined manner.

Landowner Tools

Sale or Donation

A landowner may sell, or outright donate property, to a federal, state, or local government or private land trust dedicated to the preservation of natural areas and open space. Selling property at full value can result in a capital gains tax, whereas a donation may qualify as a significant charitable contribution.

Conservation Easements

Legal agreements between a landowner and a qualified conservation organization or government agency which may establish permanent restrictions on the use of the property. The landowner continues to own the property and has rights to use the land within the guidelines established in the easement agreement. The details of the agreement are tailored to manage the land to meet the agreed upon conservation goals. Some easements may be written to maintain unique natural areas (UNA), protect a nearby natural area, manage agricultural lands for a specific purpose or protect and manage water resources such as streams and wetlands. Like a land donation or sale, an easement can be donated or sold with similar tax benefits and liabilities. Generally, conservation easements also lower the assessed value of the land, resulting in a lower property tax liability. Similarly, estate taxes will be lower when the ownership of a land parcel changes hands. An heir may also consider a conservation easement when the land value has increased substantially over the original purchase price, and thereby reduce their tax liability.

Deed Restrictions

Methods of protection, also referred to as Mutual Covenants, which also restrict activities on the land to meet some conservation goal and manage future use. However, deed restrictions do not have the regulatory oversight of an easement, and are at the mercy of the current and future landowners' dedication to the restrictions placed in the deed. Since these lack the formality of an easement, there is no potential tax advantage associated.

Remainder Interest

is accomplished by donating land to a qualified land trust organization while simultaneously retaining a life interest in the property (a reserved life estate) for the landowners, and others, who may have been granted a life interest deed. This allows the property owner, or their deed grantees, to continue to live on or utilize the land during their lifetimes. Once the landowner and grantees have passed away the land trust retains

ownership and is responsible for maintaining the land in accordance with the original owners' interests. Since this is effectively a property donation, the landowner may qualify for a federal income tax deduction.

Voluntary Land Management

Many landowners manage their property in a manner that protects natural habitats or otherwise embraces environmentally responsible practices. This may be done out of a personal sense of responsibility or from the simple enjoyment of nature. Many landowners nation-wide participate in the NWF (National Wildlife Federation) Certified Wildlife Habitat Program. Large scale, costly projects may qualify for subsidies through various state and federal programs. Certain agricultural properties may qualify for federal support under the Conservation Reserve Program (CRP).

Municipal Tools

A municipality's regulatory tools can be classified as zoning and ordinances, taxation or acquisition strategies. These classifications are described in the subsections below.

Regulatory Tools

The principle municipal regulatory method of protecting open space is through zoning and local ordinances, as described in the paragraphs below.

Overlay Districts

Defined by zoning that overlays conventional zoning. This type applies a set of standards which protect key environmental resources within that zone or overlay. The standards can dictate how sensitive environmental features may be protected within a complete suite of conventionally zoned tracts of property.

Subdivision Regulations

Define how large tracts of land may be divided into smaller parcels for the purpose of development. Under NY State Real Property Law, a map of a proposed subdivision (subdivision plat) must be filed with the county clerk and approved by the local planning board. Locally, subdivision regulations can include provisions that support open space protection. Wetlands, floodplains, steep slopes, UNAs and other resources can be protected by these regulations. Subdivision regulations can also dictate the form of a subdivision by requiring any of the following three forms of development:

Cluster Development

A technique which allows smaller than usual residential lot sizes to increase open space areas on the remainder of the development. The remaining open space may be managed by a homeowner's association, the local government or a land trust.

Conservation (Multi-Intensity) Development

A technique similar to a cluster development, but is more applicable to developments near sensitive open spaces such as UNAs. In addition to the clustering of residential lots, buffers, and possibly recreational spaces, are placed between the residential lots and the neighboring protected open space. If there is sensitive open space that needs to be protected on the space planned for development it can be set aside in addition to the buffer space.

Planned Unit Development (PUD)

A method also similar to a cluster development but differs in that mixed uses are allowed on the developed portion of the property. A PUD may also include commercial and/or light industrial development in addition to residential development. However, the protection of sensitive open space on the development property or adjoining properties is also provided by buffers and open space preservation on the developed land parcel as applicable.

Setbacks and Buffers

Setbacks are typical components of conventional zoning that define preferred distances between buildings and roads or property lines but can also define desirable distances for roads or buildings from nearby natural areas. Buffers are open spaces between two land parcels with differing land uses. They are commonly used to keep light and noise away from natural or residential areas that adjoin land parcels with more intensive uses, such as commercially or industrially zoned parcels. However, buffer and setback regulations may be included within Overlay District zoning regulations.

Incentive Zoning or Density Bonuses

Forms of zoning which allow a negotiation between a developer and a municipality wherein final agreement provides for the protection of nearby unique natural areas. A developer may donate any unique natural area on a parcel or buffer area or donate a buffer area adjoining a UNA on a neighboring property. In return, the developer is granted relief from the density regulations of the existing zoning regulations, thereby allowing development on smaller lot sizes. This negotiation is provided for in NY Town Law 261A.

Special Use Permitting

These are an element of a zoning regulation which provide for certain land uses but require a review to ensure that the specific use will not have any adverse impact on natural resources or nearby open space.

Performance Standard Zoning

These are parts of a zoning regulation which establish specific environmental protections that are required regardless of the specific land use. This is a proactive approach that is effective for commercial and industrial zonings, since the environmental standards are in place without regard to the future land use for a given land parcel.

Preservation Ordinances

A municipality may adopt a preservation ordinance that consists of the land use and environmental protection regulations embodied in any of the regulatory tools discussed above. Rather than rewrite existing zoning regulations for all forms of land use, the preservation ordinance would consist of the open space and resource protection regulations that are applicable to all land use zonings and overlay districts.

SEQR and CEA's

The NY State Environmental Quality Review (SEQR) Act requires municipalities to review development actions for potential environment impacts. Therefore, any proposed development will be reviewed for its impact upon environmentally sensitive areas and open space in general. Under SEQR, open space that may be designated as a Critical Environmental Area (CEA) will be identified, and protective measures will need to be applied. A CEA is a specific area, designated as such by the local municipality, that contains sensitive or unique natural resources which requires protection or is identified in a municipality's open space plan or inventory.

Agricultural Districts

The Agricultural Districts Law authorizes the establishment of agricultural districts, agricultural and farmland protection boards, and related protection plans. These serve to provide assessments for private farmland and right-to-farm provisions. The law also includes a “Notice of Intent” provision that requires any agency, public or private, that is proposing development of any land within an agricultural district to file notice with the NY Department of Agriculture and Markets and the associated protection boards.

Forest Tax Law

The law encourages woodland management to achieve a stable forest economy. Section 480-a of the NY Real Property Tax Law provides for tax concessions for owners of woodlots of at least 50 acres who commit their woodland to a DEC-approved forest management plan. The commitment runs for ten years, and is renewable annually.

Assessments

Property owners, who have donated or sold conservation easements or development rights, receive reductions in their property tax assessments which capture the value of the land as if it were not developable.

Design Principles

Municipal regulations may dictate specific environmental practices that help to enhance or protect sensitive environmental resources. Some examples of these are:

- Plans to minimize development impact upon hydrology near sensitive natural areas
- Establish scenic corridors to prevent development where there would be an adverse visual impact
- Practices that minimize the expansion of invasive species into natural areas
- Plans to prevent adverse impacts due to storm water run-off
- Avoid changing prevailing wind flow, natural lighting and background sound levels in the vicinity of sensitive natural areas

Roadways

One of the major responsibilities of a municipality is the maintenance of roadways and the associated practices which may have a significant impact on natural resources. A number of road maintenance practices that can benefit natural resources are the following:

- Providing buffers between roads and natural areas containing sensitive flora and fauna
- Minimizing soil disruptions along roadsides to minimize soil erosion, vehicle contaminant run-off and minimize pathways for invasive species introduction
- Establishing proper road grade, stabilized fills, back slopes and proper drainage that are consistent with the local soil types and topography. This helps to minimize road-side run-off and localized flooding during major storm events.
- Planting native species along roadsides and their adjacent buffers which can help prevent soil erosion and require less maintenance.

Taxation Strategies

Municipalities may opt to protect open space by taxation strategies, as described below:

Local Bond Acts

A municipality may issue a general revenue bond for the purpose of acquiring or otherwise protect open space. The local government may approve a bond measure, subject to permissive referendum, or it can place the measure on the ballot for direct approval or disapproval by the voting public.

Federal and State Open Space Funding Sources

Open space planning and the actions specified within an open space plan may be funded through state and federal grants. Certain local open space projects may qualify for funding under the NYS Environmental Protection Fund (EPF), or under the Federal FEMA program in very specific cases.

Dedicated Revenue Sources

A subdivision regulation may require a developer to set aside open space, or alternatively require an equivalent amount of money for establishing a trust fund used for acquisition or maintenance of open space land. Another revenue source can be created by enacting an ordinance that takes a certain percentage of general fund surpluses. A municipality may also establish a Community Preservation Trust Fund, with NY government approval. This fund receives its revenue by collecting a surcharge on each deed transfer made within the municipality.

Acquisition Strategies

Municipalities may opt to protect open space by acquisition strategies, as described below:

Acquisition

The outright purchase of real estate by a municipality or private conservation group. The land can be purchased at full, or below, market value and paid for over a set number of years. The seller of property can qualify for an income tax reduction if the land was sold at less than market value. The sale provisions can also allow life use of the land by the seller during their lifetime. A municipality must consider the long-term maintenance costs of the open space it purchases and not just the initial acquisition costs when budgeting for open space acquisition. One means a community might use to acquire a property is the Community Development Trust Fund as described under Taxation Strategies above.

Purchase of Development Rights or Easements

A municipality, conservation organization or land trust, may purchase the development rights or conservation easements to open space as part of its open space plan. If the provisions of the easement require the landowner to maintain, or otherwise protect, the open space and its resources, then the cost of executing the open space plan will be substantially lower than if it chooses to acquire the space identified in its plan. The initial cost of purchasing easements or development rights is also substantially lower than purchasing real estate at full market value.

Goals and Action Items

At a county-wide level, a number of goals have been identified that collectively establish a vision, for managing natural resources. For each goal, a number of action items are identified. Any combination of the tools identified in the previous chapter of this document may be applied in an effort to address each action item.

1. Preserve and enhance the natural and cultural features of the county that form its unique qualities and characteristics.

Action Items

- Create, maintain and update open space areas map.
- Integrate open space planning into municipalities planning/zoning review process to ensure consideration for protection of open space.
- Monitor and evaluate properties targeted for development using an open space scoring or ranking system to identify the merits of maintaining properties or portions thereof for open space.
- Pursue options and funding sources for the periodic acquisition of properties and easements.
- Partner with land trusts to acquire and to assist with stewardship of open space lands.

2. Promote responsible land use development that maintains the ecological services provided by natural resources.

Action Items

- Consider alternatives to large lot zoning such as clustering, conservation subdivision design, transfer of development rights, and the planned unit development process.
- Promote conservation subdivision design and/or clustering to preserve open space within housing subdivisions.
- Pursue use of transfer of development rights, where feasible, to preserve open spaces in rural areas while allowing for greater density where feasible.
- Limit water district and sewer district extensions to the rural portions of Broome County.

3. Ensure the quality of the County's valuable water resources.

Action Items

- Pursue options and funding sources to acquire properties in critical aquifer recharge areas and well head protection zones.
- Protect streams, ponds and wetlands, etc from development impacts through addition of buffer requirements in subdivision and site plan review procedures, and identify guidelines/standards for these buffer zones.
- Pursue conservation easements or outright acquisitions of parcels or portions of parcels within stream headwater areas and along stream banks.

4. Preserve, protect and promote responsible agricultural and forestry operations.

Action Items

- Educate landowners about open space preservation and monetary benefits available for those eligible for New York State agricultural and forestry tax exemptions.
- Identify key agricultural lands well-suited for preservation and earmark them for inclusion in a Transfer of Development Rights program.
- Encourage the use of conservation easements for the preservation of forest lands and agricultural operations.
- Use the existing online resources to promote agricultural and forestry operations and preservation, including links to agencies/resources and advertising of farmers' markets.

5. Preserve the rural character of Broome County.

Action Items

- Limit water district and sewer district extensions to rural areas of Broome County.
- Encourage cluster subdivisions and/or conservation subdivision design for new subdivision proposals.
- Consider adoption of higher minimum well yield thresholds as a prerequisite for issuance of building permits for new homes.

6. Retain forested areas, fields, stream corridors, wetlands, and other open spaces to the maximum extent practical, so as to establish and preserve buffers between developed areas.

Action Items

- Revise municipal Subdivision Regulations to eliminate clear-cutting for housing development sites.
- Apply conservation subdivision design, clustering, and other non-traditional housing development patterns to preserve buffers on new housing development sites.

7. Provide protection for environmentally sensitive areas such as wetlands, floodplains, steep slopes, wildlife habitat areas, unique geological formations, etc.

Action Items

- Promote land use development patterns that direct growth to land without natural resource constraints.
- Protect sensitive areas via "Land Conservation" zoning.

8. Preserve the character of historical sites and structures throughout Broome County.

Action Items

- Build awareness and appreciation of the importance of the County's historical heritage.
- Develop an inventory and map of local historic sites and buildings.
- Investigate the merit of establishing additional historic district(s) within the County.
- Encourage and seek state and national historic registry designation for worthy properties.
- Designate local historic "landmarks" worthy of protection.
- Develop tax incentives and regulations encouraging the preservation of historic properties.

9. Protect, expand, and/or create active and passive recreational facilities and opportunities.

Action Items

- Preserve and improve public access to the riverfronts and stream corridors.
- Pursue land acquisitions near existing recreation lands, parks, and preserves.
- Acquire land and/or develop recreational facilities in and near major housing subdivisions.
- Continue to develop a network of trail systems throughout the County
- Continue to support and recognize the heritage values of traditional outdoor recreational activities such as fishing, hunting, and trapping, consistent with NYS's Open Space Plan for Region 7.
- Pursue public fishing rights (PFR) along suitable stream corridors with assistance from NYSDEC

10. Identify and protect scenic views as seen from roadsides, parks, preserves, and other areas frequented by the public.

Action Items

- Locate development away from view sheds. If new development can't be directed entirely away from view sheds, visual impacts should be minimized through appropriate building placement, orientation, height, bulk, style, and color selection.

11. Preserve and enhance key entryways or gateways to Broome County.

Action Items

- Clarify and enforce existing zoning regulations that require identification and ornamentation of the various gateways.
- Establish a desired or preferred design/appearance for gateways.
- Seek assistance and/or donations from local entities for landscaping and beautification of gateways and installation of entrance signs.