Lower Delaware National Wild & Scenic River Study Report



Prepared by the
National Park Service, Northeast Region
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Executive Summary

The lower Delaware River flows through the very heart of the birthplace of our great nation. Every bend in the river speaks to us of history, of beauty, of opportunity. Our nation's history is revealed in the agricultural fields, forests, canals, villages, mills and inns along its path. Diverse flora and fauna thrive on its banks and islands. Yet today the Delaware River supports one of the country's largest concentrations of population and industry. Our challenge is to manage the growth and use of the corridor and its resources to protect its outstanding character

Concerned about the future of the lower Delaware River, interested citizens and organizations encouraged their representatives in the United States Congress to authorize a study of the river. This document presents the results of the Lower Delaware National Wild and Scenic River Study, authorized by Public Law 102-460. It summarizes the extensive resources associated with the lower Delaware River, the River Management Plan, and the eligibility and suitability of the study segments for National Wild and Scenic River designation.

The National Wild and Scenic Rivers Program is designed to provide river protection through the combined efforts of private landowners and other citizens, river related organizations, and all levels of government. Emphasis is given to protection of landowners' rights. Designation does not open private lands to public access, nor does it affect existing uses of private property. Each designated river receives permanent protection from federally licensed or assisted dams, diversions, channelizations, and other water resource projects that would have direct and adverse effects on the river's free-flowing condition or outstanding resources.

Eligibility and Suitability

Before a river can be added to the National Wild and Scenic River System, it must be found 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 suitability determination is based upon strong support for designation, particularly municipalities, development of a practical management framework, and that wild and scenic designation must make sense for the river in question.

River Management Framework

The Lower Delaware River Management Plan does not contain a prescription for every situation that could confront river managers. Instead, it provides a vision for the future of the river and context for future action, that emphasizes local control and home rule. The heart of that vision is expressed in the following six goals carefully crafted by the Management Plan Committee:

- Goal 1: Water Quality
  Maintain existing water quality in the Delaware River and its tributaries from measurably degrading and improve it where practical.

- Goal 2: Natural Resources
  Preserve and protect the river's outstanding natural resources, including rare and endangered plant and animal species, river islands, steep slopes and buffer areas in the river corridor and along the tributaries.

- Goal 3: Historic Resources
  Preserve and protect the character of historic structures, districts and sites, including landscapes, in the river corridor.

- Goal 4: Recreation
  Encourage recreational use of the river corridor that has a low environmental and social impact and is compatible with public safety, the protection of private property and with the preservation of natural and cultural qualities of the river corridor.

- Goal 5: Economic Development
  Identify principles for minimizing the adverse impact of development within the river corridor.

- Goal 6: Open Space Preservation
  Preserve open space as a means of maximizing the health of the ecosystem, preserving scenic values, and minimizing the impact of new development in the river corridor.

To assure implementation of the River Management Plan, the creation of a management committee and a citizens advisory committee, coordinated by the existing Delaware River Greenway Partnership, is suggested. An underlying principle is that existing institutions and authorities provide the foundation for long-term protection.

The study did not consider the section of the river between Washington Crossing and the Poquessing and Rancocas creeks (southern border of Bucks county) for national designation. However, at the direction of the United States Congress that portion of the river is included in the river management framework.

Study Recommendation

The following river sections are eligible and suitable for designation, thus are recommended for designation into the National Wild and Scenic Rivers System:

Segment D: The portion of this segment from river mile 193.8 to the northern border of the city of Easton, PA (approx. 10.5 mi., 16.9 km) – Recreational

Segment F: The segment from a point just south of the Gilbert Generating Station to a point just north of the Point Pleasant Pumping Station, excluding the section parallel to the borer of Alexandria Township, NJ (approx. 12.5 mi., 20.1 km) – Recreational

Segment G: The segment from the point just south of the Point Pleasant Pumping Station to a point 1000 feet north of the Route 202 bridge (approx. 6.3 mi., 10.1 km) – Recreational

Segment H: The segment from a point 1750 feet south of the Route 202 Bridge to the southern border of the town of New Hope, PA (approx. 1.9 mi., 3.0 km) – Recreational

Segment I: The segment from the southern boundary of the town of New Hope, PA to the town of Washington Crossing, PA (approx. 6 mi., 9.7 km) – Recreational

Segment L: Tinicum Creek (approx. 14.7 mi., 23.7 km) – Scenic

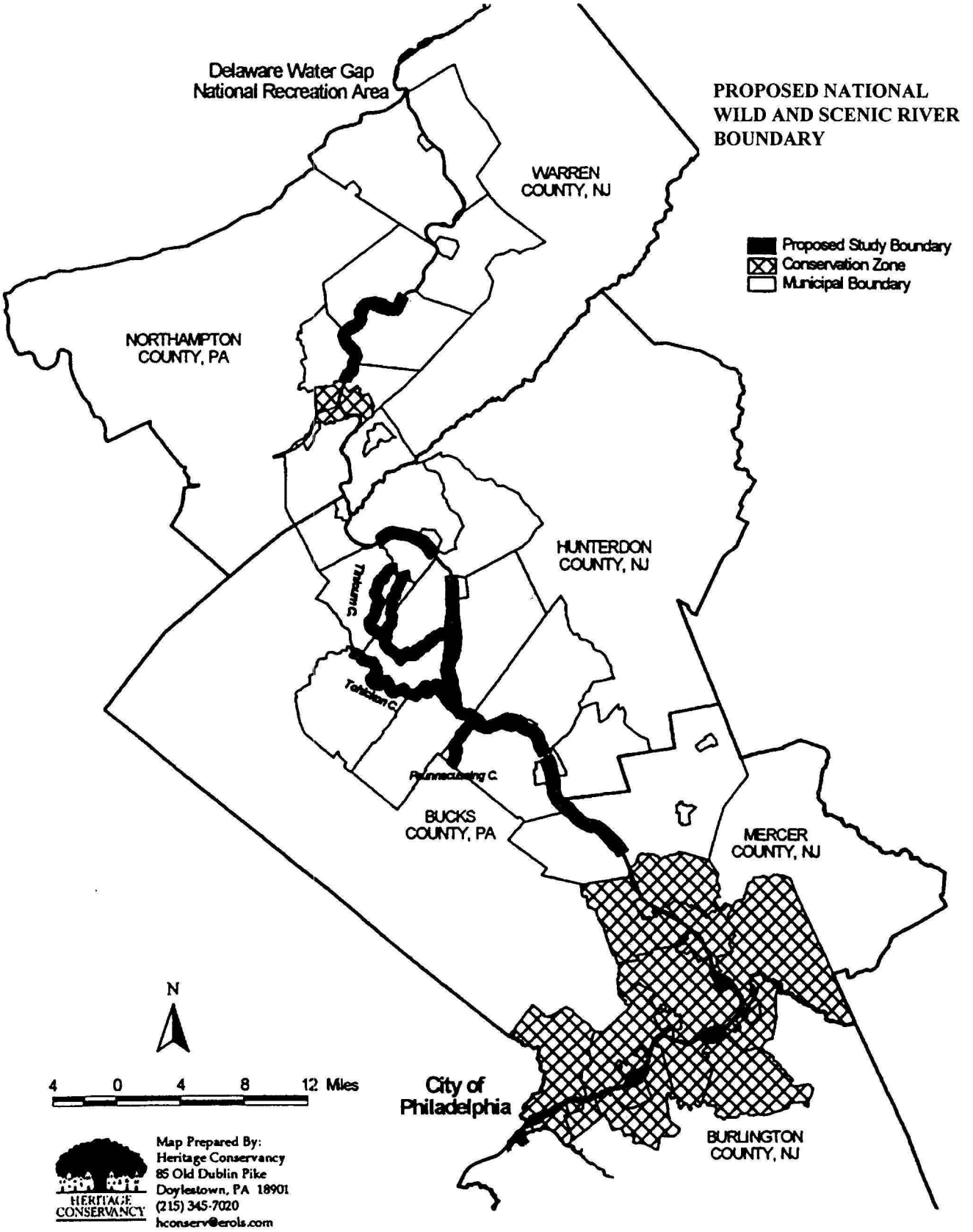
Segment M: Tohickon Creek from the Lake Nockamixon Dam to the Delaware River (approx. 10.7 mi., 17.2 km) – Scenic

Segment N: Paunacussing Creek in Solebury Township (approx. 3 mi., 4.8 km) – Recreational

The municipalities bordering each of these river segments have passed resolutions supporting the River Management Plan and requesting that these river segments be designated.

In addition, all the municipalities but one along the Musconetcong River and Lockatong and Wicecheoke creeks have passed resolutions requesting that these streams be considered for Wild and Scenic River designation. To provide an adequate review of their eligibility and suitability separate recommendations will be presented at a later date.

Lower Delaware River Study Area



Map Prepared By:
Heritage Conservancy
85 Old Dublin Pike
Doylestown, PA 18901
(215) 345-7020
hconserv@erols.com

The Lower Delaware National Wild and Scenic River Study

Benefits of Designation — General

- prohibits dams and other large scale projects requiring federal permits or funding
- protects important resources
- funding priority is enhanced for projects that implement comprehensive plans by federal, state, foundation and other grant making organizations
- encourages predictable future land use and river management at the federal, state, and local levels
- encourages river municipalities to recognize the river's values in their planning and decision making
- encourages regional river management and coordination across political boundaries
- improves cross state coordination
- can be used to promote compatible economic development and eco-tourism
- minimizes river user impacts and provides a forum for landowners to address their concerns
- serves as an educational tool to develop a local and national awareness of the importance of the Delaware River and its tributaries — strengthens awareness of river value
- encourages appropriate river access

Benefits of Designation for Landowners

- increased predictability of future land use
- potential for increased property values
- provides a forum to address river-related issues
- protects current land use
- provides a mechanism to minimize the impact of river use on private property

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Cover Photo by Chuck Barscz
Design by Beyond Words, Solebury, PA

Section I: Introduction & Study Background

"A river is more than an amenity, it is a treasure."

Oliver Wendell Holmes

The lower Delaware River flows through the very heart of the birthplace of our great nation. Every bend in the river speaks to us of history, of beauty, of opportunity — of life itself. Its fresh, free-flowing water nourishes human inhabitants as it has for over twelve thousand years. Along its path evolved the greatest economy in the world. Our nation's history is revealed in the agricultural fields, forests, canals, villages, mills and inns along its path. Diverse flora and fauna thrive on its banks and islands. Its natural beauty inspires serenity. Yet today the Delaware River supports one of the country's largest concentrations of population and industry. Our challenge is to manage the growth and use of the corridor and its resources to protect its outstanding character. Unmanaged development and inappropriate use of the corridor's resources would lead to a degradation of the water quality, loss of habitat for endangered and valuable wildlife and plant species, and destruction of its natural beauty and charming historic sites.



Bill Sharp

Concerned about the future of the Lower Delaware River, interested citizens and organizations encouraged their representatives in the United States Congress to authorize a study of the river. This document presents the results of the Lower Delaware National Wild and Scenic River Study, authorized by Public Law 102-460. It summarizes the extensive resources associated with the lower Delaware River, the River Management Plan, and the eligibility and suitability of the study segments for National Wild and Scenic Rivers designation.

Wild and Scenic Rivers Act

The National Wild and Scenic Rivers Act (P.L. 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 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 this system.

As of January 1998, one hundred fifty-four rivers or river segments totaling almost 11,000 miles had been included in the national system. Only six of these rivers are located in the Mid-Atlantic states: the upper and middle sections of the Delaware River in Pennsylvania, New York and New Jersey; the Great Egg Harbor River and the Maurice River in New Jersey; the Allegheny River and Clarion River in Pennsylvania; and the Bluestone River in West Virginia.

The National Wild and Scenic Rivers Program is designed to provide river protection through the combined efforts of private landowners and other citizens, river related organizations, and all levels of government. Emphasis is given to protection of landowners' rights. Designation does not open pri-

vate lands to public access, nor does it affect existing uses of private property.

Each designated river receives permanent protection from federally-licensed or assisted dams, diversions, channelizations, and other water resource projects that would have direct and adverse effects on the river's free-flowing condition or outstanding resources. The Wild and Scenic Rivers Act explicitly prohibits new dams and hydroelectric projects licensed by the Federal Energy Regulatory Commission (FERC) on or directly affecting a designated river segment, and requires that all other proposed federally-assisted water projects be evaluated for their potential impacts on the river's special features. Projects that would result in adverse impacts on the designated segment are precluded under the Act.

Requirements for Designation

To be eligible, a river must be free flowing and possess at least one outstandingly remarkable resource . . .

Before a river can be added to the National Wild and Scenic Rivers System, it must be found 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. The determination of a resource's significance, i.e. the degree to which it fulfills the "outstandingly remarkable" requirement, is based on the professional judgment of the study team.

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 wild and scenic study. Second, there must be strong support for designation from the entities — local municipalities, state agencies, riverfront landowners, 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.

In proposing a river for designation, a recommendation is also made regarding the river's proposed classification . The classification — wild, scenic, or recreational — is based solely on the intensity of human presence along the river corridor, in the form of railroads, highways, utility lines, buildings, etc., at the time of classification. A river's classification is principally used to guide future actions by federal agencies on projects affecting federally-owned lands (e.g., whether the construction of a new boat ramp is appropriate).

The Act defines the three classifications as follow:

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

Scenic river areas — 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 river areas — Those rivers or sections 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.

Lower Delaware Wild and Scenic River Study

Passed by Congress in 1968, the intent of the Wild and Scenic Rivers Act is to establish a national system to protect selected free flowing rivers with outstanding natural, cultural and recreational features for the benefit and enjoyment of present and future generations. The Act is designed to provide river protection through the combined efforts of private landowners and other citizens, river related organizations, and all levels of government. Emphasis is given to protection of landowners' rights, and there is no federal intent to acquire land along the segments of the river being studied. Designation does not open private lands to public access, nor does it affect existing uses of private property.

"Here is a river so long settled and so much changed one can look at it anew, a modern river in an ancient course, an ancient river in a modern world."

Bruce Stutz; Natural Lives, Modern Times, People and Places of the Delaware River.

Recognizing the nationally significant resources of the Delaware River, Congress has designated two sections of the river as part of the National Wild and Scenic Rivers System. The Delaware Water Gap National Recreation Area was designated in 1978 and contains 37 miles of the river that provides recreational opportunities such as canoeing, tubing, and rafting. This unit of the National Park Service is managed like a traditional national park with extensive federal and state land holdings. Above that is the Upper Delaware National Scenic and Recreational River, 73 miles of clear, free-flowing stream winding its way through a valley of swiftly changing scenery. Management of Upper Delaware Scenic and Recreational River is a partnership of private individuals and local, state, and federal governments.

The Lower Delaware River Wild and Scenic River Study was authorized by Congress on October 23, 1992, through P.L. 102-460. The study area as defined by Congress is the river between the Erie Lackawanna Bridge south of the Delaware Water Gap National Recreation Area, and Washington Crossing, Pennsylvania. In addition, Congress authorized the development of a Conservation Plan for the segment south of Washington Crossing to the Rancocas Creek in New Jersey and the Poquessing Creek in Pennsylvania (the southern boundary of Bucks County, Pennsylvania). Three tributaries, Cooks, Tinicum and Tohickon creeks in Bucks County were included in the study legislation. The purpose of the study was to determine whether this portion of the lower Delaware River is eligible and suitable for inclusion in the National Wild and Scenic Rivers System. The study identified ten segments in the study area to be considered for National Wild and Scenic classification. The segments lie between the Erie Lackawanna Railroad Bridge in Knowlton Township, NJ, and Washington Crossing, PA, and include the three tributaries. The more developed and industrial parts of the river corridor were excluded from consideration into the National System.

The Lower Delaware National Wild and Scenic River Study Task Force consisted of following six committees:

Advisory Committee — the coordinating body for the study, guiding all major activities

Management Committee — led development of the River Management Plan

Local Government Committee — provided the local government perspective for the 57 municipalities in the study corridor

Public Outreach Committee — sponsored the public outreach activities, including public workshops and the landowner survey

Resource Committee — collected data regarding the natural, cultural, historical, recreational and scenic resources associated with the river corridor

Economic Development Committee — represented economic interests

To increase the effectiveness of the study's public outreach activities and to facilitate the compilation of resource information, a cooperative agreement was established between the NPS and the Delaware River Greenway Partnership. The agreement also provided for the creation of a Geographic Information System (GIS). The GIS contains up-to-date information about the location of many natural and cultural resources. GIS maps provided for the study include base maps, wetlands and floodplains, and resource maps for each municipality.

Study Goals

Based on the study background and legislative directive, the NPS had two major goals:

1) To determine whether the lower Delaware River and select tributaries are an appropriate addition to the National Wild and Scenic Rivers System, and, conversely, whether wild and scenic designation is an appropriate protection tool for the rivers: and

2) To assist local communities in preparing and implementing a river conservation plan that protects the river's special qualities, regardless of whether wild and scenic designation proved to be the recommenced outcome of the study.

In accordance with legislative directives, wishes of study area communities, and established NPS policy for wild and scenic studies of "private lands" rivers, the study included the following elements:

1) A strong emphasis on grassroots involvement and consensus-building in determining whether the rivers were suitable for designation and how they should be managed.

2) The development of the "comprehensive river management plan" specified in the Act during the study rather than after designation. This plan relies on private, local

and state conservation measures rather than federal land acquisition and direct management to protect the river's outstanding resources, and was the product of close collaboration between NPS, the Study Task Force, and local and state governments.

3) A commitment to the study area communities that federal designation would only be recommended if strong support was expressed through passage of resolutions by the affected municipalities. Municipal resolutions were requested after completion of the River Management Plan in order to ensure the clarity of what was being proposed.

Public Involvement

The Study Task Force and its committees were the focal points for involvement. The Public Outreach Committee coordinated public involvement, including:

- the development of mailing lists of over five hundred entries, including key local officials, riparian landowners, and other interested individuals. Those on the lists received meeting notices, minutes, progress reports, and draft documents for comment.
- frequent meetings of study committees at various locations within the six county study area. The meetings were advertised through mailings and the local press.
- six public forums held during the beginning of the study to identify issues of importance to area residents and river users, and also to identify sources of river-related expertise.
- public forums held to educate interested parties to receive feedback regarding the River Management Plan.
- special events held to promote public awareness of the study and the unique qualities of the river.
- the International Countryside Exchange planning charette to focus attention on the section of the river below Washington Crossing.
- presentations to municipalities.
- a landowner survey in which all landowners adjacent to the river were asked to describe their river management issues and interest in river protection. Over 2000 landowners were surveyed.

River Management Plan

Development of a River Management Plan is a required component of the Lower Delaware River Wild and Scenic River Study. The Management Plan recommends actions to maintain and improve the lower Delaware River, its tributaries and surrounding natural, historic and cultural resources. It provides for economic growth in a manner that does not adversely affect the region's exceptional river-related resources.

The Plan has been compiled by the Lower Delaware National Wild and Scenic River Study Task Force Management Plan Committee and Local Government Committee, with assistance from the National Park Service, Northeast Region. The Committee is chaired by James C. Amon, Executive Director, Delaware and Raritan Canal Commission, and is made up of regional, state, and local agency representatives, landowners, conservationists, business people, and other stakeholders in New Jersey and Pennsylvania. (See Appendix B)

The River Management Plan is discussed in more detail in Section IV of this report.



Chuck Barscz

Canoeing the Delaware

The Delaware River

The Delaware River begins in the small town of Hancock, New York, where the East and West branches join. It flows south for 330 miles along four state boundaries to the sea. There are no dams on the main stem, making it the last major free-flowing river in the eastern United States.

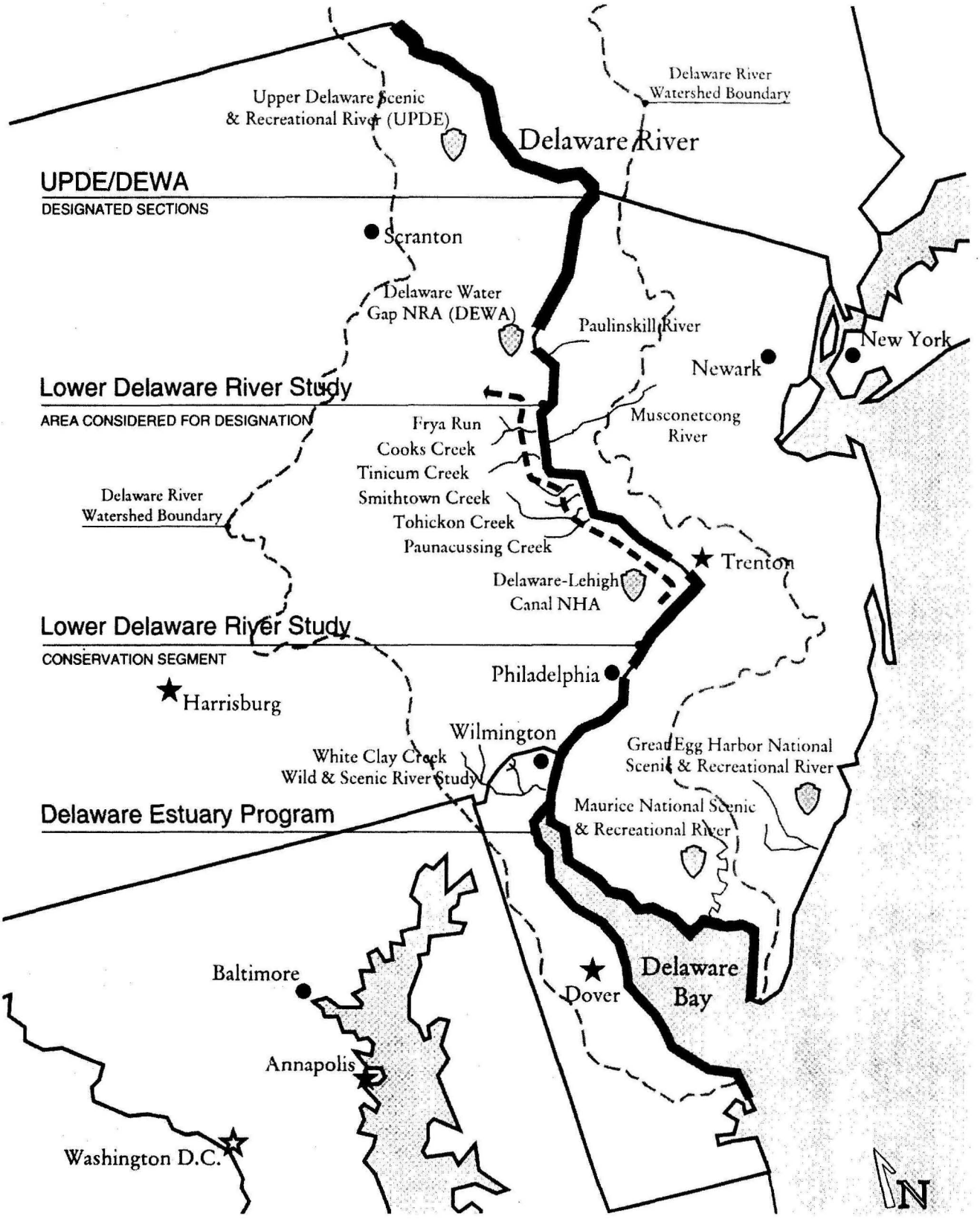
The Delaware is shaped by the varied geology through which it has carved its exit to the Atlantic Ocean. The river has carved its signature through many geologic formations: through the Appalachian Highland rock laid down 600 million years ago and through the folded Valley and Ridge formations created by the force of colliding tectonic plates and the raising of the modern Appalachian Mountains. The most unforgettable example is the Delaware Water Gap with its 1000-foot cliffs. This formation is explained by geologists as the consequence of land being uplifted as the erosive forces of the river and wind cut downward.

As the Delaware passes the mouth of the Lehigh River at Easton, PA, it enters the rolling landscape of the Piedmont region. Below Easton, at what geologists call the "Reading Prong," ancient pre-Cambrian and Cambrian formations are encountered, where the river has ground its way across four miles of granite, gneiss, and quartz at Riegelsville, PA. There the next great formation, the Triassic Lowlands, begin with its hard Brunswick and Lockatong shales where dinosaur fossils still lie deep under foot. This is a much younger land, whose granites, shales, limestones, and sandstones date from the Triassic Period, some two hundred and twenty-five million years ago. The river becomes broader and shallower below Easton, widening to 500 feet at Frenchtown, New Jersey, and is dotted with islands that are built of materials brought to the valley by the glaciers of the Pleistocene Epoch, between eleven thousand and five hundred thousand years ago. Most river islands are covered with a dense network of trees and vines.

The Triassic shales once lay thousands of feet above present ground levels, and in some places the molten mantle of the earth pushed up into the old lake-beds and cooled, leaving diabase. The hard diabase forced the river to curve at the great, dark three hundred foot cliffs above Upper Black Eddy. Diabase intrusions created stone sills and dikes, which impede underground water flows, are very hard to dig in, and have left deposits of "trap-rock" with commercial value. These deposits are mined and crushed into gravels.

Delaware River Watershed

National Wild & Scenic Rivers



From Stockton, NJ, south the gradually flattening landscape and softer soils have supported greater development. The tough pre-Cambrian rocks that formed the ancient continental shelf reappear as the rapids at the Calhoun Street Bridge between Trenton, NJ, and Morrisville, PA. Here a limestone ridge cuts across the river creating a series of falls. Above the falls the river is entirely fresh water. Below the falls the river is influenced by tides of up to eight feet. Strictly speaking, this area is not estuarine, where fresh water and brackish water from the sea mix, but the portion of the river below Trenton is generally thought of as the Delaware Estuary.

Below Trenton the river leaves the Piedmont landscape and enters the flat Coastal Plain. This a younger land still, characterized by sands, clays, and gravels that have not yet consolidated into stone. These materials are sediments that date from the Tertiary Period, two to fifty million years ago.



Delaware Estuary Management Plan

Philadelphia skyline from the Delaware River.

The southern portion of the Delaware River flows through metropolitan Philadelphia, the nation's fifth largest urban area, having a population of 5,892,937 people (U.S. Census 1990). Below Philadelphia, the river passes Wilmington, Delaware and enters the Delaware Bay, which flows into the Atlantic Ocean. This region supports the Ports of Philadelphia, Camden and Wilmington, valuable fisheries, and a growing recreational industry. The Delaware serves as the largest freshwater port in the world, with vigorous shipping facilities serving petroleum tankers and other cargo carriers.

The watershed of the Delaware River is 12,757 square miles, more than one and a half times the size of New Jersey. About one half of the watershed is in Pennsylvania, slightly less than a quarter is in New Jersey, and the remainder is divided between New York and Delaware. The watershed contains 42 counties and 838 municipalities. (See Watershed Map page 10.)

Despite its intensive use, density of development, and commercial activity, much of the Delaware conveys a sense of a river that is largely unaffected by the hand of man. Frequent floods have kept development away from most islands and much of its shore. Hence, the river corridor possesses a surprising degree of natural beauty and provides important wildlife habitat. These values, and the great affection for the river widely shared among residents of the region, have led to the inclusion of both the Upper Delaware and the Middle Delaware

"The Delaware I find really intriguing because it . . . runs on the border of megalopolis, and yet it is, at this stage, such a clean, productive river . . ."

Kenneth Lewis, Manager, Delaware Canal State Park

in the National Wild and Scenic Rivers System. The Upper Delaware extends from Hancock, New York, 73 miles downstream and became part of the Wild and Scenic Rivers System in 1978; the Delaware Water Gap National Recreation Area was also added to the System in 1978. With the lower Delaware River being studied for designation, it is possible that the length of the river from Trenton, NJ, north (with exception of a few short sections that are considered too densely developed) could have national designation as a Wild and Scenic River, and from Trenton south, as a National Estuary. The Delaware would become the only river system in the eastern U.S. with such a distinction.

The water quality of the Delaware River has undergone dramatic changes. Water quality was presumably pristine until the seventeenth century when European settlers cleared much of the land in the river corridor and drained wetlands for farming. Further declines in water quality from sewage systems and industrial waste continued to grow until after World War II. Since the 1950's, regulations on discharges into the river have resulted in a significant reduction of pollution from point sources. More recently there have been efforts to control non-point source pollution, which commonly comes from storm water runoff. Today the river water quality in the plan area is considered good, though problems still exist in the major tributaries, and the river is sometimes subject to fish advisories due to excessive toxics (for specific information on water quality see page 16).

Nearly 10% of the population of the United States relies on the Delaware River for drinking water.

While the main stem of the Delaware is free-flowing, there are impoundments on its tributaries and major diversions of its water out of the river basin, thus river flows are significantly regulated. The river drains only 0.4% of the nation's land area, yet it provides drinking water for much of the densely populated area between New York City and Philadelphia, home to more than 20 million people — nearly 10% of the U.S. population. Over many decades a system of huge diversions of water and impoundments on the river's tributaries has changed the natural flow of the Delaware into an enormous computerized water supply system.

The river system is complex and management of the river is just as complex. Water flow is heavily managed to provide drinking water and to supply industrial users. Land use in the watershed, which affects water quality and flow, is locally managed by 838 municipalities and thousands of landowners, large and small.

"Today the Delaware River, once foul-smelling and oxygen-starved as it flowed past Philadelphia and neighboring cities, supports year-round fish populations..."

Delaware River Basin Commission Annual Report 1994

The primary management of the river is overseen by the Delaware River Basin Commission (DRBC), a regulatory agency comprising the river's four boundary state governors and a federal representative, traditionally the Secretary of the Interior. The powers granted to the Commission to plan and regulate water conservation and use in the Delaware Watershed place it in a central river management role, particularly for water supply and quality issues. Recent Congressional action to eliminate funding of the federal commissioner's office raises uncertainties concerning DRBC's future, a matter of concern given the critical role it plays in maintaining water quality and balancing water supply, as well as ecological and recreational needs.

The river's water is distributed according to interstate agreements, known in aggregate as the Delaware River Compact, a multi-state commercial contract that was created in 1961 to settle bitter interstate disputes. The compact was an outgrowth of court decisions in 1929-30 and in 1954 which determined that New York City could withdraw up to 800 million gallons per day (MGD), New Jersey could take up to 100 MGD, and that Pennsylvania's allocation would be set on the basis of individual proposals from that state.

Regulators must continually ask whether at any given time there is enough water in the Delaware River to keep the river vital and to deliver water to their customers. In arriving at a sustainable water budget the DRBC considers many complex factors, but primarily the fullness of New York City's reservoirs, while assuring an adequate amount of water for downstream users. In normal times the process of determining patterns of releases from upstream reservoirs requires balancing a complicated flow formula, but some ecologists claim that it fails to provide the river with adequate water during periods of low flows, which come with regularity because the region's annual precipitation can vary greatly from year to rear.

South of the study area is the Delaware Estuary and Bay, the significance of which is recognized by the Delaware Estuary Program. It is important to recognize that the quality of the water flowing out of the river has a significant impact upon the water quality of the estuary. One scientist has likened the 134-mile long estuary and bay to a gigantic bath tub, with water being sloshed around by the tides, and having a dribble coming in at one end and a leak at the other end. It takes a drop of water 90 days to flush from the head of tides at Trenton to the Atlantic Ocean at Cape May, New Jersey.

DRBC water releases are expected to hold back ocean water to just below the confluence of the Schuylkill and Delaware rivers. However, in 1994 the DRBC had to admit that it could not provide enough flow to keep saltwater from infiltrating the water supplies of Camden and Philadelphia, creating an unknown future for the continuous taking of municipal water at Camden and Philadelphia from wells and intakes along the freshwater estuary. The 1995 report of the Delaware Estuary Program, the Comprehensive Conservation and Management Plan for the Delaware Estuary (CCMP) cites low flows caused by diversions and impoundments as one of the major problems in the estuary. The water quality in the Delaware, and especially the upper estuary from Philadelphia back to Trenton, poses difficult land use and water planning problems, in part caused by flow-related conditions.

Projected population increases of about 14% by the year 2020 will put the river's ecosystem and water supplies under increasing stress

The Lower Delaware River Management Plan sets forth resource and land management techniques that will help maintain good water quality in the lower Delaware River. Projected population increases of about 14% by the year 2020 will put the river's ecosystem and water supplies under increasing stress. The land use planning we do now will save valuable resources for the future. In planning for residential and commercial development it is essential to reduce the potential for soil erosion and sedimentation and storm water runoff, which can degrade water quality and aggravate existing sedimentation problems in the estuary. Preservation of native plant species along the river and stream banks and wetland areas will further protect water quality by preventing excessive erosion and filtering impurities entering waterways.

Furthermore, the river corridor today is a valuable recreation and tourism resource, providing millions of people in the region an opportunity to get in touch with nature and their heritage. The D&R Canal State Park, the Delaware Canal State Park, and Ralph Stover State Park attract nearly three million visitors each year. A comprehensive economic study of the Upper Delaware National Scenic and Recreational River found that it generated close to $60 million in economic impact and $20 million in direct expenditures by the National Park Service in 1986. Recreational and tourist use needs to be properly managed to protect the very resources that attract visitors.

There is much beauty along the Delaware, providing a vital resource for economic development and a birthright for future generations. This management plan provides goals and strategies that can help protect water quality and valuable river resources.

Section II:

Description of the Study Area Resources



OSPREY

The lower Delaware River is unique in its diversity of significant resources. A high density of population and recreational opportunities combine here with a wealth of natural, cultural and historic features of unparalleled national significance. The river valley contains habitats that do not occur elsewhere in the region. For example, there are sheer cliffs that rise 400 feet above the river. Southern facing cliffs are dry and desert-like, and are home to prickly pear cactus. North-facing cliffs exhibit flora usually found only in arctic-alpine climates. The river itself provides habitat for American shad, striped bass, and river herring, providing a high quality recreational and economic resource. The river is an important component of the Atlantic Flyway, one of four major waterfowl routes in North America. From an historic viewpoint, the river is one of the most significant corridors in the nation, with crucial infrastructure still intact. The corridor contains buildings used during Washington's famous crossing, historic navigation canals, Native American and colonial era archaeological sites, mills, etc. Just as important is the magnificent scenery. The view from the river for most of its length is of an undisturbed natural area, despite development taking place in the corridor.

The Lower Delaware Wild and Scenic Task Force identified five major categories of resources that require proper management in order to protect the river corridor:

Water Quality

Natural Resources

Historic Resources

Recreation

Open Space

In addition, Economic Development and its relationship to river management is discussed, and guidelines for Education and Outreach are presented. Each of these categories is described in detail below. The relevant goals, policies and implementation strategies as determined by the Task Force are set forth in Section IV.

Water Quality

"It certainly begins with these little micro-organisms in the water column and keeps going up through the insects, through small amphibians, to little fish to big fish...we're at the top of that chain...if that chain starts to break down, so do we..."

Cynthia Poten, The Delaware Riverkeeper

Before the settlement of the Delaware River watershed by Europeans in the seventeenth century, water quality was presumably pristine. The first impacts on the environmental values of the river were from the drainage of wetlands, land clearing, farming, and intensive fishing. As populations grew, pollution from sewage and industrial wastewater grew proportionately. By the time of the American Revolution, pollution of the Philadelphia waterfront and various tributaries within the city was a serious problem. Until safe water supplies were provided in the latter part of the nineteenth century, thousands of people who drank Delaware River water died of waterborne diseases. The desire to escape urban areas during the summer epidemics was a major reason for the growth of the vacation-resort industry in the Delaware River Basin north of Trenton.

By the early years of the twentieth century, key fish populations had all but collapsed due to pollution, habitat destruction, and over-fishing. Water quality studies conducted from 1910 to 1930 found pollution in the tidal Delaware River between Trenton and Wilmington to range from "substantial" to "gross." In the non-tidal Delaware, zones of pollution were documented downstream of Port Jervis, New York; within the Delaware Water Gap; and from Easton, Pennsylvania, to Trenton, New Jersey. The pollution, caused by a combination of runoff from coal mines, inadequate sewage treatment, and industrial wastes, was serious enough to necessitate the shutting off of Trenton's water intake from the river when there was intense rain in the Lehigh Valley watershed.

Water pollution grew worse during World War II. In many sections of the Delaware, industrial activity related to the war effort intensified dramatically and diverted resources that were necessary for pollution abatement programs initiated before the war. By the end of the war, water pollution in the Delaware River Basin was at its maximum — one of the most serious water pollution problems in the country. Typifying the seriousness of the problem was the Delaware Estuary, which in 1946 experienced a 20-mile zone of zero dissolved oxygen, preventing all migratory fish from passing.

A pollution control effort was launched in 1936 with the establishment of the Interstate Commission on the Delaware River Basin by the four Delaware River Basin states. By the end of the late 1950's, there were 236 wastewater treatment plants in the basin compared with 63 in the 1930's. Water quality was greatly improved by this effort.

Lower Delaware River National Wild & Scenic River Study Area

- River Management Plan Area Limit
- Proposed National Wild and Scenic River Designation Segment
- Significant Resources
- Cultural/Historic Resources
- Natural Resources
- Recreational Resources
- Scenic Resources
- Major Roads

Funding provided by a cooperative agreement between the National Park Service, Heritage Conservancy and the Delaware River Greenway
Maps developed by Mapping Technologies, a division of Lord, Anderson, Worrell & Barnett, Inc. Subsequent revisions done by Heritage Conservancy in the Fall of 1998 and Summer of 1998.

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MAPS DEVELOPED BY: LORD ANDERSON WORRELL & BARNETT Inc. Burlington, New Jersey
AND HERITAGE CONSERVANCY

N W E S

Site Location	Description
23-4	Columbia Lake State Park
23-12	Portland-PA public boat launch
23-21	Jacoby Creek wetlands-state listed species
23-22	Delawanna Creek-NJ-TM waters
23-23	PA Route 611-State Scenic Highway
23-6	Paulinskill Valley Trail-part of Kittatinny State Park
23-7	Paulinskill River-NJ-TM waters
23-9	Delaware-NJ floodplain-state listed species
33-1	Garrison Road grasslands-Harmony Twp.-state listed species
33-4	Sandt's Eddy public boat launch
33-5	Mud Run County Park
34-1	Dildine and Macks Island-NJ state land
34-10	Manunka Chunk bluffs-state listed species
34-11	Martins Creek Recreation Area-Foul Rift-state listed species
34-12	Martins Creek public boat launch
34-15	Mount Jack-state listed species
34-1H	Belvidere-NJ National Register Historic District
34-20	Buckhorn Creek-NJ-TP waters
34-3	Mount Jack County Park
34-9	Pequest River-NJ-TM waters
34-A	Doe Hollow public boat launch
34-B	Belvidere public boat launch

SECTION 1 INDEX MAP



Area of Interest Highlighted in Blue

Lower Delaware River National Wild & Scenic River Study Area

- River Management Plan Area Limit
- Proposed National Wild and Scenic River Designation Segment
- Canals
- Significant Resources
- Cultural/Historic Resources
- Natural Resources
- Recreational Resources
- Scenic Resources
- Major Roads

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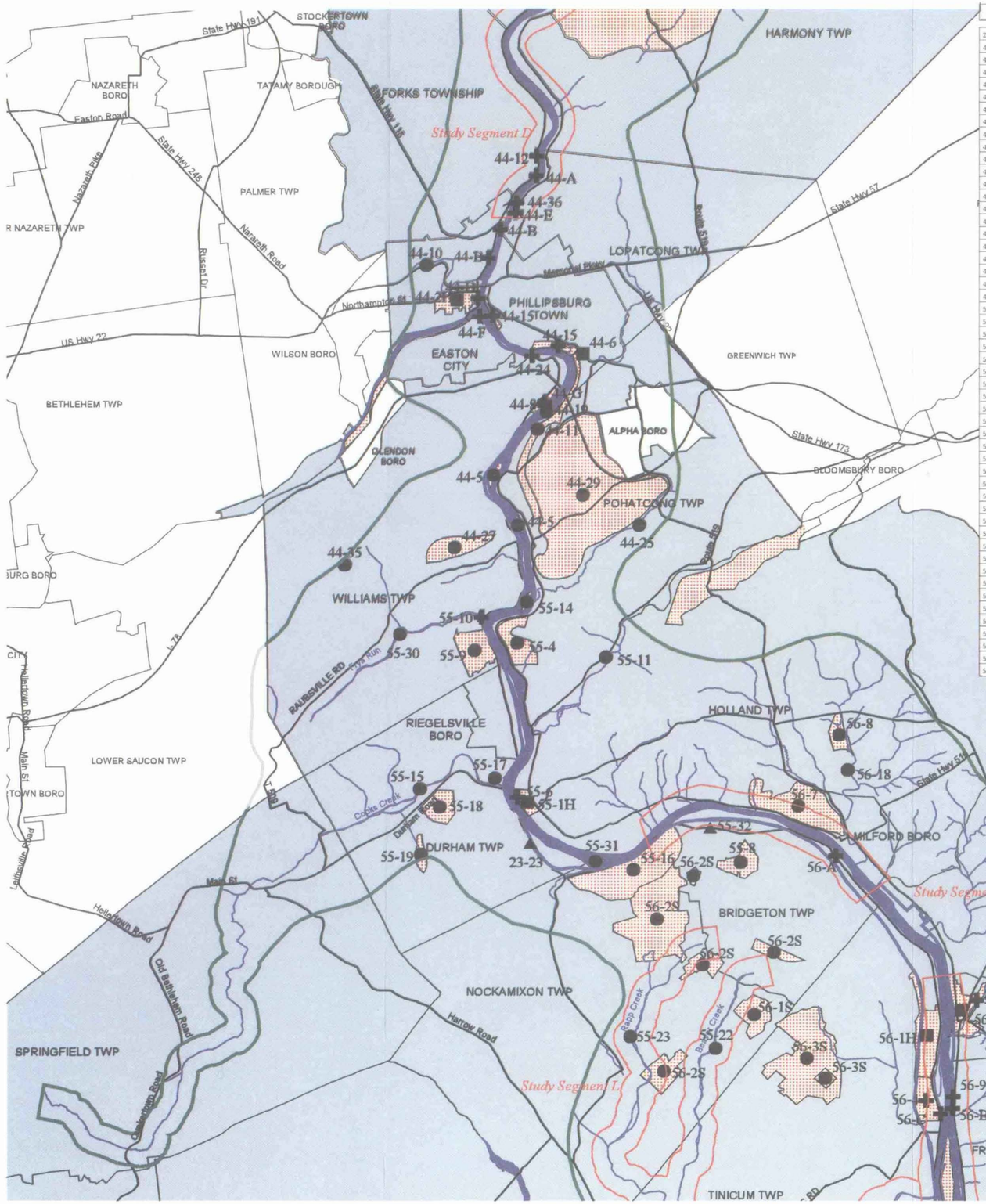
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SECTION 2 INDEX MAP



Area of Interest Highlighted in Blue

MAPS DEVELOPED BY:
LORD ANDERSON WORRELL & BARNETT Inc.
Burlington, New Jersey
AND
HERITAGE CONSERVANCY



Site Location	Description
23-23	PA Route 611-State Scenic Highway
44-10	Bushkill Creek-PA-CWF-EV waters
44-11	Phillipsburg bluffs-state listed species
44-12	Frost Hollow County Park
44-15	Phillipsburg Riverview Park public boat launch
44-19	Morgan Hill Island-PA state land
44-24	Delaware & Lehigh Canal Nat. Heritage Corridor & State Heritage Park
44-25	Pohatcong Creek-NJ-TM waters
44-27	Elephant Rock-state geological landmark
44-29	Pohatcong Grasslands (Alpha Grasslands)-state listed species
44-2H	Easton-PA National Register Historic District
44-35	Hexenkopf Rock-state geological landmark
44-36	Shandor Island
44-5	Shipponewill Island-Old Sow Island-PA state land-state listed species
44-6	Morris Canal-National Historic Landmark
44-8	Ky-Hit-Tuck County Park
44-A	Frost Hollow public boat launch
44-B	Easton riverfront parks and boat launches
44-D	Easton riverfront parks and boat launches
44-E	Hunsecs Beach public boat launch
44-F	Easton riverfront parks and boat launches
44-G	Ky-Hit-Tuck County Park public boat launch
55-10	Frya Run County Park and boat launch
55-11	Musconetcong River-NJ-TM waters
55-14	Raubs Island
55-15	Cooks Creek-PA-WF-EV waters
55-16	Nockamixon Cliffs-geological landmark-state listed species
55-17	Durham Cave-geological feature
55-18	Mine Hill-state listed species
55-19	Monroe Border Fault National Natural Landmark
55-1H	Pursleys Ferry-NJ National Register Historic District
55-22	Beaver Creek of Tinicum Creek-PA-CWF-MQ waters
55-23	Rapp Creek of Tinicum Creek-PA-CWF-MQ waters
55-30	Frya Run-PA CWF-MQ waters
55-31	Lynn Island
55-32	PA Route 32-State Scenic Highway
55-4	Silver Mill Ridge/Pohatcong Mountain-state listed species
55-8	Holland Church public boat launch
55-8	Ringing Rocks County Park-National Natural Landmark
55-9	Marlton Wildlife Sanctuary-state listed species
56-12	Frenchtown Municipal Park
56-1H	Wakihokake Creek-NJ-TM waters
56-1H	Uhlerstown National Register Rural Historic District
56-1HNJ	Frenchtown National Register Historic District
56-1S	State Gamelands #56
56-4	Tinicum County Park
56-7	Milford Bluffs-state listed species
56-8	Javes Road site wetlands-state listed species
56-9	Delaware & Raritan Canal State Park
56-A	Upper Black Eddy public boat launch
56-B	Kingwood, NJ public boat launch
56-C	Tinicum County Park public boat access

Lower Delaware River National Wild & Scenic River Study Area

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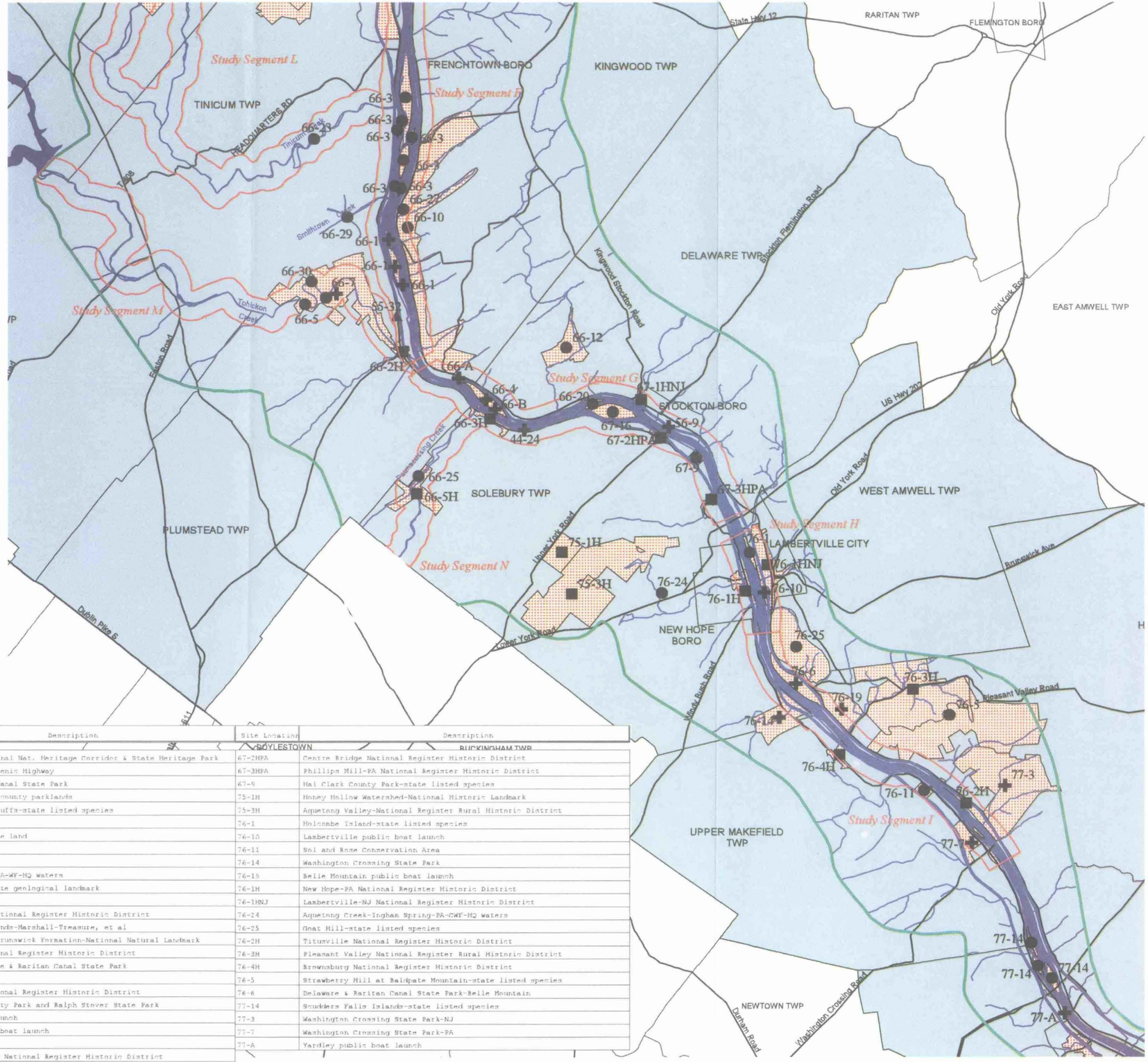
N W E S

SECTION 3 INDEX MAP



Area of Interest Highlighted in Blue

MAPS DEVELOPED BY: LORD ANDERSON WORRELL BARNETT Inc. Burlington, New Jersey AND HERITAGE CONSERVANCY



Site Location	Description	Site Location	Description
44-24	Delaware & Lehigh Canal Nat. Heritage Corridor & State Heritage Park	67-2HPA	Centre Bridge National Register Historic District
55-32	PA Route 32-State Scenic Highway	67-3HPA	Phillips Mill-PA National Register Historic District
56-9	Delaware & Raritan Canal State Park	67-6	Hal Clark County Park-state listed species
66-1	Prahls Island group-county parklands	75-1H	Honey Hollow Watershed-National Historic Landmark
66-10	Kingwood Township bluffs-state listed species	75-3H	Aquetong Valley-National Register Rural Historic District
66-12	Lockatong Reserve	76-1	Holcombe Island-state listed species
66-20	Eagle Island-NJ state land	76-10	Lambertville public boat launch
66-23	Tinicum Creek	76-11	Soil and Rose Conservation Area
66-24	Tohickon Creek	76-14	Washington Crossing State Park
66-25	Paunacussing Creek-PA-WF-HQ waters	76-19	Belle Mountain public boat launch
66-27	Devils Tea Table-state geological landmark	76-1H	New Hope-PA National Register Historic District
66-29	Smithtown Creek	76-1HNJ	Lambertville-NJ National Register Historic District
66-2H	Point Pleasant-PA National Register Historic District	76-24	Aquetong Creek-Ingham Spring-PA-CWF-HQ waters
66-3	Braided Channel Islands-Marshall-Treasure, et al	76-25	Goat Hill-state listed species
66-30	Tohickon Lockatong/Brunswick Formation-National Natural Landmark	76-2H	Titusville National Register Historic District
66-3H	Lambertville-PA National Register Historic District	76-3H	Pleasant Valley National Register Rural Historic District
66-4	Bulls Island-Delaware & Raritan Canal State Park	76-4H	Brownsburg National Register Historic District
66-5	Tohickon High Rocks	76-5	Strawberry Hill at Baldpate Mountain-state listed species
66-5H	Carversville-PA National Register Historic District	76-6	Delaware & Raritan Canal State Park-Belle Mountain
66-7	Tohickon Valley County Park and Ralph Stover State Park	77-14	Scudders Falls Islands-state listed species
66-A	Byram public boat launch	77-3	Washington Crossing State Park-NJ
66-B	Bulls Island public boat launch	77-7	Washington Crossing State Park-PA
67-16	Hendricks Island	77-A	Yardley public boat launch
67-1HNJ	Prallsville Mills-NJ National Register Historic District		

Lower Delaware River National Wild & Scenic River Study Area

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  - Cultural/Historic Resources
  - Natural Resources
  - Recreational Resources
  - Scenic Resources
- Major Roads

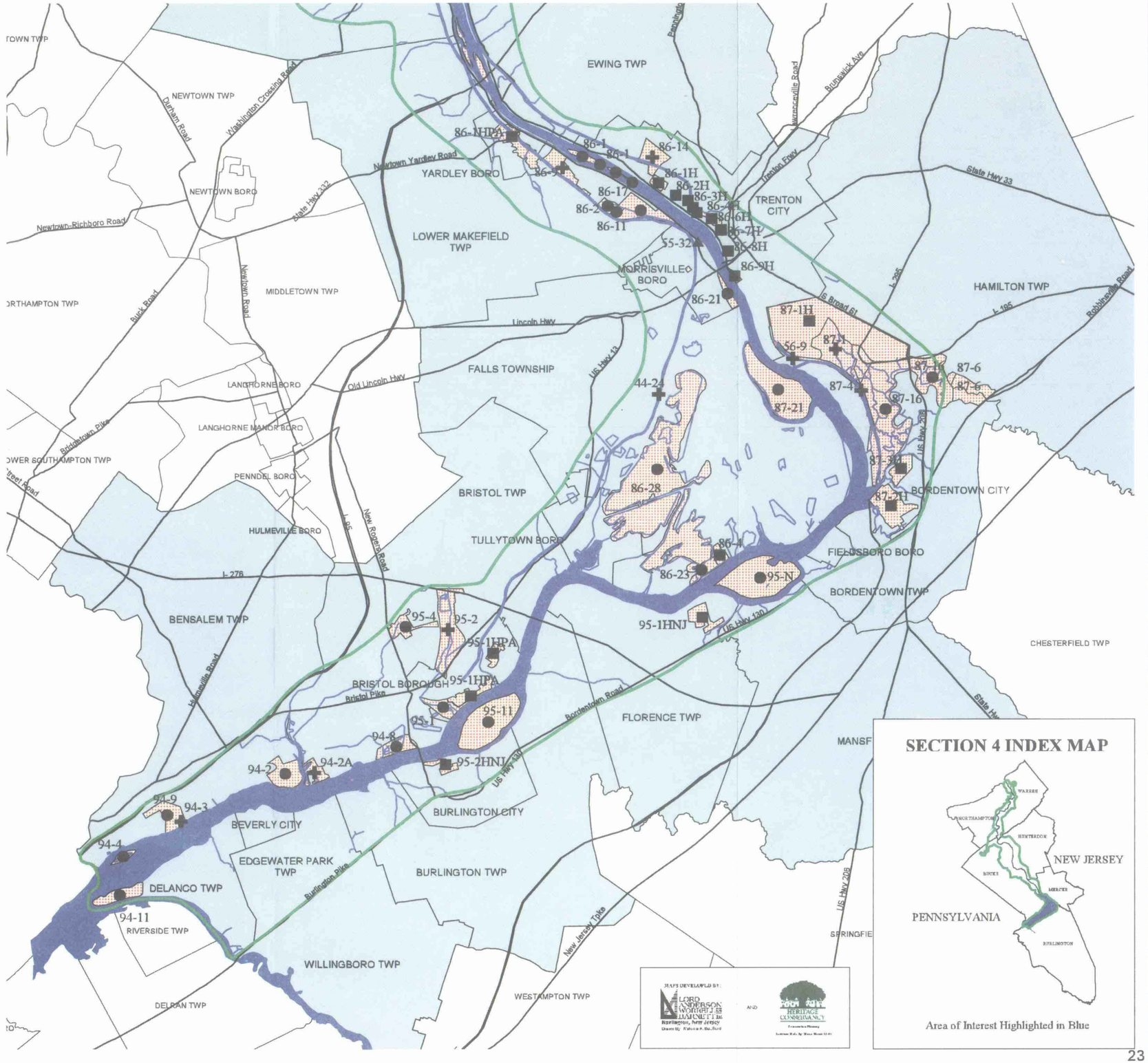
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N W E S

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Site Location	Description
44-24	Delaware & Lehigh Canal Nat. Heritage Corridor & State Heritage Park
55-32	PA Route 32-State Scenic Highway
56-9	Delaware & Raritan Canal State Park
86-1	Rotary Island group-NJ state land
86-11	Falls of Delaware wetlands
86-14	Tadwalader Park
86-17	Blaugard Island group-NJ state land
86-1H	Berkely Square District
86-1HPA	Yardley District
86-2	Falls of Delaware wetlands
86-21	Morrisville river shore-state listed species
86-22	Pennsbury Manor river shore-state listed species
86-25	Falls of Delaware wetlands
86-26	Van Sciver Lake
86-2H	Dickinson House
86-3H	Adam's Pharmacy
86-4	Pennsbury Manor National Landmark
86-4H	379 W. state street
86-5H	Kuser Mansion
86-6H	State House District
86-7H	Trenton War Memorial
86-8H	William Trent House
86-9	Macclenfield Municipal Park
86-9H	Early Trenton
87-1	Roebling Memorial Park
87-16	Trenton/Hamilton Marsh-state listed species
87-1H	Abbott Farm Arch. Site National Hist. Landmark-Trenton/Hamilton Marsh
87-21	Biles Island
87-2H	Bordentown-NJ National Register Historic District
87-3H	Point Breeze-NJ National Register Historic District
87-4	Delaware & Raritan Canal State Park
94-11	Hawk Island
94-2	Neshaminy State Park-state listed species
94-2A	Neshaminy State Park public boat launch
94-3	Ben Ryn public boat launch
94-4	Mud Island-state listed species
94-6	Maple Beach-state listed species
94-9	Ben Ryn County Park-state listed species
95-1	Bristol Marsh Municipal Preserve-state listed species
95-11	Burlington Island
95-1HNJ	Roebling-NJ National Register Historic District
95-1HPA	Bristol-PA National Register Historic Districts
95-2	Silver Lake County Park-state listed species
95-2HNJ	Burlington-NJ National Register Historic District
95-4	Delhaus Woods County Preserve-state listed species
95-N	Newbold Island



SECTION 4 INDEX MAP

Area of Interest Highlighted in Blue

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"It is impossible to separate the solutions to the problems of pollution and depletion of the river from the reforms in land use planning and regulation that are being discussed."

The Delaware River Basin, 1975, Council on Environmental Quality

The Delaware River Basin Commission (DRBC), created in 1961, launched a second-generation water control program aimed at reducing pollution from industrial discharges and other point sources, and at more thorough treatment of wastes at sewage treatment plants. This program caused water in the Delaware River to become cleaner than at any time in the twentieth century. In the 1994 Delaware River and Bay Water Quality Assessment Report, the DRBC assessed the status of water quality as observed in 1992 and 1993. Water quality in the Delaware Water Gap to Trenton reach was generally considered good with the only concern being occasional high pH levels. Previous studies by DRBC determined that the main cause of violations to DRBC water quality standards is aquatic plant photosynthesis and respiration, natural phenomena that pose no apparent harm to fisheries.

The water quality in the segment from Trenton to the Philadelphia/Bucks County border has been improving, and in 1991 DRBC raised water quality criteria for fecal bacteria to reflect the fact that the entire reach had obtained the swimmable goal of the federal Clean Water Act. This reach, however, along with other reaches in the Delaware Estuary, is currently subject to intermittent fish advisories due to toxics found in fish tissue by DRBC and state researchers. A multi-year interstate toxic management program to address this problem is nearing completion. Among some twenty water tributaries that flow into the river segment from Trenton to the Philadelphia/Bucks County border are two that contribute major volume to the river, Neshaminy Creek, PA, and Rancocas Creek, NJ. Data compiled by the Delaware Riverkeeper Network and governmental monitoring programs on these tributaries find water quality generally fair to poor, impacted primarily by agricultural, residential and roadway runoff.

Water pollution control in the Delaware River is the joint responsibility of the federal government (U.S. Environmental Protection Agency), the environmental protection departments of the four basin states, and the Delaware River Basin Commission. These agencies conduct monitoring, regulatory functions, planning and other water quality management functions.

"Non-point" Source Pollution

At present, the DRBC, state governments and many local governments are paying close attention to what is known as "non-point" source pollution. Non-point does not come from a single easily-identifiable source, but results from contaminants that are carried to watercourses in storm water runoff. Chief among these non-point contaminants are oils and salts from

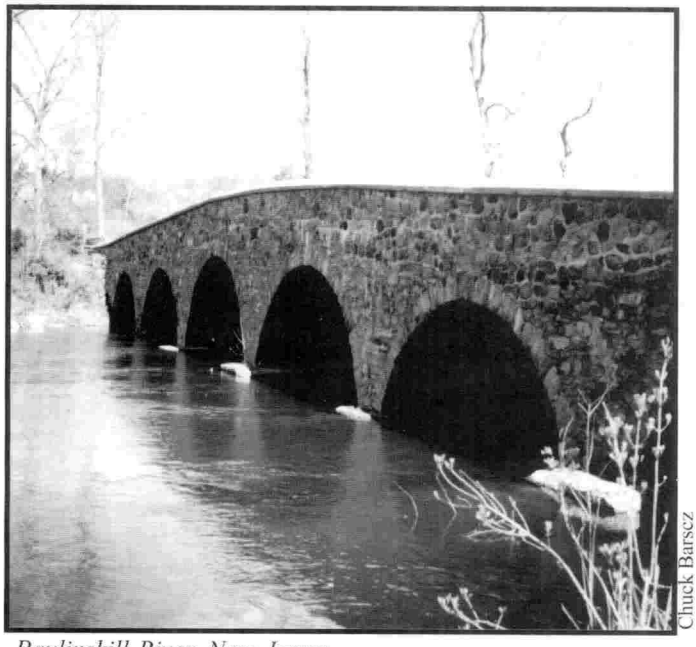
roads and parking lots, pesticides and herbicides from lawns and crop fields, and eroded soil from construction sites and farms. Soil erosion creates unconsolidated particulates that are carried downstream in the water column. These sediments fill crevices and cover bottoms that rob the ecosystem of its biological niches and cause havoc with the nutrient basis of the food chain.

Although the DRBC and state governments have some regulatory authority that can mitigate the problem of non-point pollution, the most effective reduction techniques are carefully prepared and enforced municipal land use ordinances. By requiring management of storm water runoff and protecting buffers along streams and other environmentally sensitive lands, municipalities can make a major contribution toward establishing and maintaining good water quality in the Delaware and its tributaries.

A number of streams that flow into the Delaware River within the Plan area have been designated by their respective state as having high water quality.

Important Water Resources in New Jersey

New Jersey's waters, as related to their ability to support trout, are defined in the NJ Department of Environmental Protection's Surface Water Quality Standards as follows:



Chuck Barscz

Paulinskill River, New Jersey

Trout Production Waters – Waters designated for use by trout for spawning or nursery purposes during their first summer.

Buckhorn Creek, Warren County
Lopatcong Creek, Warren County
Merrill Creek, Warren County
Pohatcong Creek, Warren County

Trout Maintenance Waters - Waters designated for their support of trout throughout the year.

Delawanna Creek, Warren County
Hakihokake Creek, Hunterdon County
Musconetcong River, Warren & Hunterdon counties
Paulinskill River, Warren County
Pequest River, Warren County

Important Water Resources in Pennsylvania

The Pennsylvania Department of Environmental Protection designates certain streams as High Quality or Exceptional Value waters as defined in Chapter 93 of its rules and regulations. The definitions are as follows:

High Quality Waters – A stream or watershed which has excellent quality waters and environmental or other features that require special water quality protection.

Aquetong Creek, Bucks County
Cuttalossa Creek, Bucks County
Frya Run, Northampton County
Paunacussing Creek, Bucks County
Rapp and Beaver Creeks, Bucks County (3rd order) – headwaters of Tinicum Creek

Exceptional Value Waters – A stream or watershed which constitutes an outstanding national, state, regional, or local resource, such as: waters on national, state or county parks or forests; waters which are used as a source of unfiltered potable water supply; waters of wildlife refuges or state game lands; waters which have been characterized by the Fish Commission as "Wilderness Trout Streams;" and other waters of substantial recreational or ecological significance.

Bushkill Creek, Forks Township, Northampton County
Cooks Creek, Durham Township, Bucks County
Tinicum Creek, Bucks County
Tohickon Creek, Bucks County



Natural Resources

The lower Delaware River includes a diversity of ecosystems that support unique vegetation and wildlife. It flows through rolling hills and broad valleys; cliffs and palisades have emerged where the river has cut deeply into the rock. Rare plants cling to rock outcrops. On shelves of north-facing cliffs in Pennsylvania grow Arctic-Alpine plants such as Rosey sedum, while cacti dot the cliff shelves on the south-facing New Jersey side. Woodlands cover many of the river islands and the sloping hills, cliffs, and palisades along its banks providing habitat for an abundance of wildlife including the endangered *Bald Eagle* and *Peregrine Falcon*. The water itself supports a diversity of fish populations. The river's valuable natural resources provide a sense of timeless beauty and peacefulness to all who take the opportunity to experience it. Following is a description of the natural resources in greater detail:

Geologic features whose natural values have attained recognition through national and/or state designation —

New Jersey

Devil's Teatable: An eroded Triassic rock perched on a cliff located in Kingwood Township, N.J.

Milford Bluffs: Nearly vertical cliffs showing a good exposure of Triassic Brunswick shale and border conglomerates. Habitat for many state listed species of rare and endangered plants.

Pennsylvania

Delaware River Section of Stockton Formation: Typesection for the Triassic Stockton Arkose. Well-developed outcrops between Lumberville and Centre Bridge, PA.

Durham Caves: Limestone underground formation near Delaware River once more extensive. Fossil bones of extinct animals and prehistoric Indian remains were found in late 1800s.

Durham Mines: Historic iron ore mines of the Durham Furnace where cannons and cannonballs were produced for George Washington's Army. Founded in the early 1700s, it is long abandoned. Shafts have become an important bat hibernaculum, recognized as the second most important in the state.

Elephant Rock: Barren summit of Bougher Hill. Outcrop of Byram gneiss, one of oldest rocks in North America.

Hexenkopf Rock: (Frya Run) Barren summit of Bougher Hill. Outcrop of Pochuck gneiss, one of oldest rocks in North America (Precambrian).

Monroe Border Fault: Oldest surface rock in North America; exposed granite, granite gneiss and amphibolite.

Nockamixon Cliffs: An escarpment of high shale cliffs which are home to unique Arctic-Alpine plants.

Geology

The character of the lower Delaware River corridor's geology changes dramatically over the corridor's length. Geologists have classified geologic differences by assigning them to geologic provinces. The lower Delaware corridor encompasses four such provinces, beginning at the northern end of the corridor with the Valley and Ridge Province. Like all of the geologic provinces, the Valley and Ridge is a band which crosses the river in a more-or-less east-west direction. The topography of the lower Delaware River is quite dramatic in the Valley and Ridge Province and gradually flattens as one proceeds southward through the New England and Piedmont Provinces, until reaching the Coastal Plain Province near Trenton, where the landscape becomes quite flat. The Coastal Plan Province, in fact, is a fairly recently elevated sea bottom.

Mineral resource extraction has a long history in the corridor. Fluxistone and iron ore mining and dimention stone quarrying flourished intermittently during the eighteen and nineteenth centuries. Presently basalt used for manufacture of asphalt, concrete and other construction purposes, sand, gravel, and dimention stone are mined in the corridor.

Vegetation/Critical Habitat

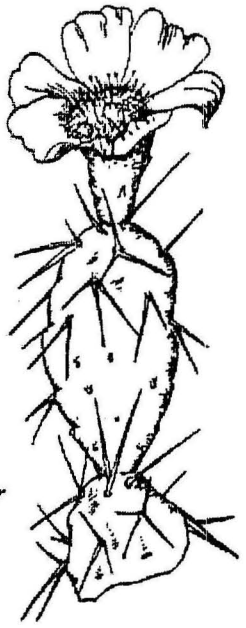
There is a variety of vegetation in the plan area resulting from differences in elevation, aspect, climate, physiography, geology and land use. Within the Piedmont uplands of red shale, red cedar grow on abandoned farms. They are eventually shaded by taller maples and oaks. North of the Piedmont in the New Jersey Highlands Province, the plant species in the early successional stages are dominated by gray birch and large-toothed aspen. Major tree species identified in the study corridor include: black, grey, river and yellow birch; red maple; red oak; white ash; large-toothed and trembling aspen; black locust, walnut, and black cherry; sycamore; and hemlock. Shrubs include willow, spirea, silk dogwood, and alder. Woody species above the floodplain include blueberry, huckleberry, rhododendron, mountain maple, staghorn sumac, sweet fern, and witch hazel. Vegetation along the river corridor provides valuable habitat for birds and other animals and shade for fish in the river.

Some areas contain special vegetation features including rare plant species, unique or unusual floral habitats, or outstanding individual specimens. For example, in some areas

Ringing Rocks: A four-acre field of large diabase boulders which, when hit with a hammer, ring in various tones.

Tohickon Creek: Triassic Lockatong and Brunswick Formations: An example of orogenic compression, the folding and thrusting in which Precambrian rocks were thrust northward over lower Paleozoic deposits.

Tohickon High Rocks: A nearly 190 foot vertical cliff formed at the interface of a band of Lockatong argillite and a band of Brunswick shale.



Prickly Pear Cactus

sheer cliffs, rising to 400 feet above the valley floor, support special flora found at no other sites in the area. Rapid drainage and exposure to winds and sun makes southern facing cliff habitats dry and desert-like. *Eastern red cedar* is the dominant tree. *Mountain spleenwort* and *Goat's rue* are commonly found on crests and ledges or in rock crevices. Flora on cliffs such as Milford Bluffs in Hunterdon County and Nockamixon Cliffs in Bucks County is rare for the northeastern U.S. *Roseroot*, an arctic-alpine herb that grows on shelves and crevices near the top of these cliffs, is in its southern-most habitat here. Prickly Pear is abundant on Milford Bluffs which also provide habitat to *Green Violet* and *Smooth Veiny Peavine,* both on the NJ endangered plant list.

Bull's Island, about 3.5 miles north of Stockton, NJ has ar exemplary forested floodplain habitat with mature sycamore, silver maple, locust and box elder. The southern portion of the island is a Natural Area, designated by New Jersey for its northern floodplain habitat and rare species habitat.

Continued development in the region is altering the composition of the forests because as these forests are fragmented, more forest edge is created causing a great increase in plant species that thrive in edge habitats.

The Nature Conservancy, in cooperation with the states of New Jersey and Pennsylvania, have identified "critical habitats" in the corridor. Meeting the outstandingly remarkable resource criteria are:

New Jersey

Alpha (Pohatcong) Grasslands
Bull's Island
Burlington Island
Byram Hillside
Delaware River Bridge at Stockton
Delaware River Floodplain, Delaware Township
Delaware River Floodplain, Harmony Township
Delaware River Floodplain, Knowlton Township
Garrison Road Site
Goat Hill
Hawk Island
Holcombe Island
Javes Road site (wetland at Hakihokake Creek)
Kingswood Township Bluffs
Manunka Chunk Bluffs
Milford Bluffs
Mine Hill
Mount Tammany
Newbold Island

Plant species existing in the plan area that have regional significance and meet the criteria for documentation as outstandingly remarkable resources include:

New Jersey

American Purple Vetch
Basil Bee-balm
Basil Mountain Mint
Blackberry Species
Broadleafed Waterleaf
Bush's Sedge
Carolina Wood Vetch
Ellisia/Aunt Lucy
False Pennroyal
Few-flowered Panic Grass
Foxtail Sedge
Great St. John's-wort
Green Violet
Hairy Lipfern
Ledge Spike-Moss
Low Sand Cherry
Lowland Brittle Fern
Missouri Goosefoot
Pawpaw
Plantain-leaved Sedge
Round-leaved Serviceberry
Nebraska Sedge
Ohio Spiderwort
Pale Indian Plantain
Redbud
Side Oats Gramma Grass
Small-fruited Groovebur
Smooth Hedge-nettle
Smooth Veiny Peavine
Squirrel-corn
Torrey's Mountain Mint
Twinleaf
Veined Skullcap
Wafer Ash
Wild Confrey
Willow-leaved Aster
(continued)

Phillipsburg Bluffs
Pohatcong Mountain
Riegelsville Bluffs
Scudders Falls Islands
Strawberry Hill
Treasure Island

Pennsylvania

Biles Island
Delhaas Woods County Preserve
Durham Mines
Frya Run Creek
Hendricks Island
Jacoby Creek
Maple Beach
Mariton Wildlife Sanctuary
Marshall Island
Mine Hill
Morrisville river shore
Mud Island
Nockamixon Cliffs
Paunacussing Creek
Scudders Falls Islands
Sol and Rose Conservation Area
Van Sciver Lake

Fisheries

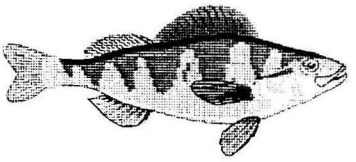
The lower Delaware River supports a wide diversity of anadromous and resident fish populations that are important commercially, recreationally and ecologically. Migratory species such as American shad, striped bass and river herring are increasing in the river in response to improved water quality and fish management. Their continued survival is dependent on the water quality of the river's lower reaches. Resident species such as smallmouth bass, channel catfish, walleye pike, hybrid muskellunge, white catfish, bullhead, white perch, sunfish, suckers, and eels add to this important recreational fishery.

One of the most recreationally and economically important fish species in the river basin is the *American Shad*, a New Jersey state threatened species. Populations of American Shad have increased tremendously in response to improved water quality. Today, approximately 900,000 adult American Shad ascend the Delaware River each spring. Fish ladders have been installed at Easton to allow shad to migrate up the Lehigh River. Annual shad festivals held in Lambertville, NJ and Easton, PA, and the Delaware River Shad Fisherman Tournament illustrate the successful relationship between tourism and fisheries.

Pennsylvania

Atlantic Sedge
Bicknell's Sedge
Brook Lobelia
Common Hop Tree
Eastern White Water-Crow
Ellisia/Aunt Lucy
Grass of Parnassus
Hoary Willow/Sage-leaved Willow
Northern Pondweed
Prickley-Pear Cactus
Roseroot Stonecrop
Sand Cherry
Small-flowered Crowfoot
Spring Coral Root
White Heath Aster
Wood's Sedge
Whorled Nut-rush

The federally listed endangered *Shortnose Sturgeon* is concentrated in the estuary between Philadelphia and Trenton and is known to spawn in the Yardley and Lambertville areas. The globally rare *Atlantic Sturgeon* travels upriver as far as Trenton.



Coldwater fisheries are supported in numerous creeks entering the river in the plan area. Many creeks are stocked with trout and are accessible to the public.

River management practices could impact the diversity or the balance of fish and other aquatic life in the corridor. Diversion and release of the water, as well as dredging in the estuary, might create conditions that favor some species over others. The use of high speed boats and personal water craft, particularly in the shallower sections of the river, could also be altering the habitat for many species.

Wildlife

Many species of wildlife exist in the plan area, some of which are rare, threatened, or endangered.

Important reptile and amphibian species known to occur in or near the river corridor area include bog turtles, New Jersey chorus frogs, coastal plain leopard frogs, eastern mud turtles, and red-bellied turtles. The bog and/or red-bellied turtles occur at sites within the Cooks Creek watershed in upper Bucks County, Frya Run Creek, on the Delaware near Washington Crossing, and in Trenton-Hamilton Marsh in the southern portion of the plan area.

Among mammal species, white-tailed deer populations have increased notably since the early 1900's in New Jersey and Pennsylvania. Many naturalists are concerned that deer have increased in such numbers that they threaten the existence of many of the plant species they eat. Deer may also threaten other animal species that rely upon the same food for survival.

Beaver and river otter are active along the Delaware. Four endangered, threatened or rare bat species inhabit parts of Upper Bucks (PA) and Hunterdon (NJ) counties in the river corridor vicinity: *Keen's bat, Small-footed bat, Northern Long-eared bat, and Indiana bat.*

The plan area is recognized on a national and state level for many characteristics related to bird breeding and migration:

"The Delaware River is an extremely important corridor for bird life, and other wildlife as well...bald eagle are making a comeback and they use the river for habitat...the osprey was endangered for a while, it's coming back now..."

Jan Holms, Nockamixon Township Environmental Advisory Council

- It is located along the Atlantic Flyway, one of four major waterfowl migratory routes in the U.S.
- The Nockamixon Cliffs historically provided nesting sites for the federal and state-endangered Peregrine Falcon. They last nested here in the 1940's and reintroduction efforts have brought them back from the edge of extinction.
- Bald Eagles, federal (until 1994) and state endangered, use the river's shoreline and islands for winter habitat.
- State endangered osprey are also making a comeback along the Delaware River through a reintroduction program.
- The Least Bittern, a PA threatened species, breeds in Upper Bucks County and the Trenton-Hamilton Marsh.
- The Alpha (Pohatcong) Grasslands are noted for nesting grassland species that are declining and for over-winter populations of Northern Harriers and Short Eared Owls.
- Mature hardwood forests of the river's floodplain and islands are important breeding areas for declining neo-tropical bird species.

Potentially important areas for migrating birds include the many small ravines and stream valleys along the river and its tributaries, floodplains, and other wetland areas, river islands, and wooded corridors. A critical concern for species in the plan area is preservation of remaining habitat. The following is a list of birds in the plan area that are endangered or threatened:

Endangered:	Bald Eagle	
	Osprey	
	Peregrine Falcon	
Threatened:	American Bittern	Least Bittern
	Bobolink	Northern Harrier
	Common Snipe	Red-headed Woodpecker
	Cliff Swallow	Red Shouldered Hawk
	Cooper's Hawk	Savanna Sparrow
	Grasshopper Sparrow	Upland Sandpiper
	Great Blue Heron	Yellow-bellied Flycatcher

Delaware River Islands

There are about 50 islands in the plan area, varying in size from a few gravel mounds in summer to forested habitats of more than 300 acres. Ownership of the islands is divided nearly equally between private and public interests. Because of limited access and seasonal flooding, the islands remain relatively natural, a condition that is considered by many to be of very

great importance to the continued natural charm of the corridor. Permanent preservation of the islands has been a high priority for many environmental groups.

The islands provide critical stopovers for migratory birds, and the shallow water areas around them are important nurseries and feeding grounds for a variety of fish. The forested islands provide a rich environment for nesting waterfowl, herons and songbirds.

Islands that contain habitat recognized as "critical" for endangered native plant species are included in the list on pages 29-30.



Wetlands

Wetlands, once thought to have little or no value, are now recognized as a vital link in our ecological system. Wetlands nurture some of the most uncommon plants in the region, including wild rice on which migrating waterfowl feed. The following is a list of critical wetlands in the Plan area:

New Jersey

Trenton/Hamilton Marsh, 1,200 acres; most northerly tidal marsh on the Delaware River.

Pennsylvania

Bristol Marsh, one of three remaining freshwater tidal areas on the river.

Kauffman Hill Swamp, 400 acres, Bridgeton and Nockamixon townships

Quakertown Swamp, headwaters of the Tohickon Creek

Historic Resources

The lower Delaware River contains historic resources of great national significance; it is a microcosm of American history. Colonial development, the American Revolution, transportation evolution, the Industrial Revolution, urbanization, suburbanization, art and theater are all represented within the corridor.

Historic and cultural sites and districts which are listed on the National Register of Historic Places:

New Jersey

Belvidere Historic District
Berkeley Square Historic District
Bordentown Historic District
Borough of Frenchtown Historic District
Burlington Historic District
Calhoun Street Bridge over the Delaware River
Delaware and Raritan Canal National Historic Landmark
Early Trenton Historic District
General Dickinson House
Jacob's Creek Somerset Mills
Lambertville Historic District
McCall Mansion, Cadwalader Park
Morris Canal National Historic Landmark and Morris Canal Arch

(continued)

The river provided access to the region for both Native Americans and European settlers and defined development patterns. Virtually every major town on both sides of the river in the plan area began as a ferry crossing.

The first public reading of the Declaration of Independence took place in Easton on July 8, 1776. George Washington's crossing of the Delaware on Christmas Eve is an event known by most school age children in the United States. The development of canals and railroads along the river in the nineteenth century allowed mineral wealth and farm products to reach growing urban markets.

Before European settlement, the Lenni Lenape hunted and fished along the Delaware and its tributaries. Many Native American archaeological sites have been documented along the corridor. The names of numerous towns, roadways and creeks are taken from the Native American language, such as Tohickon, Tinicum, Lopatcong, Pohatcong, Paunacussing, Wichecheoke, Aquetong, and Pequest.



A re-enactment of Washington Crossing the Delaware takes place each year.

European settlement began in the seventeenth century and by the end of the eighteenth century had significantly changed the environment. Forests were cut, sawmills built, land cleared for farming, and roads opened.

The 1800's brought major technological changes, and the Industrial revolution was underway. The Delaware River corridor had all the natural assets needed to spur vibrant industrial growth. It was rich in the essential resources—water, coal, wood, and iron—and occupied a prime location.

In the nineteenth century canals were established to aid in the transportation of anthracite coal from the Lehigh River region to rapidly growing industrial markets in Trenton, Philadelphia, New York, and elsewhere. The Delaware Division of the Pennsylvania Canal, the Delaware and Raritan Canal, and the Morris Canal were built for that purpose. The canals were largely hand-dug by local farmers and Irish immigrants using picks, shovels, and wheelbarrows. Towns developed at the terminus of the canals. Smaller towns emerged along the canals, and parallel

Old Barracks National Historic Landmark
Pennsylvania Railroad Bridge over the Delaware River
Pleasant Valley Rural Historic District
Point Breeze Historic District
Prallsville Mills Historic District
Pursley's Ferry Historic District
Ralph Kuser Mansion
Roebling Historic District
State House Historic District
Titusville Historic District
Washington Crossing National Historic Landmark
William Trent House National Historic Landmark

Pennsylvania

Andulusia – estate of Nicolaus Biddle, head of first Bank of the U.S.
Upper Aquetong Valley Historic District
Bristol Historic District
Bristol Industrial Historic District
Brownsburg Historic District
Carversville Historic District
Centre Bridge Historic District
Coffeetown Grist Mill
Delaware and Lehigh Canal National Heritage Corridor and State Heritage Park
Delaware Canal National Historic Landmark
Easton National Register Historic District
Frya Run Bridge
Grundy Mill Complex
Historic Fallsington District
Harriman Historic District
Honey Hollow Watershed National Historic Landmark
Jacoby Creek Bridge
Jefferson Land Association Historic District
Lumberville Historic District
New Hope Historic District
Pennsbury Manor – home of William Penn
Phillips Mill Historic District
Point Pleasant Historic District
Ridge Road Rural Historic District
Slate Hill Cemetery
Summerseat – home of Robert Morris, financier of the Revolution
Three Arches – home of John and Mary Sotcher, steward and housekeeper to William Penn.
Uhlerstown Historic District
Washington Crossing National Historic Landmark

railroads were built soon after the canals. The Delaware Canal, which operated between 1827 and 1932, is now a State Park used for recreational purposes by thousands each year and is a National Historic Landmark. The Delaware Canal is also an important component of the Delaware & Lehigh Canal National Heritage Corridor. The Delaware and Raritan Canal, which serves today as a water supply system, is also a State Park and a National Historic Landmark. Interest is growing in protecting and interpreting the remains of the Morris Canal.

The river shaped the emerging economic/physical landscape in ways that are enduring. Above the fall line at Trenton, development of towns was limited, and tributary streams fall sharply from the highlands down into the river valley. Gristmills and sawmills were built near the Delaware River along many of these tributaries to exploit the water power. Though many mills have been destroyed, several remain. Limekilns were built on the river's edge, the ruins of which are still found near Uhlerstown and Phillipsburg.

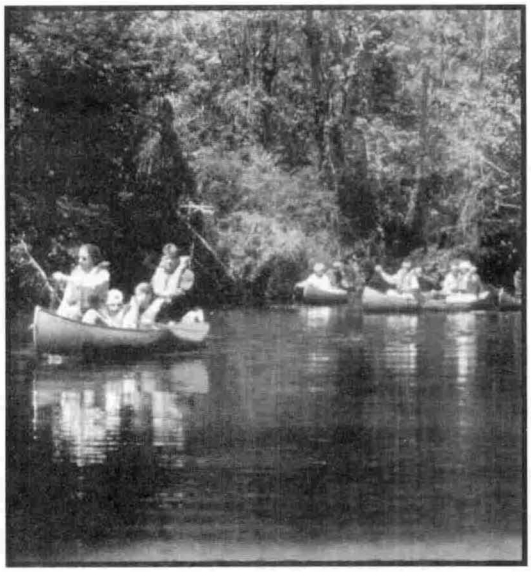
The significance of the scenic river, historic canals and towns, and remnants of early industries has already been recognized by: Congressional designation in 1988 of the Delaware and Lehigh Navigational Canal National Heritage Corridor, a key component of which is the Delaware Canal; designation of twenty-nine National Historic Districts as well as eight National Historic Landmarks. In addition, thousands of other archaeological and historic sites along the river corridor have been identified and mapped.

Funding to encourage historic preservation through documentation, acquisition, restoration, development and interpretation is limited. The problem is compounded by lack of coordination between municipalities, non-profits, states, and other programs. Regional programs like the D&L Heritage Corridor are a strong advance toward better coordination. However, given the significance of the area's historic resources and their potential for economic development, the regional commitment to their preservation and interpretation is weak.



Recreational Resources

Because of its great beauty and many natural and cultural resources, and because the Delaware River is within a day's drive of 40% of the U. S. population, it is an extraordinarily important recreational resource for millions of people. One can expect to see almost any kind of recreational boat on the river — canoes and kayaks, speed boats and jet skis, fishing boats, shells, excursion boats with pontoons and fringe-lined roofs —and in many places the river is dotted in summer with people floating with the current on innertubes. Hikers, joggers, and bicyclists crowd the canal paths on either side of the river. Fishermen, bird watchers, and people seeking a natural landscape are drawn in great numbers to the corridor. Campgrounds are scarce in the corridor, but those that do exist are popular.



Delaware River Greenway

Trenton-Hamilton Marsh, New Jersey

There are large number of state and local parks in the corridor. The Delaware and Raritan Canal State Park (NJ) and the Delaware Canal State Park (PA) are popular recreational corridors. Both have trail systems designated as National Recreational Trails. While these parklands provide a wealth of recreational opportunities, they are primarily disconnected "areas" of recreation and do not represent a cohesive recreational system. A lack of sufficient public facilities and boating access is also a limiting factor to these areas, a situation that has its benefits as well as its problems.

The use of the corridor for recreation brings with it many difficulties. While the great majority of people drawn to the corridor for recreation are respectful of the region's fragile resources and of the rights of others, enough people lack this respect that conflicts arise. The privacy and security of property owners are often violated by boaters, tubers, and others. Trash is often discarded without consideration.

No recreational issue in the lower Delaware River corridor raises more comment than the use of personal water craft, commonly called Jet Skis. These vehicles are frequently modified in ways that maximize the amount of noise they can make — a level of noise that intrudes on any other activity in the corridor. Furthermore, the drivers often create a situation that frightens other boaters and river users by riding at high speeds in circumstances that are often unsafe. These water craft also disrupt wildlife both by their loud, intrusive noise and by disturbing the ecosystem of the river's shallow areas.

Protected open space and public parks in the plan area:

<u>New Jersey</u>
Blaugard Island
Bulls Island Recreation Area
Cadwalader Park
Columbia Lake Wildlife Management Area
Delaware & Raritan Canal State Park
Delaware Watergap National Recreation Area
Dildine Island, Macks Bar
Eagle Island
Frenchtown Municipal Park
Lockatong Creek Preserve
Milford Bluffs Preserve
Musconetcong Gorge County Preserve
Kittatinny Valley Trail State Park
Phillipsburg Riverfront Park
Roebling Memorial Park, Trenton Marsh
Rotary Island
Rush Island *(continued)*

Shandor Island
Trenton Riverfront Park
Washington Crossing State Park

Pennsylvania
Bowman's Hill Wildflower Preserve
Bristol Borough Riverfront Park
Delaware Canal State Park
Delaware Watergap National Recreation Area
Easton Riverfront Park
Falls of Delaware Park
Frost Hollow County Park
Frya Run County Park
Hal Clark Park
Lehigh Canal-Hugh Moore Park Heritage Corridor
Macclesfield Municipal Park
Martins Creek Recreation Area
Morgan Hill Island
Mount Jack County Park
Mud Run County Preserve
Neshaminy State Park
Nockamixon Cliffs
Nockamixon State Park
Old Sow Island
Pen Ryn County Park
Pennsbury Manor State Park
Prahls Island group
Ralph Stover State Park
Raubs Island
Ringing Rocks County Park
Silver Lake County Park
State Gamelands #56 (Rapp and Beaver creeks)
Tinicum County Park
Tohickon Valley Park
Washington Crossing State Park
Waterfront Park, Falls Township
Whippoorwill Island
Williamson Municipal Park
Wy-Hit-Tuk County Park

Citizen protest has prompted legislative review of ways to control personal water craft use. New Jersey passed new safety regulations effective July 1, 1997, which require operators of personal watercraft to be at least 16 years of age and to obtain a boating safety certificate. However, no satisfactory solution is yet in view. Action must be taken jointly by New Jersey and Pennsylvania, and enforcement must be provided on a far higher level than presently exists on either side of the river. This enforcement can only be created by the allocation of more money for the enforcing bodies, a difficulty given the present budget restrictions in both states.

Scenic Resources

The lower Delaware River corridor provides year-round scenic opportunities. During the summer, lush vegetation along the river's floodplain and wooded slopes provides surprisingly "natural" landscapes. Fabulous fall colors combined with the pleasant autumn climate make the corridor an excellent site for color tours and outdoor opportunities. Winter provides dramatic natural ice sculptures on bluffs and cliffs. Spring heralds nature's migration and the songbirds reappear.

The traveler can choose to take to the water at various public access points to view the waterway. The view from the river provides a sense of being in pristine surroundings. Public riverfront parks have been established in some municipalities, but access to the river is still limited in many areas.

On the other hand, travel by roadway not only provides beautiful views of the river and canals, but passes through historic riverside towns. In Pennsylvania, River Road (Routes 32 & 611) from Kintnersville to Morrisville is a Pennsylvania Scenic Road. New Jersey's River Road (Route 29) between Frenchtown and Trenton has been designated a New Jersey Scenic Byway.

The Delaware River offers tranquil and often dramatic rural scenery that has become increasingly rare in the highly urbanized Northeast corridor.

Economic Resources



Jeffrey Marshall

Mules tow canal boats along the Delaware Canal.

Land use between the Delaware Water Gap and Washington Crossing is a complex mix including agricultural, small towns, light commercial uses, growing suburban-style residential development, second-home and vacation residential development, tourist facilities such as restaurants, bed and breakfasts and river-related recreational facilities, and public lands. Despite the intensive use, the lower Delaware River corridor has retained much of its natural shoreline and highly scenic quality.

The river corridor between south of Washington Crossing and the southernmost border of the plan area at the Bucks County/Philadelphia line is the most densely populated with cities, suburban residential areas and light industrial uses. Trenton is the largest urban center in the lower Delaware River corridor. Major residential development occurred in lower Bucks County from 1950 to 1965 when Levittown and Fairless Hills were constructed to house employees of the USX Corporation Fairless Works, still the largest industrial complex in the plan area. The opening of Interstate Route 95, which crosses the river above Yardley, PA, led to increased residential subdivisions. Industrial sites are primarily located in the Easton, PA area and in the tidal estuary portion of the plan area beginning at Trenton, NJ and Morrisville, PA and extending down river to the southern plan area boundary. An expanding land use in the lower reaches in recent years is trash disposal landfills and processing plants.

Urban areas in the corridor are important as focal points for access to and celebration of the river and are valuable economic generators. Economic development is a significant component in the provision of jobs and in maintaining a balanced and prosperous economic base that not only helps attract visitors, but provides the tax base to support the preservation efforts of local governments.

The lands in and around the plan area are in great demand for new residential and commercial development, creating pressures that can threaten the fragile environment and scenic beauty of the river corridor. Economic prosperity depends upon

both continued growth and preservation of the corridor's natural and cultural resources. Achieving these two often-conflicting goals will require a more region-wide approach to development than presently exists.

The historic treasures and scenic beauty of the Delaware River corridor offer numerous economic opportunities pertaining to "Eco-tourism." Many travelers are seeking destinations that provide historical and cultural stimulus as well as a chance to commune with nature through hiking, boating, bird watching, camping, etc.

More than three centuries of growth has left the Delaware River corridor a unique legacy. It is reflected in the area's prominent position in the nation's history, in the commerce and industry that grew up there and still characterize the region, in the ethnic and cultural diversity of the area, and in the wealth that its commerce and productivity have generated. The challenge now is to preserve that legacy while providing for managed economic growth.

Open Space

Preservation of open space is the basis for preserving all of the outstandingly remarkable resources in the lower Delaware River corridor. It is critical to water quality because it is from developed areas — not from natural lands — that pollution flows into the ground and surface waters. Natural areas have more stable soils than places where development has occurred, thus reducing the turbidity of storm water that runs off a site after a rainfall. Finally, natural lands in this region will eventually support a deciduous forest. Trees shade the water in smaller streams, cooling it and increasing the water's ability to contain oxygen, one of the most important elements in countering water pollution.

The preservation of open space is also the surest way of preserving habitat for rare and endangered plant and animal species. Some of these species scan survive in developed areas, but habitat loss is the primary reason that these species become rare or endangered.

Historic sites in the corridor are also dependent upon the preservation of open space. If a historic structure is preserved but the land around it experiences modern development, the structure often looses its context and much of its historic value.

"It is impossible to separate the solutions to the problems of pollution and depletion of the river from the reforms in land use planning and regulation..."

The Delaware River Basin, 1975, Council on Environmental Quality.

The importance of open space to the preservation of scenic values and to recreation sites is obvious. Any loss of open space in the corridor would significantly reduce the scenic character and recreational opportunities that made the river corridor eligible for National Wild and Scenic designation. Recreational opportunities in the corridor are almost entirely dependent upon preserving open space. Boaters, bird watchers, campers, hikers, cross-country skiers, tubers — virtually all who come to the corridor for recreation — need open space for their activities and depend upon it to assure that the corridor is attractive enough to make it a suitable place for such activities.

Agricultural land is an important component of open space. Compared to most types of land uses, properly managed agriculture preserves many natural and cultural values such as retention of critical aquifer recharge areas, protection of critical wildlife areas, maintenance of natural stream flow, conservation of prime soils, preservation of rural or historic character, and preservation of scenic landscapes. Farmlands reduce some of the extensive costs associated with scattered development. Farmlands also reduce the negative environmental impacts that diminish the attractiveness of the Delaware Watershed. Farmlands consistently generate more tax revenue than it requires in service expenditures. In contrast, residential areas require services that cost more than the tax revenue they generate. Equally important, farmers often possess valuable knowledge of their community's natural and cultural environment. The lower Delaware River and its tributaries include extensive agricultural lands along their shores, contributing to their outstanding scenic value.



Delaware River Basin Commission

A dramatic example of changing land use, this 1930 photo of Washington Crossing shows that the primary land use was farming.

The Northeast corridor is the most densely populated area in the country. The Delaware River corridor presents a rare opportunity for solitude and oneness with nature. Preserving this quality is important to the social and cultural health of the public and the economic health of the region.

Section III: Eligibility and Classification

The purpose of this chapter is to document 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 River System.

Eligibility Requirements

The 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 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, diversion, straightening, riprapping, 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."

Outstandingly Remarkable Resources

The criteria for deciding what qualifies as an outstandingly remarkable resource were adapted from two primary sources: *The Natural and Recreational Resource Evaluation* prepared for the Delaware and Lehigh Canal National Heritage Corridor Commission and *A Systematic Approach to Determining the Eligibility of Wild and Scenic River Candidates* produced for the Columbia Gorge National Scenic Area. These documents incorporated established criteria for National Park Service and United States Forest Service efforts. Further information was derived from professional planning publications. The criteria for outstandingly remarkable resources are as follows:

1. Officially Recognized

National

The resource's significance has been established through designation or recognition in federal programs such as endangered, threatened and/or rare species of fish, wildlife and vegetation; historical and cultural sites and parks; and exceptional waters.

State

The resource has been designated or recognized by the State of New Jersey and/or the Commonwealth of Pennsylvania in their programs such as scenic rivers or by-ways; historical and recreational parks; endangered, threatened or rare fish, wildlife or vegetation; and stream/water quality classifications.

Regional Importance

Regional significance has been recognized and documented in programs such as critical natural areas studies and university/foundation research.

2. Relationship to the River

Existence

The resource's existence is/was owed to its location along the river or tributary corridor. For example, a rare bird depends on a specific habitat in the corridor for survival, or an historic mill was placed on a stream segment because of the water flow.

Role

The resource's contribution or influence on the functioning of the river or tributary, such as groundwater aquifers.

If the resource meets one criteria from each of the two sections, it is considered outstandingly remarkable.

Outstandingly Remarkable River Values and Resources

The lower Delaware River corridor contains the following outstandingly remarkable resource values as exemplified by the corresponding resources. The listed resources meet the criteria for determination of outstandingly remarkable resources described above. The existence of these outstandingly remarkable resource values and the determination that a river segment is free flowing result in the river segment being eligible for inclusion into the National Wild and Scenic Rivers System. (Refer to page 53 for the list of study setments.)

Physiography and Geology

NEW JERSEY

Milford Bluffs, Holland Twp. **(Study Segment F)**

Devils' Teatable, Kingwood Twp. **(Study Segment F)**

PENNSYLVANIA

Nockamixon Cliffs, Nockamixon Twp. **(Study Segment E)**

Ringing Rock, Bridgeton Twp. **(Study Segment E)**

Monroe Triassic Border Fault, Durham Twp. - a National Natural Landmark
(Study Segment E)

Tohickon Creek: Triassic Lockaton and Brunswick Formations, Tinicum Twp. **(Study Segment M)**

Tohickon High Rocks, Tinicum Twp.
(Study Segment M)

Durham Caves and Durham Mines, Durham Twp. **(Study Segment E)**

Water Quality

The following streams have been designated by their respective state as having high water quality. Each stream listed flows into the Delaware River, a study tributary, or is a study tributary. The water quality of these tributaries sustains the water quality of the Delaware River itself.

PENNSYLVANIA

To implement federal antidegradation requirements, the Pennsylvania Department of Environmental Resources designates certain streams High Quality or Exceptional Value waters as defined in Chapter 93 if its rules and regulations. The definitions are as follows:

High Quality Waters — A stream or watershed which has excellent quality waters and environmental or other features that require special water quality protection.

Exceptional Value Waters — A stream or watershed which constitutes an outstanding national, state, regional, or local resource, such as: waters on national, state, or county parks or forests; waters which are used as a source of unfiltered potable water supply; waters of wildlife refuges or state game lands; waters which have been characterized by the Fish Commission as 'Wilderness Trout Streams;' and other waters of substantial recreational or ecological significance.

Exceptional Value Streams:
Cooks Creek, Durham Twp. etc., Bucks Co. **(Study Segment K)**

High Quality - Cold Water Fisheries Streams:
Slateford Creek, Northampton Co. **(Study Segment A)**
Jacoby Creek, Northampton Co. **(Study Segment A)**
Bushkill Creek, Forks Twp., Northampton Co. **(Study Segment D)**
Frya Run, Northampton Co. **(Study Segment E)**
Pannucussing Creek, Bucks Co. **(Study Segment N)**
Cuttalossa Creek, Bucks Co. **(Study Segment G)**
Aquetong Creek, Bucks Co. **(Study Segment G)**
Rapp and Beaver Creeks, Bucks Co. (3rd Order) — headwaters of Tinicum Creek **(Study Segment L)**

NEW JERSEY

New Jersey's waters, as related to their ability to support trout, are defined in the NJ Department of Environmental Protection's Surface Water Quality Standards (N.J.A.C. 7:9-4) as follows:

Trout Production Waters — Waters designated for use by trout for spawning or nursery purposes during their first summer.

Trout Maintenance Waters — Waters designated for their support of trout throughout the year.

Trout Production Streams:
Buckhorn Creek, Warren Co. **(Study Segment D)**
Merrill Creek, Warren Co. **(Study Segment D)**
Lopatcong Creek, Warren Co. **(Study Segment E)**
Pohatcong Creek, Warren Co. **(Study Segment F)**

Trout Maintenance Streams:
Paulinskill River, Warren Co. **(Study Segment J)**
Pequest River, Warren, Co. **(Study Segment B)**
Delawanna Creek, Warren Co. **(Study Segment B)**
Musconetcong River, Warren & Hunterdon counties **(Study Segment O)**
Hakihokake Creek, Hunterdon Co. **(Study Segment F)**

Species of Concern

The species of concern below are identified and ranked by the Federal and State governments and the Nature Conservancy as endangered, threatened, or rare, thus, qualifying as outstandingly remarkable resources in need of protection. Below is a brief description of the rankings:

G = Global Element Ranks
- G1 = Critically imperiled globally.
- G2 = Imperiled globally.
- G3 = Very rare and local throughout its range or found locally in a restricted range.
- G4 = Apparently secure globally, quite rare in parts of its range.
- G5 = Demonstrably secure globally, quite rare in parts of its range.

S = State Element Ranks
- S1 = Critically imperiled in state.
- S2 = Imperiled in state.
- S3 = Rare in state.

E = Endangered, T = Threatened, R = Rare (NJ = New Jersey, P = Pennsylvania)

B = Biodiversity Significance

H = Historical Significance

Vegetation

Segment vA: Delaware Water Gap to Columbia/Portland Toll Bridge

Pennsylvania
Hoary Willo/Sage-leaved Willow (Salix candida) PT, G5/S2
Grass of Parnassus (Parnassa glauca) PT, G5/2
Prostrate Sand Cherry (Prunus pumil var. depressa) PT, G5/S3
Brook Lobelia (Lobelia kalmii) PE, G5/S1
White Heath Aster (Aster ericodes) PR, G5/S3
Bicknell's Sedge (Carex bicknelli) PR, G5/S1
Atlantic Sedge (Carex sterilis) PT, G4/S2
Wood's Sedge (Carex tetanica) PT, G4/S2
Whorled Nut-rush (Scleria verticillata) PE

Segment B: Erie Lackawanna Railroad Bridge to Dildine Island

New Jersey
Nebraska Sedge (Carex jamesii) NJE, G5/S1
Broadleafed Waterleaf (Hydropphllum canadense) NJE, G5/SH
Foxtail Sedge (Carex alopecoidea) NJE, G5/SH
Blackberry Species (Rubus orarius) S2
Hairy Lipfern (Cheilanthes lanosa), G5/S2
American Purple Vetch (Vicia americana), G5/SH

Pennsylvania
Northern Pondweed (Potamogeton alpinus) PE, G5/S1

Segment C: Macks Island to Belvidere, NJ

Pennsylvania
White Heath Aster (Aster ericodes) PR, G5/S3

Segment D: Belvidere, NJ to Easton, PA

New Jersey
Round-leaved Serviceberry (Amelachier sanquinea), NJE, G5
Broad-leaved Waterleaf (Hydrophyllum canadense), NJE, G5/S2

Segment E: Phillipsburg, NJ to the Gilbert Generating Station

New Jersey
Side Oats Gramma Grass (Bouteloua curtipendula), NJE, G5/S1
False Pennroyal (Isanthus brachiatus) NJE, G4/S1
Carolina Wood Vetch (Vicia caroliniana) NJE, G5/S1
Plantain-leaved Sedge (Carex plantaginea) NJE, G5/S1 — only known state occurrence

Pennsylvania
Sand Cherry (Prunus pumila) PT, G5/S3
Bicknell's Sedge (Carex bicknelli) PE, G5/S1

Segment F: Gilbert Generating Station to Pleasant Pumping Station

New Jersey
Bush's Sedge (Carex bushii) NJE, G4/S1
Small-fruited Groovebur (Agrmonia microcarpa) NJE, G5/S2
Hairy Lipfern (Cheilanthes lanosa) G5/S2
Green Violet (Hybanthus concolor) NJE, G5/S1
Carolina Wood Vetch (Vicia caroliniana) NJE, G5/S1
Smooth Veiny Peavine (Lathyrus venosus) NJE, G5/S1
Basil Mountain Mint (Pycnanthemum clinopodiodes) G2/S1
Torrey's Mountain Mint (Pycnanthemum torrei) NJE, G2/SH
Pawpaw (Asimina triloba) NJE, G5/S1
Nebraska Sedge (Carex jamesii) NJE, G5/S1
Lowland Brittle Fern (Cystopteris protusa) G5/S2
Veined Skullcap (Scutellaria nervosa) G5/S2
Wafer Ash (Ptelea trifoliata) NJE, G5/S2
Missouri Goosefoot (Ribes missouriense) NJE, G5/S1
Ledge Spike-Moss (Selaginella rupestris) G5/S2
Wild Comfrey (Cynoglossum virginianum) G5/S2

Pennsylvania
Roseroot Stonecrop (sedum rosea) PR, G5/S1
White Heath Aster (Aster ericoides) PR, G5/S3
Prickley-Pear Cactus (Opuntia humifia) PR, G5, S3
Small-Flowered Crowfoot (Ranunculus mictanthus) PR, G5/S3
Eastern White Water-Crow (Ranunculus longirostis) PT, G5/S3

Segment G: Pt. Pleasant Pumping Station to Route 202 Bridge

New Jersey
ProstrateSand Cherry (Prunus pumila var. depressa) G5/S2
Broad-leaved Waterleaf (Hydrophyllum canadense), NJE, G5/S2
White Heath Aster (Aster ericodes) G5/S3
Willow-leaved Aster (Aster praeltus) NJE, G5/S1
Great St. John's-wort (Hyoericum pyramidatum) G4/S2
Basil Bee-balm (Monarda clinnopodia) NJE, G3-5/S1
Few-flowered Panic Grass (Panicum oligosanthes) G5/S2
Smooth Hedge-nettle (Stachys tenfolia) G5/SU

Pennsylvania
Common Hop-Tree (Ptelea Trifoliata) PR, G5/S3

Segment H & I: New Hope, PA to Washington Crossing, PA

New Jersey
Squirrel-corn (Dicentra canadensis) NJE, G5/S2
Green Violet (Hybanthus concolor) NJE, G5/S1
Twinleaf (Jeffersonia diphylla) NJE, G5/S1
Veined Skullcap (Scutellaria nervosa) G5/S2
Pale Indian Plantain (Cacalia atriplcifolia) NJE, G5/SH
Nebraska Sedge (Carex jamesii) NJE, G5/S1
Small-fruited Groovebur (Agrmonia microcarpa) NJE, G5/S2

Redbud (Cercis canadensis) NJE, G5/S1
Wild Comfrey (Cynoglossum virginianum) G5/S2
Ohio Spiderwort (Tradescantia ohiensis) G5/SU
Ellisia/Aunt Lucy (Ellisia nyctelea) NJE, G5/S1

Pennsylvania
Ellisia/Aunt Lucy (Ellisia nyctelea) PT, G5/S2
Spring Coral Root (Corallorrhiza) PT, G5/S3

Critical Habitat

Segment B: Erie Lackawanna Railroad Bridge to Dildine Island

New Jersey
Delaware River Floodplain, Knowlton Township, Warren County — high biodiversity, B3
Manunka Chunk Bluffs, Knowlton and White Townships, Warren County — biodiversity

Segment D: Belvidere, NJ to Easton, PA

New Jersey
Garrison Road Site, Harmony Township, Warren County — agricultural grasslands
Delaware River Floodplain, Harmony Township, Warren County — high biodiversity, B3

Segment E: Phillipsburg, NJ to the Gilbert Generating Station

New Jersey
Phillipsburg Bluffs, Pohatcong, Warren County limestone plant community — biodiversity, B3
Alpha Grasslands, Pohatcong Township, Warren County — biodiversity
Pohatcong Mountain, Pohatcong Township, Warren County — biodiversity

Pennsylvania
Durham Mines, Durham Township, Bucks County second most significant bat hibernaculum in state

Segment F: Gilbert Generating Station to Pt. Pleasant Pumping Station

New Jersey
Wetland at Hakihokake Creek (Javes Road Site), Holland Township, Hunterdon County — high biodiversity, B3
Milford Bluffs, Holland Township, Hunterdon County best red shale cliff community in the state, G3/S2 — high biodiversity, B3
Treasure Island, Kingwood Township, Hunterdon County — high biodiversity, B3

Byram Hillside, Kingwood Township, Hunterdon County
— biodiversity

Pennsylvania
Nockamixon Cliffs, Nockamixon and Bridgeton Townships, Bucks County
— state designated outstanding scenic geological feature and shale cliff plant community, including arctic-alpine species
Marshall Island, Tinicum Township, Bucks County
— biodiversity

Segment G: Pt. Pleasant Pumping Station to Route 202 Bridge

New Jersey
Delaware River Floodplain, Delaware Township, Hunterdon County
— biodiversity
Bull's Island, Kingwood Township, Hunterdon County
— biodiversity
Delaware River Bridge at Stockton, Borough of Stockton, Hunterdon County
— Cliff Swallow community

Segment H & I: New Hope, PA to Washington Crossing, PA

New Jersey
Goat Hill, West Amwell Township, Hunterdon County
— biodiversity

Strawberry Hill, Hopewell Township, Mercer County
— biodiversity

Fisheries

American Shad (Alosa sapidissima) - considered one of the most important fish species in the Delaware River Basin (Angler Study) —NJT
Shortnose Sturgeon (Acipenser brevirostrum) — Federal E, PE, G3/S1
Striped Bass — NJT

Reptiles and Amphibians

Bog Turtle (Clemmys muhlenbergii) — Federal T, G4, NJE, PE
New Jersey Chorus Frog (Pseudacris feriarum kalmi) — PR, G4/S2,
Coastal Plain Leopard Frog (Rana utricularia) — PE, G5/S2
Red-bellied Turtle (Pseudemys rubriventris) — PT, G5/S2
Longtail Salamander (Eurycea logicauda) — NJT, G5/S2
Wood Turtle (Clemmys insculpta) — NJT, G5/S3

Mammals

Keen's Bat (Myotis keenii) — PR, inhabits parts of upper Bucks County in the river corridor vicinity
Small-footed Bat (Myotis leibeii) — PT, G3/S1 - inhabits the same locations as Keen's Bat
Northern Long-eared Bat (Myotis septentrionalis) — G4/S2

Birds

Vesper Sparrow (Pooecetes gramineus) — NJE, G5/S2
Cliff Swallow (Hirundo pyrrhonota) — NJT, G5/S2
Grasshopper Sparrow (Ammodramus savannarum) — NJT, G4/S2
Savanna Sparrow (Passerculus sandwichensis) — NJT, G5/S2
Bobolink (Dolichonyx oryzivorus) — NJT, G5/S2
Osprey (Pandion haliaetus) — NJT
Least Bittern (Ixobrychus exilis) — PT, G5/S2
Red-headed Woodpecker (Helanerpes erythrocephalus) — NJT, G5/S2
Peregrine Falcon (Falco peregrinus) — Federal E, PE, G3/S1
Bald Eagle (Haliaetus leucocephalus) — Federal E, NJE, G3/S1
Upland Sandpiper (Scolopacidae) — NJE

Characteristics Related to Bird Breeding and Migration

The Delaware River, located along the Atlantic Flyway, is one of four major waterfowl migratory routes in the U.S.

The Nockamixon Cliffs in upper Bucks County are a historic nesting site for the federally and state-endangered peregrine falcon (Falco peregrinus). They last nested there in the 1950's, but are again nesting along the Delaware River because of reintroduction efforts.

Bald eagles (Haliaeetus leucocephalus) use the river's shoreline and islands for roosting sites.

The state-endangered osprey (Pandion haliaetus) also appears to be making a comeback along the Delaware River as a result of a reintroduction program several years ago.

The least bittern (Ixobrychus exilis), a PA threatened species, breeds in upper Bucks County.

Recreation

The lower Delaware River is clearly a major recreational resource; however, to meet the criteria for an outstandingly remarkable resource, a recreational resource is defined as a state park or having a national designation.

New Jersey
Paulinskill Valley Trail - part of Kittatinny State Park **(Study Segments A & J)**
Delaware and Raritan Canal National Recreational Trail **(Study Segments G, H & I)**

Delaware and Raritan Canal State Park **(Study Segments G, H & I)**
Bull's Island State Park **(Study Segment G)**
Washington Crossing State Park **(Study Segment I)**

Pennsylvania

Delaware Canal National Recreational Trail **(Study Segments E, F, G, H & I)**
Delaware Canal State Park **(Study Segments E, F, G, H & I)**
Washington Crossing State Park **(Study Segment I)**
Ralph Stover State Park **(Study Segment M)**
Nockamixon State Park **(Study Segment M)**

Scenic

Many members of the Lower Delaware National Wild and Scenic River Study Task Force strenuously stress the scenic values of the lower Delaware River. However, scenic values are difficult to objectively define. Thus, to meet the criteria for an outstandingly remarkable resource, scenic value is defined by a state scenic by-way designation.

Scenic By-ways

New Jersey

Route 29 (NJ Scenic Byway — designation pending)

Pennsylvania

Route 32 (PA Scenic Road- designated 12/89) – from US Rt. 1 to Rt. 611 **(Study Segments E, F, G, H & I)**
Route 611 (PA Scenic Road- designated 12/89) – from Kintnersville to Rt. 209 **(Study Segment A. B, C, D)**

Cultural/Historic

Outstandingly remarkable cultural and historic resources for this study are defined as National Historic Districts and National Historic Landmarks.

Pennsylvania

Northampton County, Bucks County
Delaware and Lehigh Canal National Heritage Corridor and State Heritage Park **(Study Segment E, F, G, H & I)**

Bucks County
Tinicum Twp.
Uhlerstown Historic District **(Study Segment F)**
Point Pleasant Historic District **(Study Segment F)**
Ridge Valley Rural Historic District **(Study Segment L)**

Solebury Twp.
Lumberville Historic District **(Study Segment G & N)**
Centre Bridge Historic District **(Study Segment G)**
Phillips Mill Historic District **(Study Segment G)**
New Hope Historic District **(Study Segment H)**

Upper Makefield Twp.
Washington Crossing National Historic Landmark (upper tract) **(Study Segment I)**
Washington Crossing N.H.L. (Taylorsville) **(Study Segment I)**
Brownsburg Historic District **(Study Segment I)**

New Jersey

Warren County
Town of Belvidere
Belvidere Historic District **(Non-Study Segment)**

Hunterdon County, Mercer County
Delaware and Raritan Canal National Historic Landmark **(Study Segments G, H & I)**

Hunterdon County
Holland Township
Pursley's Ferry Historic District **(Study Segment E)**
Borough of Frenchtown
Frenchtown Historic District **(Study Segment F)**
Delaware Township
Prallsville Mills Historic District **(Study Segment G)**
City of Lambertville
Lambertville Historic District **(Study Segment H)**

Mercer County
Delaware and Raritan Canal National Historic Landmark **(Study Segment H & I)**
Hopewell Twp.
Titusville Historic District **(Study Segment I)**
Washington Crossing National Historic Landmark **(Study Segment I)**
Pleasant Valley Rural Historic District **(Study Segment I)**

Classification

Section 2(b) of the act requires that eligible river 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:

1) **Wild river areas** — Those 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.

2) **Scenic river areas** — Those that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.

3) **Recreational river areas** — Those areas 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 Findings

The entire study area, including all tributaries except the Tohickon Creek above Lake Nockamixon and the Smithtown Creek, meets the eligibility criteria. The lower Delaware River corridor exhibits exceptional natural, historic, scenic, and recreational values. The entire study corridor includes many outstandingly remarkable resources and is thus eligible for inclusion into the National Wild and Scenic Rivers System with classifications as outlined below.

The Mainstem of the Lower Delaware River

Each of the segments of the mainstem of the lower Delaware River, study segments A through I, are classified as recreational because each segment is readily accessible by road and/or contains some development along the shoreline.

Segment A: The segment from the Delaware Water Gap to the Toll Bridge connecting Columbia, NJ and Portland, PA
Classification: Recreational

Segment B: The segment from Erie Lackawanna Railroad Bridge to the southern tip of Dildine Island (approximately 3.6 miles, 5.8 km)
Classification: Recreational

Segment C: The segment from the southern tip of Mack Island to the northern border of the town of Belvidere, NJ (approx. 2 mi., 3.2 km)
Classification: Recreational

Segment D: The segment from the southern border of the town of Belvidere, NJ to the northern border of the city of Easton, PA, excluding river mile 196.0 to 193.8 (approx. 12.5 mi., 20.1 km)
Classification: Recreational

Segment E: The segment from the southern border of the town of Phillipsburg, NJ, to a point just north of Gilbert Generating Station (approx. 9.5 mi., 15.2 km)
Classification: Recreational

Segment F: The segment from a point just south of the Gilbert Generating Station to a point just north of the Point Pleasant Pumping Station (approx. 14.2 mi., 22.8 km)
Classification: Recreational

Segment G: The segment from the point just south of the Point Pleasant Pumping Station to a point 1000 feet north of the Route 202 bridge (approx. 6.3 mi., 10.1 km)
Classification: Recreational

Segment H: The segment from a point 1750 feet south of the Route 202 Bridge to the southern border of the town of New Hope, PA (approx. 1.9 mi., 3.0 km)
Classification: Recreational

Segment I: The segment from the southern boundary of the town of New Hope, PA to the town of Washington Crossing, PA (approx. 6 mi., 9.7 km)
Classification: Recreational

The Tributaries

Segment J: Paulinskill River in Knowlton Township — from the municipal border downstream to Brugler Rd. (approx. 2.4 mil., 3.8 km)
Classification: Recreational

Segment K: Cook's Creek (approx. 3.5 mi., 5.6 km) — Eligible
Classification: Scenic

Segment L: Tinicum Creek (approx. 14.7 mi., 23.7 km) — Eligible
Classification: Scenic

Segment M: Tohickon Creek (approx. 25.6 mi., 41.2 km)
Sub-Segment (1): Mainstem of the Delaware River to the Lake Nockamixon Dam - Eligible
Classification: Scenic

Sub-Segment (2): above the Lake Nockamixon Dam – Ineligible
The existence of the Lake Nockamixon Dam and the lake behind it makes this section of Tohickon Creek ineligible for inclusion into the National System. However, the lake and surrounding land is a state park and is thus protected as a recreational resource.

Segment N: Paunacussing Creek in Solebury Township (approx. 3 mi., 4.8 km)
Classification: Recreational

Segment O: Musconetcong
Nineteen of twenty municipalities along the Musconetcong River requested that it be added to Lower Delaware Wild and Scenic River Study. Therefore, the Musconetcong is being studied in a second phase and a separate recommendation will be issued at a later date.

Segment P: Lockatong and Wicecheoke Creeks
Delaware, Kingwood, Franklin, and Raritan townships recently passed resolutions requesting that these creeks be considered for Wild and Scenic River designation. To provide an adequate review of their eligibility and suitability, a separate recommendation will be presented at later date.

Segment Q: Smithtown Creek
Ineligible because no "outstandingly remarkable resource values" were identified.

Section IV:
The Lower Delaware River Management Plan — Summary

"It's special because it's the only major free-flowing river on the east coast . . . it provides drinking water for 22 million people, and in addition to being a political boundary, it's also a very lovely, peaceful place that's a vital resource to all of us ..."

David Ennis, New Jersey Conservation Foundation

Development of a River Management Plan is a required component of the Lower Delaware River Wild and Scenic River Study. The Management Plan recommends actions to maintain and improve the lower Delaware River, its tributaries and surrounding natural, historic and cultural resources. It provides for economic growth in a manner that does not adversely affect the region's exceptional river-related resources.

The Plan has been compiled by the Lower Delaware National Wild and Scenic River Study Task Force Management Plan Committee and Local Government Committee, with assistance from the National Park Service, Northeast Region. The Committee is chaired by James C. Amon, Executive Director, Delaware and Raritan Canal Commission, and is made up of regional, state, and local agency representatives, landowners, conservationists, business people, and other stakeholders in New Jersey and Pennsylvania. (See Appendix B)

Traditionally river management plans are prepared following Wild and Scenic River designation. However, given that no federal acquisition is planned and that protection remains primarly a local function it was necessary to prepare a plan first. This was necessary to get local concurrance for the management strategy and designation. Furthermore, the plan can be used to protect river related resources regardless of whether the river is designated.

The Management Plan and Local Government Committees have been collecting and analyzing information on a regular basis since 1994. All meetings have been open to the general public. Committee work has been supported by significant public and municipal involvement in the study process. Municipal and public workshops were conducted throughout the study corridor to solicit river-related issues, concerns, and management recommendations. A survey of all landowners along the river and the three original study tributaries was conducted to solicit opinions about river management. The Public Outreach Committee of the Study Task Force led the efforts to solicit

input. Background issues and recommendations were supplied by the Resource and the Economic Development committees. Individual profiles were prepared for each municipality in the study corridor detailing existing municipal resources and conservation programs. These efforts led to the development of the six major goals and specific policies and implementation strategies contained in the Plan.

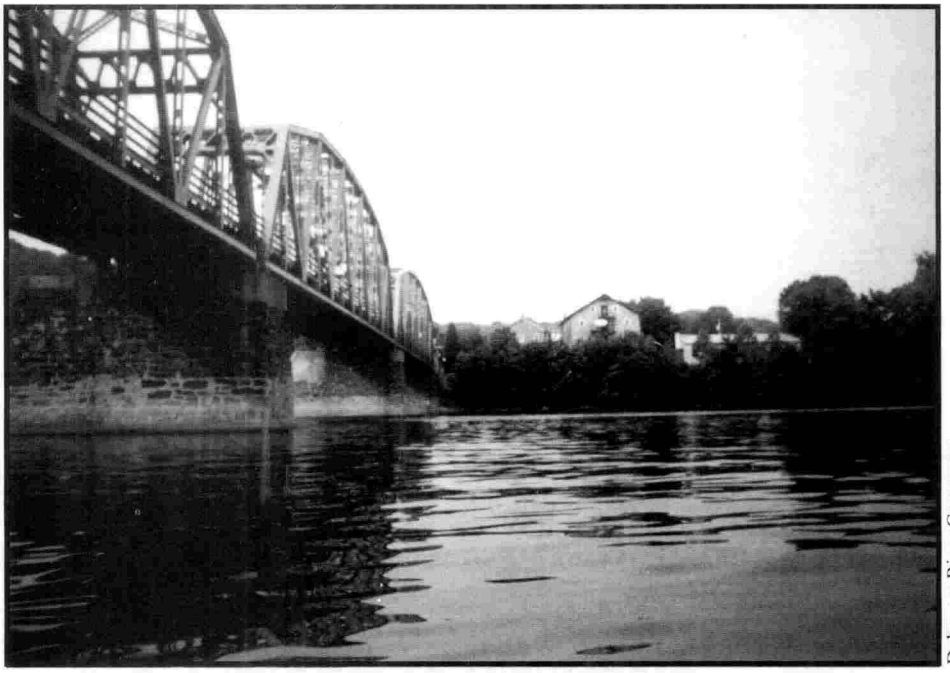
To assure the protection of important resources in the corridor, the Study Task Force concluded that the Management Plan should cover a broader reach of the lower Delaware than that included in the area considered for Wild and Scenic River designation. The Task Force decided that one management plan should be developed covering (1) areas eligible for Wild and Scenic designation, (2) the area south of Washington Crossing, PA, and (3) excluded sections. The Plan area generally follows the prominent ridge lines on both sides of the lower Delaware River between the Delaware Water Gap National Recreation Area and the Rancocas Creek in New Jersey and the Poquessing Creek in Pennsylvania (the southern boundary of Bucks County, Pennsylvania), extending further inland to encompass important corridor resources and eight tributaries: Cooks, Frya Run, Paunacussing, Smithtown, Tinicum and Tohickon creeks, and the Musconetcong and Paulinskill rivers. The boundary was drawn on the basis that this corridor most directly effects the scenic character and water quality of the river. The Plan Area lies in the states of New Jersey and Pennsylvania and includes six counties and fifty-eight municipalities, which represent a population in excess of 5 million.

Each level of government would retain its existing level of authority with or without National Wild and Scenic Rivers System designation. With designation, federal agencies are required to consider the values for which the river is designated and make decisions which are compatible with the plan. Since the plan was developed by local river interests and focuses on municipal implementation, it can be used with or without designation.

Non-regulatory programs existing in the Plan area provide important protection measures. These programs include the acquisition of land or easements by local and state governments and non-profit groups such as land trust organizations. Public education on the value of the river's resources and on ways individuals can act to preserve or enhance these resources is also of great value. Many environmental organizations maintain registers for landowners who do not want to give up any of

their rights to the land, but wish to voluntarily preserve its natural or historic resources and to receive help in that effort.

A wide range of federal, state and local regulatory programs provide varying degrees of resource protection in the lower Delaware River corridor. Some are very effective because they are based on well-founded laws, aggressively supported by the necessary finances, qualified personnel, and include education programs. Others lack these qualities and are therefore less effective. Local municipalities are a key to many of these regulatory programs even though enforcement originates from higher levels of government. They are close to areas where violations may be occurring and are intimately aware of local situations. Municipalities carry considerable persuasive weight with these regulatory agencies and are a key to bringing important facts to their attention. In addition, municipal land use regulations, stormwater management controls, and open space programs can provide further levels of resource protection.



Delaware River Greenway

Bridge over Delaware River at Milford, New Jersey

Management Goals

...a vision for the future of the river

The River Management Plan is directed to local governments, the states of New Jersey and Pennsylvania, federal agencies, regional commissions, private organizations, residents of the river corridor, river users, and others who care about the future of the river. The Plan does not contain a prescription for every situation that could confront river managers. Instead, it provides a vision for the future of the river and context for future action. The heart of that vision is expressed in the following six goals carefully crafted by the Management Plan Committee and the associated policies and implementation strategies.

Goal 1: Water Quality

Maintain existing water quality in the Delaware River and its tributaries from measurably degrading and improve it where practical.

Policies:

- Achieve the highest practical state and federal water quality designation for the river and its tributaries.
- Manage point discharge and storm water non-point runoff to minimize degradation of the river.
- Encourage the use of Best Management Practices in the agricultural areas within the river corridor to minimize water quality degradation from storm water runoff.
- Encourage the use of Best Management Practices for activities other than agricultural that could result in water quality degradation from storm water runoff.
- Discourage inappropriate development in floodplains, wetlands, steep slopes and buffer strips along the lower Delaware River and its tributaries.

Implementation Strategies:

General

- Pennsylvania's Department of Environmental Protection, New Jersey's Department of Environmental Protection, and the Delaware River Basin Commission should jointly develop a river corridor water quality management plan describing the highest level of water quality protection

consistent with the water quality goal of this Management Plan, and the monitoring, research, modeling and regulations needed to insure protection of that level of water quality.

- An enhanced water quality monitoring program should be implemented for the lower Delaware River and its tributaries under the leadership of the Delaware River Basin Commission.
- The regional cooperative environmental monitoring plan prepared for the Delaware Estuary Program should be expanded and adopted to cover the entire river corridor. The environmental monitoring plan is focused on the key areas of water quality, toxics, living resources, and habitat/land cover/land use.
- Sewage discharges from malfunctioning private or public sewage systems can severely impact water quality. The current system of monitoring septic/sewage systems should be improved and property owners should be educated.
- Education programs should be designed to educate the public to know that: 1) existing state and federal programs do not offer full protection of streams and rivers; 2) many of the serious impacts are the result of individual and community actions related to land use; 3) sewage discharges from malfunctioning private or public sewage systems can severely impact water quality; and 4) the use of best management practices can minimize pollution impact from sources such as pesticides, herbicides and fertilizers.
- The Natural Resources Conservation Service and appropriate state agencies should encourage farmers to develop farm management plans in accordance with best management practices.
- Periodic water quality announcements/advisories should be issued by DRBC.

Municipal

- Corridor municipalities should provide stream corridor preservation through preserving buffers, steep slopes, wetlands, floodplains, and woodlands that are a vital part of the ecosystem of the river corridor.
- Corridor municipalities should provide protection against non-point source pollution and provide for storm water management.

- Regional storm water management facilities should be developed and the use of other best management practices encouraged. Planning at the municipal, inter-municipal, and county levels should be encouraged in order to achieve regional management strategies.

Goal 2: Natural Resources

Preserve and protect the river's outstanding natural resources, including rare and endangered plant and animal species, river islands, steep slopes and buffer areas in the river corridor and along the tributaries.

Policies:

- Promote stream corridor preservation, as well as protection of steep slopes, floodplains and wetlands.
- Encourage the protection of river corridor resources while allowing property owners to utilize their land in ways that do not harm those valuable resources.
- Encourage the protection of significant natural resources in the corridor, including rare and endangered plant and animal species and significant wildlife habitats.

Implementation Strategies:

General

- Landowners will continue as the primary stewards of lands along the river. Long-standing traditions of private land ownership and diverse land uses are major factors in the character and quality of the river corridor. Landowners can fulfill their stewardship responsibility by taking an active interest in the river, expanding their knowledge of sensitive land management practices, and incorporating those practices into land management. Sensitive land management includes maintaining or re-establishing vegetative buffers along the river and tributaries and reducing or eliminating the use of fertilizers and pesticides on lawns.
- Watershed plans should be developed for each tributary in the study area under consideration for designation into the Wild & Scenic Rivers System.
- Native plant materials should be used in landscaping.

Municipal

- Corridor municipalities should provide stream corridor protection through preserving buffers, steep slopes, wetlands, floodplains, and woodlands that are a vital part of the ecosystem of the river corridor.
- Corridor municipalities should establish guidelines for natural resource preservation techniques, including cluster development.
- Corridor municipalities should establish environmental advisory councils or environmental commissions.
- Watershed plans should be developed for each tributary in the study area under consideration for designation into the Wild and Scenic Rivers System.

Goal 3: Historic Resources

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

Policies:

- Structures, districts or sites, including landscapes, that are listed on the State or National Register of Historic Places, or are eligible for such listing, are important to the character of the river corridor and should be preserved.
- Encourage communities and historical organizations to survey and, where appropriate, nominate historic buildings or districts for inclusion on the states and national registers of historic places.

Implementation Strategies:

General

- A corridor wide historic preservation plan should be developed that includes an inventory of historic resources and identifies appropriate protection measures.
- Residents and river users should be educated about the history of the region and the benefits of historic preservation, including the potential for increased property values from preservation.

Municipal

- Corridor municipalities should conduct inventories in order to identify the structures, districts or sites that are

eligible for inclusion on the State or Federal Registers of Historic Places.

- Corridor municipalities should preserve significant historic places by nominating them to state or national registers.

Goal 4: Recreation

Encourage recreational use of the river corridor that has a low environmental and social impact and is compatible with public safety, the protection of private property and with the preservation of natural and cultural qualities of the river corridor.

Policies:

- Establish publicly owned land which provides appropriate river access and support facilities for people pursuing recreational opportunities.
- Establish strict rules on excessively noisy, intrusive, reckless and environmentally harmful activities or vehicles in the river corridor, and promote enforcement of those rules by both states.
- Promote appropriate public access points with maps, guidebooks, signs, etc. to reduce recreational trespassers on private property.
- Lands with significant recreational value within the corridor should be publicly owned or protected by land trusts in order to facilitate public recreational use.

Implementation Strategies:

General

- State, county, municipal, and private entities should provide additional access sites to the river, particularly low-impact recreational activities that are environmentally suited to protecting the river and habitats. Suggestions include fishing, birding and wildlife observation, hiking, and canoe camping. All proposals for new recreational activities should be evaluated to determine impact upon the important resources of the study area. Suitable sites should be secured while opportunities remain.
- An analysis of river access needs should be conducted that facilitates officials at all levels to provide access, including funding information.

- The New Jersey Marine Police and the Pennsylvania Fish and Boat Commission should:
  - provide the police force necessary to enforce the rules governing recreational activity in the river corridor, particularly during peak periods of use on summer weekends.
  - work in partnership with personal watercraft retailers and manufacturers to encourage safe and courteous use of personal watercraft.
- Governmental entities at all levels and both sides of the river should adopt compatible rules governing recreational use of the river corridor. These rules should be in accord with the recreational goals and policies of the Management Plan.
- Watercraft licensing procedures should include training on the safe, courteous and environmentally sound use of watercraft.
- An effective enforcement policy should be developed and implemented to control watercraft uses to minimize excessive noise and speed, to eliminate potential collisions between river users, to discourage intimidation of non-power watercraft users and fisherman by power craft, to protect the environment, and to consider establishing designated areas for personal watercraft.
- A comprehensive interpretation plan for the entire lower Delaware River corridor should be developed that is compatible with the plan prepared for the Delaware and Lehigh Canal National Heritage Corridor. The plan will encourage the protection of resources, promote safe and courteous river use, and raise awareness of the value of the Delaware's resources.
- A Lower Delaware Region Workshop should be conducted for residents and commercial organizations impacted by watercraft use. Workshop participants should review regulations and make specific recommendations.

Municipal

- Corridor municipalities should provide additional access sites to the river.

Goal 5: Economic Development

Identify principles for minimizing the adverse impact of development within the river corridor.

Policies:

- Continued economic growth, new infrastructure, and the replacement, repair or expansion of existing infrastructure should occur in ways that minimize harmful impacts on the natural, cultural, recreational and scenic values of the river corridor and that are cost-effective.

Implementation Strategies:

Tourism

- An Economic Development Coordinating Committee should be established to assume responsibility for coordinating river festivals and events, educational programs and economic development opportunities.
- Coordination between chambers of commerce and economic development groups should be improved to attract tourists to area. Chambers should coordinate with government agencies and municipalities to promote recreational and tourist opportunities. Evaluate the need to organize a corridor-wide chamber of commerce.
- Opportunities should be identified for appropriate privately-owned tourism sites (wineries, microbreweries, bed and breakfasts, etc.)
- Interest by the public should be encouraged through re-enactments, especially at Washington Crossing.
- Existing activities that attract outside tourists should be encouraged, such as:
  Railroad excursions
  Trolley-type vehicles
  Additional tours to promote resources
  Ferry boat or river boat connections south of Trenton
- A view shed study should be conducted to identify significant views, areas in need of protection and protection measures. Maintain existing character and views of roadways where possible.
- The use of visual themes (signs, construction techniques, road patterns) should be investigated to develop a solid identity within the lower Delaware valley.

General

- Best Management Practices should be required for all industrial areas to protect the river's resources. Visual appearance of industrial areas should be improved to maintain scenic value of the corridor. Buffer zones between public facilities and the river should be encouraged.
- Public and private utility uses and rights-of-way should be concentrated to minimize impact.
- Reviews should be conducted to anticipate expansion needs with natural gas, electric, telecommunication, and other utility companies operating in the river corridor and develop a plan that allows those needs to be met in a manner that is compatible with the river corridor's resources and that is cost-effective.
- Expansion needs should be reviewed with with appropriate governmental entities regarding existing sewage authorities and anticipated new sewage treatment facilities to ensure compatibility with the goals of this plan.
- A system of evaluation for proposed projects throughout the corridor should be developed that identifies the impact on significant resources and compares the environmental impacts with the economic benefits.

Municipal

- Appropriate types of development should be identified that are sensitive to the important natural, historic, scenic and recreational resources.
- Corridor municipalities should assure that local zoning ordinances direct development to locations that are compatible with the river corridor's resources.
- Municipalities should report development plans to adjacent communities for review. A corridor-wide newsletter could be developed to inform municipal officials and residents about development proposals within the corridor.
- New industrial development should be encouraged to locate outside the immediate river corridor or be concentrated where such uses already exist or on sites of former industrial facilities.
- Municipal, county and state departments of highways and transportation should assure that new or improved roads in the river corridor will be compatible with the river corridor's resources and that the construction techniques used will reduce the impact of storm water runoff on the water quality.

Goal 6: Open Space Preservation

Preserve open space as a means of maximizing the health of the ecosystem, preserving scenic values, and minimizing the impact of new development in the river corridor.

Policies:

- Lands within the river corridor that have special environmental or scenic value and significant agricultural lands should be permanently preserved by private programs, individual landowners and public ownership in fee or easement as appropriate to assure their ability to continue to offer scenic benefits.

Implementation Strategies:

General

- The New Jersey Green Acres program is designed to use public funds for direct State acquisition, as a grant and loan mix for county and municipal acquisition, and as a 50% matching grant for acquisition by private, non-profit land trusts. The New Jersey side of the river corridor should be surveyed to determine which pieces of land should be in public ownership and which public or private entity would be most likely to work with the Green Acres program.
- The Pennsylvania Rivers Program, Department of Environmental Protection and Pennsylvania Key 93 Municipal Assistance Program provide direct assistance to municipalities for the acquisition and development of open space, river conservation and recreation projects. A determination needs to be made of the priorities for land acquisition, and appropriate funding provided for land protection.
- Private land trusts should identify and protect lands in the corridor with significant resource value.
- The state coastal zone management should give priority to land protection within those coastal areas that lie in the river corridor.
- The state farmland protection programs should give priority to the protection of agricultural lands in the river corridor.

"A river, a lake, a cliff... if inhabitants of a town were wise, they would seek to preserve these things ... for such things educate."

Henry David Thoreau, 1861

- Farmland should be taxed on the basis of its value for the production of agricultural products, not on its fair market value that includes its value for development.
- Establish Agricultural Security Areas or Agricultural Development Areas.
- Education programs should be offered to landowners, developers, and professionals such as tax attorneys and real estate brokers regarding land and resource protection, and opportunities for conservation easements and land preservation. Methods such as notices in utility bills and IRS mailings could be used.
- Significant unprotected, undeveloped lands within the corridor should be permanently protected with priority given to highly visible, potentially developable tracts, and to the cliff areas that contain rare plant species.
- Encourage the acquisition of easements for development rights on agricultural lands by land trusts and government agencies.

Municipal

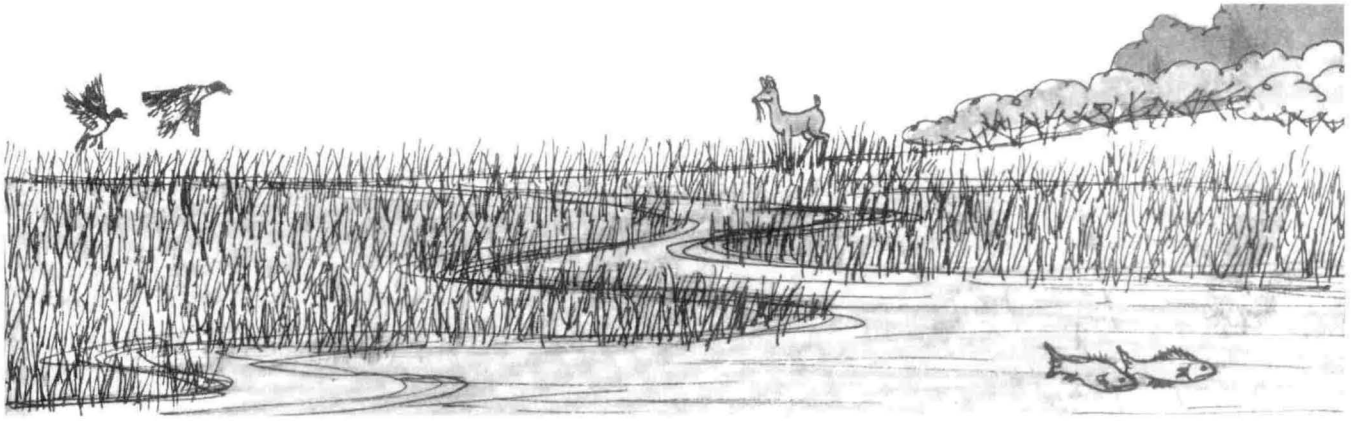
- Corridor municipalities should identify and protect lands in the river corridor with significant resource value through direct acquisition, establishment of agricultural security areas, conservation easements, TDR's, and educational programs for landowners.

Education and Outreach

Landowners will continue as the primary stewards of lands along the river. Actions of residents throughout the Delaware River Watershed have direct impacts upon the river. As such they cannot be neglected as components of a river management strategy. Landowners, both residential and commercial, need to know about the river's important resources and to understand what they can do to enjoy and protect them. The long-term success of this management plan is dependent on: well-informed citizens and landowners who work to achieve the objectives of the plan at home and within their communities; and environmentally aware children and young people who will provide the next generation of leadership and stewardship for the watershed.

Implementation Strategies:

- The Delaware River Greenway Partnership should take the lead in implementing an education and outreach program, and all the parties to the Management Plan will have roles to play in it. Local and regional school systems will be enlisted as major participants in the educational program. Municipalities, park systems and interpreting institutions will help bring river-related issues to the attention of the public.
- Increase general awareness of the river and its tributaries.
- Residents should be made familiar with best land management practices to protect and enhance the resources of the Delaware River and tributaries.
- A sense of the Delaware Watershed as a "community" and watershed pride by residents and local officials should be fostered.
- Instill in school children a sense of stewardship and pride in the Delaware Watershed through development of school curricula.
- A comprehensive interpretation plan for the entire lower Delaware River corridor is needed that is compatible with the plan prepared for the Delaware and Lehigh Canal National Heritage Corridor. The plan will encourage the protection of resources, promote safe and courteous river use, and raise the awareness of the value of the Delaware River's resources.



Summary of Recommendations for Local Governments

Local support 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 of actions to maintain and improve the lower Delaware River and its tributaries is needed to achieve designation of eligible segments and tributaries as a National Wild and Scenic River.

Local support is an important part of a cooperative effort involving private landowners and groups as well as all levels of government.

The River Management Plan, as summarized below, recognizes that local governments hold the key to successful river conservation.

- *Goals*

  Endorse the Goals of the Lower Delaware River Management Plan and support designation as a National Wild and Scenic River; agree to take action to address these goals.

- *Comprehensive Planning*

  Incorporate goals of Lower Delaware River Management Plan into Comprehensive Plan.

  Conduct a Natural Resource Inventory to identify important resources.

  Consider natural and river resources in recommendations for type, location, and intensity of land uses specified by the community's comprehensive plan.

- *Zoning and Other Regulations*

  Consider regulations to protect floodplains, steep slopes, wetlands, river corridor buffers, and outstandingly remarkable resources.

  Consider regulations that guide development so that land uses will have minimal effects on the river and tributaries by controlling what types of activities are permitted and in what locations.

  Enact regulations to control how development occurs: minimize adverse effects of stormwater runoff and soil and vegetation disturbance.

  Each municipality should establish an Environmental Advisory Council/Environmental Commission as official bodies of local government to advise local officials and planning commissions on environmental issues, including:

  - leading the development of environmental resource inventories
  - providing an important source of expertise with regard to environmental impacts of various types of development

Valuable River Resources

Proper management of the Delaware River and tributary streams, and the lands along them, serves multiple objectives.

- **protection of people and property from flooding**
- **protection of water quality**
- **protection of fish and wildlife habitat**
- **promotion of scenic and recreational values**
- **enhancement of economic conditions by reducing costly hazardous activities and by encouraging river-based economic activities**

- educating citizens of their community about environmental issues and importance of the Delaware River as a vital resource and generating support for its protection.

Protecting the Resources–The Landowner Role

Individual initiative can make a tremendous difference in the health of the Delaware River and tributaries. The Delaware and tributaries will benefit from the voluntary action of landowners for stream protection by reducing soil erosion, stabilizing stream banks, enhancing natural areas and habitat, improving water quality, and reducing flood potential.

Forested riparian buffers are extremely important to maintaining the health of a stream. Naturally vegetated stream corridors provide food, nesting areas, and migration routes for a variety of wildlife. Forested and wetland buffers remove nutrients from run-off while trapping sediment. This is especially important in farming communities where filter strips protect water quality.

There are many proper management techniques landowners can practice for riparian lands, including:

- placing conservation easements, especially in the floodplain and for wetlands
- not dumping materials into the stream or onto the floodplain, including yard debris, trash, etc.
- not mowing or cutting vegetation to the water's edge
- avoiding cultivation or grazing on the water's edge
- allowing a forested buffer to grow along the river/stream
- using native plants in landscaping
- limiting impervious surfaces
- moving livestock away from the stream and fencing waterways
- minimizing use of pesticides, herbicides, and fertilizers
- minimizing groundwater use and avoiding landscaping that requires irrigation systems
- participating in water quality monitoring programs
- minimizing use of hazardous products

"Scenic beauty, wildlife habitat and overall atmosphere of the region are the three most important qualities of the area."

Quote from Landowner Survey

Long Term Management

To assure implementation of the River Management Plan, the creation of a management committee and a citizens advisory committee, coordinated by the Delaware River Greenway Partnership, is recommended. An underlying principle in this recommendation is that existing institutions and authorities provide the foundation for the long-term protection of the Lower Delaware River and tributaries.

A multiple partnership model is needed to coordinate river management activities, minimize regulation and service duplication, and minimize cost, while protecting river resources. The breadth of issues, political jurisdictions, and resources suggests that no single agency can adequately implement the River Management Plan. This partnership model: 1) brings the major players in river management together on a regular basis, 2) stimulates cooperation and coordination among the players, 3) provides a forum for all river interests to discuss and resolve issues, and 4) coordinates implementation of the management plan.

The Management Committee

"Never doubt that a small group of thoughtful, committed citizens can change the world. Indeed, it's the only thing that ever has."

Margaret Mead

The purpose of the Lower Delaware Management Committee is to remind participating agencies of the plan goals, provide oversight and guidance to participating agencies, and through those agencies to other organizations. It is not to assume any regulatory functions. Meetings are to be structured around the goals, open to anyone, and to have agendas and notices provided in advance. Activities of the committee will be coordinated by the Delaware River Greenway Partnership.

The functions of the committee include: prioritizing goals; setting timetables; providing education on river management actions; acting as a watch dog/sheep dog; encouraging other agencies to adopt the plan goals; tracking activity in the river corridor and acting as an information clearinghouse across political boundaries; providing technical assistance; and updating the plan (at least every 5 years).

The committee membership will include representatives of the municipalities, watershed associations, counties, the Delaware River Basin Commission (DRBC), the Delaware River Greenway Partnership (DRG), the State of New Jersey (DEP), the Commonwealth of Pennsylvania (DCNR, DEP, Fish & Boat Commission), the Delaware & Lehigh Canal National Heritage Corridor Commission, and the National Park Service.

"What you do upriver is going to affect people downriver...what we do is going to affect people not just in our area, not just in our time, but in future generations..."

Jeffrey Marshall, Heritage Conservancy

Each partner organization is responsible for broad resource or issue areas related to their existing responsibilities. They remain responsible for the functions they already have as determined by law, regulation, or charter. As a member of the committee they are responsible for working with their existing partners, including state and federal agencies, and educating those partners about the goals in the management plan. The roles of the partner organizations in relation to management plan implementation are:

Delaware River Greenway Partnership: Land use and open space preservation issues - Education and outreach - Municipal contacts and notification - Bi-annual river management report - Coordinate partner issues (government, business, non-profit) - Lead contact for river concerns - Convenes Management and Citizen Committees.

Delaware River Basin Commission: Water quality and flow management and regulation - Biological issues (i.e., fisheries).

Municipalities: Land use regulation and protection - Recreation & access - Water quality. Day to day, the municipalities, as land use regulators, assume the key role in the implementation of the Management Plan.

Watershed Associations: Stream conservation - Stream Planning - Advocacy - Landowner and stream user education.

States of NJ and PA: Resource Protection - Scenic Byways - Grants and technical assistance - Recreation & access - Open Space - Visitor services and facilities.

Counties: Warren, Hunterdon, Mercer, Burlington, Northhampton, Bucks: Land use review and assistance - Recreation, access, open space - Planning support.

Delaware & Lehigh Canal National Heritage Corridor Commission: Resource protection - Resource interpretation - Land use planning assistance - Economic development enhancement.

National Park Service: Recreation, historic & tourism coordination - Coordination with federal agencies - Visitor services and facility development - Resource protection - Section 7, Wild and Scenic Rivers Act Review (insuring consistency at the federal level through its authority under the Act) - Interpretive planning - Financial assistance for management plan implementation by municipalities.

"One of the finest, best, and pleasantest rivers in the world."

Henry Hudson said of the Delaware

If the lower Delaware River is included in the Wild and Scenic Rivers System, the NPS will enter into a formal agreement(s) with member organizations pursuant to Sec. 10(e) and/or Sec. 11(b)(1) of the 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 lower Delaware River.

In addition, it is recommended that the Governors of New Jersey and Pennsylvania issue executive orders requiring state agencies to act in consistence with t he goals of the Lower Delaware River Management Plan should the river and tributaries be designated.

Citizens Advisory Committee

This provides a forum for landowners and the general public to speak openly regarding any river corridor issue, to advocate any position, and to provide advice to river management agencies. Landowners and other river users are very important to meeting the goals of the Management Plan. Individual decisions regarding such crucial actions as maintaining stream buffers have a significant cumulative impact upon water quality and habitat.

Activities of the Citizens Advisory Committee will be coordinated by the Delaware River Greenway.

Administration

Although this model is intended to be cost effective and simple, success requires adequate funding and staffing and formalization of the coordination arrangement. Management Committee member roles and responsibilities will be defined by a Memorandum of Understanding. Funding will be provided through the National Park Service for NPS and DRG management activities that are assumed beyond their existing management functions and to provide assistance to municipalities for implementation of management plan recommendations. This is a small investment to assure protection of nationally significant resources.

Estimated initial annual National Park Service expenditures for management of the lower Delaware River include:

• NPS Staffing and expenses		$ 120,000
• Cooperative Agreement for Delaware River Greenway coordination activities		
• Staffing	$ 120,000	
• Space, equipment, supplies, travel	$ 15,000	
Subtotal		$ 135,000
• Financial assistance for municipalities for management plan implementation		$ 60,000
• Develop and distribute interpretive/ educational brochure		$ 35,000
TOTAL		$350,000

Section V: Suitability

This chapter describes the study's findings relative to Section 4(a) of the Act, which requires the study report to detail the river's suitability for designation into the National Wild and Scenic Rivers System.

Suitability Criteria

A river's suitability for wild and scenic designation is a matter of whether it is free-flowing and contains outstandingly remarkable resources, whether designation makes sense, and whether designation provides lasting protection. For rivers such as the lower Delaware that flow through predominately private lands, federal land acquisition may not be an appropriate protective measure. Thus, protection must rely on a combination of federal, state, local, and private resource protection actions. If designation is to be effective, the non-federal entities must support and be committed to the implementation of any necessary resource protection measures.

For the lower Delaware River, the criteria used to assess suitability is:

1. Is there local support for designation of the river and implementation of the River Management Plan?

This support was determined primarily by municipal agreement to adopt the goals of the Management Plan and support for national designation of the river. To date 24 of the 37 municipalities in the area under consideration for designation (not counting the Musconetcong River communities) have passed resolutions of support. In addition, twenty-seven municipalities passed resolutions asking that the Musconetcong and Paulinskill rivers, Frya Run, and Smithtown, Paunacussing, Lockatong, and Wickecheoke creeks, be added to the study area.

89.9% of survey respondents said they support land use regulations and programs to conserve and protect the river.

Public workshops and the Landowner Survey Report document strong support for preserving the river's natural, historic, and recreational resources. Survey respondents listed scenic beauty, wildlife habitat, and overall atmosphere of the region as the three most important qualities of the area (see Appendix A). In fact, 89.9 percent of those who returned surveys said they would support land use regulations and programs to conserve and protect the river. Eighty-eight

percent of the respondents said they support an overall conservation plan for the river.

2. How adequate are existing protection measures (including state and local resource protection laws, zoning, and land ownership) in conserving the river's outstanding resources and free-flowing character?

Two reports document the significant resource protection provided by the existing municipal land use control, the states of New Jersey and Pennsylvania, and the Delaware River Basin Commission. The Municipality Surveys provide a town-by-town description of land use and zoning regulations. The River Management Plan describes the regulatory and non-regulatory programs by the states, the Delaware River Basin Commission, federal agencies, and non-profit organizations. Further, the plan documents the publicly held land that protects important river-related resources, such as the two canal state parks that parallel the river.

3. Can a resource protection and management framework be developed that closes any resource protection gaps without relying on federal land acquisition and that facilitates communication and cooperation among governmental entities and private citizens who bear responsibility for implementing all river protection measures?

The River Management Plan that is summarized in Section IV provides the framework for enhanced resource protection and greater cooperation between resource management entities. This is accomplished in part through voluntary adoption of the six river management goals and through creation of a River Management Committee under direction of the existing Delaware River Greenway Partnership. By establishing the River Management Committee that will include representatives of all entities responsible for ongoing resource protection, the Plan ensures that future management decisions will be based on resource protection objectives that satisfy the Wild and Scenic Rivers Act mandate to protect and enhance the river's outstanding values. Federal designation will encourage enhanced coordination between two states, six counties, and fifty-seven municipalities. Further, most of the river corridor above the study area is already part of the National Wild and Scenic Rivers System.

Suitability Finding

All study segments under consideration for designation, except for Tohickon Creek above Nockamixon Dam, are eligible for designation into the National Wild and Scenic Rivers System. The following segments are suitable and recommended for national designation:

Segment D: The portion of this segment starting at river mile 193.8 to the northern border of the city of Easton, PA (approx. 10.5 mi., 16.9km)

Segment F: The segment from a point just south of the Gilbert Generating Station to a point just north of the Point Pleasant Pumping Station (approx. 14.2 mi., 22.8 km)

Segment G: The segment from the point just south of the Point Pleasant Pumping Station to a point 1000 feet north of the Route 202 bridge (approx. 6.3 mi., 10.1 km)

Segment H: The segment from a point 1750 feet south of the Route 202 Bridge to the southern border of the town of New Hope, PA (approx. 1.9 mi., 3.0 km)

Segment I: The segment from the southern boundary of the town of New Hope, PA to the town of Washington Crossing, PA (approx. 6 mi., 9.7 km)

Segment L: Tinicum Creek (approx. 14.7 mi., 23.7 km)

Segment M: Tohickon Creek from the Lake Nockamixon Dam to the Delaware River (approx. 10.7 mi., 17.2 km)

Segment N: Paunacussing Creek in Solebury Township (approx. 3 mi., 4.8 km)

The following segments are not suitable because not each municipality on both sides of the river has yet passed a resolution supporting designation. It is recommended that designation be granted if municipal resolutions from the communities on both sides of the river segment are passed in the future.

Segment A: The Segment from the Delaware Water Gap to the Toll Bridge connecting Columbia, NJ and Portland, PA

Segment B: The segment from Erie Lackawanna Railroad Bridge to the southern tip of Dildine Island

Segment C: The segment from the southern tip of Mack Island to the northern border of the town of Belvidere, NJ

Segment D: The portion of this segment from the southern border of the town of Belvidere, NJ to river mile 196.0

Segment E: The segment from the southern border of the town of Phillipsburg, NJ, to a point just north of Gilbert Generating Station (approx. 9.5 mi., 15.2 km)

Segment J: Paulinskill River in Knowlton Township

Segment K: Cook's Creek from Springfield/Durham townships' border to the Delaware River

Segment O: Musconetcong

Nineteen of twenty municipalities along the Musconetcong River requested that it be added to the Lower Delaware Wild and Scenic River Study. Given that the Musconetcong is the largest tributary to the Delaware River in New Jersey and the number of communities affected, it is being studied in a second phase and a separate recommendation will be issued at a later date.

Segment P: Lockatong and Wicecheoke Creeks

Delaware, Kingwood, Franklin, and Raritan townships recently passed resolutions requesting that these creeks be considered for Wild and Scenic River designation. To provide an adequate review of their eligibility and suitability a separate recommendation will be presented at a later date.

Recommended Boundary

Section 7(a) of the Wild and Scenic Rivers Act prohibits federal authorization of any water resources project that would have an adverse impact on the values for which the river is designated. For the purposes of administering Section 7 of the Act regarding actions of the federal government, the Study Task Force recommends that a formal boundary be established within one-quarter mile from the ordinary high water mark on each side of the suitable river segments.

APPENDIX A

Public Support for River Corridor Protection

The successful implementation of the Management Plan is dependent upon the cooperation of local government officials and landowners in the study area. As a means of soliciting opinions about the management of the river and informing residents of the efforts to conserve the river-related resources in their communities, a survey was conducted in early 1994. Under the auspices of the Northeast Field Area of the National Park Service, the survey was prepared by the Lower Delaware National Wild and Scenic River Study Task Force in cooperation with the Delaware River Greenway partnership hosted by the Heritage Conservancy.

Methodology

The survey was mailed to 2,980 landowners with property fronting on the Delaware River within the study area and on Tinicum and Tohickon Creeks. Names and addresses were obtained from property tax records for the municipalities adjoining the River and the aforementioned Creeks. The mailing contained a cover letter explaining the purpose of the survey, a questionnaire booklet which contained 15 multiple choice questions and a summary of the legislative history, the Wild and Scenic Rivers Act and the steps being taken to implement the study.

Of the 2,980 surveys, 76 were undeliverable. Of the remaining 2,904 legitimate surveys, 617 were returned, representing a response rate of 21.2 percent. Thirty percent (187) of the respondents identified themselves a living in New Jersey. Sixty-eight percent (394) claimed Pennsylvania residency. The remainder did not identify their state of residence.

Findings

The tabulated results indicate that there is strong support for preserving the river's natural, historic, and recreational resources. Respondents listed scenic beauty, wildlife habitat, and overall atmosphere of the region as being the three most important qualities of the area. In fact, 89.9 percent of the respondents said they would support land use regulations and programs to conserve and protect the river.

While 87.7 percent want to discourage aggressive development of the corridor, 27.1 percent of the respondents do not want any conservation effort that restricts residential, commercial or industrial growth. As one respondent said, "Today's planning should provide choices for private and public use in the future."

Conservation

Well over 90 percent of the respondents think the existing qualities and characteristics of the lower Delaware River area should be preserved. Among these are water quality (98 percent support), undeveloped land (95 percent), farmland and farming (93 percent), forested land (96 percent), historic resources (97 percent), rural character (98 percent), scenic character (99 percent), and wildlife habitat (98 percent).

Over three-quarters (88 percent) of the individuals said they would support an overall conservation plan for the river.

Recreation

Respondents participate in a variety of recreational activities on and along the lower Delaware River. The most popular pursuits include fishing (80 percent), boating (75 percent), swimming (71 percent), and observing nature (65 percent).

Recreation is what brought and holds many residents to the area. Over half of the respondents (57 percent) said they chose to own property on the waterfront because of river-related recreation.

Management

Almost half (48 percent) of the residents who responded feel that the government is not doing an adequate job of managing the river area. However, over a third (36 percent) had no opinion on this matter.

When asked who should be responsible for conserving the natural, historic, and recreational resources on the lower Delaware River, there was no clear consensus. A third (34 percent) of the respondents think a coalition of public and private organizations should be responsible. Slightly more than a quarter (27 percent) think management should remain in the control of landowners only, and 22 percent believe that either the state government or the federal government should have oversight.

APPENDIX B

LOWER DELAWARE RIVER WILD & SCENIC MANAGEMENT PLAN COMMITTEE MEMBERS

JANUARY 1997

DAMON AHERNE

RICHARD ALBERT
DELAWARE RIVER BASIN COMMISSION

JIM AMON
DELAWARE & RARITAN CANAL COMMISSION

MICHELLE HENKIN BADE

FREDERIC H BROCK
LEHIGH-NORTHAMPTON JOINT PLANNING COMMISSION

TERRY BROWN

MAYA VANROSSUM
DELAWARE RIVERKEEPER NETWORK

DAVE BURD
MERRILL CREEK RESERVOIR

WILLIAM COLLINS
COLLINS DESIGN & CONSTRUCTION

ROB COSTAGNA

THOMAS DALLESSIO
NJ STATE PLANNING COMM

DONALD DREESE
PA DEPT. OF CONSERVATION & NATURAL RESOURCES

LINDA MEAD
HERITAGE CONSERVANCY
DELAWARE RIVER GREENWAY

JEFF GOLDMAN
PECO ENERGY CO

RALPH HARNER
MET-ED

NANCY B. JONES
BUCKS COUNTY AUDOBON SOCIETY

JOHN MACFARLAND

CHRISTIAN R. NIELSON

TISHA PETRUSHKA

JOSEPH M PYLKA

PATRICIA QUINBY
DELAWARE & RARITAN GREENWAY

CHRIS ROBERT
DELAWARE RIVER BASIN COMMISSION

WILLIAM ROCKAFELLOW

JEAN SHADDOW
DEPT OF REC, NAT RES & CULTURE

BILL SHARP
NATIONAL PARK SERVICE

VAL SIGSTEDT

ROBERT STANFIELD
TINICUM CIVIC ASSOCIATION

RODNEY STARK
PECO ENERGY

STANLEY STETTZ

ROBERT STOKES
BUREAU OF RECREATION
NJ DEP GREEN ACRES

CAROLINE ARMSTRONG
HUNTERDON CO PLANNING BOARD

RON TINDALL
PLANNER

CELESTE TRACY
OFFICE OF NATURAL LAND MANAGEMENT, NJ DEPT. OF ENVIRONMENTAL PROTECTION

PAMELA VINICOMBE
MERCER COUNTY PLANNING DIVISION

BRUCE WALLACE
TINICUM CREEK WATERSHED ASSOCIATION

LORI HIXON
GPU GENERATION

KATHY WANNEMACHER
DELAWARE RIVER GREENWAY HERITAGE CONSERVANCY

ERIC MOYER
MET ED/PENELEC

KENNETH G. ZINIS
HOFFMANN-LA ROCHE INC.

JOHN BOOSER
PA DER

DAN LONGHI

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APPENDIX C

One Hundred Second Congress of the United States of America

AT THE SECOND SESSION

Begun and held at the City of Washington on Friday, the third day of January, one thousand nine hundred and ninety-two

An Act

To amend the Wild and Scenic Rivers Act

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. WILD AND SCENIC RIVER STUDY.

(a) STUDY — Section 5(a) of the Wild and Scenic Rivers Act (16 U.S.C. 1276(a)) is amended by adding at the end thereof the following new paragraph:

"( ) DELAWARE RIVER, PENNSYLVANIA AND NEW JERSEY.

"(A) The approximately 3.6-mile segment from the Erie Lackawanna Railroad Bridge to the southern tip of Dildine Island.

"(B) The approximately 2-mile segment from the southern tip of Mack Island to the northern border of the town of Belvidere, New Jersey.

"(C) The approximately 12.5-mile segment from the southern border of the town of Belvidere, New Jersey, to the northern border of the city of Easton, Pennsylvania, excluding river mile 196.0 to 193.8.

"(D) The approximately 9.5-mile segment from the southern border of the town of Phillipsburg, New Jersey, to a point just north of the Gilbert Generating Station.

"(E) The approximately 14.2-mile segment from a point just south of the Gilbert Generating Station to a point just north of the Point Pleasant Pumping Station.

"(F) The approximately 6.5-mile segment from a point just south of the Point Pleasant Pumping Station to the north side of the Route 202 bridge.

"(G) The approximately 6-mile segment from the southern boundary of the town of New Hope, Pennsylvania. to the town of Washington Crossing, Pennsylvania.

"(H) The Cook's Creek tributary.

"(I) The Tinicum Creek tributary.

"(J) The Tohickon Creek tributary."

(b) ELIGIBILITY STUDY AND REPORT. —Section 5(b) of the Wild and Scenic Rivers Act, as amended, (16 U.S.C. 1276(b)) is amended by adding at the end the following new paragraph:

"(11)(A) The study of the Delaware River segments and tributaries designated for potential addition to the National Wild and Scenic Rivers System pursuant to section 5(a) of this Act shall be completed and the report submitted to Congress not later than one year after the date of enactment of this paragraph.

"(B) The Secretary shall—

(i) prepare the study in cooperation and consultation with appropriate Federal, State, regional. and local agencies, including but not limited to, the Pennsylvania Department of Environmental Resources, the New Jersey Department of Environmental Protection and Energy, the Delaware and Lehigh Navigation Canal National Heritage Corridor Commission, and the Delaware and Raritan Canal Commission; and

"(ii) consider previous plans for the protection of affected cultural, recreational, and natural resources (including water supply and water quality) and existing State and local regulations, so as to avoid unnecessary duplication.

"(C) Pursuant to Section 11(bl) of the Act, the Secretary shall undertake a river conservation plan for the segment of the Delaware River from the northern city limits of Trenton, New Jersey, to the Southern boundary of Bucks County, Pennsylvania."

(c) EXISTING FACILITIES AND POSSIBLE ADDITIONS THERETO. — The study of the river segments and tributaries designated for potential addition to the National Wild and Scenic Rivera System under subsection (a) shall not be used in any preceding or otherwise to preclude, prevent, restrict, or interfere with the completion, continued or changed operation, maintenance, repair, construction, reconstruction, replacement, or modification of the Gilbert Generating Station and associated facilities, the Point Pleasant Pumping Station and associated facilities, the Portland Generating Station and associated facilities, the Martins Creek Steam Electric Station and associated facilities, or the Merrill Creek Reservoir Project and associated facilities, or with the licensing, permitting, relicensing, *or* repermitting of such projects, stations, and associated facilities. Such study designation shall not preclude or interfere with the licensing, permitting, construction, operation, maintenance, repair, relicensing, or repermitting of any additions to any such facilities, so long as such additions are outside the segments of the Delaware River designated for study by subsection (a) and impounded backwater from any such addition does not intrude on any such segment, and so long as the values present in such segments on the date of enactment of this Act are not unreasonably diminished thereby.

(d) TRANSMISSION AND DISTRIBUTION FACILITES. —The study of the river segments and tributaries designated for potential addition to the National Wild and Scenic Rivers System under subsection (a) of this Act shall not be used in any proceeding or otherwise to preclude, prevent, restrict, or interfere with the present or future access to or operation, maintenance, repair, construction, reconstruction, replacement, or modification of electric or gas transmission or distribution lines across or adjacent to such segments, or with the licensing, permitting, relicensing, or repermitting of such lines across such segments: *Provided, however,* that during the study of such segments, each new electric or gas transmission or distribution line across any such segment shall be located no further than 1/2 mile from the center line of any transmission or distribution line across any such segment in existence on the date of enactment of this Act.

(e) AUTHORIZATION OF APPROPRIATIONS. —There are authorized to be appropriated such sums as are necessary to carry out this section.

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This report does not necessarily reflect the opinion of the U.S. Department of the Interior or the National Park Service

APPENDIX D

Environmental Assessment

Summary

I. Purpose and Need
II. Alternatives
III. Affected Environment
IV. Impacts
V. Consultation, Coordination, Public Involvement

I. Purpose and Need for Action

A. Purpose

The purpose of this document is to provide a basis for the National Park Service and its partners to:

1. Determine if the suitable sections of the lower Delaware River and associated tributaries (Paulinskill River in Knowlton Township, Cook's Creek, Tinicum Creek, Smithtown Creek, Tohickon Creek, and Paunacussing Creek) should be added to the National Wild and Scenic Rivers System
2. Determine the best long term conservation strategy for the river corridor from the Delaware Water Gap to the Rancocas and Poquessing creeks.

Public Law 102-460 amended the Wild and Scenic Rivers Act of 1968 to require study of the lower Delaware River for possible designation as a Wild and Scenic River and the development of a river conservation plan, hereafter referred to as the Lower Delaware River Management Plan.

The Wild and Scenic Rivers Act (Public Law 90-542, as amended), passed in 1968, establishes a framework whereby the nation's outstanding rivers and streams may be permanently protected for the benefit and enjoyment of present and future generations. Congress declared that "the established national policy of dam and other construction...needs to be complemented by a policy that would preserve other selected rivers, or sections thereof, in their free-flowing condition to protect the water quality of such rivers and to fulfill other vital national conservation purposes." These selected rivers collectively form the National Wild and Scenic Rivers System.

B. Need

The primary need for the study, as determined by the legislative mandate, the direction set by the Lower Delaware National Wild and Scenic River Study Task Force, and established policy for wild and scenic studies of "private lands" rivers, is to assist local communities in preparing and implementing a river conservation plan that protects the special qualities of the lower Delaware River. The following six goals were set through the study process to direct the decision for designation and the creation of implementation strategies for river conservation:

- Goal 1: Water Quality
  Maintain existing water quality in the Delaware River and its tributaries from measurably degrading and improve it where practical.

- Goal 2: Natural Resources
  Preserve and protect the river's outstanding natural resources, including rare and endangered plant and animal species, river islands, steep slopes and buffer areas in the river corridor and along the tributaries.

- Goal 3: Historic Resources
  Preserve and protect the character of historic structures, districts and sites, including landscapes, in the river corridor.

- Goal 4: Recreation
  Encourage recreational use of the river corridor that has a low environmental and social impact and is compatible with public safety, the protection of private property and with the preservation of natural and cultural qualities of the river corridor.

- Goal 5: Economic Development
  Identify principles for minimizing the adverse impact of development within the river corridor.

- Goal 6: Open Space Preservation
  Preserve open space as a means of maximizing the health of the ecosystem, preserving scenic values, and minimizing the impact of new development in the river corridor.

The lower Delaware River flows through the heart of the birthplace of our nation. Every bend in the river speaks of history, of beauty, of opportunity. Its free-flowing water nourishes human inhabitants as it has for over twelve thousand years. Our nation's history is revealed in the agricultural fields, forests, canals, villages, mills and inns along its path. Diverse flora and fauna thrive on its banks and islands. Its natural beauty inspires serenity. However, the Delaware River is surrounded by one of the country's largest concentrations of population and industry. Thus, the challenge today is to manage the growth and use of the corridor and its resources to protect its outstanding character. Unmanaged development and inappropriate use of the corridor's resources could lead to a degradation of the water quality, loss of habitat for endangered and valuable wildlife and plant species, and destruction of its natural beauty and historic sites.

Requirements for Wild and Scenic River Designation

Before a river can be added to the National Wild and Scenic River System, it must be found 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. The determination of a resource's significance, i.e. the degree to which it fulfills the "outstandingly remarkable" requirement, is based on the professional judgment of the study team.

The lower Delaware River corridor contains important "outstandingly remarkable" resource values related to physiography and geology, water quality, species of concern, recreation, scenery, and culture and history (refer to page 15 of the Lower Delaware Wild and Scenic River Study Report for a detailed description of the resource values).

The suitability determination for a wild and scenic river designation 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, or through a combination of existing and new conservation measures resulting from the wild and scenic study. Second, there must be strong support for designation from the entities — local municipalities, state agencies, riverfront landowners, 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.

II. Alternatives

In accordance with legislative directives, wishes of study area communities and established NPS policy for wild and scenic studies of "private lands" rivers, the following issues guided the Lower Delaware River Study:

1. A strong emphasis on grassroots involvement and consensus-building in determining whether the rivers were suitable for designation and how they should be managed.
2. The development of the "comprehensive river management plan" specified in the Act during the study rather than after designation. The plan prepared was the product of close collaboration between NPS, the Study Task Force, and local and state governments. It relies on private, local and state conservation measures rather than federal land acquisition and direct management to protect the river's outstanding resources.
3. A commitment to the study area communities that federal designation would only be recommended if strong support was expressed through passage of support resolutions by the affected municipalities.
4. Existing patterns of land use will be maintained and local land use control and home-rule will not be usurped.
5. The laws and regulations affecting the lower Delaware River are a complex web of overlapping jurisdictions involving two states, fifty-seven municipalities, six counties, the Delaware River Basin Commission, and several federal agencies. Coordination between jurisdictions is limited and the recommended management strategy must enhance cooperation and communication.

These issues set parameters for review of the following alternatives considered by the study partners:

Alternative A. No Action

The National Environmental Policy Act requires consideration of no action along with action alternatives. No action is analyzed and used as a baseline for comparison with the effects of the action alternatives. The "no action" alternative means that the river is not designated into the national system and no river management plan is adopted. Under this alternative it is assumed that local, state, and federal government authorities would continue to function according to their existing regulations, without the enhanced coordination provided through a river management plan or the limitations placed on federal action by the Wild and Scenic Rivers Act.

Local municipalities would remain responsible for land use regulation. Landowners would continue current activities under existing state and federal regulations and programs. Resource protection would depend on existing programs including voluntary local zoning, voluntary landowner covenants, state and municipal programs, and not-for-profit conservation strategies. The Delaware River Greenway Partnership would continue its coordination functions within the corridor as funding allows.

Alternative B. Adoption of a River Management Plan without Wild and Scenic River Designation

Under Alternative B the lower Delaware River would not be added to the National Wild and Scenic Rivers System. The goal of conserving river and river related resources would be accomplished through adoption of a voluntary management plan. The chief assumption of this alternative is that increased vision, education and coordination are sufficient to achieve this goal. A river management committee or council, similar to that described in Section 4, the Lower Delaware River Management Plan, would be established to coordinate river conservation activities. Membership on the council/ committee would be voluntary and include government agencies that currently manage resources in the corridor and individuals representing major river related interests. The purpose of the council/ committee would be to remind river management organizations of the management plan goals, provide oversight and guidance to participating agencies, and through those agencies to other organizations. Functions of the council/committee could include, but not be limited to:

- coordinate management of the river with responsible agencies
- assist municipalities in implementing zoning and other protection methods
- review and coordinate actions among municipalities for consistency
- provide education and technical assistance to promote Best Management Practices
- coordinate law enforcement and river access
- provide assistance in seeking funds for operating activities
- implement and update the River Management Plan
- provide a forum for open discussion of water quality and river management issues

The National Park Service would not participate since it would have no authorization to do so without the Wild and Scenic River designation.

Alternative C. Wild and Scenic River Designation Managed by a River Management Committee/Council - PREFERRED ALTERNATIVE

Under Alternative C, the lower Delaware River would be added to the National Wild and Scenic Rivers System and the Delaware River Greenway Partnership would assume lead responsibility for coordination of river management plan implementation. To undertake this responsibility, the Greenway would coordinate the activities of a river management committee or council, similar to that described in Section 4 of the Lower Delaware River Management Plan.

The National Park Service would serve as an advisor to the council/committee and provide financial assistance to cover the cost of management plan implementation coordination. The Service would have a strong partnership with the council/committee and assist in implementing visitor service initiatives, interpretation, and coordination with other federal agencies. Much of NPS involvement would be through the use of cooperative agreements.

The purpose of the council/committee would be to remind river management organizations of the management plan goals, provide oversight and guidance to participating agencies, and through those agencies to other organizations. Functions of the council/committee could include, but not be limited to:

- coordinate management of the river with responsible agencies
- develop policies that promote long term preservation of the river corridor
- assist municipalities in implementing zoning and other protection methods
- review and coordinate actions among municipalities for consistency
- provide education and technical assistance to promote Best Management Practices
- coordinate law enforcement and river access
- provide assistance in seeking funds for operating activities
- implement and update the River Management Plan
- provide a forum for open discussion of water quality and river management issues

Functions of the National Park Service could include, but not be limited to:

- under section 7(A), Wild and Scenic Rivers Act, conduct technical reviews of federal agency actions affecting river resources
- financial assistance to support the coordination functions of the Greenway and management council/committee
- financial assistance for management plan implementation by municipalities
- serve in an advisory capacity to river management council/committee
- answer public inquiries
- develop appropriate plans to protect resources and develop visitor/interpretation needs
- fund additional research initiatives for resource protection/public use
- provide technical and financial assistance, as appropriate, through use of cooperative agreements
- assist in public education
- develop interpretive brochures

Alternative D. Wild and Scenic River Designation Managed Directly by the National Park Service

Under Alternative D the lower Delaware River would be added to the National Wild and Scenic River System as a unit of the National Parks Service and management services would be provided directly by National Park Service staff. A local NPS office would be funded and staffed for administration and operations. A river council/committee with similar responsibilities to that described in Alternative B would be created. This option suggests a more active NPS role, using the council/committee and river management plan for guidance. NPS would link organizations together and be a much more visible presence in the communities. NPS would assume responsibility for direct coordination of the management council/committee functions, and, but not limited to:

- coordination with federal agencies
- development of appropriate resource protection and visitor/interpretation plans
- provide technical assistance to municipalities on resource protection and land use planning
- river recreation coordination, resource protection and visitor service development through

cost-share incentives

- Section 7, Wild and Scenic Rivers Act permit review
- assist in public education
- development of informational and promotional brochures
- respond to public inquiries
- fund necessary research initiatives for resource protection/public use

III. Affected Environment

The lower Delaware River is unique in its diversity of significant resources. A high density of population and recreational opportunities combine here with a wealth of natural, cultural and historic features of unparalleled national significance. The river valley contains habitats that do not occur elsewhere in the region. For example, there are sheer cliffs that rise 400 feet above the river. Southern facing cliffs are dry and desert-like, and are home to prickly pear cactus. North-facing cliffs exhibit flora usually found only in arctic-alpine climates. The river itself provides habitat for American shad, striped bass, and river herring, providing a high quality recreational and economic resource. The river is an important component of the Atlantic Flyway, one of four major waterfowl routes in North America. From an historic viewpoint, the river is one of the most significant corridors in the nation, with crucial infrastructure still intact. The corridor contains buildings used during Washington's famous crossing, historic navigation canals, Native American and colonial era archaeological sites, mills, etc. Just as important is the magnificent scenery. The view from the river for most of its length is of an undisturbed natural area, despite development taking place in the corridor.

For a detailed description of the affected environment refer to Section II: Description of the Study Area Resources or the study area maps on pages 17-24.

IV. Impacts

This section provides the analytic basis for comparing the alternatives. It is not anticipated that any aspect of the environment will be negatively affected or impacted by designation of the lower Delaware River into the National Wild and Scenic River System or adoption of the River Management Plan. The alternatives under consideration, except for no action, are intended to enhance protection of the river in order to prevent negative impacts on the river corridor. No physical construction projects or improvements that may impact the environment are being considered as part of this planning process.

Alternative A. No Action

Based on the response from the Lower Delaware National Wild and Scenic River Study Task Force committees; the landowner survey; public workshops; comments received on draft proposals; and the passage of resolutions by municipalities agreeing to adopt the goals of the Lower Delaware River Management Plan and urging designation of the river; there is local consensus that the "no action alternative" is not sufficient to adequately protect the river's outstanding resources. Eighty-eight percent of respondents to the landowner survey said they would support an overall conservation plan for the river.

Further, 89.9% or the respondents said they would support land use regulations and programs to conserve and protect the river.

Under the "no action" alternative, environmental protection will continue to rely on the many separate local, state, and federal agencies. There would continue to be limited coordination between entities. Based on current land use trends, lands adjacent to the river will continue to be developed in many areas. Potential effects include destruction of buffers, decreased bank stabilization, increased storm water runoff volume, potential water quality degradation, and reduction in the scenic value of the corridor.

Alternative A does not provide designation of the river or enhance river protection, thus existing socioeconomic trends are expected to continue.

Alternative B. Adoption of a River Management Plan without Wild and Scenic River Designation

This multiple partnership model to coordinate river management activities will help minimize regulation and service duplication, and minimize cost, while protecting resources. The breadth of issues, political jurisdictions, and resources suggests that no single agency can adequately implement a river management plan. This partnership model brings the major players in river management together on a regular basis, stimulates cooperation and coordination among the players, provides a forum for all river interests to discuss and resolve issues, and coordinates implementation of the river management plan.

The primary positive impacts of this alternative would be to attract greater attention to the lower Delaware River and provide a vision for resource protection through the management plan. A strictly voluntary approach responds to concerns about restrictions placed on landowners and municipal governments. The effectiveness of an all-volunteer council/committee would be based upon its ability to encourage individuals and organizations to respond to river management issues. The limitations of this approach is the difficulty in getting all the appropriate players involved, particularly municipalities, and obtaining funding for ongoing coordination activities.

Environmental impacts on the river would be decreased under this alternative through coordination of river management. Socioeconomic impacts would be minimal. Adoption of management plan recommendations by municipalities may result in expenditures to change zoning ordinances (estimated to cost $1000 to $2500 per ordinance). However, local land use regulation remains a local responsibility, thus any additional costs are assumed voluntarily by the affected municipality. Appropriate zoning will help minimize municipal service costs over the long term.

Alternative C. Wild and Scenic River Designation Managed by a River Management Committee/Council - PREFERRED ALTERNATIVE

Similar to Alternative B, this model will help minimize regulation and service duplication, and minimize cost, while protecting resources. This model brings the major players in river management together on a regular basis, stimulates cooperation and coordination among the players, provides a forum for all river interests to discuss and resolve issues, and coordinates implementation of the river management plan. The national designation and federal financial assistance are strong incentives for participation in the council/committee and for implementation of the management plan.

The primary positive impacts of this alternative would be to attract greater attention to the lower Delaware River, provide a vision for resource protection through the management plan, and require federal

agencies to act in accordance with the plan. This approach minimizes duplication by relying on the existing Delaware River Greenway to coordinate management. Management coordination and municipal outreach by the Greenway is viewed as less threatening than if it came directly from the National Park Service. NPS involvement, through technical and financial assistance and participation on the council/committee, is critical to long-term river preservation.

Environmental impacts on the river would be decreased under this alternative through coordination of river management and implementation of management plan recommendations. Socioeconomic impacts would be minimal. Adoption of management plan recommendations by municipalities may result in expenditures to change zoning ordinances. However, local land use regulation remains a local responsibility, thus any additional costs are assumed voluntarily by the affected municipality. Appropriate zoning will help minimize municipal service costs over the long term.

Federal financial assistance and technical assistance for river conservation may help landowners and municipalities by encouraging compatible land use.

There is potential for greater positive impacts in this alternative because management decisions are made at the local level, with support from the National Park Service. A strong understanding of local issues and concerns provided by the council/committee allows more appropriate and responsive decisions to be made.

Alternative D. Wild and Scenic River Designation Managed Directly by the National Park Service

Local home rule and control over land use was clearly stated as a priority by the Study Task Force and municipal representatives. While resource conservation is a high priority there is consensus that the lower Delaware River remain locally managed. Further, study participants are reluctant to create a new bureaucracy and expressed concern over what the NPS could commit to, both financially and administratively. It was felt that the preservation of the river is primarily the responsibility of local governments. However, NPS involvement, through technical and financial assistance and participation on the council/committee, is critical to long term river preservation.

Environmental impacts on the river would be decreased under this alternative through coordination of river management and implementation of management plan recommendations. Socioeconomic impacts would be minimal. Adoption of management plan recommendations by municipalities may result in expenditures to change zoning ordinances. However, local land use regulation remains a local responsibility, thus any additional costs are assumed voluntarily by the affected municipality. Appropriate zoning will help minimize municipal service costs over the long term.

Federal financial assistance and technical assistance for river conservation may help landowners and municipalities by encouraging compatible land use.

V. Consultation, Coordination, Public Involvement

An extensive public involvement program was developed to make sure that the study and action alternatives considered the concerns of landowners, local residents, state and federal agencies, municipalities and counties, business and conservation interests. To ensure that diverse viewpoints were considered during each step of the study, the broad based ad-hoc Lower Delaware National Wild and Scenic River Study Task Force was created. The Task Force consisted of six committees: the Advisory, Management, Local Government, Public Outreach, Resource, and Economic Development committees.

The Study Task Force and its committees were the focal points for public involvement. The Public Outreach Committee coordinated public involvement, including:

- development of mailing lists with over five hundred entries, including key local officials, riparian landowners, and other interested individuals. Those on the lists received meeting notices, minutes, progress reports, and draft documents for comment.
- frequent meetings of study committees at various locations within the six-county study area. The meetings were advertised through mailings and the local press.
- public forums held during the beginning of the study to identify issues of importance to area residents and river users, and also to identify sources of river-related expertise.
- public forums held to educate interested parties and to receive feedback regarding the River Management Plan.
- special events to promote public awareness of the study and the unique qualities of the river.
- the International Countryside Exchange planning charette to focus attention on the section of the river below Washington Crossing.
- presentations to municipalities.
- the Landowner survey, where all landowners adjacent to the river were asked to describe their river management issues and interest in river protection. Over 2,000 landowners were surveyed.

APPENDIX E

Sample Municipal Resolution Supporting Wild and Scenic River Designation

Incorporated March 12, 1738

TINICUM TOWNSHIP

Bucks County

BOARD OF SUPERVISORS

163 Municipal Road
Pipersville, Pennsylvania 18947

NICHOLAS C. FORTE, CHAIRPERSON
GARY PEARSON, VICE-CHAIRPERSON
BRUCE WALLACE, MEMBER

TINICUM TOWNSHIP BOARD OF SUPERVISORS
RESOLUTION OF THE BOARD
OCTOBER 7, 1997

WHEREAS, the Tinicum Township Board of Supervisors recognizes that the Delaware River provides outstandingly remarkable natural, cultural, recreational, and scenic resource values that are important for the quality of life and economic health of our community; and

WHEREAS, the Tinicum Township Board of Supervisors recognizes that the Lower Delaware River Management Plan provides a mechanism to enhance protection of the Lower Delaware River, primarily through local action while recognizing the rights of property owners; and

WHEREAS, the Tinicum Township Board of Supervisors recognizes the benefit of forming a partnership with other municipalities and interested parties along the Lower Delaware River in protection of the Delaware River; and

WHEREAS, the United States Congress authorized a study of the Lower Delaware River and Cooks, Tinicum and Tohickon Creeks to determine their suitability for inclusion into the National Wild and Scenic River System and whereas at the request of the affected municipalities, five additional tributaries were added to the study area: Frya Run, Paunacussing Creek and Smithtown Creek, Paulinskill River and Musconetong River.

NOW THEREFORE, BE IT RESOLVED, that the Tinicum Township Board of Supervisors supports the Lower Delaware River Management Plan, agrees to adopt the goals of the plan into the Township Comprehensive Plan, will take action as appropriate to implement the goals of the plan, and endorses designation of the eligible sections of the Lower Delaware River and its tributaries that border the Township of Tinicum into the National Wild and Scenic River System.

TINICUM TOWNSHIP SUPERVISORS

Nicholas C. Forte, Chairperson

Gary Pearson, Vice-Chairperson

Bruce Wallace, Member

Attest:

Linda Wieand, Township Manager

Office Hours: Mon. Tue. Thurs. Fri. 9am-5pm, Wed. 9am-Noon
Phone: (610) 294-9154
Fax: (610) 294-9889

United States Department of the Interior
NATIONAL PARK SERVICE
Northeast Region
U.S. Custom House
200 Chestnut Street
Philadelphia, PA 19106