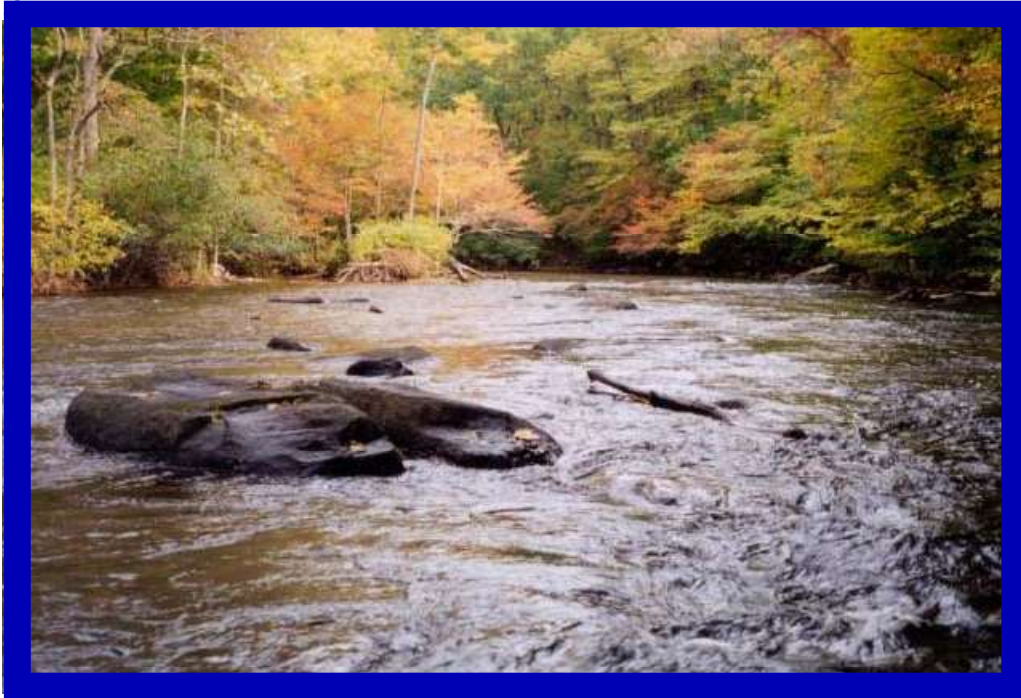

Musconetcong River

National Wild and Scenic Rivers Study



River Management Plan

Prepared by:

Musconetcong River Management Council
Musconetcong Watershed Association
Heritage Conservancy
National Park Service



June 2011 Update

The views and conclusions contained in this document are those of the authors and should not be interpreted as representing the opinions or policies of the U.S. Government. Mention of trade names or commercial products does not constitute their endorsement by the U.S. Government.

EXECUTIVE SUMMARY

This management plan proposes a strategy for managing the Musconetcong River and its many outstanding resource values. It was prepared as part of a study to evaluate the Musconetcong River for inclusion in the National Wild and Scenic Rivers System.

The Musconetcong River drains a 157.6 square mile watershed area in northern New Jersey, and as a major tributary to the Delaware River, is part of the 12,755 square mile Delaware River watershed. The Musconetcong River is a boundary water for its entire length, first dividing Morris and Sussex counties, then Hunterdon and Warren counties. All or portions of 26 municipalities lie within the natural boundaries of the Musconetcong watershed. Fourteen municipalities fall within the river segments eligible for National Wild and Scenic Rivers designation.

The impetus for the Musconetcong National Wild and Scenic Rivers study can be traced back to 1991, when petitions were circulated calling for the protection of the Musconetcong River under both the National Wild and Scenic Rivers System and New Jersey Wild and Scenic Rivers program. In 1992, Congress passed legislation authorizing the National Park Service to study the eligibility and potential suitability of the Lower Delaware River for addition to the National Wild and Scenic Rivers System.

The Musconetcong Watershed Association (MWA) was formed in 1992. In 1993, MWA and the National Park Service (NPS) organized two Roundtable Meetings to discuss the problems, amenities and opportunities associated with the Musconetcong River. In 1995, the New Jersey Department of Environmental Protection (NJDEP) Office of Natural Lands Management recommended to the NPS that the Musconetcong River be included in the Nationwide Rivers Inventory of “candidate” rivers” considered to have the appropriate characteristics for wild and scenic designation. Two years later, 18 of the 19 municipalities along the river voted to request the NPS to study the Musconetcong River to determine its eligibility and suitability for inclusion in the National System.

A Musconetcong Advisory Committee, consisting of municipal representatives was formed to work with the NPS and the Musconetcong Watershed Association in completing the National Wild and Scenic study. The study area included the main stem of the river and the river corridor from the outlet at Lake Musconetcong to the Delaware River, a distance of approximately 42 miles.

An *Eligibility and Classification Report*, completed in August 1999, recommended that three segments of the river, representing 28.5 miles of river, were eligible for inclusion in the National Wild and Scenic Rivers System based on flow characteristics and natural and cultural resources. Next, an analysis of land ownership, land use regulation and physical barriers to development in the river

corridor was completed to determine the effectiveness of existing mechanisms in management of the river and its outstandingly remarkable values, and to identify gaps which could be addressed by the implementation of a comprehensive management plan.

Development of a river management plan is a requirement of the National Wild and Scenic Rivers study. This management plan is the result of cooperative efforts of the Musconetcong Advisory Committee, Musconetcong Watershed Association, Heritage Conservancy, the National Park Service, and a variety of local, county and state representatives. The management plan sets forth five major goals and recommends actions to maintain and improve the Musconetcong River corridor, its tributaries and watershed, and surrounding natural, cultural and recreational resources.

- Goal 1.** Encourage recreational use that is compatible with the preservation of natural and cultural qualities of the river corridor while respecting private property.
- Goal 2.** Preserve and protect the character of archaeological sites and historic structures, districts, sites, and landscapes in the river corridor.
- Goal 3.** Preserve farmland and open space within the river corridor and the watershed.
- Goal 4.** Preserve, protect, restore and enhance the outstanding natural resources in the river corridor and the watershed, including rare and endangered species, forests, steep slopes, floodplains, headwaters and wetlands.
- Goal 5.** Maintain existing water quality in the Musconetcong River and its tributaries and improve where possible.

Successful implementation of the management plan will require cooperation between all levels of government, individual landowners and non-governmental organizations. The plan recognizes that local municipalities play a key role in implementing the recommended management actions. In 2008, the Musconetcong River Management Council was established to replace the ad-hoc Musconetcong Advisory Committee and officially forge a continuing relationship among the public and partners involved in implementing and updating the management plan.

TABLE OF CONTENTS

EXECUTIVE SUMMARY	i
CHAPTER 1 – INTRODUCTION AND BACKGROUND	1
National Wild and Scenic Rivers Act	1
Requirements for Designation.....	1
Musconetcong Study Background	2
Study Approach	3
Study Goals	4
Public Involvement.....	4
New Jersey Watershed Planning Process.....	5
Musconetcong River Management Council	6
CHAPTER 2 – ELIGIBILITY AND CLASSIFICATION.....	7
Eligibility and Classification Methodology	7
Free-flowing Condition	7
Outstandingly Remarkable Resource Values	8
Classifications.....	8
Eligibility and Classification Findings	9
Eligible Segments and Proposed Classifications	9
Outstandingly Remarkable Values	10
Recreational	10
Historic and Prehistoric.....	10
Scenic.....	10
Wildlife and Critical Habitat	10
Segment-by-Segment Analysis	10
Segment A: Saxton Falls to Rt. 46 Bridge	11
Segment B: Kings Highway Bridge to the railroad tunnels at Musconetcong Gorge	11
Segment C: Hughesville Mill to Delaware River confluence	11
CHAPTER 3 – RIVER MANAGEMENT FRAMEWORK	13
Council Membership	13
Funding and Staff.....	13
National Park Service Role	14
Guidelines for Water Resource Projects, including Public Utilities, Transportation and Recreation Facilities.....	14
CHAPTER 4 – RESOURCE MANAGEMENT	21
Recreational and Scenic Resources	21
Historic and Archeological Resources	26
Farmland and Open Space Preservation	32
Natural Resources	36
Geology.....	36
Vegetation and Critical Habitat	36

Fisheries	39
Game Resources	39
Water Quality	43
Summary of Recommendations for Local Governments	47
GLOSSARY	49
COMMON ACRONYMS	53
SELECTED BIBLIOGRAPHY	59
LIST OF PARTICIPANTS.....	61
April 2003 Original River Management Plan	61
June 2011 River Management Plan Update	62
APPENDIX A: REGULATORY AND NON-REGULATORY PROGRAMS	63
Regulatory Programs	63
Resource Focus: Water Quality.....	64
Resource Focus: Natural Resources	70
Resource Focus: Historic and Cultural	71
Non-Regulatory Programs	72
APPENDIX B: ANALYSIS OF EXISTING RESOURCE PROTECTION	77
Corridor Summary	77
Allamuchy Township	78
Hackettstown	78
Mount Olive Township	79
Washington Township, Morris County	79
Lebanon Township.....	80
Hampton Borough.....	81
Bethlehem Township	81
Bloomsbury Borough.....	83
Greenwich Township	83
Franklin Township	84
Mansfield Township	85
Pohatcong Township.....	86
Holland Township.....	87
APPENDIX C: RELATED REFERENCE MATERIALS	89

MAPS

- Eligible River Segments
- Open Space and Recreation Lands
- Historic and Scenic Resources
- Highlands Land Use Capability Zones
- Land Use and Land Cover
- Important Habitats & Natural Areas

CHAPTER 1 – INTRODUCTION AND BACKGROUND

National Wild and Scenic Rivers Act

The National Wild and Scenic Rivers Act (Public Law 90-542, as amended) was enacted in 1968, to balance long standing federal policies that promoted the construction of dams, levees, and other river development projects with a program that would permanently preserve selected rivers, or river segments, in their free-flowing condition. Section 1(b) of the Act states:

“It is hereby declared to be the policy of the United States that certain selected rivers of the Nation, which with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural or other similar values, shall be preserved in a free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations.”

The original Act designated eight rivers as components of the National Wild and Scenic Rivers System, and specified processes by which other rivers could be added to the system. Rivers may be designated either through an act of Congress (by amending the National Wild and Scenic Rivers Act) or through an administrative action by the Secretary of the Interior upon application by the governor of the state through which the river flows.

As of November 2001, one hundred sixty two rivers or river segments totaling 11,600 miles had been included in the national system. Only seven of these rivers are National Park Service “Partnership” Wild and Scenic Rivers. These rivers are: the Great Egg Harbor River and the Maurice River in New Jersey; the Lower Delaware River in Pennsylvania, and New Jersey; the White Clay Creek in Delaware and Pennsylvania; the Farmington River in Connecticut; the Lamprey River in New Hampshire; and the Sudbury, Assabet and Concord River segments in Massachusetts.

A National Park Service partnership river is one in which no federal agency, including the National Park Service (NPS), owns land or can acquire land within the designated wild and scenic river corridor. Rather, the NPS serves as a partner with local landowners, municipalities, county, state governments and non-governmental organizations (NGOs) in collectively managing a river, so that the river retains the outstandingly remarkable values for which it was initially designated. The NPS will not acquire or own land in the Musconetcong River watershed.

Under sections 7(a) and 10(a) of the National Wild and Scenic Rivers Act, all designated rivers receive protection from federally assisted projects, including projects funded, licensed, or sponsored by the federal government, which would alter the rivers’ free-flowing condition or have a direct and adverse effect on the rivers’ outstanding resources.

Requirements for Designation

Before a river can be added to the National Wild and Scenic Rivers System, it must be found to be both eligible and suitable. To be eligible, the river must be i) free flowing; and

ii) possess at least one “outstandingly remarkable” resource value, such as exceptional scenery, recreational opportunities, fisheries and wildlife, historic sites, or cultural resources. The resource values must be directly related to or dependent upon, the river.

If found eligible, a candidate river is then analyzed to determine its current level of development and a recommendation is made regarding the river’s proposed classification. The classification is based on the intensity of human presence along the river corridor. The Act defines the three classifications as follows:

Wild Rivers: Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.

Scenic Rivers: Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.

Recreational Rivers: Those rivers or section of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

The suitability determination is based upon several findings. First, there must be evidence of lasting protection for the river’s free-flowing character and outstanding resources, either through existing mechanisms (including patterns of conservation land ownership, state and local land use regulations, physical barriers to inappropriate development, etc.) or through a combination of existing and new conservation measures resulting from the National Wild and Scenic Rivers study. Second, there must be strong support for designation from the entities – local municipalities, state agencies, riverfront landowners, and conservation organizations – that will be partners in the long-term protection of the river. Third, a practical management framework must be devised that will allow these interests to work together as effective stewards of the river and its resources. Finally, wild and scenic designation must make sense for the river in question: it must be an appropriate and efficient river conservation tool.

Musconetcong Study Background

The impetus for the Musconetcong National Wild and Scenic Rivers study can be traced back to 1991 when petitions were circulated calling for the protection of the Musconetcong River under both the National Wild and Scenic Rivers System and New Jersey Wild and Scenic Rivers program. Meanwhile, Congress passed legislation in 1992 authorizing the National Park Service to study the eligibility and potential suitability of the Lower Delaware River for addition to the National Wild and Scenic Rivers System. Although the Musconetcong is a major tributary to the Lower

Delaware River, the legislation included only three Delaware River tributaries, all located in Pennsylvania.

The Musconetcong Watershed Association (MWA) was formed in 1992 and began water monitoring and river cleanup programs along the Musconetcong River. The MWA and the National Park Service (NPS) organized two Roundtable Meetings in 1993 as part of the NPS Rivers, Trails and Conservation Assistance Program. Representatives from local, county, and state governments, nonprofit organizations, businesses, and individuals came together to discuss the problems, amenities and opportunities associated with the Musconetcong River. The proceedings of the Roundtable meetings were used by MWA to produce a report entitled “THE MUSCONETCONG WATERSHED: A Conservation Strategy Handbook.” The “Handbook” was used to educate watershed residents about river-related issues and resources.

In 1995, the New Jersey Department of Environmental Protection (NJDEP) Office of Natural Lands Management recommended to the NPS that the Musconetcong River be included in the Nationwide Rivers Inventory of “candidate” rivers that are considered to have the appropriate characteristics for wild and scenic designation. Two years later, 18 of the 19 municipalities along the river voted to request the NPS to study the Musconetcong River to determine its eligibility and suitability for inclusion in the National System. An initial meeting was held in July 1997 and included representatives from eighteen river corridor municipal governments, National Park Service, Musconetcong Watershed Association, county and state officials, major industries, Heritage Conservancy, Highlands Coalition, and Trout Unlimited, as well as interested citizens and river front property owners.

Study Approach

A Musconetcong Advisory Committee, consisting of municipal representatives was formed to work with the NPS and the Musconetcong Watershed Association and a work plan for completing the Wild & Scenic study was developed. It was agreed by all parties that the Musconetcong Advisory Committee and local municipalities would have the final say as to whether the Musconetcong River is recommended for designation. Subcommittees were formed to address public involvement needs and to conduct the resource assessment for the *Resource Assessment, Eligibility & Classification Report*. The study area included the main stem of the river and the river corridor from the outlet at Lake Musconetcong to the Delaware River, a distance of approximately 42 miles.

The *Eligibility & Classification Report*, completed in August 1999, recommended that three segments of the river were eligible for inclusion in the National Wild and Scenic Rivers System.

The Advisory Committee then conducted an analysis of existing resource protection in the river corridor and developed draft management goals, objectives and key actions. The Advisory Committee served as the coordinating body for the study, guiding all major study activities. In order to facilitate the compilation of information about the river’s resources and suitability, the NPS established cooperative agreements with the

Musconetcong Watershed Association and with Heritage Conservancy. These agreements allowed staff to provide outreach coordination, conduct resource and land use analysis, develop a GIS map system, and develop draft reports.

Study Goals

Based on local and state interest in a wild and scenic rivers study, the NPS had two major goals for the study:

- 1) To determine whether the Musconetcong River would be an appropriate addition to the National Wild and Scenic Rivers System, and conversely whether wild and scenic designation would be an appropriate tool for the river; and
- 2) To assist local communities in preparing and implementing a river management plan that would protect the river's special qualities, regardless of whether wild and scenic designation proved to be the recommended outcome of the study.

In accordance with the wishes of the study area communities and established NPS policy for wild and scenic studies of rivers that flow through primarily privately held lands, the study included the following elements:

- 1) A strong emphasis on grassroots involvement and consensus building in determining whether the river was suitable for designation and how it should be managed.
- 2) The development of a "comprehensive river management plan" during the study rather than after designation. The plan relied on private, local and state conservation measures rather than federal land acquisition and management to protect the river's outstanding resources and was the product of close collaboration between NPS, the Musconetcong Advisory Committee, and local and state governments.
- 3) A commitment to the study area communities that federal designation of the study segments would be recommended only if strong support was expressed through passage of resolutions by the affected municipalities.

Public Involvement

The Musconetcong Advisory Committee and the public outreach subcommittee initiated public meetings and events. Opportunities for public involvement included the following:

- Monthly Advisory Committee meetings were held at various locations throughout the river corridor open to all.
- A mailing list of local officials, county and state agencies, meeting attendees, and other interested individuals was developed and maintained. Those on the mailing list received meeting notices, meeting minutes and handouts, and report drafts.

- A public opinion survey was developed and mailed to 750 residents of the 18 river municipalities, including 300 riparian landowners.
- Several special meetings were sponsored to promote public awareness of the river and of its unique resources, including a historical perspective on the river valley presented by a NPS historian, driving tours of the watershed, canoe tours, and hiking trips to remote reaches of the river.
- Periodic progress reports were presented to municipal officials and boards. A copy of the *Resource Assessment and Eligibility & Classification Report* was provided to each municipality.

Four copies of the draft River Management Plan were provided to each of the river municipalities and to others on the mailing list. A series of three public workshops were held between January and February 2002 to present the management plan and address any questions. A revised draft was prepared and mailed to each municipality in June 2002 with a request for a resolution in support of the plan and the designation of the river. Thirteen of the fourteen municipalities approved a resolution of support at a public meeting.

New Jersey Watershed Planning Process

The NJDEP Division of Watershed Management was created in 1999 to implement the state's watershed management program. NJDEP has delineated 20 major Watershed Management Areas (WMAs) in New Jersey. The WMAs are organized under the umbrella of the Division of Watershed Management, specifically the Bureau of Watershed Planning.

The Musconetcong River falls within the Upper Delaware Region of New Jersey, which is designated as Watershed Management Area # 1, or WMA1. The region encompasses all of the Delaware River tributary watersheds in New Jersey from the Musconetcong north to the New York border. Other major tributary watersheds within WMA1 include the Pohatcong Creek, Pequest River, Paulinskill River and Flatbrook River.

The NJDEP Office of Environmental Planning presented information about New Jersey's *Statewide Watershed Management Framework* to the Musconetcong Advisory Committee at a meeting held in January 1998. NJDEP staff described plans to begin a Musconetcong River Watershed Characterization and Assessment Study, the first step in the development of a watershed management plan.

While there are similar goals for both the National Wild and Scenic Rivers study and watershed management planning efforts, the latter involves a more detailed look at water quality issues and includes an assessment of Musconetcong River tributary lakes and streams. The National Wild and Scenic Rivers study contains more detail on river-related cultural, historic and recreational resources and focuses primarily on the Musconetcong River corridor. Moreover, the National Wild and Scenic Rivers study

came about as a result of broad-based local support, whereas the NJDEP watershed management program is driven by Federal Clean Water Act mandates.

The Musconetcong Advisory Committee voted to support a watershed management planning initiative for the Musconetcong watershed with the understanding that such an effort will help sustain and support Musconetcong National Rivers program goals of long-term protection of the Musconetcong River and its tributaries. To avoid duplication of effort, the Musconetcong Advisory Committee received assurances from the NJDEP Office of Environmental Planning staff that information gathered for the Musconetcong National Rivers study would be incorporated into NJDEP's Musconetcong Watershed Characterization and Assessment study.

In April 1998, the NJDEP Office of Environmental Planning began a three-year watershed management planning initiative for the Musconetcong River watershed with various stakeholder groups. The Musconetcong Watershed Management Initiative was halted in 2000 due to a lack of financial and technical resources, and because the NJDEP expanded the watershed planning process beyond the Musconetcong watershed to include all the watersheds within the Upper Delaware Region (WMA1). However, this initial watershed planning process resulted in the creation of a "Musconetcong Work Plan" that lists actions to be taken to improve water quality and address issues of concern. Many elements of the "Musconetcong Work Plan" are found in the Musconetcong Wild and Scenic Rivers Management Plan.

On October 2, 2000, NJDEP contracted with North Jersey Resource Conservation and Development Council to begin the watershed planning process within Watershed Management Area #1. The State committed \$600,000 over four years to develop a comprehensive management plan for the entire Upper Delaware Region, including the Musconetcong River watershed. This laid the groundwork for successive grant awards in the Musconetcong Watershed. A contract awarded by the NJDEP in the year 2000 allowed for the completion of fifteen riparian buffer restoration projects in the Upper Delaware Watershed, several of which were within the Musconetcong Watershed. In addition, the NJDEP approved funding for the Musconetcong Watershed Restoration and Protection Plan in 2006. This contract was awarded to the North Jersey Resource Conservation and Development Council in conjunction with other project partners such as the Musconetcong Watershed Association and Rutgers University to identify sources of non-point source pollutants and recommend specific best management practices and policies for implementation in order to attain water quality goals.

Musconetcong River Management Council

In 2008, the Musconetcong River Management Council (MRMC) was established to replace the ad-hoc Musconetcong Advisory Committee and officially forge a continuing relationship among the public and partners involved in implementing and updating the management plan. This report is the first update to the River Management Plan completed by the MRMC since the original document was prepared in April of 2003.

CHAPTER 2 – ELIGIBILITY AND CLASSIFICATION

This chapter documents the National Park Service findings relative to the eligibility of the study river segments for designation and the proposed classification under which the eligible segments could be included in the National Wild and Scenic Rivers System.

Eligibility and Classification Methodology

The National Wild and Scenic Rivers Act requires that for river segments to be eligible for inclusion into the national system they be free-flowing and adjacent to or within related land areas that possess one or more outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural or other similar values.

Free-flowing Condition

The National Wild and Scenic Rivers Act is intended to protect only “free-flowing” rivers, and such flows must be adequate to support all flow-dependent outstanding resource values. Section 16(b) of the Act defines “free-flowing” as:

“... existing or flowing in natural condition without impoundment, diversions, straightening, rip-rapping or other modification of the waterway. The existence, however, of low dams, diversion works, and other minor structures ... shall not automatically bar ... consideration for ... inclusion: Provided, that this shall not be construed to authorize, intend or encourage future construction of such structures within components of the National Wild and Scenic Rivers System.”

Federal guidelines provide the following additional clarification:

“The fact that a river segment may flow between large impoundments will not necessarily preclude its designation. Such segments may qualify if conditions within the segment ... Existing dams, diversion works, riprap and other minor structures, will not bar recreational classification provided that the waterway remains generally natural and riverine in its appearance.”

There are eleven dams of varying size along the main stem Musconetcong River from Lake Hopatcong to Finesville, thus the “free-flowing” aspect of the study received considerable attention. “Natural riverine character” was used as the subjective standard to determine whether a particular dam significantly alters the river’s natural width, flow, and benthic characteristics, and to decide if a particular river segment met the eligibility requirement.

Dams such as those found at Imlaydale and New Hampton are little more than archaeological remains and have no effect on flow. The dams at Penwell, Asbury and Bloomsbury are historic mill dams that have created small pools, but exert minimal influence over the river’s natural riverine character.

Five dams along the river between Lake Hopatcong and Saxton Falls have created large impoundments that significantly alter natural riverine character excluding this segment of the river from National Wild and Scenic Rivers eligibility. Lubbers Run, the largest tributary to the Musconetcong River, was also excluded due to the presence of several impoundments. In the Musconetcong Gorge below Bloomsbury a large dam diverts much of the river's flow into a canal that serves as a water supply and power source for the paper mill in Warren Glen. A second dam below Route 519 and the paper mill also forms a substantial dam pool. This segment of the river was excluded from eligibility because the two dams and the canal diversion have significantly altered riverine character.

Outstandingly Remarkable Resource Values

To be considered eligible for inclusion in the National Wild and Scenic Rivers System, a river segment, together with its adjacent lands, must support one or more “outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural or other similar values ...” (Section 1(a) of the Act). The Interagency Guidelines have further clarified that “other similar values, such as ecological, if outstandingly remarkable, can justify inclusion of a river in the national system.”

In order to be assessed as outstandingly remarkable, a river-related value must be a unique, rare or exemplary feature that is significant at a regional or national scale. Also, all values should be directly river-related. That is, they should: 1) be located in the river or within one-quarter mile; 2) contribute substantially to the functioning of the river ecosystem; and/or 3) owe their location or existence to the presence of the river. The determination for evaluating outstandingly remarkable resources is, however, left to the judgment of the study team. For the purposes of the Musconetcong Study, river-related resources were determined to be outstandingly remarkable if they were found to be rare or exemplary within a regional or national context. The criteria applied for this context are as follows:

National: The resource's significance has been established through designation or recognition in federal programs such as endangered, threatened and/or rare species; and historical and cultural sites and parks.

State: The resource has been designated or recognized by the State of New Jersey in programs such as historic sites, recreational parks and trails, endangered, threatened and rare species, critical habitats, state planning areas, and stream classifications.

Regional: Regional significance has been recognized and documented in research programs or studies and confirmed by regional experts.

Classifications

Section 2(b) of the Act requires that eligible segments be classified as wild, scenic or recreational. For classification purposes, a study river may be segmented. Below is a brief description of each classification:

Wild Rivers: Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.

Scenic Rivers: Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.

Recreational Rivers: Those rivers or section of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

Eligibility and Classification Findings

Eligible Segments and Proposed Classifications

An assessment of natural, cultural and historic features completed as part of this study shows that three segments of the Musconetcong River, a total of 28.5 miles, are eligible for inclusion in the National Wild and Scenic Rivers System. The following is a description of the river segments and proposed classifications, and a summary of outstandingly remarkable values.

Each of the three segments of the Musconetcong River is classified as recreational because the segment is readily accessible by road and/or contains some development along the shoreline. Segment A is also classified as scenic because most of the land along the riverfront is public parkland and remains largely primitive.



Iron Truss Bridge in the Borough of Bloomsbury

Segment A: Saxton Falls to the Rt. 46 Bridge (3.5 miles)
Classification: Scenic and Recreational

Segment B: Kings Highway Bridge to the Railroad tunnels at Musconetcong Gorge (20.7 miles)
Classification: Recreational

Segment C: Hughesville Mill to Delaware River confluence (4.3 miles)
Classification: Recreational

Outstandingly Remarkable Values

Recreational

The Musconetcong River Valley features a diversity of recreational opportunities that are popular enough to attract visitors from throughout the region. The river corridor provides a high-quality environment for a wide variety of recreational activities which are important to the local economy. State, county and local parklands within the river corridor provide significant opportunities for hiking, fishing, canoeing, camping, nature study and other outdoor activities. The Musconetcong River and its tributaries are regionally important trout fishing streams. Approximately 20 of the tributary streams support naturally reproducing trout populations. The river is also eligible for designation to the State Trails System as a *Waterways Trail*. The river-related recreational resources are considered to be regionally exemplary.

Historic and Prehistoric

The Musconetcong River Valley contains many river-related historic bridges, mills and historic districts that are listed on the National Register of Historic Places. One river-related resource, the Morris Canal Historic District, is a National Historic Landmark and was judged to be nationally exemplary. The Plenge Paleo-Indian archaeological site within the river corridor is eligible for National Landmark designation study. River-related historic resources were judged overall to be regionally exemplary.



Asbury Mill

Scenic

Several locations in the river corridor offer outstanding views of the agricultural river valley, Highland Ridges, Kittatinny Mountain and Delaware Water Gap. These views of landforms and vegetation throughout the seasons are only minimally interrupted by cultural intrusions. River-related scenery was judged to be regionally exemplary.

Wildlife and Critical Habitat

Regionally important populations of wildlife and critical habitat for state listed threatened, endangered or rare species are present within the river corridor. The Musconetcong River watershed lies entirely within the New Jersey Highlands Region, a landscape of national importance as determined by the U.S. Forest Service and within the Atlantic Flyway, one of four major migratory bird routes in North America.

Segment-by-Segment Analysis

The following is a categorical description of outstanding resources found within each study segment.

Segment A: Saxton Falls to Rt. 46 Bridge

- Recreational: Allamuchy/Stephens State Park
Eligible State Waterway Trail
- Historic: Morris Canal National Historic Landmark
- Scenic: Largely primitive, undeveloped river corridor through state and municipal parklands
- Wildlife: Barred Owl: State threatened
Brook Floater: Critically imperiled in NJ

Segment B: Kings Highway Bridge to the railroad tunnels at Musconetcong Gorge

- Recreational: Musconetcong River Reservation
Eligible State Waterway Trail
Numerous state-owned access points for fishing, boating and hiking
- Historic: Beattystown Historic District: National Register
Miller Farmstead and stone bridge: National Register
New Hampton Pony Pratt Truss Bridge: National Register
New Hampton Historic District: National Register
Imlaydale Historic District: National Register
Asbury Village Historic District: National Register
North Bloomsbury Historic District: National Register
- Scenic: Outstanding views of agricultural river valley, Highland Ridges, Kittatinny Mountain and Delaware Water Gap Outstanding views of agricultural river valley from Highway 639, Franklin Township
- Wildlife: Wood Turtle: State threatened
Fleshy Hawthorn: State endangered

Segment C: Hughesville Mill to Delaware River confluence

- Recreational: State-owned and county parks access points for fishing, boating and hiking
- Historic: Siegle Homestead: National Register
George Hunt House: National Register
Riegelsville Company Town Historic District: National Register
- Critical Habitat: Alpha Grasslands Natural Heritage Priority Site

CHAPTER 3 – RIVER MANAGEMENT FRAMEWORK

To ensure implementation of the River Management Plan, the Musconetcong River Management Council (MRMC) was created based upon the underlying principle that existing institutions and authorities should continue to provide the foundation for the long-term protection of the Musconetcong River and its watershed. The MRMC works with the Musconetcong Watershed Association and builds on the previous efforts of the Musconetcong Advisory Committee in highlighting river management issues.

The purpose of the Musconetcong River Management Council is to promote the long-term protection of the Musconetcong River by: (1) bringing those involved in river issues together on a regular and ongoing basis, (2) stimulating cooperation and coordination among those organizations and individuals, (3) providing a forum for all river interests to discuss and resolve issues, and (4) coordinating implementation of this management plan. The Musconetcong River Management Council serves in an advisory capacity to local, county, and state authorities and private interests to achieve effective protection of the river through implementation of the management plan recommendations.

Council Membership

Voting membership in the MRMC includes representatives of the fourteen watershed municipalities and four counties traversed by the designated river segments, the Musconetcong Watershed Association, Heritage Conservancy, and Trout Unlimited. Participation in MRMC activities by representatives of federal, state, regional and local agencies and members of the general public is encouraged. The MRMC has also established sub-committees to address specific goals, objectives and key actions in the management plan.

The MRMC is governed by a set of bylaws, in addition to the Memorandum of Understanding signed by each voting member acknowledging their endorsement of the provisions contained in the legislation designating the river. These documents establish a cooperative commitment among members to participate in the long-term management of the river and to implement those parts of the management plan under their jurisdiction or for which they assume responsibility.

Funding and Staff

To implement the actions identified in the management plan, the MRMC requires both direct funding and in-kind assistance. Funds may be directed to hire staff to coordinate the MRMC activities, undertake specific implementation projects and to cover general operating expenses related to specific activities or responsibilities.

The NPS is authorized to enter into a formal agreement with the MRMC's member organizations pursuant to Section 10(e) and or Section 11(b)(1) of the National Wild and Scenic Rivers Act. Such agreements could include provisions for limited financial or other assistance from the federal government to facilitate the protection and

management of the river. Such funds may be part of the annual budget request to Congress by the National Park Service. An annual budget of \$400,000 provides for NPS staffing and cooperative agreements.

For long-term funding needs and for specific implementation projects, the MRMC may pursue financial assistance and in-kind contributions from individuals, foundations, corporations, and local, state and federal government sources.

National Park Service Role

The National Park Service (NPS) serves as the key federal representative in the implementation of the Musconetcong National Wild and Scenic Rivers Management Plan. It is important to note, however, that the NPS' role in managing the river is limited. A key principle of the administrative framework is that existing institutions and authorities will play primary roles in the long-term protection of the river. Landowners, municipalities, counties, state agencies and private organizations will participate in maintaining the outstandingly remarkable qualities that made the Musconetcong River eligible for designation. This partnership approach to the management of the Musconetcong River entails no land acquisition or ownership by the NPS. Local landowners and municipalities will be responsible for managing land areas along the river corridor within the federally designated boundary.

The agency's primary roles are to review river projects as required by the National Wild and Scenic Rivers Act's Section 7(a) and 10(a) provisions. Pursuant to this review process, the NPS will evaluate any proposed river projects to ensure the river's outstandingly remarkable resource values and free-flowing character are protected, or even enhanced, when possible. The river municipalities and the state retain their existing land use authority and responsibility for recreation management.

Guidelines for Water Resource Projects, including Public Utilities, Transportation and Recreation Facilities

Facilities providing transportation, energy resources, communications, water supply, waste disposal, education and recreation are critical public services provided to citizens living, working in, and visiting the Musconetcong River corridor. If such facilities, however, are improperly located, designed, constructed or maintained, they may have the potential to severely damage or destroy the very values for which the river was considered for designation into the national system. The cumulative impacts of multiple corridor and stream crossings can exacerbate these problems.

Section 7 Provisions

For these reasons, the United States Congress (through Section 7 of the Federal Wild and Scenic Rivers Act (P.L. 90-542, as amended), directed that within the boundaries of designated national wild and scenic rivers that the proposed location, design and construction of water resource projects, where any kind of federal assistance is provided, should be reviewed to determine if there is the potential to affect the free-flowing character of wild, scenic or recreational rivers. Commonly used Section 7 terms are defined as:

- **Water Resources Project** - Any dam, water conduit, reservoir, powerhouse, transmission line, or other project under the Federal Power Act (FPA), or other construction or developments which would affect the free-flowing characteristics of a wild and scenic or a congressionally authorized study river. In addition to projects authorized by the Federal Energy Regulatory Commission (FERC), water resources projects may also include: dams; water diversion projects; fisheries habitat and watershed restoration or enhancement projects; bridges and other roadway construction; bank stabilization projects; channelization projects; levee construction; recreation facilities such as boat ramps and fishing piers; and activities that require a permit from the Army Corps of Engineers (ACOE), pursuant to the Rivers and Harbors Act or Section 404 of the Clean Water Act.
- **Federal Assistance** - Any assistance by an authorizing agency before, during, or after construction. Such assistance may include, but is not limited to: a license, permit, preliminary permit, or other authorization granted by FERC; a license, permit or other authorization granted by the Army Corps of Engineers. Assistance also includes federal funding of projects such as highways, roads and bridges; environmental and recreational facilities, community development activities; etc.
- **Free-Flowing** - Defined in the Wild and Scenic Rivers Act in Section 16(b) as “existing or flowing in natural condition without impoundment, diversion, straightening, rip-rapping, or other modification of the waterway.”

Procedures

The vast majority of these activities are subject also to review and approval by other federal, state and local agencies. No new permits are required under Section 7, however, the section requires that the federal agency assisting with the project consult with the National Park Service before a project is actually begun. Project proponents are encouraged to consult very early in the scoping, siting and project design process to avoid delays and costs associated with projects that cannot be approved under Section 7.

Section 7 states, in part, that no department or agency of the United States shall assist by loan, grant, license or otherwise, in the construction of any water resource project that either:

- Would have a direct and adverse impact on the values for which the river was designated (for projects located on a designated river); in the case of the Musconetcong River, this includes hydro-geology, water quality and quantity, certain botanical, fish and wildlife resources, and historic and cultural values; or
- Invade the area or unreasonably diminish the scenic, recreational, fish and wildlife values present in the area at the time of designation (for projects above or below designated rivers, or on a non-designated tributary).

Review Criteria

Transportation, recreation and utility corridors and facilities, and other water resource projects, should be designed to protect the free-flowing character and outstandingly remarkable values of the Musconetcong River through application of the following:

1) Assessment of:

- A. Impacts on the free-flowing character of the Musconetcong River
- B. Impacts on the outstandingly remarkable values of the Musconetcong River for which the area was designated as a component of the National Wild and Scenic Rivers System.
- C. Effect on related environmental factors and ecological systems involved, including adjacent lands, waters, aesthetics, fisheries, recreational, floodplain, wildlife, vegetation, and historic and archeological values.
- D. Cumulative Impacts.
- E. Alternatives available to the applicant, with explanations as to why some alternatives are unsuitable.
- F. Secondary effects likely to be caused or encouraged by the project.
- G. Economic factors, including the need for resource protection measures in the approximate area in the future.
- H. Other relevant factors.

2) In addition to the general assessments described above, the following specific items need to be considered:

A. For all projects:

- 1. The facility should be located to take advantage of existing topography and vegetation.
- 2. The facility should be located, constructed and maintained so that it does not lead to accelerated bank erosion or degradation of streams and related resources.
- 3. Removal of trees, shrubs, and other vegetation should be kept to a minimum, for the protection of water quality, fish and wildlife habitat, visual quality and related values.
- 4. Construction should incorporate the use of materials that blend with the natural setting.
- 5. Only minimal filling of wetlands and floodplains should occur.
- 6. During construction, strict erosion control measures should be taken to prevent sediment from reaching the river. Only minimal clearing of existing vegetation, clearing, grubbing and grading should be performed.

7. The construction area should be restored to as natural a condition as possible immediately following construction.
8. Following construction, special measure may be needed to restore the natural appearance of the area, stabilize river banks, discourage damaging off-road vehicle or other recreational use, or enhance fish and wildlife habitat.
9. Materials used for bank stabilization following construction should maintain and enhance the natural and aesthetic qualities of the Wild and Scenic River area.
10. Biodegradable materials such as burlap, jute netting or blankets made from coconut fiber should be used to hold vegetative plantings in conjunction with slope stabilization and other erosion and sedimentation control measures.
11. Specifications regarding stabilization efforts and revegetation should be consistent with the goals of maintaining stream width as near as possible to the original width, and to provide early revegetation of the area.
12. If revegetation is required within the riparian forest buffer, native plant materials commonly found in that area should be used.
13. The time and method of planting native vegetation should occur in a manner that ensures maximum survival and growth of plant species.
14. Work should be performed at the time of the year when the stream is experiencing low flow conditions in order to minimize impacts to fish and macroinvertebrate species.

B. For corridors and rights-of-way:

1. Planning for new rights-of-way should identify existing nearby rights-of-way which the proposed facility might share or be located adjacent to.
2. Establishment of new corridors should anticipate future needs in that area, and attempt to accommodate those needs, so that additional, future intrusions into designated areas will be minimized.
3. The narrowest width right-of-way necessary to facilitate construction and maintenance of the facility should be used.
4. The low points of approach on the corridor should be far enough landward of the water's edge to direct runoff to a vegetated area away from any part of the river.
5. Upon reaching the riparian forest buffer during clearing operations for overhead transmission or communication lines, tall-growing tree species may selectively be removed. Shrubs, low growing tree species with a mature height of less than 20 feet, and other vegetation should be left as natural as possible.

6. Management of trees, shrubs and other vegetation for maintenance of all rights-of-way should be done manually in the riparian forest buffer. However, appropriate herbicides may be applied by hand to stumps of selectively cut trees, where establishing and maintaining a low-growing shrub community in this zone will further the objectives of the wild and scenic river designation. Selective hand application of certain pesticides to control insect or disease infestations is acceptable.

C. River Crossings

Bridge and culvert structures – In order to safeguard the free-flowing character of designated rivers and protect scenic, recreational and fish and wildlife values, bridges should be:

- Clear-span structures (means spanning the entire width of the waterway, without piers, piles, abutments or other structures located below the ordinary high water mark).
 - Low profile, and constructed of materials that blend with the natural surroundings as much as feasible.
 - Where watercraft and/or passage of anglers is required, a vertical clearance of 5 feet between the ordinary high watermark and the bottom of the bridge is desired.
 - Culverts should provide for a natural streambed under the span, either by using a bottomless structure or by recessing the culvert bottom a minimum of 12 inches below the river bottom.
1. The river should be crossed by a method that minimizes disruption to the streambed. Rivers should be crossed by bridges perpendicular to their banks, and at the point and time that are least damaging to fisheries and vegetation.
 2. If aerial crossings are used, they should be designed to accommodate safe recreational use of the river in addition to protection of the river banks.
 3. A single-span river crossing is preferred wherever possible, maintaining proper vertical clearance over the waterway and proper structure height for minimal adverse visual impact.
 4. Underground installation is preferred for all new utility lines except: power lines of greater than 35 KV; where new lines are to be placed on existing poles, towers or bridges; or where burying is proven to be infeasible because of geologic constraints.
 5. Directional boring will be the preferred method of crossing the river. Open cut construction across the stream is discouraged, except for large diameter installations such as a sewer or water main.
 6. Towers and poles should be removed when elimination of existing above-ground facilities occurs.

7. The width of the riverbed should not be altered.

D. Other Structures

Except as provided for in B and C above, structures associated with water resource projects should be located in such a manner as to protect and enhance the outstandingly remarkable values of the Musconetcong River.

CHAPTER 4 – RESOURCE MANAGEMENT

There are five major categories of resources that require management in order to protect the river corridor:

- Recreational and Scenic Resources
- Historic and Archaeological Resources
- Farmland and Open Space
- Natural Resources
- Water Quality

The following section describes each of these major resource categories, the responsibilities of government agencies and other entities involved in their management, the goals and objectives for each category, and key actions required to implement the plan.

Recreational and Scenic Resources

The Musconetcong River Valley features a remarkable diversity of scenic farms, secluded natural areas, villages and hamlets. In addition to being one of the most scenic river valleys in New Jersey and the surrounding region, the Musconetcong River valley is a high-quality setting for a wide variety of recreational activities such as hiking, hunting, fishing, paddling, bird watching, swimming, camping, nature study, agri- and eco-tourism, and other outdoor activities. Local residents as well as people from the surrounding region come to the Musconetcong River Valley to enjoy the recreational opportunities. The scenic and recreational resources combined are an important part of the local and regional economy.

The geologic features of the Musconetcong River Valley play a major role in determining its regionally unique scenic character. The prominent ridges that parallel both sides of the valley provide an unmistakable definition to the valley landscape. Long stretches of the river valley are wide and straight enough to allow for sweeping views of gently sloping farmland and forested ridgelines. The river itself contains many hidden away areas that provide intimate views of mature forests, farmland and historic villages. Scenic views can be divided into several categories: intimate views of the river and its surroundings, vistas of the river valley from higher elevations, and glimpses of the river and adjacent landscape from the recently designated Warren Heritage Scenic Byway (Route 57).

Recreational opportunities in the Musconetcong River Valley are found in the over 10,000 acres of state-owned parks and river access points. There are also several hundred acres of county and local municipal parklands along the river. In addition, several property owners lease their riverfront lands to private fishing and hunting clubs while others allow access for such activities as fishing. Warren County has also provided grant funds to the Musconetcong Watershed Association (MWA) and Heritage Conservancy (HC) for the conservation of riverfront parcels for public access.

The Musconetcong is one of the most popular trout fishing streams in New Jersey and the surrounding region, and has more miles of stocked waters than any other stream statewide. The Musconetcong River's popularity is growing with the increase of public fishing access sites maintained by the NJDEP Division of Fish and Wildlife (NJDF&W) and often purchased by NJ Green Acres dollars. Trout are the primary species targeted by anglers and most of the 42-mile river has a year-round trout population. The river contains both stocked and naturally reproducing trout.



The river is also an important source of recreation for boating (primarily canoes and kayaks), and has been identified by the NJDEP Office of Natural Lands Management in its New Jersey Trails Plan as a Waterways Trail. The most frequently paddled sections of the river are between Beattystown and Bloomsbury. Difficult portages occur at the Bloomsbury, Warren Glen, Hughesville and Finesville dams. (Efforts to remove some of these dams are underway). The Musconetcong Watershed Association recently produced a waterways trail guide to provide additional access information to river users. The increase in number of fishing access sites has also created more access to the river for boaters.

Swimming and tubing are common recreational pursuits at various points along the river. The Musconetcong River corridor also provides numerous locations for hiking, birding and other passive forms of recreation. Exceptional hiking opportunities along the Musconetcong are found in Allamuchy-Stephens State Park, Point Mountain Park, Musconetcong Preserve and state-owned lands below Bloomsbury.

Conflicts between riverfront property owners and recreational users of the river (primarily fishermen) are known to occur in certain areas. As the amount of public lands along the river and numbers of recreational users increase over time, the potential for such conflicts will likely increase. The Green Acres Program, as land acquisition agent for the Department of Environmental Protection, continues to maintain an aggressive program along the river, and these properties are turned over to NJDF&W. The Division maintains these areas to provide access to the river, primarily in the form of parking for anglers. The Division encourages easements, which provide perpendicular and parallel access to the river's edge. There is currently no comprehensive management plan in place to protect the natural resources while providing recreational opportunities. A management plan is needed to ensure that recreational use is sustainable, from a resource standpoint, and that recreational opportunities are facilitated in a way that protects both property owners and recreational users of the river. Informing both recreational users of the river and landowners about the available public access points and appropriate uses of public lands would serve to minimize conflicts and improve the condition of the resources.

There are also three on-going regional trail development projects within various parts of the Musconetcong watershed. The Highlands Trail currently crosses a tributary to the Musconetcong, Lubbers Run, in Byram Township and is proposed along the ridge of Musconetcong Mountain in other parts of the watershed. Other trail projects include the Liberty to Water Gap Trail (from Liberty State Park on the Hudson to the Delaware Water Gap, a project initiated by the Morris County Park System), and the Morris Canal Corridor Trail (to follow the route of the Morris Canal along or near the Musconetcong River in Morris County, a project involving county, state, and federal agencies and five private groups). Such linear linkages are a priority for the state Green Acres program. Warren County has also been successful in the protection of sites along the historic Morris Canal including inclined Plane 10W and is in the process of planning for a related greenway along the Warren County portions of the historic canal.

The 1,429 acres owned by NJDF&W are scattered along the river, several tracts in excess of 300 acres, providing almost two dozen access points, mostly used by hunters and fishermen. The largest parcel is the 123-acre Musconetcong Wildlife Management Area (the Iraeni Tract) in Pohatcong, which borders the 164-acre Warren Glen Pohatcong Park. The Iraeni Tract is across the river from Hunterdon County's Musconetcong Gorge Nature Preserve. The NJDF&W sites provide a good cross-section of the watershed's lands, from steep forested slopes to croplands. NJDF&W also manages the 234-acre Hackettstown Hatchery where warmwater game fish are raised for stocking ponds and lakes throughout NJ.

The largest NJDEP Parks and Forestry holding is the huge complex in Byram, Green, Allamuchy, and Mount Olive townships at the northeastern end of the Musconetcong watershed, just below Lake Musconetcong. Within this complex are Stephens State Park (805 acres) and Allamuchy Mountain State Park (9,000 acres consisting of Saxton Falls and a 2,440-acre Natural Area). Stephens State Park and Saxton Falls are along the river, with Allamuchy extending from the river to the watershed ridgeline, a huge extent of forested land. These parks are considered complete, although parks officials are seeking about 450 acres in and around Allamuchy Mountain State Park to consolidate its border and add an access point. These parks are very well used, with annual attendance figures in Stephens averaging 40,000-45,000 and in Allamuchy 62,000-67,000.

The Hunterdon County parks provide some of the Musconetcong Watershed's best natural and recreational sites. All four parks contain substantial forested tracts and ridgelines, and the two largest extend to the river's edge. Warren County manages part of the Morris Canal and Patriot's Path. Morris County does not have holdings in the Musconetcong River corridor.



Overlook at Point Mountain

Parks, public recreation and protected open space in the plan area include:

- | | |
|------------------------------------|-----------------------|
| - Allamuchy-Stephens State Park | - Charlestown Reserve |
| - Bethlehem Township Heritage Park | - Cliffdale Center |

- | | |
|---|--|
| - Hackettstown Municipal Park | - Musconetcong Wildlife Management Areas |
| - Hampton Borough Park | - MWA River Resource Center |
| - Highlands Trail | - NJDEP Fish and Wildlife river access sites |
| - Liberty to Water Gap Trail | - Patriot's Path |
| - Millennium Trail | - Sussex Branch Trail |
| - Morris Canal Corridor Trail | - Tower Hill Park |
| - Musconetcong River Reservation,
Musconetcong Gorge | - Warren Glen Pohatcong Park |
| - Musconetcong River Reservation,
Point Mountain Section | |

OBJECTIVE 1.1 Protect and enhance the fisheries of the river and river tributaries.

Key Actions

- ❑ Evaluate the river and its tributaries for evidence of trout production and recommend reclassification if appropriate.
- ❑ Preserve and protect trout production streams, including headwater areas and tributaries.
- ❑ Maintain and restore riparian buffers along the river and river tributaries to protect water quality and moderate temperature.
- ❑ Design, construct and maintain habitat improvements to enhance trout habitat.
- ❑ Identify non-functional dams for potential removal.
- ❑ Review water resource and other projects consistent with Section 7(a) and 10 (a) of the National Wild and Scenic Rivers Act where the National Park Service has project review responsibility.

Roles

- SG/NG
- LG/SG/LO/NG
- LG/SG/LO/NG
- SG/NG/LO/LG/CG
- SG/LO/NG
- FG

OBJECTIVE 1.2 Provide suitable and appropriate public access to the river corridor for recreational uses.

Key Actions

- ❑ Provide signage and appropriate facilities for existing river access points.
- ❑ Conduct an inventory and develop a recreational user's guide to the river to direct visitors to appropriate public use areas.
- ❑ Evaluate the need and capacity for additional access points for designated uses as public recreation lands are expanded.

Roles

- LG/SG/LO/NG
- CG/SG/NG
- LG/NG/SG/CG

OBJECTIVE 1.3 Protect and enhance natural and cultural resources on public lands.

Key Actions

- ❑ Develop and implement management plans for all public lands.
- ❑ Provide property maintenance through inter-governmental cooperative agreements, dedicated funding and voluntary citizen action.
- ❑ Mark property boundaries to clearly identify the extent of public lands in the river corridor.
- ❑ Support appropriate patrol and law enforcement on public recreation lands.

Roles

- LG/SG
- LG/SG/NG/LO
- LG/SG
- LG/LO

OBJECTIVE 1.4 Identify and preserve lands in the river corridor and the watershed, which have exceptional scenic value.

Key Actions

- ❑ Identify and delineate scenic corridors, vistas, landscapes and natural features and incorporate into municipal and county plans.
- ❑ Consistent with the Wild and Scenic Rivers Act Section 10(a), preserve, protect and enhance scenic corridors, vistas, viewsheds and natural features by evaluating projects and their impacts to the RMP's outstandingly remarkable resource values.
- ❑ Preserve priority scenic corridors, vistas, landscapes and natural features through open space acquisition, purchase of development rights and donation of conservation easements.
- ❑ Encourage development and redevelopment patterns, which maintain views and vistas by adopting appropriate zoning and land development ordinances and design guidelines.
- ❑ Support implementation of the Warren Heritage Scenic Byway Corridor Management Plan.

Roles

- LG/CG/NG
- FG
- LG/CG/SG/NG/LO
- LG
- LG/CG/SG/NG/LO

Many agencies, organizations and individuals will have active roles in completing the key actions of this management plan. Recommended roles are abbreviated as follows: LO = landowner, LG = local government, CG = county government, SG = state government, FG = federal government and NG = non-governmental organization.

Historic and Archeological Resources

Human habitation in the Musconetcong River valley has been traced back to as early as 12,000 years ago when Paleo-Indians occupied the region during the final retreat of the Wisconsin glacier. Evidence of their presence in the valley was documented at the Plenge Site, which is located along the lower Musconetcong River in Franklin Township, Warren County. The Plenge Site was the first of only two major Paleo-Indian archaeological site excavations in New Jersey, and it is considered to be one of the most important in the northeastern United States.

The Lenape village on the river, called “Pelouesse” by the colonial Americans, was named by the Lenape as either “mpilusasu” meaning “it has been burned by the water” or “yapeilusasu” meaning “it has been burned on the stream bank.” The “mpi” part of the word, which means “water”, sounds like “pi”, and the “yapei” part, meaning “on the stream bank”, stresses the “pe” sound. The burned area, similar to one at the village of Musconetcong, was used as a plantation by the Lenape. Pelouesse was located in Warren County just across from Hampton, Hunterdon County.

The history of the name of the Musconetcong River reveals that before 1700 the quality of the river was appreciated by the Lenni Lenape people. The Lenape name of a village located where Hackettstown is today was “Moschakegeuhannekoak”, meaning “place of the clear stream.” Clean, clear water was valued by the native people even then. Later, a 1770 British map names the river “Muskanetkunk Creek.” The suffix “kunk” means “place” in the translation of the oral Lenape language for the modern Lenape-English dictionary. But pronunciation of “kunk” in oral recordings by Lenape descendants sounds like “cong.” Colonial Americans picked up on that sound to give us the Musconetcong name for the Lenape village and the river.

By the time European settlement came to the Musconetcong River valley during the early 18th century, the Lenape Indians were already in a state of decline, and the several thousand-year-old aboriginal occupation was coming to an end. While the Lenape Indians burned off significant areas of forest to plant crops and attract game, their only lasting imprint on the landscape were the major trails that European colonists eventually adapted to roads. One of these was the Malayelick Path which ran from the head of the tidal Delaware River to the Musconetcong River “gap” between Musconetcong and Schooleys Mountains. The path was the forerunner of State Highway 31, which begins in Trenton and crosses the Musconetcong River at Hampton Borough. Portions of State Highway 206 are part of the Minisink Trail, which linked the New Jersey coast with Minisink Island in the Upper Delaware River.

Subsistence agriculture took root in the lower Musconetcong River valley at the beginning of the 18th century. The fertile limestone valley was rapidly cleared for croplands, and subsistence agriculture gradually evolved into commercial grain and dairy farming. Villages sprang up around the many gristmills and iron forges built along the Musconetcong River from Finesville to Hackettstown.

The charcoal iron industry was also established during the early 18th century on the lower Musconetcong River, and was supported by abundant supplies of ore and wood from the surrounding ridges. The iron industry faced a precipitous decline when wood supplies were depleted by the early 19th century. However, the industry was rescued when one of early America's truly amazing engineering feats -- the Morris Canal -- was built to carry coal from the Pennsylvania coalfields to fuel the iron furnaces.

The Morris Canal was a world-famous engineering marvel that required abundant supplies of water. Lake Hopatcong, the source of the Musconetcong River, was originally two small natural glacial lakes. In 1750, a dam was built on the Musconetcong River where it emptied the lakes raising the water level to join the two lakes as one. Lake Hopatcong alone was found to be an inadequate water source for the Morris Canal. To augment the flow of water to the canal, several other dams were built on the Musconetcong River and Lubbers Run, its largest tributary.



Morris Canal Remnants at Bread Lock Park

The economic and practical use of the Morris Canal was short lived. By the 1860s, the Central Railroad of New Jersey and the Delaware Lackawanna and Western Railroad entered the Musconetcong River valley, both built to carry coal from Pennsylvania to the iron furnaces, forges and foundries of New Jersey and New York City. The CRRNJ joined with the DLWRR in Hunterdon County at Hampton, which was originally called Junction.



Railroad tunnel above the Musconetcong Gorge

Only a few remnants of the Morris Canal remain, yet its impact on the river can be seen in the silted-in dam pools above Waterloo Village and Saxton Falls. The lakes that were created to serve the needs of the canal and iron industry also spawned a new “industry” – summer cottage recreation and tourism. Even as the iron industry and Morris Canal were dying out, passenger trains and automobiles were carrying people to the

summer cottages that sprang up along several lakes of the upper Musconetcong River watershed. This historic land-use pattern in the upper valley continues today, although most of the summer cottages have since become permanent residences. The lower Musconetcong River Valley, where agriculture continues to dominate the landscape, has undergone remarkably little change in the past 100 years.

Nearly all known archeological sites in the Musconetcong River Valley are located on level well-drained soils situated on lower-lying terraces above the floodplain.

Prehistoric sites tend to cluster in wider areas of the valley floor near passes through ridge gaps. Particular site concentrations have been identified within a one-mile radius of Hackettstown, Beattystown, Hampton, Penwell, Asbury, West Portal and Riegelsville. Almost all are open sites containing remains of campsites and activity areas.



Historic Finesville

Outstanding river-related historic features -- many of which are listed on the New Jersey and National Registers of Historic Places -- can be found in Stanhope, Waterloo Village, Asbury, Finesville and several other Musconetcong River communities. These features contribute greatly to the scenic character and overall quality of life in the Musconetcong River valley, and are important to the local economy as key components of regional tourism.

Remains of locks and associated historic archeological features have been found within the Morris Canal Historic District National Historic Landmark paralleling the river above Port Colden. The Paleo-Indian Plenge Site near Asbury is the only other archeological locale presently considered eligible for National Historic Landmark designation study.

Unlike most areas in the region, a large portion of the Musconetcong River Valley remains a relatively undeveloped rural enclave. Although road construction and other developments have destroyed four known prehistoric sites and impacted all historic resources, inventoried archeological resources located within fields or forested areas may yet survive relatively intact. Un-inventoried archeological sites also almost certainly survive in designated historic sites and districts, areas of known site concentration, in level, well watered and drained locales particularly conducive to human habitation, in and around historic buildings and structures, and other locales.

Archaeological sites, historic sites and districts located in the plan area:

- Paleo-Indian site
- Morris Canal National Landmark
- Stanhope
- Waterloo Village
- Saxton Falls
- Beattystown
- Stephensburg
- Miller Farmstead and Stone Bridge
- Penwell
- Squires Point
- Changewater
- Lebanon Township Historical Museum
- Bloomsbury
- New Hampton
- Imlaydale
- Asbury
- New Hampton Pony Pratt Truss Bridge
- Warren Glen
- Siegle Homestead
- Finesville
- George Hunt House
- Riegelsville/Mt. Joy

GOAL: Preserve and protect the character of archaeological sites and historic structures, districts, sites, and landscapes in the river corridor.

OBJECTIVE 2.1 Protect historic bridges and other historic structures and landscapes.

Key Actions

- ❑ Complete cultural resource inventories and incorporate into master plans and ordinances.
- ❑ Rehabilitate rather than replace bridges that are on or eligible for the National Register of Historic Places or are integral to National Register Districts.
- ❑ Encourage the establishment of historic preservation commissions and the adoption of historic preservation plan elements in master plans.
- ❑ Complete nominations to the State and National Registers of Historic Places.
- ❑ Recommend the designation of historic districts and outstanding historic resources as Historic and Cultural Sites through municipal master plans.
- ❑ Develop model ordinances, design guidelines and case studies to support preservation.
- ❑ Promote the use of federal tax credits, state and federal grant programs, and transportation enhancement funds for preservation and rehabilitation.

Roles

- LG/NG
- CG/SG
- LG/CG
- LG/NG/LO
- LG/NG
- LG/CG/NG
- LG/CG/SG/NG/LO

LO = landowner, LG = local government, CG = county government, SG = state government, FG = federal government and NG = non-governmental organization.

OBJECTIVE 2.2 Promote public awareness of historic and archaeological resources and their benefits to the community.

Key Actions

- ❑ Encourage activities such as self-guided heritage tours, walking tours, oral history presentations and heritage-based events.
- ❑ Evaluate cultural and heritage tourism potential of the river corridor and river communities.
- ❑ Promote the economic benefits of preservation to the community.
- ❑ Provide training and information on techniques for preserving historic structures, districts and landscapes.
- ❑ Promote local historic-based initiatives such as the Warren Heritage Scenic Byway and the Morris Canal Greenway Plan (Warren County).

Roles

- NG/CG
- NG/CG/LG
- NG/CG
- LG/CG/SG/NG
- NG/CG

OBJECTIVE 2.3 Consider historic and archaeological resources in the land development process.

Key Actions

- ❑ Encourage review of development and building permit applications for impacts to historic sites and districts, and archaeological sites.
- ❑ Prepare guidelines for restoration of historic bridges.
- ❑ Provide buffer zones for significant cultural resources.
- ❑ Review zoning and land development ordinances to determine their effect on historic resources and encourage historic re-use.
- ❑ Promote educational programming with river corridor school districts.
- ❑ Encourage the establishment of a river corridor natural, historical and cultural interpretive center.

Roles

- LG/SG
- CG/SG
- LG/LO
- LG/NG
- NG
- NG

Townships with significant historic resources may incorporate protective strategies into their comprehensive planning and zoning in order to retain the unique character these resources lend to their towns.

Greenwich Township has included in its Master Plan extensive findings concerning historic sites and structures, including the results of comprehensive historic surveys and reviews, a map of historic landmarks, structures listed on state and national registers, and sites eligible for listing. The Master Plan discusses the benefits of historic preservation to the township and sets forth numerous methods at the township's disposal to achieve historic preservation. These include: 1) historic district overlay zoning, and ordinances that transfer density away from historic features; 2) establishment of a Historic Preservation Commission that would formalize review of development and building permit applications, and establishment of a Historic/Design Council that would suggest architectural design guidelines, and that would provide input on applications for new construction; 3) site plan review; 4) restrictive covenants; 5) sale/leaseback programs; 6) nominations to state and national registers of historic places; 7) preservation easements to limit exterior alterations of buildings, to limit changes in use, and/or to provide agreement on the manner of future subdivision or development.

The "Historic Village" section of Greenwich's zoning ordinance provides the teeth to implement the master plan recommendations. Under this ordinance, a Committee on Architectural Review must grant a certificate of compliance with regard to exterior appearance, design, and relation to other historical buildings in the district before a zoning permit can be issued. Certificates of compliance are issued both for new structures within the designated historic village and those adjacent to historic structures outside of it. The Committee on Architectural Review also decides the appropriateness of removal or demolition of buildings constructed prior to 1900.



Native American artifact displays at Bread Lock Park

Farmland and Open Space Preservation

About 15 percent of the Musconetcong River watershed's 100,864 acres are permanently preserved as open space or farmland. Most of these 'green acres' border the river or are within the one-quarter mile corridor of the wild and scenic plan area. Within the corridor, the limestone bedrock creates the finest prime agricultural soils that are ranked very high in preservation evaluations.

The most active acquisition agencies have been the New Jersey Department of Environmental Protection Green Acres Program (about 10,660 acres), county and state farmland preservation programs (about 2,419 acres, 1,340 of this in Warren County), and the Hunterdon County Parks Program (about 1,150 acres).

Within the last several years, however, municipalities have become an increasingly active partner. As of December 2000, 12 of the 26 municipalities in the Musconetcong Watershed had enacted special taxes for open space acquisition. Eleven of those municipalities are within the National Wild and Scenic Rivers study area, bordering the river. In the watershed, there are 204 acres of municipally owned open space. Municipalities with open space plans and dedicated funding can apply to the state Green Acres Program for Planning Incentive Grants that average about \$500,000 and can be replenished as the money is spent.

Three of the four counties along the river have their own open space or parks programs. In Warren and Morris counties, these programs are funded by a dedicated tax; in Hunterdon, they are funded through capital expenditures.

All four of the counties have farmland preservation programs, although Sussex County's program emphasizes areas outside the Musconetcong Watershed. State funds support the farmland preservation programs in Hunterdon, Warren and Morris, with the counties providing a 20 to 40 percent match on each easement purchase. Warren's 1,340 preserved acres are in 10 farms, all of them on or near the river. Hunterdon has 467 acres in seven farms in the watershed, with one 135-acre farm directly on the river. Morris has preserved five farms containing 612 acres, all immediately on the river. Warren is aggressively pursuing more farms next to or near the riverside clusters. All farms within the preservation program are required to have conservation plans to control erosion and runoff.

The active participation of municipalities and counties and of the Musconetcong Watershed Association and other citizens groups has helped make the Musconetcong corridor a high-ranking state preservation priority. The ultimate goal of the State Green Acres Program in the Musconetcong corridor is to establish a greenway along the entire length of the river. The most recent legislation signed in April 2001 allocated an additional \$1 million for open space acquisition and planning incentives for the Musconetcong River Greenway. To date, the Green Acres 'State Land Acquisition Program' has obtained just over 10,000 acres within the Musconetcong watershed that have been deeded to the State Division of Parks and Forestry or the State Division of Fish and Wildlife. Of these, 625 acres are

scattered along the river, providing almost two dozen access points, mostly used by fishermen. In addition, the Green Acres 'Green Trust Program' makes grants and loans to municipalities and counties and matching grants to non-profit preservation groups. Within the watershed are 131 green acres owned by non-profit groups, 10 of those on the river and 111 within a half-mile.

GOAL: Preserve farmland and open space within the river corridor and the watershed.

OBJECTIVE 3.1 Maintain the rural and agricultural character of the watershed.

Key Actions

- ❑ Support the New Jersey Farmland Assessment Act, which provides preferential tax treatment for land in agricultural or horticultural use.
- ❑ Encourage landowner enrollment in approved farmland preservation programs and agricultural districts to preserve agricultural cores.
- ❑ Support adoption of Farmland Preservation Elements to municipal master plans.
- ❑ Encourage the appointment of municipal Agricultural Advisory Committees.
- ❑ Support the approval of dedicated municipal funding for farmland and open space preservation.
- ❑ Review existing and proposed local ordinances and amendments, and adopt policies that support agricultural land use.
- ❑ Encourage the use of conservation easements, purchase of development rights, and similar voluntary techniques for the preservation of farmland.
- ❑ Develop community design guidelines that are compatible with the rural character of the valley and encourage implementation.
- ❑ Support the Highlands Council Land Use Capability Zoning designations Protective Zone, Conservation Zone, Conservation Zone Environmentally Constrained, and Existing Community Zone Environmentally Constrained in the watershed.

Roles

- LG/SG/NG/LO
- SG/LG/CG/NG/LO
- LG
- LG
- LG/NG/LO
- LG/NG
- LG/NG/LO
- LG/CG/NG/LO
- LG/SG/NG/LO

LO = landowner, LG = local government, CG = county government, SG = state government, FG = federal government and NG = non-governmental organization.



OBJECTIVE 3.2 Increase recreation opportunities, enhance wildlife habitat, promote sustainable agriculture and protect water quality.

Key Actions

- ❑ Identify and map existing protected public and private lands to target gaps for conservation.
- ❑ Identify the Musconetcong River corridor as a high priority for open space preservation in open space plans.
- ❑ Support the approval of dedicated municipal funding for farmland and open space preservation.
- ❑ Review local ordinances and adopt policies that support smart growth strategies such as non-contiguous clustering, lot size averaging, center-based planning and open space zoning.
- ❑ Review local ordinances and adopt policies that support compliance with Highlands Land Use Capability Zoning and minimal growth in the river corridor.
- ❑ Encourage the use of conservation easements, purchase of development rights, and similar voluntary techniques for the preservation of farmland.
- ❑ Ensure that funding for preservation of open space includes management of public lands and monitoring of conservation easements.
- ❑ Encourage recruitment of youth into the outdoor sports such as hunting, fishing, hiking, canoeing, kayaking, etc. that are lifelong recreational activities.
- ❑ Review local compliance with storm water management ordinances to prevent non-point pollution and groundwater preservation.
- ❑ Encourage eco-tourism and agri-tourism in the watershed.
- ❑ Support the existence of a strong, influential New Jersey Department of Agriculture. [SG]
- ❑ Educate local officials about the importance of sustainable development, water, and habitat protection strategies.

Roles

- LG/CG/NG
- LG/CG/SG/NG
- LG/NG/LO
- LG/NG
- LG/CG/NG/LO
- LG/SG/NG
- LG/SG/NG
- LG/CG/SG
- LO/LG
- LO/LG/CG/SG
- SG
- LG/CG/SG/NG

Some communities with a strong agricultural base have taken action to preserve their farmland using state incentive programs, county programs, zoning tools, and land acquisition or preservation mechanisms. Pohatcong Township, Warren County has taken advantage of the state Farmland Preservation Planning Incentive Grant program by adopting a Farmland Preservation Plan. Necessary components of these plans are a comprehensive inventory of farm properties with a map of significant agricultural land areas, a statement showing that municipal ordinances support and promote agriculture in the township, and a plan for preserving as much farmland as possible in the short term by leveraging monies made available by the Garden State Preservation Trust Act. Under this program, the State Agriculture Development Committee (SADC) may fund up to 50 percent of the cost of the ten-year disbursement program.

Pohatcong has also been creative about raising revenue to acquire or otherwise preserve farmland. It has established an Open Space/Farmland Trust Fund through a tax increase of five-cents per one hundred dollars assessed property value in order to raise roughly \$100,000 per year to be earmarked for open space and farmland preservation. Pohatcong has also established an Agricultural advisory Committee to make recommendations for establishing agricultural development areas in the township.



What is sustainable agriculture?

Sustainable agriculture refers to an agricultural production and distribution system that:

- Achieves the integration of natural biological cycles and controls,
- Protects and renews soil fertility and the natural resource base,
- Optimizes the management and use of on-farm resources,
- Reduces the use of non-renewable resources and purchased production inputs,
- Provides an adequate and dependable farm income,
- Minimizes adverse impacts on health, safety, wildlife, water quality and the environment.

Source: Sustainable Agriculture Network, 2002

Natural Resources

The Musconetcong River is a tributary to the Delaware River and both rivers have features that are recognized as being of national importance. The Delaware River is one of four major bird migratory routes in North America and the Musconetcong is part of this important wildlife corridor. The Musconetcong River watershed is located entirely within the New Jersey Highlands region, which continues northeast as part of the New England Uplands physiographic province and continues southwest as the Reading Prong and the Blue Ridge in Pennsylvania.

Geology

High ridges of Precambrian crystalline rock separated by Cambro-Ordovician limestone valleys distinguish the watershed. The rugged and discontinuous Highland ridges rise abruptly in contrast to the nearly flat Triassic Lowlands and Croton plateau of the Piedmont region. Due to the karst topography, some of the small streams that begin on the ridge tops flow down into the valley and disappear into underground cavern networks. In other areas, groundwater flows into the river through springs in the riverbed. The terminal moraine of the Wisconsin glacier crosses the valley below Netcong and Stanhope.

Water quality in the watershed is affected by the underlying geology. Groundwater in the crystalline Precambrian rock on the ridges is iron rich and acidic (low pH), while the groundwater in the limestone in the valley is calcium carbonate rich and basic (high pH). Connections between the Precambrian aquifer and the limestone aquifer and the Musconetcong River water occur. The limestone aquifer is particularly vulnerable to pollution by surface water infiltration given the weak confinement of the overlying clayey soil.

Vegetation and Critical Habitat

In order to survive, all wildlife species must have access to quality habitat. Simply put, habitat is an animal's home. It is the geographic area essential to the survival and reproduction of the species. It is where they find food, water, cover and a place to rear young. A habitat is considered *critical habitat* when it is essential to the survival of a threatened or endangered species and contains biological and physical features, such as food and cover, necessary for species conservation (NJAS, 2007)¹. The Musconetcong Watershed provides such critical habitat for a host of wildlife species, some of which are listed threatened or endangered or are State Species of Special Concern.

The Musconetcong watershed lies within the New Jersey Highlands, a region containing the greatest diversity of natural resources in the state. The forested ridges of the Highlands form critical migration routes for songbirds and hawks that follow the distinct topography of the New England Upland physiographic province. The New Jersey Highlands was recognized in 1991 as an area of national significance when Congress authorized a study of the region by the U.S. Forest Service. The forested ridges that define the watershed boundaries of the Musconetcong River,

¹ New Jersey Audubon Society, "Guide to Protecting The Critical Habitat of New Jersey's Threatened and Endangered Wildlife", 2007

including Musconetcong Mountain, Schooleys Mountain and Pohatcong Mountain, have been identified by the Forest Service study as critically important forestland.

Two Natural Heritage Priority Sites are located within the plan area: a portion of the Alpha Grasslands, located in Pohatcong Township, Warren County; and Vincennes Ravine, located in Holland Township, Hunterdon County. These sites are identified by the Office of Natural Lands Management, DEP Endangered and Nongame Species Program and The Nature Conservancy as containing critical habitat of rare species and exemplary natural communities.

Furthermore, four areas specific to the Musconetcong watershed - the Alpha Grasslands,² the Musconetcong Gorge,³ Northern Musconetcong Mountain Region,⁴ and Allamuchy State Park⁵ - were designated in 2008 as New Jersey Important Bird Areas (IBA) under the a global initiative begun by Birdlife International and promoted in New Jersey by the New Jersey Audubon Society. Under the criteria specified in the IBA program these sites provide essential habitat for one or more species of birds and that make a contribution to the long-term viability of native avian populations in New Jersey.⁶

The areas along the eligible river segments provide the following habitat types critical for the survival of several wildlife species to be listed later, as defined by NJDEP's i-Map NJ⁷:

- Deciduous Forest (>50% Crown Cover)
- Streams & Canals
- Deciduous Wooded Wetlands
- Mixed Wooded Wetlands
- Deciduous Scrub/Shrub Wetlands
- Cropland/Pastureland
- Agricultural Wetlands
- Mixed Forest (>50% Crown Cover)
- Mixed Forest (10-50% Crown Cover)
- Orchards/Vineyards/Nurseries/Horticultural Areas
- Mix Scrub/Shrub Wetlands
- Recreational Land
- Mixed Deciduous/Coniferous Brush/Shrubland
- Old Field (<25% brush cover)
- Herbaceous Wetlands

² <http://www.njaudubon.org/Tools2.Net/IBBA/SiteDetails.aspx?sk=3055>

³ <http://www.njaudubon.org/Tools2.Net/IBBA/SiteDetails.aspx?sk=3102>

⁴ <http://www.njaudubon.org/Tools2.Net/IBBA/SiteDetails.aspx?sk=3099>

⁵ <http://www.njaudubon.org/Tools2.Net/IBBA/SiteDetails.aspx?sk=3122>

⁶ <http://www.njaudubon.org/Conservation/IBBA/>

⁷ <http://www.state.nj.us/dep/gis/depsplash.htm#> (NJDEP's Geographic Information System environmental data – Landscape Project Version 3.0)

NJDEP's i-Map NJ also identifies either confirmed sightings of, or potential habitat for, rare species along eligible segments of the Musconetcong River, as shown below:

TABLE 1 Rare Species with Confirmed Sightings or Potential Habitat along the Musconetcong River						
Species	Latin Name	Breeding Population Only	Non-Breeding Population Only	State Species of Special Concern*	State Threatened Species**	State Endangered Species***
Eligible River Segment A:						
Arrowhead Spiketail Dragonfly	<i>Cordulegaster obliqua</i>			X		
Barred Owl	<i>Strix varia</i>				X	
Bobcat	<i>Lynx rufus</i>					X
Cooper's Hawk	<i>Accipiter cooperii</i>				X	
Great Blue Heron (Foraging area)	<i>Ardea herodias</i>			X		
Eligible River Segment B:						
Great Blue Heron (Foraging area)	<i>Ardea herodias</i>			X		
Wood Turtle	<i>Glyptemys insculpta</i>				X	
Barred Owl	<i>Strix varia</i>				X	
Bobcat	<i>Lynx rufus</i>					X
Savannah Sparrow	<i>Passerculus sandwichensis</i>					
Vesper Sparrow	<i>Poocetes gramineus</i>	X	X		X	X
Bobolink	<i>Dolichonyx oryzivorus</i>	X			X	
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	X				
American Kestrel	<i>Falco sparverius</i>			X		
Brook Snaketail Dragonfly	<i>Ophiogomphus aspersus</i>			X		
Longtail Salamander	<i>Eurycea longicauda</i>				X	
Red-Headed Woodpecker	<i>Melanerpes erythrocephalus</i>				X	
Bald Eagle (Foraging Area)	<i>Haliaeetus leucocephalus</i>	X	X		X	X
Eligible River Segment C:						
Bobcat	<i>Lynx rufus</i>					X
Cooper's Hawk	<i>Accipiter cooperii</i>				X	
Osprey	<i>Pandion haliaetus</i>	X			X	
Vesper Sparrow	<i>Poocetes gramineus</i>	X	X		X	X
<p>*<i>Species of Special Concern</i> applies to species that warrant special attention because of some evidence of decline, inherent vulnerability to environmental deterioration, or habitat modification that would result in their becoming a threatened species. This category is also applied to species that meet the foregoing criteria and for which there is little understanding of their current population status in the state. See http://www.nj.gov/dep/fgw/spclsp.htm for a list of NJ Species of Special Concern and http://www.njodes.com/concern.htm for a list of NJ Dragonfly Species of Special Concern.</p> <p>**<i>State Threatened Species</i> (ST) are those who may become endangered if conditions surrounding them begin to or continue to deteriorate.</p> <p>***<i>State Endangered Species</i> (SE) are those whose prospects for survival in New Jersey are in immediate danger because of a loss or change in habitat, over-exploitation, predation, competition, disease, disturbance or contamination. Assistance is needed to prevent future extinction in New Jersey.</p>						

In addition, the Natural Heritage Program has records of the following rare freshwater mussel and plant species within the eligible river segments:

- | | | |
|-------------------|-----------------------------|------------------|
| • Brook floater | <i>Alasmidonta varicose</i> | State endangered |
| • Fleshy hawthorn | <i>Crataegus succulenta</i> | State endangered |

Pursuant to the NJDEP records and GIS mapping, additional Species of Special Concern can be found along the eligible river segments at various times of the year because of the diversity of critical habitat types along the river and the geographic importance of New Jersey on a whole to the migration route for many avian neo-tropical migrant passerines.⁸



- | | | | |
|-------------------|-----------------------------|----------------------------|-------------------|
| • Barred Owl | <i>Strix varia</i> | State threatened | <i>Barred Owl</i> |
| • Brook floater | <i>Alasmidonta varicose</i> | Critically imperiled in NJ | |
| • Wood turtle | <i>Clemmys insculpta</i> | State threatened | |
| • Fleshy hawthorn | <i>Crataegus succulenta</i> | State endangered | |

Fisheries

The Musconetcong River is one of the most important trout fisheries in New Jersey, and as result it is one of the state's most valuable recreational resources. Trout, especially the native brook trout, are important indicators of water quality because of their sensitivity to pollution and changes in habitat.

The NJDEP Division of Fish and Wildlife stocks the Musconetcong River and two tributaries, Trout Brook and Lubbers Run, each year with brook, brown and rainbow trout. Approximately 20 Musconetcong tributary streams support natural breeding populations of brook or brown trout. These streams support populations that are extremely sensitive to thermal pollution, siltation and habitat degradation. Two Musconetcong tributaries, Hances Brook and Stephensburg Brook, receive the special designation of Wild Trout Stream and are managed under more restrictive angling regulations

The Musconetcong River is classified by the NJDEP as a Category One (C1) stream downstream of Saxton Lake to the Delaware River including all of its tributaries, named and unnamed (27 miles). The New Jersey Surface Water Quality Standards at N.J.A.C.7:9B-1.4 define Category One (C1) as being designated for "purposes of implementing the anti-degradation policies set forth at N.J.A.C.7:9B-1.5(d), for protection from measurable changes in water quality...based on exceptional ecological significance, exceptional recreational significance, exceptional water supply significance, or exceptional fisheries resource(s) to protect their aesthetic value...and ecological integrity."

Game Resources

The Musconetcong River corridor includes lands that are some of the better hunting grounds in New Jersey. Sustainable, harvestable populations of big game, including deer, bear, coyotes, and turkey; small game, including squirrels, rabbits, and

⁸ See <http://www.nj.gov/dep/fgw/spclsspp.htm> for a complete listing of these numerous avian species included in the State's List of State Species of Special Concern as part of the Partners in Flight Program

pheasants; and waterfowl, including domestic and migratory Canada and snow geese, and several species of ducks inhabit the corridor. In addition to hunting on private land, hunting is permitted on public land in the corridor, such as Allamuchy State Park, Point Mountain County Park, Musconetcong Wildlife Management Area, and Musconetcong Gorge County Park. The New Jersey Department of Fish and Wildlife stocks pheasants on their local gamelands. There are also private game preserves, hunting clubs, and landowners that stock pheasants on their private land.

GOAL: Preserve, protect, restore and enhance the outstanding natural resources in the river corridor and the watershed, including rare and endangered species, forests, steep slopes, floodplains, headwaters and wetlands.

OBJECTIVE 4.1 Identify and prioritize important wildlife habitat and natural resources in the river corridor and along its tributaries.

Key Actions

- ❑ Conduct natural resource inventories to identify important resources and critical areas.
- ❑ Utilize existing resource inventories and plans to prioritize natural resource protection efforts.
- ❑ Establish steep slope districts limiting disturbance activities in sensitive areas.
- ❑ Encourage woodland protection on steep slopes, ridges and stream corridors.
- ❑ Encourage conservation of floodplains to protect flood storage capacity and maintain the ecological function of the floodplain.
- ❑ Encourage the use of conservation easements, purchase of development rights, and similar voluntary techniques for the preservation of critical natural features.
- ❑ Maintain and disseminate GIS data to provide up-to-date information on the location and status of conservation lands.
- ❑ Conduct interpretive outreach, education, and recreation programs for watershed officials and residents.
- ❑ Review proposed water resource projects covered under the National Wild and Scenic Rivers Act's Section 7(a) provisions to ensure there are no adverse impacts to the river's remarkable resource values.
- ❑ Review proposed projects covered under the National Wild and Scenic Rivers Act's Section 10(a) provisions to protect outstanding river resource values and promote the enhancement of those values where possible.

Roles

- SG/LG/CG/NG
- SG/CG/LG/NG
- LG
- LG
- LG/SG
- LG//CG/NG/LO
- CG/SG
- NG
- FG
- FG

LO = landowner, LG = local government, CG = county government, SG = state government, FG = federal government and NG = non-governmental organization.

OBJECTIVE 4.2 Sustain biodiversity and habitat linkages through private land stewardship and public land management.

Key Actions

- ❑ Encourage the creation of an interconnected system of green spaces and wildlife corridors within the watershed.
- ❑ Identify and implement habitat restoration projects in the watershed that will benefit wildlife.
- ❑ Provide technical assistance to landowners seeking to protect, restore and enhance riparian buffers, wildlife habitat and natural resources.
- ❑ Encourage reforestation to prevent erosion and enhance wildlife habitat.
- ❑ Educate landowners about forest stewardship and management options that protect wildlife habitat.
- ❑ Encourage proper game laws and regulations to prevent species (deer, geese) from becoming invasive and destructive of their ecosystem.
- ❑ Encourage proper game laws and regulations to keep game species populations (black bear) within sustainable limits of their habitat.
- ❑ Encourage recruitment of youth into hunting and fishing to sustain the license-paying, revenue-generating public for land acquisition and management.
- ❑ Encourage private businesses involved in hunting and fishing and the tourism thus generated.
- ❑ Educate landowners about habitat restoration and enhancement programs.

Roles

- SG/LG/NG/LO
- SG/NG/LO
- FG/SG/NG/LO
- SG/NG/LO
- SG/N
- SG
- SG
- SG
- LO/LG/CG/SG
- NG

Open space plans have been prepared and implemented by many of the river corridor communities as a means of preserving natural resources. In Bethlehem Township, Hunterdon County, open space preservation with a focus on protecting unique and natural features has been a high priority. The Bethlehem Township Greenway and Open Space Plan was prepared to set guidelines to preserve open space including farms, historical artifacts and environmentally sensitive areas. The plan includes an inventory of sensitive landscapes in a municipality replete with steep slopes, forests, headwaters, undiscovered historical sites and rich farm acreage, and establishes objectives for expanding parklands in accordance with county and state plans as well as local interests. Methods of preservation involve fee simple and easement acquisitions by government and non-governmental agencies as well as consideration in development applications as they arise. Natural resource protection ordinances are proposed as an additional measure of protection.

To date, state, county, municipal and non-governmental resources have been combined to preserve 1,283 acres of farmland and 1,645 acres of forest and field. An additional 531 acres are under consideration or negotiation for preservation either on a fee simple or deed restricted basis as of December 2001.

A municipality may protect its resources by limiting development on steep slopes. Lebanon Township, Hunterdon County has enacted a steep slope ordinance that prohibits development, regrading, or stripping of vegetation on slopes greater than 25 percent, and that limits these activities on slopes greater than 15 percent. Newly subdivided lots in Lebanon must include a minimum of one contiguous acre of land with a slope less than 15 percent on which all development shall occur.

Model ordinances recently developed for the Ten Towns Great Swamp Watershed Management Plan includes a steep slopes ordinance that recommends the following:

- Require mapping of steep slope areas in connection with site plans and subdivisions.
- Encourage roads and driveways to follow the natural terrain to the greatest extent possible.
- Prohibit development, regarding, or stripping of vegetation on slopes greater than 25 percent unless disturbance is for road or utility crossings.
- Analysis of soil stability, erosion control methods, and revegetation plan is required for all earthmoving activities on slopes 15 percent or greater.

Eight of the ten municipalities in this watershed have enacted ordinances, which meet the goals of the model ordinance.

Keeping development away from ridgelines protects both natural resources and a town's scenic views. Washington Township (Morris County) has adopted a "Scenic Vista and Ridgeline Protection" ordinance for these purposes. Referencing a township ridgeline map, it prohibits proposed buildings or structures from extending above the predominant tree line, requires that they be set at least sixty feet from the ridgeline, and prohibits alteration of the view both from and to the natural ridgeline.



Maidenhair Fern

Water Quality

The Musconetcong River is widely considered to be a high quality stream in comparison to many other rivers in New Jersey. However, there are indications that water quality may be declining along the more urbanizing reaches of the river.

There are 28 permitted surface water dischargers in the entire Musconetcong watershed, a relatively small number for the size of the watershed. The NJDEP has identified a few of the dischargers as being in violation of their permits. It is suspected that by far the most significant source of pollution comes from non-point sources. Some of these include runoff from farms, and urban areas (roads, parking lots, etc.), malfunctioning septic systems, and domestic waterfowl.

Water pollution control in the Musconetcong River is the joint responsibility of the New Jersey Department of Environmental Protection (NJDEP), and the U.S. Environmental Protection Agency. Several other agencies are involved in varying degrees with water quality monitoring, regulatory, planning, and other water management activities. These include the Delaware River Basin Commission, US Geological Survey, USDA Natural Conservation Service, NJDEP Division of Fish and Wildlife, and county health departments and soil conservation districts.

The Federal Clean Water Act sets forth minimum water quality standards, and requires states to assess stream quality and list those waterways that are “water quality limited waterbodies.” This list is required by section 303 (d) of the Clean Water Act. NJDEP data contained in the New Jersey 1998 Section 303 (d) report indicates that water quality in some sections of the Musconetcong River does not meet federal minimum standards for several criteria including: ammonia, temperature, fecal coliform, pH, total phosphorus and various heavy metals.

The federal and state point source pollution control programs instituted with the Federal Clean Water Act (1972) resulted in dramatic improvements in water quality for many impaired water bodies. Billions of dollars of public and private funds were spent to build and upgrade municipal and industrial wastewater treatment plants. However, despite the considerable investments and improvement of technology for “end of pipe” discharges, many waterbodies still failed to meet minimum federal water quality standards due to impairment from non-point sources of pollution.

The Clean Water Act Amendments of 1987 established programs for managing stormwater, wetlands, groundwater and non-point source pollution. During the 1990’s, with the realization that many of the nation’s waterways and coastal waters still suffered from significant pollution problems, the EPA and the states moved toward adopting a watershed approach in their efforts to identify, prioritize and clean up water quality problems.

The New Jersey Department of Environmental Protection (NJDEP) has developed a comprehensive watershed management program as part of a strategy to satisfy state mandates found in Section 303 of the Federal Clean Water Act (1972). Section 303

requires each state to establish water quality standards for all of its waterbodies, identify those streams and lakes failing to meet the standards, and take action to clean them up.

NJDEP entered into a Memorandum of Agreement with EPA Region 2 to implement a specific timetable within which NJDEP must either establish total maximum daily loads (TMDLs) for all water quality limited segments identified in the New Jersey 303d water quality list, or propose the de-listing of specific water quality limited segments. A TMDL identifies the amount of an offending pollutant (whether a nutrient or a toxin) a stream can assimilate without violating its water quality standards. TMDLs are set on a pollutant-by-pollutant basis. Thermal pollution loads must also be set.⁹

The NJDEP Division of Watershed Management was created in 1999 to implement the state's watershed management program. NJDEP has delineated 20 major Watershed Management Areas (WMAs) in New Jersey. The WMAs are organized under the umbrella of five regional bureaus within the Division of Watershed Management. The WMAs are organized under the umbrella of the Division of Watershed Management, specifically the Bureau of Watershed Planning.”



The Musconetcong River falls within the Upper Delaware Region of New Jersey, which is designated as Watershed Management Area # 1, or WMA1. The region encompasses all of the Delaware River tributary watersheds in New Jersey from the Musconetcong north to the New York border. Other major tributary watersheds within WMA#1 include the Pohatcong Creek, Pequest River, Paulinskill River, and Flatbrook River.

In April 1998, the NJDEP Office of Environmental Planning began a three-year watershed management planning initiative for the Musconetcong River watershed with various stakeholder groups. The Musconetcong Watershed Management Initiative was halted in 2000 due to a lack of financial and technical resources, and because the NJDEP decided to expand the watershed planning process beyond the Musconetcong watershed to include all the watersheds within the Upper Delaware Region (WMA1).

On October 2, 2000, NJDEP contracted with North Jersey Resource Conservation and Development Council to begin the watershed planning process within Watershed Management Area #1 and develop a comprehensive management plan for the entire Upper Delaware Region, including the Musconetcong River watershed.

In addition to the state-led watershed planning effort underway, a number of other efforts have focused on reducing sources of non-point pollution. Most significant of

⁹ For current TMDL data on the Musconetcong River see <http://www.state.nj.us/dep/watershedmgt/tmdl.htm>

these are the various federally funded agricultural programs designed to assist farmers in reducing runoff from croplands, pastures and feedlots. A partnership of state, county and local organizations is working to promote and install riparian buffers to improve water quality and wildlife habitat.

GOAL: Maintain existing water quality in the Musconetcong River and its tributaries and improve where possible.

OBJECTIVE 5.1 Sustain aquatic life and designated uses.

Key Actions

- ❑ Participate in the NJDEP Upper Delaware WMA#1 watershed planning process.
- ❑ Support stream-monitoring programs such as the Musconetcong Watershed Management River Watcher program to improve water quality data collection and provide indicators of local stream condition.
- ❑ Identify and protect aquifer recharge areas and cool temperature springs, which discharge to the river.
- ❑ Implement agricultural, forestry, and homeowner best management practices to reduce non-point pollutants.
- ❑ Participate in the NJ Volunteer Monitoring Network
- ❑ Review proposed projects covered under provisions of the National Wild and Scenic Rivers Act to maintain and improve water quality.

Roles

- SG/LG/NG/LO
- SG/LG/NG
- SG/LG/NG/LO
- SG/LG/NG/LO
- NG
- FG

OBJECTIVE 5.2 Manage storm water to prevent non-point source pollution, maintain infiltration and aquifer recharge, and protect aquatic habitat.

Key Actions

- ❑ Implement public education programs about non-point source pollution.
- ❑ Encourage storm water management based on the principles of minimal site disturbance, minimal impervious surfaces, opportunities for infiltration, and the use of non-structural practices.

Roles

- LG/CG/SG/NG
- LG/CG/SG/NG

LO = landowner, LG = local government, CG = county government, SG = state government, FG = federal government and NG = non-governmental organization.

OBJECTIVE 5.3 Manage the riparian environment to maintain and enhance water quality in the river and its tributaries.

Key Actions

- ❑ Ensure maintenance of riparian vegetation through enforcement of NJ Stormwater and the Flood Hazard Area Control Act regulations protecting near watercourse vegetation.
- ❑ Identify riparian areas in need of restoration and implement cooperative programs to stabilize streambanks and plant woodland species.
- ❑ Adopt setbacks, stream corridor protection zoning and riparian buffer ordinances, which protect the natural drainage system of the river and its tributaries.

Roles

- SG/LG
- SG/LG/NG/LO
- LG

As the relationship between land use and water quality has become more clearly understood, municipalities have begun to revisit zoning provisions that address the issue. The lack of adequate riparian buffer strips along watercourses has been a prime concern, as more pollutants then enter the stream, lowering water quality, and causing other adverse impacts to the stream channel. Washington Township (Morris County) has made revegetation of stream buffers a condition of any major subdivisions or major site plans.



Students Studying Macroinvertebrates

Summary of Recommendations for Local Governments

An underlying principle of the management plan is that existing authorities will continue to provide the foundation for the long-term protection of the Musconetcong River, its tributaries and its watershed. Local commitment is necessary to protect the natural, cultural, and recreational features of the river for the benefit and enjoyment of present and future generations. Local support for actions to maintain and improve the Musconetcong River and its tributaries is needed to achieve designation of eligible segments as a national wild and scenic river.

Local support can be demonstrated by local governments through endorsement of the goals of the Musconetcong River Management Plan and through incorporation of the goals and key actions into municipal master plans, zoning and land development regulations. The management plan identifies outstandingly remarkable values within the river corridor, including historic sites and districts, recreational lands and uses, scenic vistas, and critical wildlife habitat. Local governments will want to review these maps and consider adopting resource protection strategies and land use planning tools which support long-term protection of these river-related resources.

GLOSSARY

Agricultural Use:	A use involving the production, keeping, or maintenance for sale, lease or personal use plants and animals useful to man, including but not limited to forages, grain, seed crops, dairy animals, poultry, beef, sheep, horses, pigs, bees, fur animals, trees, food of all kinds, vegetables nurseries, and land devoted to soil conservation or forestry management programs.
Anti-degradation policy:	A policy to adhere to the anti-degradation clause: A provision in air quality and water quality laws that prohibits deterioration of air or water quality in areas where the pollution levels are presently below those allowed.
Aquifer:	An underground bed or stratum of earth, gravel or porous stone that contains a useable supply of water.
Aquifer Recharge:	Replenishment of a useable supply of groundwater by infiltration of rainfall or water which infiltrates the soil.
Best Management Practices:	A practice or combination of practices for preventing or reducing diffuse or non-point sources of pollution to a level compatible with water quality goals.
Boundary:	A map line that defines the area of national interest in the Musconetcong River Corridor. The area to be protected through local laws, plans and ordinances, and the use of other existing laws.
Classification:	Under the Wild and Scenic Rivers Act, a system for assessing existing development levels and for directing future management; the proposed classifications on the Musconetcong River are scenic and recreational.
Clustering:	Clustering involves the arrangement of residential building lots in groups through a reduction in lot area and building setback requirements while still adhering to permitted density regulations. This allows the remaining area of the development to be incorporated as open space, often based upon the preservation of environmentally sensitive areas (i.e., woodlands, wetlands, floodplains, or severely steep slopes).
Conservation Easement:	A flexible legal instrument that protects land while leaving it in private ownership. A landowner generally donates the easement to a qualified conservation organization or government agency, which in turn ensures that the conditions of the easement are met over time.

Critical Habitat:	The area of land or water that is crucial to the survival of either a plant or animal species.
Cultural Resources:	Tangible and intangible features, animate or inanimate, that provide information about a cultural system; this may include human history, archaeological sites, industrial remnants and architectural features.
Designation:	The process whereby rivers are added to the National Wild and Scenic Rivers System by an act of Congress or by administrative action of the Secretary of the Interior with regard to state-designated rivers und Section 2(a)(ii) of the Wild and Scenic Rivers Act.
Easement:	A partial interest in land.
Feedlot:	A lot or building, or a combination thereof, intended for the confined feeding, breeding, raising or holding of animals and specifically designed as a confinement area in which manure may accumulate; or in which the concentration of animals prevents maintenance of a vegetative cover within the enclosure. Open lots used for the feeding and rearing of poultry are considered feedlots.
Fish and Wildlife:	A division of the NJDEP whose mission is to manage the characteristics and interactions of fish and wildlife populations and their habitats in order to promote, protect or enhance the ecological integrity of those populations.
Floodplain:	The channel of a natural stream and the relatively flat area adjoining the channel, which has been or which may be covered by flood water, including, at a minimum, those areas designated by the Federal Insurance Administration and/or the Federal Emergency Management Agency as “flood hazard areas.”
Forestry:	The management, including growing or harvesting, of a forest, woodland or plantation, including the construction, alteration or maintenance of woods, roads, landings and related research and educational activities.
Headwaters:	The waters from which a river rises. Referring to the source of a river or stream.
Historic District:	One or more historic sites and intervening or surrounding property united historically or aesthetically by plan or physical development. A district may also comprise individual elements separated geographically but linked by association or history.

Impervious Surface:	Hard surfaces which are impermeable to rainfall, such as roof tops, roads, parking lots, driveways and sidewalks.
Impoundment:	Any body of water located on a tributary, brook, stream, kill or river formed by a new manmade structure within the boundary of the designated river; this does not include structures for fishery management.
Jurisdiction:	The limits or territory within which authority may be exercised.
Karst Topography:	A terrain, generally underlain by limestone in which the topography is chiefly formed by the dissolving of rock. It is commonly characterized by closed drainage, subterranean drainage and caves.
Landfill:	Site where trash or refuse, including toxic or radioactive waste, is buried as part of a public or private business operation.
Lot Averaging:	Lot averaging is similar to clustering in that both methods allow some variation in minimum lot size regulations. However, the lot averaging technique common open space areas are not typically created nor is overall density typically modified. Larger lots are designed to avoid encroachment into environmentally sensitive areas, while still providing adequate area for residential construction. The zoning ordinance generally requires a minimum lot size for each specific zoning district.
Lot:	A parcel of land designated by metes and bounds, registered land survey, auditor's plot or other accepted means; and separated from other parcels or portions by the description for the purpose of sale, lease, or separation of the parcel or portion.
Open Space Set Aside:	Any parcel or area of land or water set aside in a development.
Overlay:	A zoning district that encompasses one or more underlying zones and that imposes additional requirements above that required by the underlying zone.
Restrictive Covenant:	Provision in a deed limiting the use of the property and prohibiting certain uses.
Ridgeline:	A line connecting the highest points along a ridge and separating drainage basins or small-scale drainage systems from one another.
Riprap:	A layer, facing or protective mound of rubble or stones randomly placed to prevent erosion, scour, or souging of a structure or embankment; also the stone used for this purpose.

Riparian Buffer:	A vegetated area near a stream, usually forested, which helps shade and partially protect a stream from the impact of adjacent land uses.
Riparian:	Belonging or relating to the bank of a natural course of water.
Setback:	The minimum horizontal distance from a lot line, shoreline or road to the nearest part of a structure.
Wetland:	An area where hydric soils are saturated by surface and/or ground water long and frequently enough during the growing season to support a dominance of hydrophytic vegetation.

COMMON ACRONYMS

CADB **County Agriculture Development Board**

DRBC **Delaware River Basin Commission**

The Delaware is the longest un-dammed river east of the Mississippi, extending 330 miles from the confluence of its East and West branches at Hancock, N.Y. to the mouth of the Delaware Bay where it meets the Atlantic Ocean. The river is fed by 216 tributaries, the largest being the Schuylkill and Lehigh Rivers in Pennsylvania. In all, the basin contains 13,539 square miles, draining parts of Pennsylvania (6,422 square miles or 50.3 percent of the basin's total land area); New Jersey (2,969 square miles, or 23.3%); New York (2,362 square miles, 18.5%); and Delaware (1,004 square miles, 7.9%). Included in the total area number is the 782 square-mile Delaware Bay, which lays roughly half in New Jersey and half in Delaware.

A breakthrough in water resources management occurred in 1961 when President Kennedy and the governors of Delaware, New Jersey, Pennsylvania, and New York for the first time signed concurrent compact legislation into law creating a regional body with the force of law to oversee a unified approach to managing a river system without regard to political boundaries.

The members of this regional body - the Delaware River Basin Commission (DRBC) - include the four basin state governors and the Division Engineer, North Atlantic Division, U.S. Army Corps of Engineers, who serves as the federal representative.

When the DRBC was created, some 43 state agencies, 14 interstate agencies, and 19 federal agencies exercised a multiplicity of splintered powers and duties within the watershed, which stretches 330 miles from the Delaware River's headwaters near Hancock, N. Y., to the mouth of the Delaware Bay.

The Compact's signing marked the first time since the nation's birth that the federal government and a group of states joined together as equal partners in a river basin planning, development and regulatory agency.

FERC **Federal Energy Regulatory Commission**

The Federal Energy Regulatory Commission, or FERC, is an independent agency that regulates the interstate transmission of natural gas, oil, and electricity. FERC also regulates natural gas and hydropower projects.

FPA

Federal Power Act

The Federal Power Act is a law appearing in chapter 12 of Title 16 of the United States Code, "Federal regulation and development of power". Enacted as the Federal Water Power Act in 1920, its original purpose was coordinating hydroelectric projects in the United States. Representative John J. Esch (R-Wisconsin) was the sponsor.

The act created the Federal Power Commission (FPC) (now the Federal Energy Regulatory Commission) as the licensing authority for these plants. The FPC regulated the interstate activities of the electric power and natural gas industries, and coordinated national hydroelectric power activities. The Commission's mandate called for it to maintain reasonable, nondiscriminatory and just rates to the consumer. It was ensured that 37.5% of the income derived from hydroelectric power leases given out under the Water Power Act of 1920 went to the state in which the dam was built in.

In 1935 the law was renamed the Federal Power Act, and the FPC's regulatory jurisdiction was expanded to include all interstate electricity transmission.

Subsequent amendments to the law include the following statutes:

Public Utility Regulatory Policies Act (PURPA) (Public Law 95-617)

Energy Security Act (P.L. 96-294)

Electric Consumers Protection Act of 1986 (PL 99-495)

Energy Policy Act of 1992 (PL 102-486)

MGD

Million gallons per day

MOU

Memorandum of Understanding

A memorandum of understanding (MOU or MoU) is a document describing a bilateral or multilateral agreement between parties. It expresses a convergence of will between the parties, indicating an intended common line of action. It most often is used in cases where parties either do not imply a legal commitment or in situations where the parties cannot create a legally enforceable agreement. It is a more formal alternative to a gentlemen's agreement.

MWA

Musconetcong Watershed Association

NGO

Non-governmental Organization

Non-governmental organization (NGO) is a term that has become widely accepted as referring to a legally constituted, non-governmental organization created by natural or legal persons with no participation or representation of any government. In the cases in which NGOs are funded totally or partially by governments, the NGO maintains its

non-governmental status and excludes government representatives from membership in the organization. Unlike the term intergovernmental organization, "non-governmental organization" is a term in general use but is not a legal definition.

NJDEP New Jersey Department of Environmental Protection

The NJDEP oversees air; water; land and open space; site cleanups; waste management; parks and forests; and fish and wildlife.

NPS National Park Service

Since 1916, the American people have entrusted the National Park Service with the care of their national parks. With the help of volunteers and park partners, we are proud to safeguard these nearly 400 places and to share their stories with more than 275 million visitors every year.

The National Park Service is a bureau of the U.S. Department of the Interior and is led by a Director nominated by the President and confirmed by the U.S. Senate.

The Director is supported by senior executives who manage national programs, policy, and budget in the Washington, DC, headquarters and seven regional directors responsible for national park management and program implementation. Collectively, these executives make up our National Leadership Council.

NRCS National Resource Conservation Service

Since 1935, the Natural Resources Conservation Service (originally called the Soil Conservation Service) has provided leadership in a partnership effort to help America's private land owners and managers conserve their soil, water, and other natural resources. □ It is part of the US Department of Agriculture.

QAPP Quality Assurance Project Plan

A QAPP documents the planning, implementation, and assessment procedures for a particular project, as well as any specific quality assurance and quality control activities. It integrates all the technical and quality aspects of the project in order to provide a "blueprint" for obtaining the type and quality of environmental data and information needed for a specific decision or use. All work performed or funded by EPA that involves the acquisition of environmental data must have an approved Quality Assurance Project Plan.

RC&D Resource Conservation and Development

The purpose of the Resource Conservation and Development (RC&D) program is to accelerate the conservation, development and utilization

of natural resources, improve the general level of economic activity, and to enhance the environment and standard of living in designated RC&D areas. It improves the capability of State, tribal and local units of government and local nonprofit organizations in rural areas to plan, develop, and carry out programs for resource conservation and development. The program also establishes or improves coordination systems in rural areas. Current program objectives focus on improvement of quality of life achieved through natural resources conservation and community development which leads to sustainable communities, prudent use (development), and the management and conservation of natural resources. RC&D areas are locally sponsored areas designated by the Secretary of Agriculture for RC&D technical and financial assistance program funds.

SADB State Agriculture Development Board

TMDL Total Maximum Daily Load
The TMDL identifies the amount of an offending pollutant (whether a nutrient or a toxic) s stream can assimilate without violating its water quality standards.

TU Trout Unlimited
Today TU is a national organization with more than 150,000 volunteers organized into about 400 chapters from Maine to Montana to Alaska. This dedicated grassroots army is matched by a respected staff of lawyers, policy experts and scientists, who work out of more than 30 offices nationwide. These conservation professionals ensure that TU is at the forefront of fisheries restoration work at the local, state and national levels.

Its mission is to conserve, protect and restore North America's coldwater fisheries and their watersheds.

WHIP Wildlife Habitat Incentive Program
The Wildlife Habitat Incentive Program (WHIP) is a voluntary program for conservation-minded landowners who want to develop and improve wildlife habitat on agricultural land, non-industrial private forest land, and Indian land.

Program description: The Food, Conservation, and Energy Act of 2008 reauthorized WHIP as a voluntary approach to improving wildlife habitat in our Nation. The Natural Resources Conservation Service administers WHIP to provide both technical assistance and up to 75 percent cost-share assistance to establish and improve fish and wildlife habitat. WHIP cost-share agreements between NRCS and the participant generally last from one year after the last conservation

practice is implemented but not more than 10 years from the date the agreement is signed.

WMA

Watershed Management Area

There are twenty watershed management areas that overseen by the NJDEP, as shown in the figure below.



SELECTED BIBLIOGRAPHY

Lower Delaware River Management Plan. August 1997. National Park Service, Phila., PA

Lower Delaware Wild and Scenic Study Report. May 1999. National Park Service, Phila., PA

Musconetcong River National Wild and Scenic River Study Resource Assessment and Eligibility & Classification Draft Report. August 1999. National Park Service, Boston, MA

Sudbury, Assebet and Concord Wild and Scenic River Study, River Conservation Plan. March 1995. National Park Service, Boston, MA

Sudbury, Assebet and Concord Wild and Scenic River Study, Draft Report. September 1996. National Park Service, Boston, MA

Upper Farmington River Management Plan. April 1993. National Park Service, Boston, MA

White Clay Creek and Its Tributaries Watershed Management Plan with Reference Sections. n.d. National Park Service, Philadelphia, PA

Wild and Scenic Rivers Reference Guide. March 2000. Interagency Wild & Scenic Rivers Coordinating Council, National Park Service

LIST OF PARTICIPANTS

April 2003 Original River Management Plan

Musconetcong Advisory Committee

Allison Irland	Hackettstown	Warren
Al Kleinschrodt	Washington Township	Morris
Gottfried Pletzer	Lebanon Township	Hunterdon
Joyce Koch	Bethlehem Township	Hunterdon
David Thomas	Bloomsbury Borough	Hunterdon
Greg Sumner	Bloomsbury Borough	Hunterdon
Susan Dickey	Washington Township	Warren
Janice Eppler	Mansfield Township	Warren
Merle Morris	Mansfield Township	Warren
Ed Sekula	Netcong Township	Morris
Maria Elena Jeannette	Holland Township	Hunterdon
Art Biggs	Holland Township	Hunterdon
Donna Koenig	Byram Township	Morris
Stacy D'Onofrio	Byram Township	Morris
Henry Meltzer	Franklin Township	Warren

Additional Participants

John Brunner	Musconetcong Watershed Association
Sharon Yates	Heritage Conservancy
Gary Bowles	Heritage Conservancy
Richard Cotton	Musconetcong Watershed Association
Jamie Fosburgh	National Park Service
Cassie Thomas	National Park Service
Bill Sharp	National Park Service
Paul Kenney	National Park Service
Sabine von Aulock	Morris County Planning Board
Greg Sipple	Warren County Planning Department
Wayne and Edie Martin	Lebanon Township Residents
Cinny MacGonagle	Bethlehem Township Resident
Pete Martin	Lebanon Township Resident
Valerie Salice	NJ Division of Parks & Forestry, ONLM
Caroline Armstrong	Hunterdon County Planning Board
Agust Gudmundsson	Trout Unlimited
Wilma Frey	Highlands Coalition

June 2011 River Management Plan Update

Musconetcong River Management Council (MRMC)

Pam Bailey	Hampton Borough, Hunterdon County
Joe Bristow	Hackettstown, Warren County
Brian Cowden	Trout Unlimited
Rick Ege	Mount Olive Township, Morris County
Charles Fineran	Allamuchy Township, Warren County
Ilse Goshen	Bloomsbury Borough, Hunterdon County
Erik Henriksen	Lebanon Township, Hunterdon County
Al Ivany	Washington Township, Warren County
Joyce Koch	Bethlehem Township, Hunterdon County
CJ Koop	Musconetcong Watershed Association
Bill Leavens	Washington Township, Morris County
Cinny MacGonagle	Bethlehem Township, Hunterdon County
Jeanmarie Murray	Franklin Township, Warren County
Harry Noble	Independence Township, Warren County
Scott Olson	Byram Township, Sussex County
Michele Rehse	Byram Township, Sussex County
Bob Sheridan	Hampton Borough, Hunterdon County
Marian Sumner	Heritage Conservancy
Paul Tarlowe	Mansfield Township, Warren County
Bruce Williams	Greenwich Township, Warren County
Karen Williamson	Heritage Conservancy

Additional Participants

Beth Styler Barry	MRMC Executive Director
David Dech	Warren County Planning Department
Christine Hall	National Resource Conservation Service
Paul Kenney	National Park Service
Helen Maurella	NJDEP Division of Parks and Forestry
Grace Messinger	North Jersey Resource Conservation & Development
Steven Rattner	Morris County

APPENDIX A: REGULATORY AND NON-REGULATORY PROGRAMS

Regulatory Programs

Regulatory programs are based on laws and regulations at the federal, state, regional, county and municipal levels. Many landscape features such as wetlands, floodplains and steep slopes are regulated to limit environmental degradation and protect resource values and property. An overview of some of the existing regulatory programs in the study area is included below.

Two of the state Land Use Regulations that affect the river corridor are the Flood Hazard Control Act and the Freshwater Wetland Protection Act. NJ State Flood Control law regulates activities in the floodplain, including the placement of fill and the removal of riparian vegetation within 50 feet of the top of the channel of the river. In addition, NJ State Freshwater Wetlands law regulates activities in wetlands and transition areas of 50 to 150 feet around wetlands in the Musconetcong watershed. These regulations provide basic protections to the river corridor. Within the eligible, sections an additional 15 percent of the river corridor is regulated floodplain, freshwater wetlands or wetland transition areas.

At the local level, a review of municipal zoning and land development ordinances was conducted to determine if municipalities have established goals to protect natural resources and determine what measures have been adopted to meet these goals.

In general, many communities have goals and objectives in their master plans which benefit the river corridor. These goals include:

- protection of critical resources,
- limiting development in natural hazard areas,
- preservation of stream corridors,
- protection of scenic views,
- preservation of farmland, and
- establishment of a river greenway.

The mechanisms to implement these goals are varied. Many communities have zoned the undeveloped sections of the river corridor for agricultural and low density residential uses. Several ordinances allow for lot averaging, clustering and open space set asides, either as options or requirements. When wetlands, floodplains and stream corridors are identified as resources to be preserved in open space or through clustering, these mechanisms may be effective in establishing building setbacks from the river and its tributary streams.

Many master plans identify protection of water resources and preservation of stream corridors as a goal, and a few have adopted stream setbacks or riparian buffer ordinances.

Gaps in resource protection along the river were identified in several locations and recommendations for actions to ensure long-term protection were developed to address these issues. These actions were incorporated into the river management plan and are discussed in Section IV of this report.

Resource Focus: Water Quality

Federal Programs

Clean Water Act, 33 U.S.C. 1251 et seq.

The Clean Water Act of 1977 provides, among other things, that “fishable/swimmable” waters wherever attainable shall be the objective of the national policy. It provides the directives to restore and maintain the chemical, physical and biological integrity of the nation’s waters.

Federal Water Pollution Act of 1972, U.S.C. 1988 Title 33 SS.1251 et seq.

The purpose of this act is to restore and maintain the chemical, physical and biological integrity of the nation’s waters. In order to achieve this objective, the Congress recognizes that it is a national goal to eliminate the discharge of pollutants into navigable waters; wherever attainable, an interim goal of water quality that provides for the protection and propagation of fish, shellfish and wildlife, and provide for recreation in and on the waters of the nation. It is national policy that area-wide waste treatment management processes be developed and implemented to assure adequate control of sources of pollutants in each state and that federal financial assistance be provided to construct publicly owned waste treatment works.

The Army Corps of Engineers regulates waterways and wetlands through permits the discharge of dredge and fill material into U.S. waters (including wetlands) under authority of Section 404 of the Federal Clean Waters Act and Section 10, Rivers and Harbors Act of 1899.

Any individual, company, corporation or government body planning construction of fill activities in the waters of the United States, including wetlands, must obtain a permit from the Corps of Engineers. In general, the Corps of Engineers has jurisdiction over all construction activities in tidal and/or navigable waters, including adjacent wetlands shoreward to the mean high water line. In other areas such as non-tidal waterways, adjacent wetlands, isolated wetlands, forested wetlands and lakes, the Corps has regulatory authority over the discharge of dredged or fill material. Permits are required for activities such as: bulkheads, piers, boathouse, pilings, excavation, dredging, filling and depositing dredged materials in waters and wetlands, and overhead and underwater transmission lines, cables and pipes.

Regional Programs

Delaware River Basin Commission

In 1961, the federal government and the states of New York, New Jersey, Pennsylvania, and Delaware, recognizing the regional and national significance of the water and related sources of the Delaware River Basin, created the Delaware River Basin Commission. The purpose of the Commission is to adopt and promote coordinated policies for water conservation, control, use and management of the Basin. The powers granted to the Commission to plan and regulate water conservation and use in the Basin place it in a central river management role, particularly for water supply and quality issues. The Commission's powers include:

1. **Water Supply** – To develop and implement plans for the use of Basin water for domestic, municipal, agricultural and industrial water supply.
2. **Pollution Control** – to conduct studies, and develop and maintain projects and facilities to control potential and existing pollution.
3. **Flood Protection** – to plan and develop projects and facilities for flood damage reduction.
4. **Watershed Management** – to promote sound watershed management, including projects and facilities to retard runoff and water flow and prevent soil erosion.
5. **Recreation** – to provide for the development of water related public recreational facilities.
6. **Hydroelectric Power** – to develop or authorize dams and related facilities for generating hydroelectric power.
7. **Regulation of Withdrawals and Diversions** – to regulate and control withdrawals and diversions from surface and ground waters.
8. **Intergovernmental Relations** – to avoid conflicts of jurisdiction all projects related to the powers delegated by the Commission must be undertaken in consultation with the Commission.
9. **Capital Financing** – to borrow money for the purposes of the Delaware River Basin Compact.

DRBC is required to adopt a Comprehensive Plan that guides development of the Basin's water resources as a management and regulatory mechanism. It includes codification of administrative decisions governing water resources use, development and conservation.

The Water Code of the Basin (March 1994) establishes policy for 1) conservation, development, and utilization of Delaware River Basin Water Resources, and 2) water quality standards for the Basin. Water conservation policy includes requiring maximum feasible efficiency in the use of water by new industrial, municipal and agricultural users and eventual application of feasible conservation practices by existing users. The Water Code establishes priorities of water use during drought emergencies, determined in part by stream flow objectives at Trenton, NJ. Water quality standards include an antidegradation policy for interstate waters to maintain existing water quality where existing water quality is better than the established stream quality objectives, with certain caveats. The antidegradation policy includes a no measurable change for designed special protection waters with exceptionally high scenic, recreational, ecological, and/or water supply values.

State Programs

Flood Hazard Area Control Act of 1962, N.J.S.A. 58:16a-66 et seq.

To delineate flood hazard areas, review and process stream encroachment applications in accordance with program regulations.

Freshwater Wetlands Protection Act of 1987, N.J.S.A. 13:9B-1 to 13:9B-23 et seq.

The purpose of the Act is to preserve the purity and integrity of the state's remaining wetlands by expanding the state's jurisdiction beyond tidal waters and providing a basis for assuming the federal program.

Safe Drinking Water Act, N.J.S.A. 58:12A-1, et seq.

The Act regulates pollutants in drinking water supplies, and empowers DEP to promulgate and enforce regulations to purify drinking water prior to distribution and to assume primary enforcement under the Federal Safe Drinking Water Act through the imposition of primary and secondary drinking water standards, limits on hazardous contaminants in drinking water, and standards for construction of public water systems.

The Wetlands Act of 1970, N.J.S.A. 13:9A-1 et seq.

Authorizes the Commissioner of DEP to regulate alternatives of, or activities in, coastal wetlands by issuing, revising, or repealing orders that form the basis for issuing permits.

Water Pollution Control Act, N.J.S.A. 58:10A-21 to 58:10A-37 et seq.

To facilitate restoration and maintenance of unpolluted surface and ground waters of the state.

Water Quality Planning Act, N.J.S.A. 58:11A-2 to 58:11A-11 et seq.

To restore and maintain the chemical, physical and biological integrity of the waters of New Jersey.

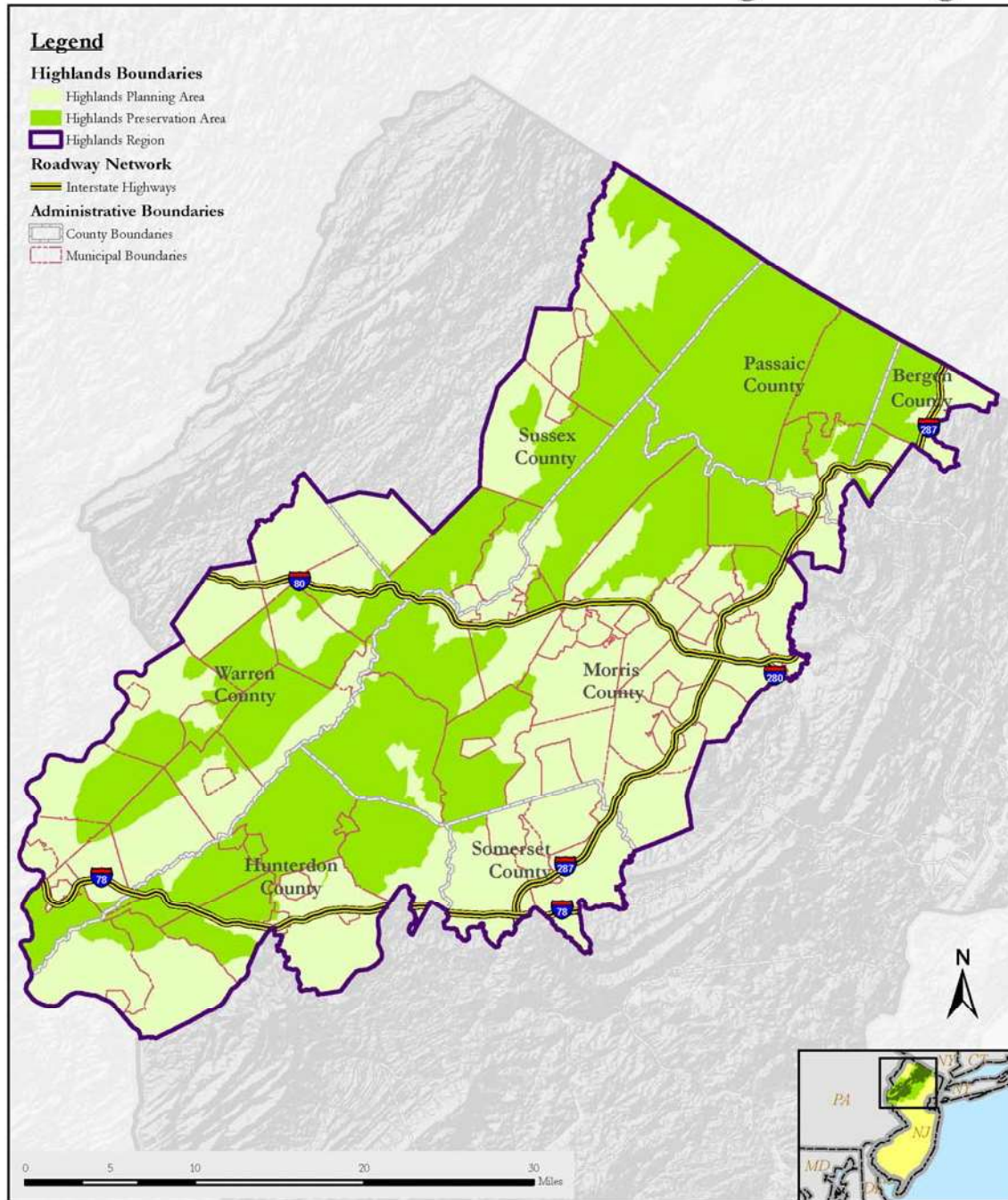
The Highlands Water Protection and Planning Act (Highlands Act, P.L. 2004, c. 120). Enacted by the Senate and General Assembly of the State of New Jersey on August 10, 2004, this legislation declared that “the New Jersey Highlands,” encompassing parts of seven counties in the northwestern portion of the state, “is an essential source of drinking water, providing clean and plentiful drinking water for one-half of the State's population, including communities beyond the New Jersey Highlands, from only 13 percent of the State's land area; that the New Jersey Highlands contains other exceptional natural resources such as clean air, contiguous forest lands, wetlands, pristine watersheds, and habitat for fauna and flora, includes many sites of historic significance, and provides abundant recreational opportunities for the citizens of the State.” The act created the New Highlands Water Protection and Planning Council to prepare a Regional Master Plan in order to protect these resources “through conformance by municipalities and counties, financial and technical assistance by the Council, and State and federal coordination.” The legislation designated Preservation Areas to protect 414,965 acres of land from the threat of imminent land development. The Preservation Areas are subject not only to the standards in the act but also to a myriad of Highlands Water Protection and Planning Act Rules subsequently adopted by the New Jersey Department of Environmental Protection to strictly control land development activities (Statutory authority: N.J.S.A. 13:20-1 et seq.; 13:1D-1 et seq.; 13:1B-16.128 et seq.; 13:9B-1 et seq.; 23:2A-1 et seq.; 58:1A-1 et seq.; 58:10A-1 et seq.; 58:11-23 et seq.; 58:11A-1 et seq.; 58:12A-1 et seq.; and 58:16A-50 et seq. Date last amended: December 7, 2009).

Table 2.1 from the Regional Master Plan

The remaining 444,394 acres of land in the New Jersey Highlands were classified as Planning Areas. The distinctions between the Preservation and Planning Areas can be seen in the goals outlined in the following Table 2.1 from the Regional Master Plan and in the fact that municipal and county conformance with this plan is mandatory in Preservation Areas and is voluntary in the Planning Areas.

REGION-WIDE GOALS FOR PRESERVATION AREA AND PLANNING AREA	
Protect, restore, and enhance the quality and quantity of surface and ground waters • Preserve farmland and historic sites and other historic resources • Preserve outdoor recreation opportunities, including hunting and fishing, on publicly owned land • Promote conservation of water resources • Promote brownfield remediation and redevelopment	
Goals Specific to Preservation Area	Goals Specific to Planning Area
Preserve extensive and, to the maximum extent possible, contiguous areas of land in its natural state, thereby ensuring the continuation of Highlands environment which contains the unique and significant natural, scenic, and other resources representative of the Highlands Region	Preserve to the maximum extent possible any environmentally sensitive lands and other lands needed for recreation and conservation purposes
Protect the natural, scenic, and other resources of the Highlands Region, including, but not limited to, contiguous forests, wetlands, vegetated stream corridors, steep slopes, and critical habitat for fauna and flora	Protect and maintain the essential character of the Highlands environment
Promote compatible agricultural, horticultural, recreational, and cultural uses and opportunities within the framework of protecting the Highlands environment	Promote the continuation and expansion of agricultural, horticultural, recreational, and cultural uses and opportunities
Prohibit or limit, to the maximum extent possible, construction or development which is incompatible with preservation of this unique area	Encourage, consistent with the State Development and Redevelopment Plan and smart growth strategies and principles, appropriate patterns of compatible residential, commercial, and industrial development, redevelopment, and economic growth, in or adjacent to areas already utilized for such purposes; discourage piecemeal, scattered, and inappropriate development, in order to accommodate local and regional growth and economic development in an orderly way while protecting the Highlands environment from the individual and cumulative adverse impacts thereof
	Promote a sound, balanced transportation system that is consistent with smart growth strategies and principles and which preserves mobility in the Highlands Region

Highlands Region



The Highlands Council makes no representations of any kind, including, but not limited to, the warranties of merchantability or fitness for a particular use, nor are any such warranties to be implied with respect to the information contained on this map. The State of New Jersey shall not be liable for any actions taken or omissions made from reliance on any information contained herein from whatever source nor shall the State be liable for any other consequences from any such reliance. Additional sources of information may include NJDOT and NJDEP GIS digital data, but this secondary product has not been verified by NJDOT or NJDEP.

Highlands Regional Master Plan
Final Draft, November 2007

Highlands Council
 New Jersey

Sources:
 New Jersey Highlands Council, 2006

The Regional Master Plan includes land use capability maps that “provide information sufficient to determine, at a regional scale, the potential for land use based on a variety of factors including existing development, agricultural uses, high quality and contiguous natural areas, utility capacity and environmental constraints. The maps delineate the following zones and sub-zones:

Conservation Zone consists of areas having significant agricultural lands and limited low-density development interspersed with environmental features that should be preserved whenever possible.

Conservation Zone - Environmentally Constrained Sub-Zone consists of areas within the Conservation Zone that have significant environmental features that should be preserved and protected from non-agricultural development.

Existing Community Zone consists of areas of extensive and intensive existing development which may have capacity to support additional human development without adversely affecting the ecological value of the Highlands Region.

Existing Community Zone - Environmentally Constrained Sub-Zone consists of areas within the Existing Community Zone that have high resource value and limited or no capacity for on-site human development without adversely affecting the ecological value of the Highlands Region.

Lake Community Sub-Zone are those areas within the Existing Community Zone that are within 1,000 feet of lakes that are ten acres or greater in size. This sub-zone has unique policies to prevent degradation of water quality, harm to lake ecosystems, and natural aesthetic values.

Protection Zone consists primarily of high resource value lands (in terms of forest resources, Critical Habitat, water quality and quantity, and ecological function) that have limited or no capacity to support human development without adversely affecting overall ecological function of the Highlands Region.

Wildlife Management Sub-Zone consists of both areas managed by the United States Fish and Wildlife Service as part of the National Wildlife Refuge System and Wildlife Management Area System administered by the NJDEP Division of Fish & Wildlife’s Bureau of Land Management. These areas are part of a network of lands and waters for conservation, management, and where appropriate, restoration of fish, wildlife, and plant resources and their habitats and permit compatible wildlife-dependent recreational uses.

Resource Focus: Natural Resources

Federal Programs

Endangered Species Act of 1973, 16 U.S.C. 1531 et seq.

The Act provides means to ensure that endangered and threatened species are conserved and protected and that their continued survival is ensured. The Act mandates that all federal agencies will take action to ensure that their activities do not jeopardize endangered species or habitats critical to their survival.

National Environmental Policy Act of 1969 (NEPA), 42 U.S.C. 4321-4347 et seq.

Section 102 of the Act directs that “to the fullest extent possible: the policies, regulations and public laws of the U.S. shall be interpreted and administered in accordance with the policies set forth in this Act, and all agencies of the federal government shall...insure that presently unquantified environmental amenities and values may be given appropriate considerations in decision-making along with economic and technical considerations”.

National Wild and Scenic River Act, 16 U.S.C. 1271-1287

Certain selected rivers of the nation which, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other values, shall be preserved in free-flowing condition, and they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations.

State Programs

Endangered and Non-Game Species Act, N.J.S.A. 23:2A-1 to 23A-13 et seq.

Endangered wildlife indigenous to New Jersey that is found to be endangered should be accorded special protection in order to maintain them and, to the extent possible, enhance their numbers. The Act can, in extreme cases request a resort to condemnation procedures, when it feels that proposed development poses a detrimental risk to endangered wildlife species.

Municipal Conservation Commission Act, N.J.S.A. 58:16A-50 to 16A-66 et seq.

The Act allows environmental commissions to acquire and administer property by gift, grant, bequest or lease. This statute also allows for the creation of joint environmental commissions by municipal ordinance. In view of the disparity in zoning practices from one municipality to another, this statutory device holds promise for joint action to preserve and protect common environmental elements by monitoring use and development.

Municipal Land Use Law, N.J.S.A. 40:55D-2 to 40:55D-20 et seq.

The legislation is intended to provide sufficient space in appropriate locations for a variety of agriculture, residential, recreational, commercial and industrial uses, as well as open spaces, according to their respective environmental requirements. The statute encourages planning boards to design a conservation plan that provides for the preservation, conversation, and utilization of natural resources, including water

supply, forests, soil, marshes, wetlands, fisheries, endangered or threatened species, and other natural resources.

The **Natural Areas** (N.J.S.A. 13:1B-15.4 et seq.) and **Natural Areas Systems Act** (N.J.S.A. 13:1B-15.12a et seq.) establish a system of State Natural Areas for the protection of natural resources for present and future New Jersey residents. The System is currently comprised of 42 Natural Areas encompassing 38,579 acres of state-owned lands. Rules promulgated at N.J.A.C. 7:5A-1.14 allow any individual or organization to suggest that a site be included on the Register of Natural Areas. The Register is a list of sites, public and private, which serve as official recognition of the site's important natural features that are worthy of preservation by the property owner. It is also a list of sites from which to draw new areas for designation to the Natural Areas System. This process could allow for the protection of state-owned lands that support endangered and threatened species of plants and animals, unique and representative natural communities, and significant wildlife habitats.

New Jersey State Planning Commission Act, N.J.S.A. 52:18A-196 to 52:18A-205 et seq.

The significance of this Act rests upon the fact that this is the only statewide planning mechanism in New Jersey; the purpose is to integrate and coordinate state planning to conserve natural resources.

New Jersey Wild and Scenic River Act, N.J.S.A. 13:8-45 to 13:8-63 et seq.

The purpose is to preserve and protect New Jersey rivers, together with adjacent land areas, possessing outstanding scenic, recreational, geologic, fish and wildlife, floral, historic, cultural, or similar values that are public trust.

New Jersey Environmental Rights Act, N.J.S.A. 2A:35A-1 et seq.

This Act allows any person to maintain an action in a court of competent jurisdiction against any other person to enforce, or to restrain the violation of any statute, regulation, or ordinance which is designed to prevent to minimize pollution.

Soil Erosion and Sediment Control Act, N.J.S.A. 4:29-39 et seq.

All major land development activities must be carried out with regard to the control of soil erosion and sedimentation. The Act calls for the creation of land use regulations with districts in order to conserve soil resources, while preventing and controlling soil erosion

Resource Focus: Historic and Cultural

Federal Programs

Archeological Resources Protection Act, P.L. 96-95 Stat. 721

To meet an urgent need to provide greater protection for archeological resources on federally controlled public lands and on Indian Lands, Congress enacted Public Law 96-95. It was signed into law on October 31, 1979

The Act had two fundamental purposes “to protect irreplaceable archeological resources on public lands and Indian lands which are subject to loss or destruction from actions of persons who would excavate, remove, damage, alter or deface them for commercial or personal reasons; and to increase communications and the exchange of information among government authorities, the professional archeological community, collectors, Native Americans and the general public toward the goal of protecting and conserving archeological resources nationwide.

National Historic Preservation Act, 16 U.S.C. 470 to 471

This Act provides for the protection and enhancement of sites associated with events that have made a significant contribution to the broad patterns of our history; or are associated with the lives of persons significant in our past; or embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or otherwise have high artistic or specific value; or have the ability to yield information important to history. This act applies to all federal actions or federally funded actions.

Native American Graves Protection and Repatriation Act, 25 U.S.C. 3001, 3002

The regulations set forth by this Act to develop a systematic process of determining the rights of lineal descendants and members of the Indian Tribes to certain Native American human remains and cultural items with which they are affiliated. These regulations include procedures related to the intentional excavation and inadvertent discovery of human remains or cultural items from federal or tribal lands.

State Programs

New Jersey Register of Historic Places Act NJSA 13:1B.128

Establishes the State Register of Historic Places.

NJSA 13:1B-15.131

Requires state, county or municipality to determine whether any of their undertakings encroach upon state register properties and, if so, to provide information on the project to the commissioner of DEP. All state register encroachment projects require authorization from the commissioner of DEP.

Non-Regulatory Programs

Regulatory methods to protect river resources often suffer from lack of coordination throughout the watershed. Regulations are also subject to failure when funding is insufficient, staffing inadequate, property owner equity is not considered, or when regulations fail to consider the cumulative impact of multiple projects on a resource. An effective tool to provide long-term protection of resources is often a non-regulatory program.

There are numerous such programs in place in the study area. A description of these programs is included in Appendix A. Some of the most important programs are those that provide for the permanent preservation of open space through land acquisitions and easements. Most lands in the watershed are being preserved through

the NJ Green Acres program, the county and state farmland preservation programs, or the Hunterdon County Parks program. In addition, eleven of the municipalities in the study area have dedicated funding for open space acquisitions. As a result of these efforts over 1,754 acres of land are permanently preserved within the eligible sections of the river corridor.

Federal Programs

The Environmental Quality Incentives Program (EQIP), Agricultural Management Assistance (AMA) program, and Wildlife Habitat Incentives Program (WHIP) were reauthorized in the Food, Conservation, and Energy Act of 2008 (Farm Bill). Contracts with eligible applicants provide payments to implement conservation practices with a minimum term that ends one year after the implementation of the last scheduled practice and a maximum term of ten years. Program payments are calculated at up to 75 percent of the cost of the typical practice implementation. Limited resource producers, socially disadvantaged producers and beginning farmers and ranchers may be eligible for increased payment rates up to 90 percent. Farmers and ranchers may elect to use a certified third-party provider for technical assistance. All applicants must meet the Adjusted Gross Income limitations and be in compliance with the Highly Erodible Land and Wetland conservation provisions of the Farm Bill to apply.

The Environmental Quality Incentives Program (EQIP) is a voluntary conservation program for farmers and ranchers that promotes agricultural production and environmental quality as compatible national goals. EQIP offers financial and technical help to assist eligible participants install or implement structural, vegetative, and management practices on eligible agricultural land.

Persons who are engaged in livestock or agricultural production, including forestry, on eligible land may participate in the EQIP program. EQIP activities are carried out according to an EQIP plan of operations developed in conjunction with the producer that identifies the appropriate conservation practice or practices to address the resource concerns. The practices are subject to NRCS technical standards adapted for local conditions.

An individual or entity may not receive, directly or indirectly, payments that, in the aggregate, exceed \$300,000 for all EQIP contracts entered during the term of the Farm Bill. The 2008 Farm Bill also provides conservation payments for organic operations or those transitioning to organic. Contracts approved under this provision are limited to \$20,000 per person per year and an aggregate of \$80,000 during the term of the Farm Bill.

The Agricultural Management Assistance (AMA) program provides financial and technical assistance to agricultural producers to voluntarily address issues such as water management, water quality, and erosion control by incorporating conservation into their farming operations. Persons who are engaged in livestock or agricultural production on eligible land may participate in the AMA program. Producers may

construct or improve water management structures or irrigation structures; plant trees for windbreaks or to improve water quality; and mitigate risk through production diversification or resource conservation practices, including soil erosion control, integrated pest management, or transition to organic farming.

The program in New Jersey is focused on providing these benefits to beginning farmers, small farms, and limited resource producers. AMA activities are carried out according to an AMA plan of operations developed in conjunction with the producer that identifies the appropriate conservation practice or practices to address the resource concerns. The practices are subject to NRCS technical standards adapted for local conditions.

The Wildlife Habitat Incentives Program (WHIP) is a voluntary program for people who want to develop and improve wildlife habitat on private land. Eligible agricultural producers can receive both technical and financial assistance to establish and improve habitat for fish and wildlife species of significant concern in the state.

New Jersey has identified six habitats that are eligible for funding. These are: Native pollinator habitat, Grasslands habitat, Bog turtle habitat, Disturbance-dependent habitat, Wetland habitat, and the Delaware Bay flyway habitat.

WHIP activities are carried out according to a WHIP plan of operations developed in conjunction with the producer that identifies the appropriate conservation practice or practices to address the resource concerns. The practices are subject to NRCS technical standards adapted for local conditions. Under the 2008 Farm Bill, payments are limited to \$50,000 per person per year.

State Programs

New Jersey Farmland Preservation Program

In 1981, New Jersey established the Farmland Preservation Program. The Agriculture Retention and Development Act is the framework of the program. The primary purpose of the program is to strengthen the agricultural industry and preserve important farmlands to enhance the economy and quality of life in the state. Under this program development rights are donated or sold to the State Agriculture Development Committee or County Agriculture Development Board (SADC or CADB). Farms may also be purchased by the SADC and subsequently auctioned after deed restrictions are in place. All four counties in the Musconetcong watershed have established County Agriculture Development Boards.

Green Acres Program of the Department of Environmental Protection

The Green Acres Program was created in 1961 to meet New Jersey's growing recreation and conservation needs. In the first Green Acres bond referendum, the legislature declared that "the provision of lands for public recreation and conservation of natural resources promotes public health, prosperity, and general welfare and is a proper responsibility of the government." Over the years, New Jersey's voters have overwhelmingly approved nine bond issues totaling more than \$1.4 billion. As a result, the state of New Jersey has acquired or assisted

municipalities and non-profit conservation organizations to acquire over 440,000 acres of open space. The goal of this program is to protect one million acres of open space and farmland over the next decade.

New Jersey State Development and Redevelopment Plan 2001

In 1985, the New Jersey Legislature adopted the State Planning Act (N.J.S.A. 52:18A-196 et seq.). In the act, the legislature declared that the state of New Jersey needs sound and integrated “statewide planning to conserve its natural resource, revitalize its urban centers, protect the quality of its environment, and provide needed housing and adequate public services at a reasonable cost while promoting beneficial economic growth, development and renewal...” The state plan is not a regulation but a policy guide for state, regional and local agencies to use when exercising their delegated authority.

In response to a petition from environmental organizations and local governments submitted during cross-acceptance, the New Jersey Highlands, which includes the Musconetcong watershed, have been recognized in the New Jersey State Plan as a special resource area. This demonstrates the Highlands' critical importance to the state and provides assistance for coordinated planning efforts.

New Jersey Trails Plan

The 1996 plan is a major component of the New Jersey's State Trails Program efforts, with the purpose of preserving and expanding trails and trail systems throughout the state by incorporating these as part of a state trails system, and providing a planning guide for establishing trails. The Musconetcong River is one of seven waterways eligible for the New Jersey State Trails System. This waterways trail includes 31 miles of river from Lubbers Run in Allamuchy State Park to Bloomsbury.

New Jersey Scenic Byway Program was “approved by the Federal Highway Administration in October 1993” and “has been developed within the context of a formal, comprehensive and integrated framework of State policy,” as stated in the February 1995 New Jersey Scenic Byway Program manual. The objectives of the program are to:

- Preserve and enhance the beauty of natural, cultivated, and built landscapes and their relationship to our history, our culture and our future;
- Promote understanding of the State's heritage and an appreciation of its diversity;
- Provide and promote safe access to recreational, cultural, historic and archaeological opportunities in proximity to scenic views and centers of residential and economic activity;
- Enhance tourism throughout New Jersey in proximity to centers of recreation and commerce;
- Provide safe and relaxing everyday travel opportunities linked with other travel options such as bicycling, hiking and multi-modal travel;

- Encourage land uses that create and complement scenic vistas, prospects and panoramas;
- Create and improve relationships among the architectural, technological and engineering elements of transportation facilities and associated structures visible in the travel corridor;
- Improve traffic flow along main routes and promote pedestrian, bicycle, and para-transit travel in ways that contribute to conserving energy resources and improving air quality; and
- Promote appropriate local and state initiatives that enhance the scenic qualities of all roadways consistent with the intent of the Federal Intermodal Surface Efficiency Act of 1991 and the State Development and Redevelopment Plan.

The program sets forth the criteria to be used in identifying and evaluating scenic, natural, recreational, archaeological, historic and cultural resources along a roadway, the process for designating the roadway as a scenic byway based upon these resources, and the method for managing these resources once the roadway is officially designated.

APPENDIX B: ANALYSIS OF EXISTING RESOURCE PROTECTION

Preservation of outstanding river resources is a primary goal of the National Wild and Scenic Rivers Act. The long-term protection of the river corridor, lands immediately adjacent to the riverbanks, and the outstandingly remarkable resources is necessary in order to maintain the integrity of the river system and for the eligible river segments to be suitable for designation in the National Wild and Scenic program.

Protection of lands within the corridor was determined based on two levels of assessment: 1) the status of ownership for conservation purposes, and 2) local and state land use laws.

Identification of lands, which are designated for public use and conservation purposes, were determined from the NJ Highlands report – An Inventory and GIS Mapping of Open Space and Undeveloped Land. This mapping provided a supplement to the Green Acres data previously available to the study team. Open space lands, which are not subject to long-term conservation restrictions, were not considered as protected for our purposes.

Local land use laws and regulations that protect natural resources or provide incentives and setbacks were evaluated in a preliminary way for each river municipality. This evaluation was done based on a review of master plans and land development ordinances available at the county planning board offices.

Protections afforded by state land, use laws that protect the river corridor, including wetlands, floodplains, and critical areas were also evaluated. This analysis provides a summary of the level of protection currently provided by these mechanisms and the potential for the maintenance and enhancement of river resources values in the future. Threats to the corridor and gaps in the protection of river resources are addressed in the management plan.

Corridor Summary

The following findings are estimates based on readily available land use data, reviews of county files for master plans and municipal land development ordinances as of January 2000. Only the 14 municipalities in the sections considered eligible for wild and scenic designation were evaluated.

Approximately 16 percent of the river corridor lands (land within one-quarter-mile of the river) in the 14 river municipalities are protected from incompatible land uses through ownership by state or local governments. These lands include 467 acres of municipal and county owned lands and 1,063 acres of state owned lands.

The banks of the river form approximately 57 miles of riverfront within the sections considered eligible for wild and scenic designation. Approximately 11.8 miles (or 20 percent) of this frontage is currently public land.

An additional four-percent of the river corridor lands are protected through conservation or agricultural easements on private land in Bethlehem Township. Recent additions to the farmlands preservation program in Warren County, principally in Pohatcong, Franklin and Washington townships will increase the total acreage of properties subject to easements within the river corridor. The remaining 11 municipalities have no privately protected lands in the river corridor according to the county files.

Approximately 15 percent of the remaining river corridor lands are floodplain, wetland or wetland transition area regulated by the state. Some portion of this wetland and wetland transition area is in agricultural production and exempt from some state wetland regulations.

Allamuchy Township

Land use along the river corridor from Saxton Falls to Hackettstown is primarily parkland and low density residential. Approximately 72 percent of the river corridor lands in the township are within Allamuchy Mountain State Park. To the right of County Road 604 the state parkland is designated as a natural area. Less than 800 feet of riverfront is privately owned within the township's river corridor. This area is zoned single family residential (SFR). No sewer service is present or proposed in this area. Critical areas in the township have been identified and mapped including freshwater wetlands, 100-year floodplain, and slopes in excess of 15 percent. Permitted uses within the floodplain include overflow parking and detention basins. No structures or septic systems are permitted within the floodplain.

The Master Plan (dated 1993) recommends preservation of priority stream corridors, including the Musconetcong River, through conservation easements of 150 feet from each bank or greater if the floodplain extends further.

Hackettstown

The Town of Hackettstown is a densely developed town center in the river corridor. The downstream portions of the riverfront were determined to be ineligible for designation as wild and scenic. Zoning along the riverfront includes highway commercial (HC), Apartments (APT), limited manufacturing (LM), community commercial (CC), health facilities (HF), and residential (R-30, R-12.5/OFF). Approximately 23 percent of the riverfront is preserved as state park, fish and game lands, or community park. The remaining undeveloped riverfront lands would be developed subject to the town's natural features ordinance which seeks to minimize changes in existing grades and preserve natural features. Natural features to be preserved include: trees > six-inches in diameter, wooded areas, brooks, hilltops, view and vistas, rock outcrops, wetlands, steep slopes, seasonal high water lands, and

surface and water bodies. In addition, critical areas are to be preserved as undeveloped open space including: wetlands, significant trees, floodplains, slopes > 25 percent, habitat of state or federally listed rare, threatened or endangered species, and historically significant structures.

Although the undeveloped lands along the river are zoned for high-density residential and commercial uses, the implementation of the town's natural features ordinance should allow for the preservation of the remaining riverfront as open space.

Mount Olive Township

Lands along the riverfront are comprised of public parklands and residential developments. State parklands comprise 54 percent of the river corridor in Mount Olive and there is little or no potential for additional development in the remaining river corridor lands. A comprehensive natural resources inventory of the township completed in 1988 identified the many critical features and limitations to development in the watershed. The township's critical areas ordinance prohibits development in critical wetlands, flood hazard areas, slopes in excess of 25 percent, and surface waters. The 1988 Master Plan indicates the Musconetcong watershed and river corridor as conservation and open space with many limitations due to natural features, groundwater recharge and quality, flood hazard and wetlands. The draft Open Space and Recreation Plan, dated May 1999, identifies the forested ridge above the Musconetcong River and the preservation of naturally vegetated corridors along streams, rivers and lakes as priorities. Undeveloped parcels in the watershed below Saxton Falls are zoned for rural residential (1DU/ five acres).

Washington Township, Morris County

The Township master plan and reexamination adopted in 1995 include the following goals and objectives: establish a center in the northwest portion of the township; develop a greenways plan and a system of hiking, bicycle and equestrian routes; provide for conservation easements for critical features; recognize and protect unique views and vistas; and establish a ridge protection ordinance. The designated center in the northwest portion of the township includes Hastings Square and Peachtree village and is adjacent to Hackettstown, a regional center. This area along the Musconetcong River is served by public sewer and water and is zoned for multi-family residential, golf course, commercial and industrial/office uses. This section of the river was determined not to be eligible for designation as wild and scenic.

The remainder of the riverfront downstream from Schooleys Mountain Road (Route 24) is zoned for residential use (R3, minimum lots of less than three acres), with the exception of the municipal wastewater treatment plant and three existing hamlets, zoned R20 (minimum lots of less than one-half-acre).

Two municipal parcels along the corridor are designated for water treatment use. A proposed expansion of the existing wastewater treatment plant would increase the

design capacity from 1.65 to 3.3 MGD to serve the township and portions of five surrounding municipalities.

A Greenways Plan and Trails Map were both adopted in 1999, however the Musconetcong River corridor was not specifically identified in either plan. The Greenways Plan provides for an overlay district in large portions of the township which encourages protection of critical features and consideration of linkages through clustering of development. Additional overlay districts are provided for Agricultural Use, Carbonate Area Restrictions and Historic Preservation. The Historic Preservation Overlay zone does not include any areas of the Musconetcong watershed.

Washington Township also requires that developers convey conservation easements to the township for steep slopes, ridgelines, streams and wetlands. Watercourses and other waterbodies are protected by a minimum setback of 95 feet on each streambank. The riparian area is dedicated to the township and is restricted from removal of vegetation, topsoil or mineral excavation, erection of structures, and the placement of fill. Steep slopes and ridge protection is provided by ordinance. All activities on slopes 15 to 25 percent are subject to township review. Only transitional grading is permitted on slopes 25 to 30 percent and no disturbance is permitted on slopes in excess of 30 percent. Within 100 feet of the ridgeline no buildings or structures with heights above the ridgeline are permitted. No structures or disturbance other than access are permitted within 60 feet of the ridgeline.

The township has a strong Erosion and Sediment Control ordinance with provisions for local enforcement by the township engineer, and a Stormwater ordinance designed to address water quality as well as the typical water quantity concerns. New ordinance are being developed to address forest management and stream buffers.

Lebanon Township

The original River Management Plan acknowledged the township's efforts in protecting its natural resources. The master plan contained a solid base of limitations to development including "groundwater, septic, base flows, steep topography, floodplains, swamps and poor soils."

Because the river flows more closely to the mountain within the Lebanon Township portion of the Musconetcong River valley, there is less level land than in most of the other townships bordering the river. A Tree Ordinance prohibits tree cutting on slopes of 25 percent or more with the stated purpose being to "control drainage and soil erosion."

Since the original River Management Plan, most of the remaining undeveloped land has been rezoned as Resource Conservation with a minimum lot size of 7.5 acres. In 2004, the minimum lot size for the township was increased dramatically when the State passed the Highlands Water Protection and Planning Act. The Highlands Act

designated Lebanon Township an area of exceptional natural resource value; all but four lots of the township now lie in the Highlands Preservation Area.

State regulations also helped protect the watershed with the highest level of stream/river protection of C-1 being granted to the Musconetcong and its tributaries, along with more stringent Storm Water Runoff rules.

The Hunterdon County Parks department has acquired additional land within the watershed. Point Mountain Park has increased to 1082 acres with the addition of the Wattles property between Point Mountain Rd and Mountain Top Rd. Properties contiguous to Point Mountain Park in the northwest corner of the township have been acquired with the intent of creating a larger Bio Reserve.

The Lebanon Township Environmental and Open Space Commission works hand in hand with various organizations in realizing their mutual goals of land preservation. The Commission's current efforts are aimed at trail connectivity between all the preserved lands within the township.

The township is also working with the National Flood Insurance Program to update its flood plain ordinances.

Hampton Borough

Riverfront lands in Hampton include a Borough park, a small zone of Highway commercial along Route 31, and two residential zones. The majority of the riverfront which lies downstream from the Route 31 bridge is zoned Rural residential (RR5). This area is the source of the local water supply, an aquifer recharge area over a limestone formation susceptible to groundwater contamination. The town well is located in this zone. Minimum lot size is five acres and cluster development with a 45 percent open space provision is permitted. The remaining riverfront area upstream from Route 31 is zoned residential (R2) and allows for two-acre lots. Limiting factors to development in this area include clay soils which limit the use of septic systems.

Natural features ordinances address stormwater control and development of steep slopes. The rate of stormwater runoff must not be increased and groundwater recharge capacity must not be decreased with development. Detention must be designed to contain any excess post-construction volume of runoff. The steep slope development control applies only to the R5 zone at the higher elevations in Hampton. This ordinance discourages development on slopes greater than 30 percent and limits impervious surface to 50 percent permitted on slopes 11 to 19 percent and 20 percent of that permitted on slopes 20 to 29 percent.

Bethlehem Township

Bethlehem Township provides protection for the Musconetcong River and its immediate corridor through a combination of techniques including zoning, open space acquisition, and the Farmland Preservation Program. Of the latter category, 281 acres of farmland within the river corridor are currently protected through

agricultural easements. Moreover, a substantial wooded buffer exists along much of the Agricultural Preservation stretch of the river.

The township also purchased the Vliet Farm, which fronts the river just above Bloomsbury, protecting 115 acres within the river corridor. State lands within the corridor total 142 acres resulting in approximately 25 percent public ownership of the river corridor in this township.

Those areas not protected through farmland preservation or municipal open space are zoned as Agricultural Residential (AR). This zoning designation allows for six-acre zoning or optional cluster building with a 70 percent open space requirement. A small area across from the village of Asbury is designated Manufacturing which reflects the existence of the graphite mill along the river. A Residential, Office, Manufacturing district (ROM) exists just above Bloomsbury. Virtually the entire river corridor lies within a Carbonate District Overlay which carries with it additional protection in the form of a Limestone Features ordinance.

Protection of the Musconetcong tributaries is critical to maintaining water quality within the river itself. Bethlehem Township has adopted a Mountain Residential District (MRD) designed to protect steep slopes. The MRD calls for five-acre zoning with mandatory clustering and 70 percent open space, as well as a minimum 100-foot buffer for streams and wetlands. While the MRD requirement does not apply to the river corridor, it does afford significant protection for several tributaries and their headwaters on Musconetcong Mountain.

The township land use and development ordinance (1997) includes a Natural Features ordinance that covers floodplains, wetlands, steep slopes and limestone features. The township does not have ordinances covering stormwater management and erosion control.

The township master plan was adopted in 1984 and has since been amended numerous times, making it difficult to understand exactly what is “on the books.” The master plan was last re-examined in 1994, and the planning board is currently conducting an update.

Bethlehem recently completed a Greenway and Open Space Plan adopted and incorporated into the Master Plan in 1999. The plan was developed to “set guidelines to preserve open space including farms and environmentally sensitive areas.” The plan identifies two methods for open space preservation. “First, the Plan will be incorporated into the Bethlehem Township Master Plan requiring all future developments in the township to be designed in a fashion that is consistent with the objectives of the Open Space Plan. Second, open space will be preserved through acquisition of specific properties...that are critical to the achievement of the goals of the Open Space Plan.”

The plan identifies twelve priority areas for acquisition including the establishment of a Musconetcong River Trail Greenway and restoration of the West Portal Brook stream corridor. The plan also contains the following goals for the protection of stream corridors where new development is proposed.

Bethlehem Township shall establish 150-foot greenway on each side of trout production and maintenance streams.

Where natural vegetation is lacking, the reforestation of these areas should be required as a condition of site plan approval.

Areas within the 150 feet greenway shall be designated as conservation easements subject to passive public use at time of subdivision approval.

Measures to protect conservation easements from post development disturbance shall also be required to the greatest possible extent as part of the subdivision approval.

Bloomsbury Borough

Approximately one half of the riverfront lands in the Borough are currently medium density residential or commercial uses. The east end of the Borough is zoned for Planned Urban Development (PUD). Development in this district allows a net density of three dwelling units (DU)/acre for single-family units and 10 DU/acre for multi-family units. A minimum of 20 percent common open space is required. The master plan also indicates that the flood hazard area, and open space along the river should be included in this open space. A setback of 100 feet along streams is required by ordinance in residential districts. Development of the PUD zone can be compatible with protection of the resource values of the river corridor if the setbacks and open space provisions are implemented in the site design.

The remaining riverfront land is zoned agricultural conservation (AC) and agricultural residential (AR). The AC district includes 56 acres of state owned natural area and approximately five acres of municipal open space according to the NJ Highlands data. Unprotected lands within this zone allow a minimum five-acre lot, while the AR district requires a minimum three-acre lot. Both districts allow for a cluster option.

No sewer systems are present or planned within the Borough.

Greenwich Township

All riverfront lands in the township are zoned agricultural and open space preservation residential (R7). This district is designed to preserve prime agricultural soil and open space for recreation and conservation. This provides a sending zone for transfer of development rights to designated town centers. The minimum lot size is seven acres with options for open space communities, residential hamlets, and density bonus for preservation or rehabilitation of historic structures. To the right of

Route 173 is a Research Office and Manufacturing zone which allows for 10-acre lots with a floor area ratio of .15. A new sewer treatment plant and discharge to the Musconetcong is proposed with the development of this manufacturing zone.

Environmentally sensitive areas in the R7 zone are to be protected by conservation easement. An environmental inventory included in the Master Plan Update (dated 1998) identified wetlands, floodplains and steep slopes in excess of 25 percent. A historic survey of the township was completed identifying historic or potentially historic sites in the area of Route 173 and I-78 as well as along Route 173 within the river corridor. The Park, Recreation and Greenway Plan identifies the proposed greenway along the Musconetcong River. The master plan also includes a Historic Preservation Plan element and Community Design Guidelines.

There are presently no public or privately protected lands in the river corridor in Greenwich Township. Approximately 23 percent of the river corridor is wetland, wetland transition area or floodplain regulated by the state.

Franklin Township

Riverfront lands within the township are zoned primarily rural conservation (RC), with the exception of Asbury which is zoned village residential, and an area across from Bloomsbury Borough which is zoned industrial park (IP). The rural conservation district was designed to address the goals of protecting groundwater quality, scenic rural character, and promoting agricultural use. The RC district allows for one dwelling unit per five acres and provides options for lot averaging and clustering. Minimum buildable areas exclusive of steep slopes (> 25 percent), floodplains, karst features, and drainage or conservation easements must be met. These performance criteria do not apply to the IP zone.

The entire township is identified as a carbonate area and residential development capacity in the township is based on a nitrate dilution model. The Carbonate Area District ordinance requires special investigations and may impose special construction techniques. There is no sewer service existing or planned for the township, however public water service is planned for Asbury village and the IP district and currently exists in some other areas.

Objectives noted in the Land Use plan element of 1999 include: protect steep slopes; maintain and enhance groundwater and surface water quality; preserve prime agricultural soils; identify and manage stream corridor buffer areas; preserve the Morris Canal; adopt a stormwater management plan and preserve historic buildings. The Historic Plan Amendment adopted in March 2000 recommends that the Asbury Historic District should receive attention in the land development ordinances. A master plan re-examination is currently underway. An open space and recreation plan as well as a farmland preservation plan are also being prepared.

The township has land development ordinances related to the following features: Chapter 113 Soil Erosion and Sediment Control, follows the county guidelines and

regulations are to be enforced by Warren County Soil Conservation District; Chapter 80 Flood Damage Prevention, requires a township permit for construction in the floodplain; Chapter 73 Farming, establishes a municipal farm preservation program. There are no specific natural features ordinances.

Approximately 15 percent of the river corridor is state or municipal lands. Preserved farms along Maple Avenue and east of Wolverton Road protect additional acreage of the river corridor. In addition, 26 percent of the corridor is wetland, wetland transition area or floodplain regulated by the state.

The historic village of Asbury is essentially built out and the majority of the riverfront is zoned for low-density residential use. The township's requirement for dedication of right-of-way with subdivisions along the Morris Canal will provide for protection and future recreational use. The build out of the IP zone presents a potential threat to the river corridor. Development pressure in this area is currently low due to lack of suitable highway access, lack of water and sewer services, and slopes. One parcel in the IP is under consideration for farmland preservation.

The 1994 draft master plan update included a conservation element, recreation plan and historic preservation plan. An environmental resource inventory was completed in 1991 and an open space inventory in 1992 by the environmental commission. Some objectives stated in the master plan included: retain rural atmosphere while allowing appropriate development and growth; protect historic resources; protect unique environmental features; provide adequate recreation facilities; new development should not adversely affect ground or surface water; and encourage farmland and open space preservation. Environmental constraints mapped include steep slopes, floodplains, wetlands, unsuitable soils, agricultural soils, sensitive geologic features, and scenic features. Scenic features are described as wooded hillsides, agricultural valleys and stream corridors. Stream corridors are also the focus of the conservation element. An overlay zone is recommended to provide a 150-foot buffer along streams. The buffer width is based on the goals of sediment control and nutrient removal. Residential development capacity in the township is based on a nitrate dilution model. Conservation easements are recommended for greenways. Historic structures within the river corridor include seven structures in Imlaydale hamlet, and three in Changewater. Zoning and buffering are recommended to protect historic resources. There is no public sewer or water service along the river currently. Expansion of sewer service was proposed in the 1994 master plan update within a proposed development boundary along Route 31. No zoning map or ordinances were available for review at the county planning board.

Mansfield Township

The land use along the river corridor in Mansfield Township is currently a mix of agricultural, residential and open space uses with high-density development centered in Beattystown and Port Murray. The township's master plan directs additional growth to lands surrounding Beattystown and Port Murray, particularly along the Route 57 corridor paralleling the river. Expansion of sewer and water service is

planned for two areas along the river. These services would support the following proposed land uses along the river downstream of Beattystown: historic village commercial (HVC); adult retirement community; and business with senior housing option (B-1).

Between Port Murray and the river a sewer and water system is proposed along with village residential and golf course community developments. Between the growth centers of Beattystown and Port Murray recent acquisitions of open space will protect the area between the river and Route 57 from further development. To the right of Route 57 the existing agricultural land is planned for R-1 residential development. In addition to conventional three-acre lot subdivisions, the township allows for lot size averaging to encourage farmland preservation, cluster development with 30 percent open space designation, and transfer of development credits to the village community zone. If implemented with the river corridor in mind, these options would allow for the permanent protection of lands adjacent to the river corridor.

Mansfield Township recommends preservation of stream corridors and the establishment of a greenway and trail system along the Musconetcong in the open space element of their master plan.

Pohatcong Township

The goals and objectives of the township Master Plan include preserving remaining open and forested land, natural features and farms and the preservation and enhancement of existing stream corridors. An environmental resource inventory identifies wetlands, topography, depth to seasonal high water, soils, geology and critical geologic areas. A Farmland Preservation Plan element was adopted in 1999. Within the Musconetcong watershed this plan identifies two agricultural development areas (ADA), Silver Hills and Valley & Ridge. The plan indicates that 673 acres of farmland are slated for preservation in the Silver Hills ADA and 2022 acres in the Ridge & Valley ADA. One farm is currently preserved along the river corridor immediately upstream from Warren Glen. The township open space and farmland trust fund was increased in November 1999 from .02 per \$100 assessed property to .05 per \$100.

The villages of Warren Glen, Finesville, Siegetown, Riegelsville and Mt Joy are zoned as residential high-density villages (R4V). Limited areas in the river corridor adjacent to Warren Glen are zoned neighborhood business and industrial. All remaining riverfront in the township is zoned residential rural (R1 and R2). These districts allow densities of 0.2 and 0.5, respectively. There is no sewer service within the watershed currently and no plans for expansion to this area. Warren Glen and Riegelsville have public water service from Garden State Water Company. There are no plans for expansion of this service.

Holland Township

Riverfront land uses in the township include industrial and low density residential. The Musconetcong Gorge Nature Preserve, part of the Hunterdon County park system, parallels the river for approximately three miles. The residential district along the river is zoned for five-acre lots and allows for three-acre lots with lot averaging or cluster options. This district was recently rezoned from R3 to reduce the density based on the objectives of preserving agriculture and the physical and environmental limitations throughout the district including steep slopes, adverse soil and bedrock conditions, septic disposal limitations and limited groundwater yield. The area of Riegelsville is zoned village residential (VR) and designed to promote retention of existing buildings and preserve the historic character of the village. There are no sewer systems or plans for expansion into the river corridor.

APPENDIX C: RELATED REFERENCE MATERIALS

Musconetcong Watershed Association Documents:

- River Watcher Program Annual Report
- River Watcher Water Monitoring Manual
- River Watcher Water Monitoring Quality Assurance Project Plan (QAPP)
- The MWA Strategic Plan

North Jersey Resource Conservation and Development Documents:

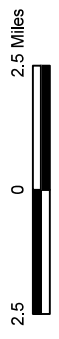
- Musconetcong Water Restoration and Protection Plan (2006)

MUSCONETCONG RIVER

National Wild & Scenic Rivers Study

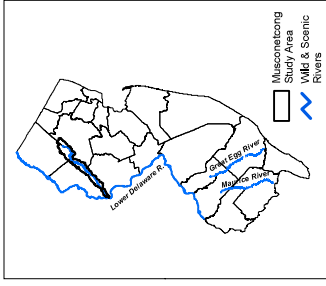
Eligible River Segments

- Eligible Segment
- Watershed Boundary
- Municipal Boundary
- Open Water
- Streams



This map was developed using New Jersey Department of Environmental Protection Geographic Information Systems digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

The information conveyed in this map is regional in nature and is not suited for use in site specific studies. The user shall hold Heritage Conservancy harmless from any suits, claims or actions arising out of the use of this map or accompanying information.



Segment A

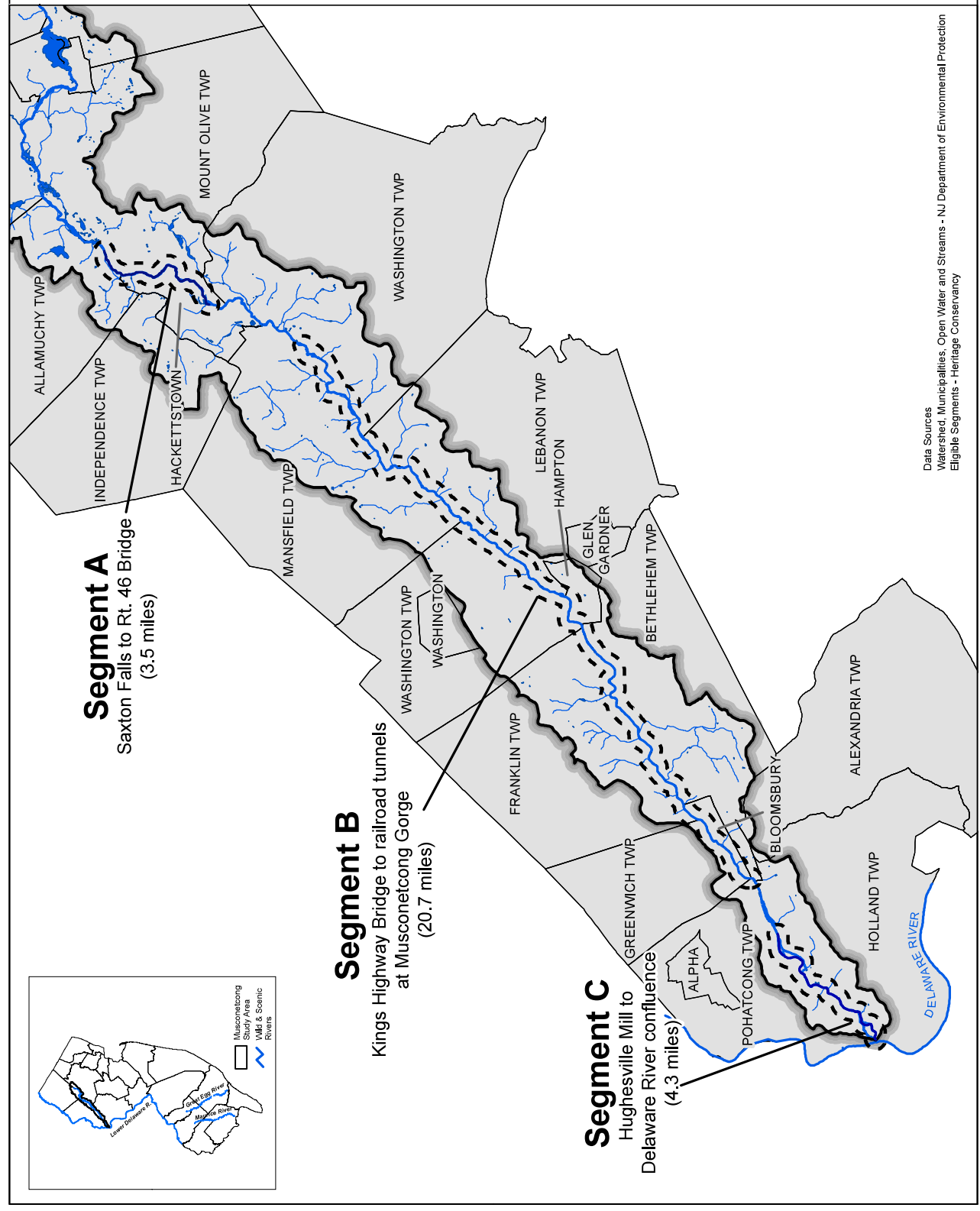
Saxton Falls to Rt. 46 Bridge
(3.5 miles)

Segment B

Kings Highway Bridge to railroad tunnels
at Musconetcong Gorge
(20.7 miles)

Segment C

Hughesville Mill to
Delaware River confluence
(4.3 miles)



Data Sources
Watershed, Municipalities, Open Water and Streams - NJ Department of Environmental Protection
Eligible Segments - Heritage Conservancy

MUSCONETCONG RIVER

National Wild & Scenic Rivers Study

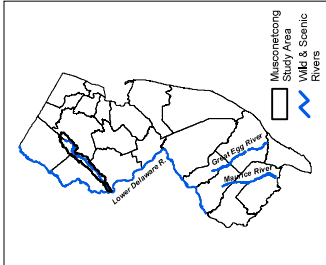
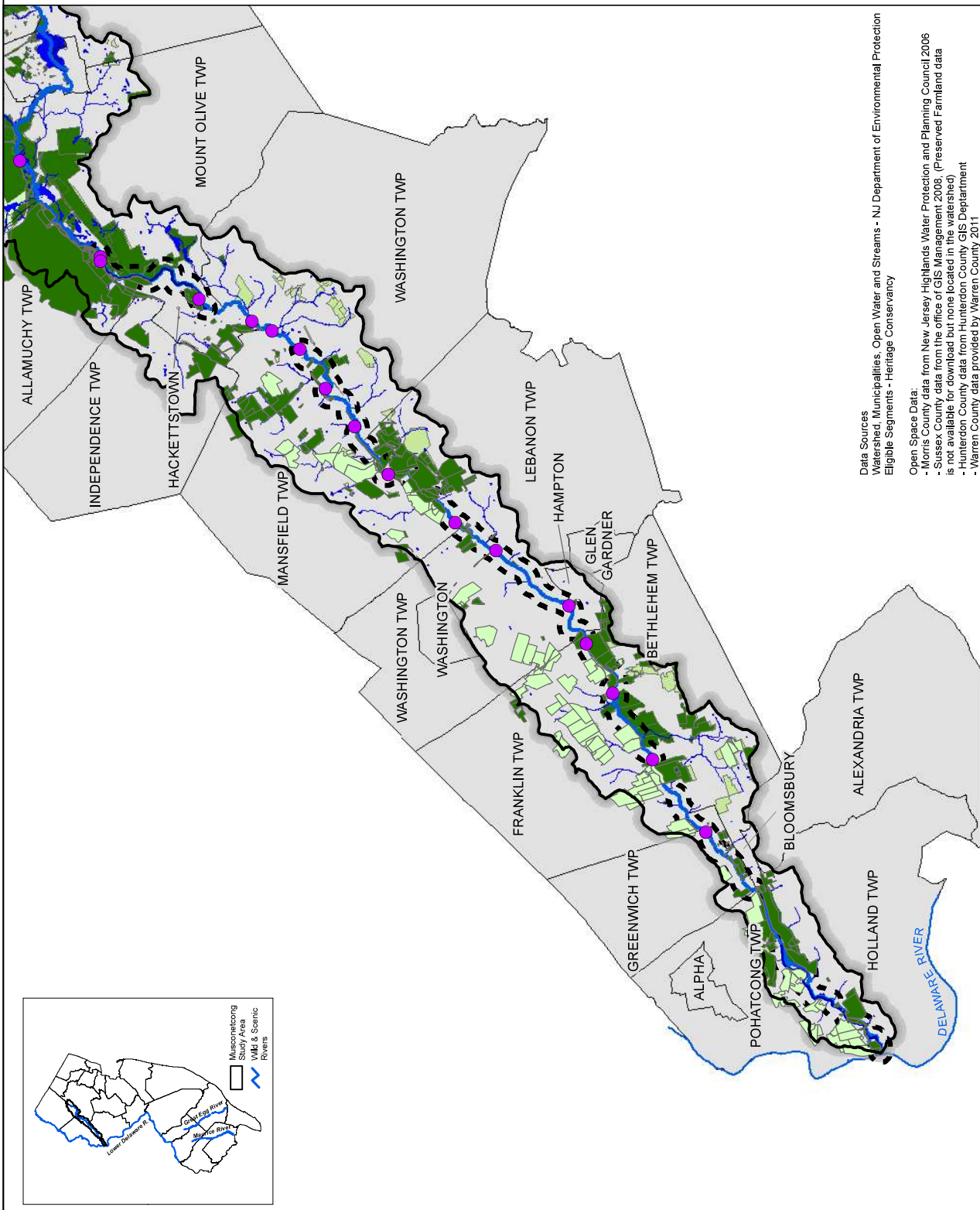
Open Space & Recreational Lands Map

- Eligible Segment
- Watershed Boundary
- Municipal Boundary
- Open Water
- Streams
- Public Open Space
- Private Open Space & Preserved Farmland
- River Access Points (Public)



This map was developed using New Jersey Department of Environmental Protection Geographic Information Systems digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

The information conveyed in this map is regional in nature and is not suited for use in site specific studies. The user shall hold Heritage Conservancy harmless from any suits, claims or actions arising out of the use of this map or accompanying information.



Data Sources
 Watershed, Municipalities, Open Water and Streams - NJ Department of Environmental Protection
 Eligible Segments - Heritage Conservancy

Open Space Data:
 - Morris County data from New Jersey Highlands Water Protection and Planning Council 2006
 - Sussex County data from the office of GIS Management 2008. (Preserved Farmland data is not available for download but none located in the watershed)
 - Hunterdon County data from Hunterdon County GIS Department
 - Warren County data provided by Warren County 2011

MUSCONETCONG RIVER

National Wild & Scenic Rivers Study

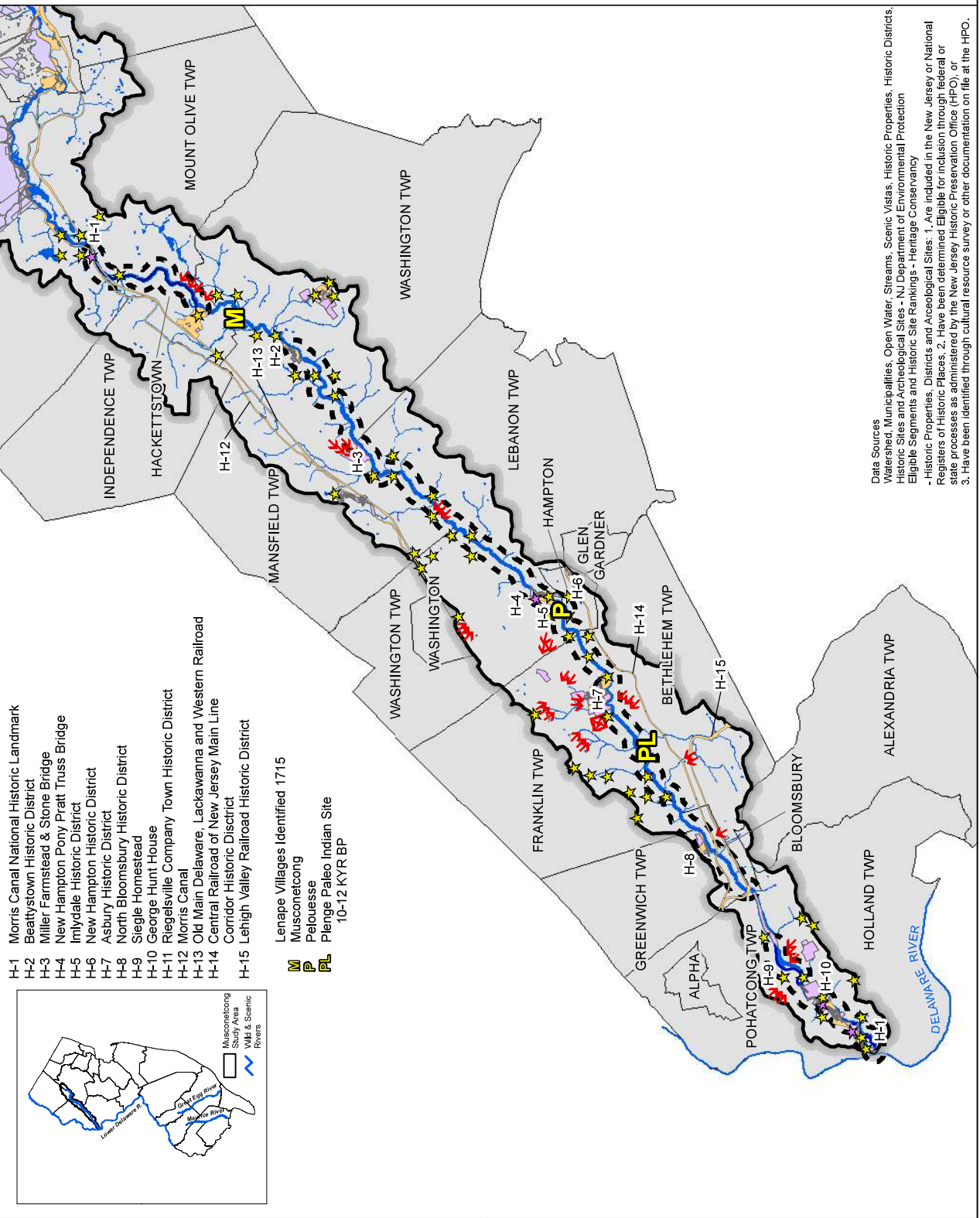
Historic & Scenic Resources Map

- Eligible Segment
- Watershed Boundary
- Municipal Boundary
- Open Water
- Streams
- Scenic Vistas
- Historic Properties
- Historic Districts
- Historic Sites
- Archeological Sites

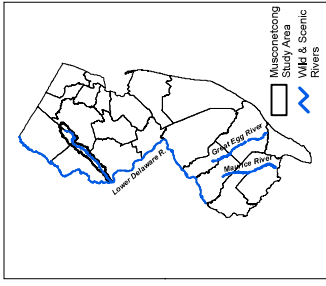


This map was developed using New Jersey Department of Environmental Protection Geographic Information Systems digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

The information conveyed in this map is regional in nature and is not suited for use in site specific studies. The user shall hold Heritage Conservancy harmless from any suits, claims or actions arising out of the use of this map or accompanying information.



Data Sources
Watershed, Municipalities, Open Water, Streams, Scenic Vistas, Historic Properties, Historic Districts, Historic Sites and Archeological Sites - NJ Department of Environmental Protection
Eligible Segments and Historic Site Rankings - Heritage Conservancy
- Historic Properties, Districts and Archeological Sites: 1. Are included in the New Jersey or National Registers of Historic Places. 2. Have been determined Eligible for inclusion through federal or state processes as administered by the New Jersey Historic Preservation Office (HPO), or 3. Have been identified through cultural resource survey or other documentation on file at the HPO.



- H-1 Morris Canal National Historic District
 - H-2 Beattystown Historic District
 - H-3 Miller Farmstead & Stone Bridge
 - H-4 New Hampton Pony Pratt Truss Bridge
 - H-5 Inlydale Historic District
 - H-6 New Hampton Historic District
 - H-7 Asbury Historic District
 - H-8 North Bloomsbury Historic District
 - H-9 Siegle Homestead
 - H-10 George Hunt House
 - H-11 Regelsville Company Town Historic District
 - H-12 Morris Canal
 - H-13 Old Main Delaware, Lackawanna and Western Railroad
 - H-14 Central Railroad of New Jersey Main Line
 - H-15 Lehigh Valley Railroad Historic District
- M Musconetcong
 - P Pelouesse
 - PL Plenge Paleo Indian Site 10-12 KYR BP
- Lenape Villages Identified 1715

MUSCONETCONG RIVER

National Wild & Scenic Rivers Study

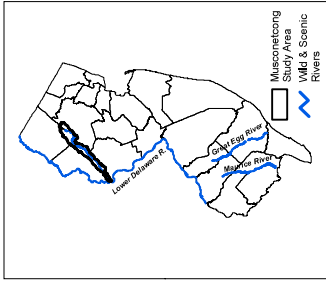
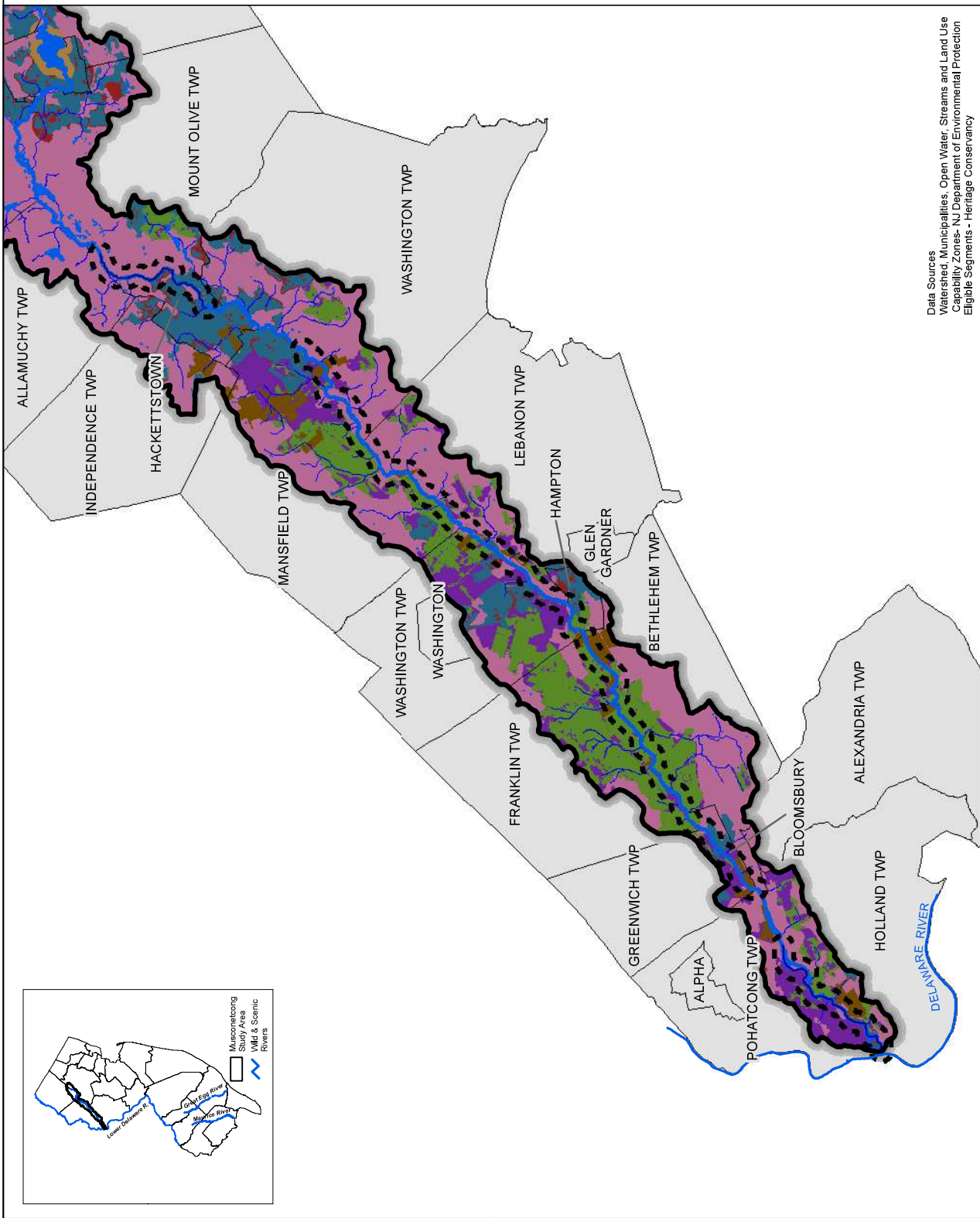
Highlands Land Use Capability Zones

- Eligible Segment
- Watershed Boundary
- Municipal Boundary
- Open Water
- Streams
- Conservation Environmentally Constrained Subzone
- Conservation Zone
- Existing Community Environmentally Constrained Subzone
- Existing Community Zone
- Lake Community Subzone
- Protection Zone
- Wildlife Management Area



This map was developed using New Jersey Department of Environmental Protection Geographic Information Systems digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

The information conveyed in this map is regional in nature and is not suited for use in site specific studies. The user shall hold Heritage Conservancy harmless from any suits, claims or actions arising out of the use of this map or accompanying information.



Data Sources
Watershed, Municipalities, Open Water, Streams and Land Use Capability Zones - NJ Department of Environmental Protection
Eligible Segments - Heritage Conservancy

MUSCONETCONG RIVER

National Wild & Scenic Rivers Study

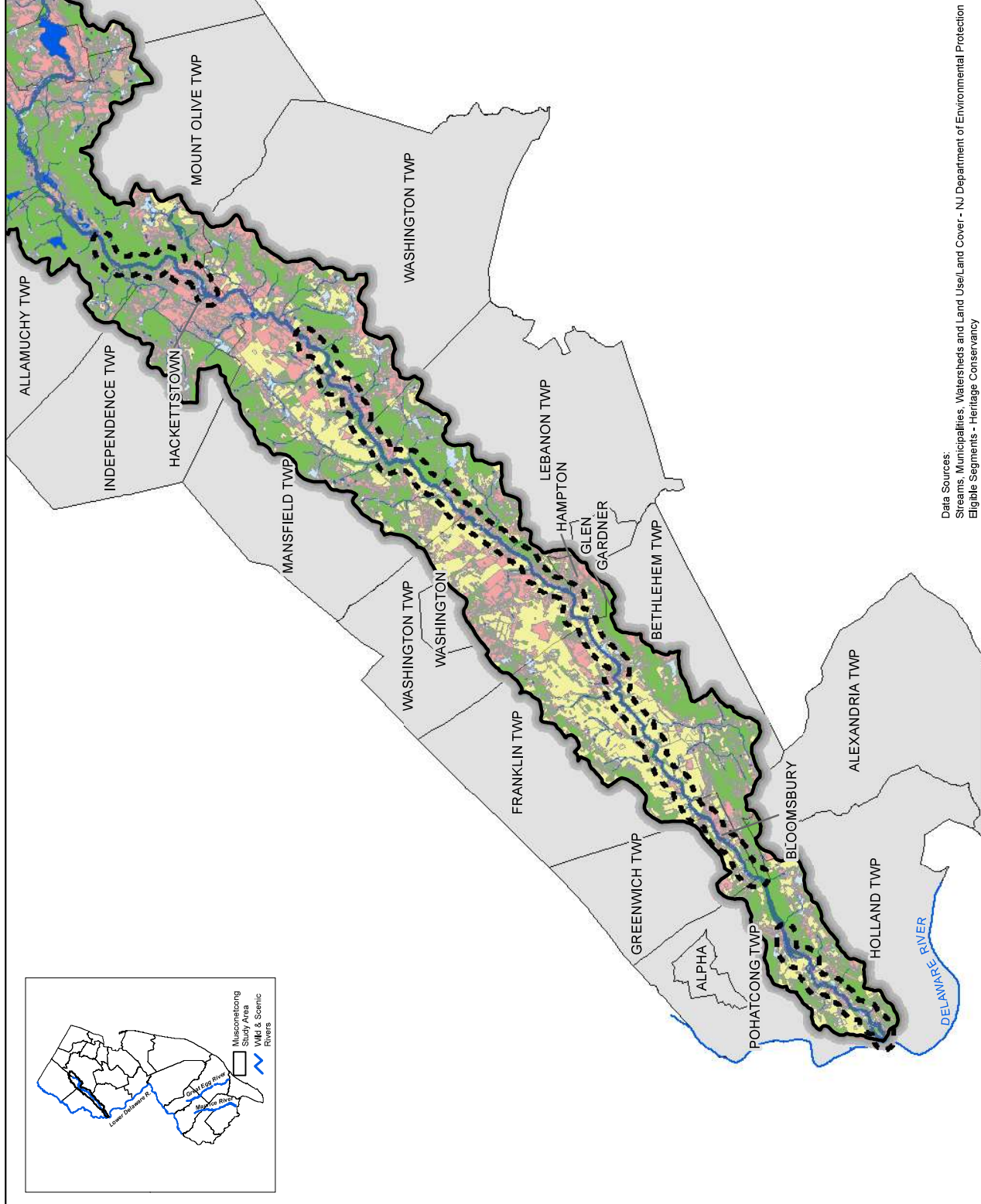
Land Use/Land Cover Map

- Eligible Segment
- Watershed Boundary
- Municipal Boundary
- Streams
- Agriculture
- Barren Lands
- Forest
- Urban
- Water
- Wetlands
- NUDEP (2007)

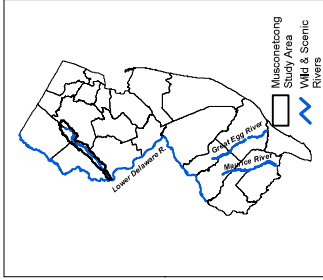


This map was developed using New Jersey Department of Environmental Protection Geographic Information Systems digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

The information conveyed in this map is regional in nature and is not suited for use in site specific studies. The user shall hold Heritage Conservancy harmless from any suits, claims or actions arising out of the use of this map or accompanying information.



Data Sources:
Streams, Municipalities, Watersheds and Land Use/Land Cover - NJ Department of Environmental Protection
Eligible Segments - Heritage Conservancy



MUSCONETCONG RIVER

National Wild & Scenic Rivers Study

Important Habitats & Natural Areas

- Forest Boundary
- Wild Trout Stream
- Trout Maintenance Stream
- Trout Production Stream
- Natural Heritage Site
- Grassland
- Suitable Habitat
- State Threatened Species
- State Endangered Species
- Federally Listed Species
- No Data
- Emergent
- Suitable Habitat
- Non-Listed Priority Species
- State Threatened Species
- State Endangered Species
- Federally Listed Species
- No Data
- Forested Wetland
- Suitable Habitat
- Non-Listed Species
- State Threatened Species
- State Endangered Species
- Federally Listed Species
- No Data
- Forest
- Suitable Habitat
- Non-Listed Priority Species
- State Threatened Species
- State Endangered Species
- Federally Listed Species
- No Data

(NJDEP 1999)

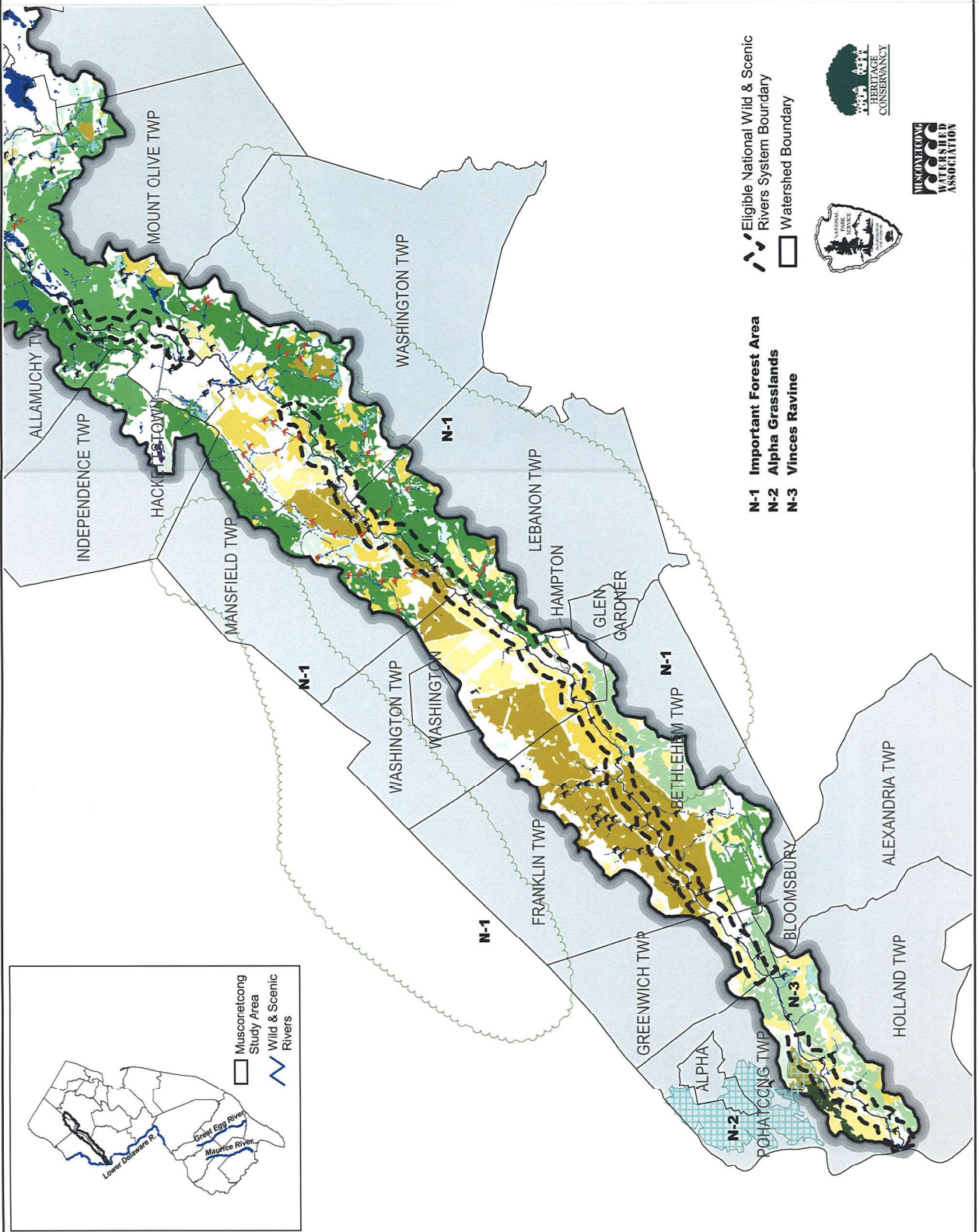


0 3 Miles

Data Source

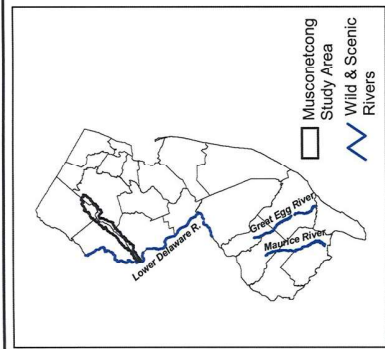
N.J. Department of Environmental Protection
Heritage Conservancy

This map was developed using New Jersey Department of Environmental Protection data. The data was collected by NJDEP and is not state-subsidized. The information conveyed in this map is regional in nature and is not suitable for use in site-specific studies. The user assumes all liability for any use of this map or its contents or for any errors or omissions appearing on the map or its contents.



- Eligible National Wild & Scenic Rivers System Boundary
- Watershed Boundary

- N-1 Important Forest Area
- N-2 Alpha Grasslands
- N-3 Vincennes Ravine





Musconetcong Watershed Association
P.O. Box 113
Asbury, NJ 08802
www.musconetcong.org



Heritage Conservancy
85 Old Dublin Pike
Doylestown, PA 18901
www.heritageconservancy.org



National Park Service
Stewardship & Partnership Program
200 Chestnut Street, 3rd Floor
Philadelphia, PA 19106
www.nps.org
