



Maurice River & its Tributaries

WILD & SCENIC RIVER STUDY

Final Eligibility and Classification Report

P31/D-6



United States Department of the Interior

NATIONAL PARK SERVICE

MID-ATLANTIC REGION
143 SOUTH THIRD STREET
PHILADELPHIA, PA. 19106

IN REPLY REFER TO:
L7423(MAR-PD)
Maurice River

11 JUL 1988

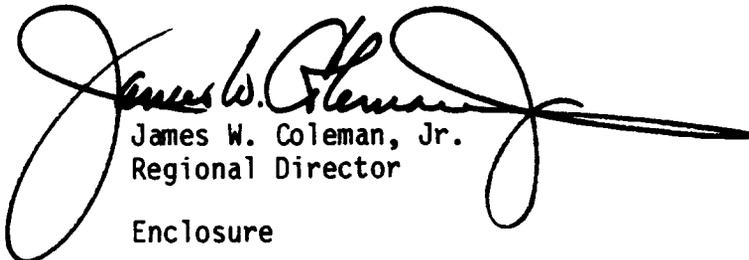
Dear Friend of the Maurice River and its Tributaries:

Enclosed is your copy of the final eligibility and classification report for the Maurice, Manumuskin, Menantico and Muskee Rivers Wild and Scenic Rivers Study. This report documents (1) the significant resource values of the Maurice River and its tributaries; (2) river segments that are eligible to be added to the National Wild and Scenic Rivers System; and (3) recommends a proposed classification (i.e., wild, scenic or recreational) for each eligible river segment. This report makes no recommendation about whether or not the river or its tributaries should be designated into the National Wild and Scenic Rivers System. This determination will be made by the Cumberland County Task Force and municipal officials once a management plan has been written and accepted by the communities.

Numerous citizens have contributed to the compilation of this report. I would like to thank those of you who sent your comments on the draft to us. We appreciate your willingness to contribute your time and expertise. This study has completely depended on the cooperation and input of citizens such as yourself. It will continue to do so as the task force begins examining management options for the Maurice, Manumuskin, Menantico and Muskee Rivers.

I encourage you to read this report. If you have any questions or comments, please contact Evelyn Swimmer, Project Manager, at the above address or call (215) 597-6473. Once again, thank you for your time and assistance.

Sincerely,



James W. Coleman, Jr.
Regional Director

Enclosure



Maurice River & its Tributaries

W I L D & S C E N I C R I V E R S T U D Y

June, 1988

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Final Eligibility and Classification Report

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I. INTRODUCTION

A. Legislated Segments

On May 7, 1987, legislation was passed (Public Law 100-33) authorizing the study of the Maurice and Manumuskin Rivers and Menantico Creek as potential additions to the National Wild and Scenic Rivers System. This study is being conducted by the Mid-Atlantic Regional Office of the National Park Service with assistance from a task force of state and local government representatives and area residents. It was formally initiated in September 1987.

The purpose of this report is to: 1) indicate which river areas are eligible for inclusion in the national system; and 2) to indicate the appropriate classification of eligible segments should the rivers be designated. This assessment makes no recommendations as to whether or not the eligible river segments should be placed in the national system. The report only indicates the study teams findings regarding the rivers' eligibility for potential inclusion. The National Park Service will abide by the decision of local governments and the river community as to whether or not to pursue designation.

Public Law 100-33 authorizes the following river segments to be studied for potential inclusion in the National Wild and Scenic Rivers System:

<u>Name</u>	<u>Segment Description</u>	<u>Length in Miles</u>
Maurice River	From Shellpile to the point three miles north of Laurel Lake	16.4
Manumuskin River	From its confluence with the Maurice River to the crossing of State Route 49	6.6
Menantico Creek	From its confluence with the Maurice River to its source (Interpreted to include Panther Branch and Cedar Branch)	18.0 <u>41.0</u>

B. Additional Segments

On November 5, 1987, at the Maurice, Manumuskin and Menantico Wild and Scenic Rivers Study Task Force resource sub-committee meeting, the National Park Service received nominations for adding portions of the Maurice and Manumuskin Rivers and Muskee Creek to the existing study area. Expansion of legislated segments is possible without a formal action by Congress. The Federal Register (Vol. 47, No 173/Tuesday, September 7, 1982) states:

"If areas adjacent to the study area have been studied and found eligible, the report may present alternatives which incorporate such areas into the river area proposed for designation. Such expansion of the original study area either in length or width may be desirable to preserve and facilitate management of river ecosystems, historic or archeological areas or other special areas" (p.19548).

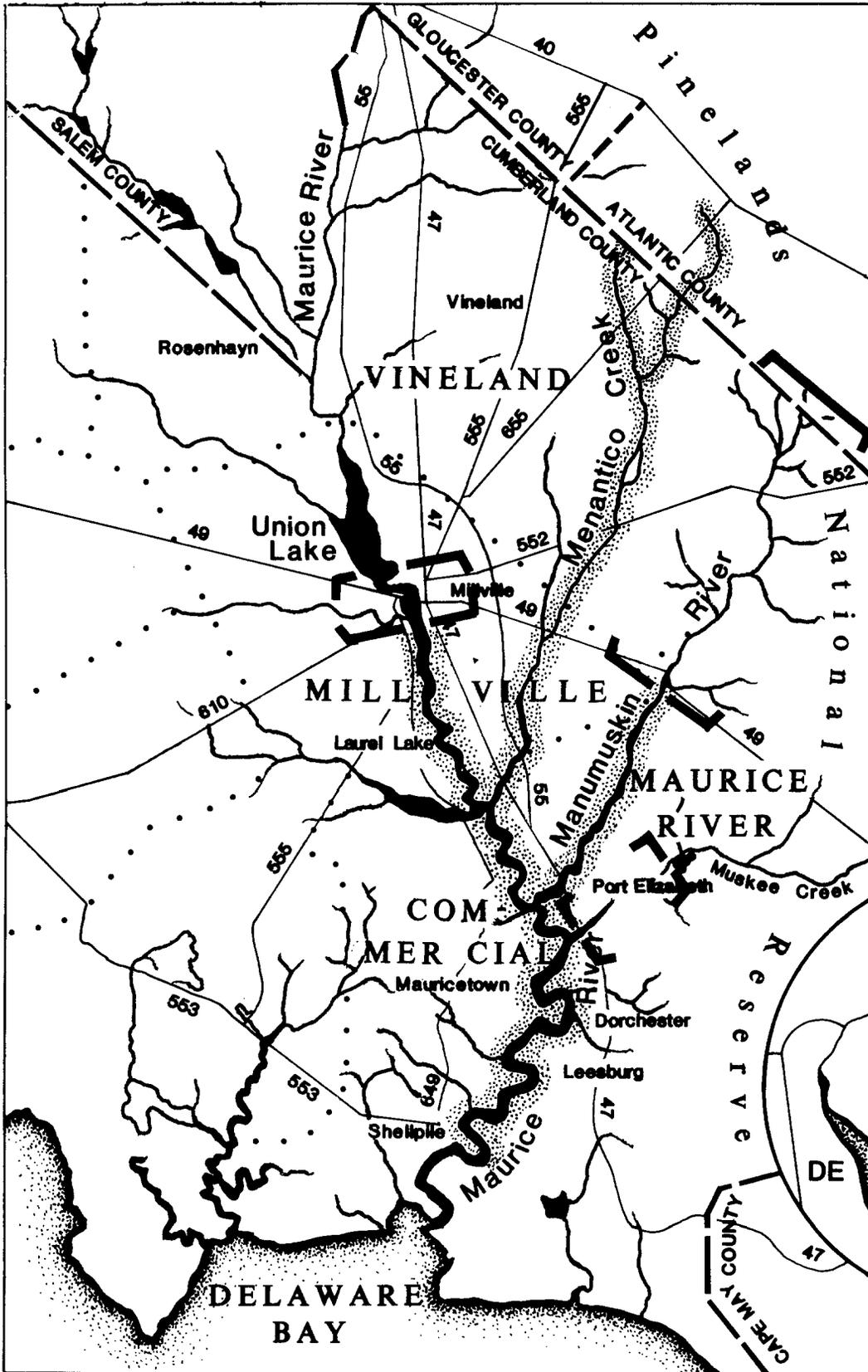
Four additional river segments were recommended to be studied for potential inclusion in the National Wild and Scenic Rivers System.

<u>Name</u>	<u>Segment Description</u>	<u>City or Township</u>	<u>Miles</u>
Maurice River	Confluence with Delaware Bay (east side of Fowler Island) to Shellpile	Commercial Maurice River	2.8
Maurice River	From point three miles north of Laurel Lake to Union Lake Dam	Millville	3.6
Manumuskin River	From Cumberland Pond at State Route 49 to source	Buena Vista Vineland Maurice River	7.7
Muskee Creek	From its confluence with the Maurice River to the PA Reading Seashore Line Railroad Bridge at Jones Mill	Maurice River	2.7

The entire task force then received copies of each addition proposed. There was a discussion at the December 14, 1987 task force meeting with a vote taken by mail-in ballot. The task force approved the addition of the segments for study provided all the affected municipalities agreed by resolution.

Resolutions were passed by City of Millville, City of Vineland, Maurice River Township and Buena Vista. No action was taken by Commercial Township. Therefore, the following segments were added and studied to determine their eligibility and classification for potential inclusion in the National Wild and Scenic Rivers System.

<u>Name</u>	<u>Segment Description</u>	<u>City or Township</u>	<u>Miles</u>
Upper Maurice River #2	From point 3 river miles north of Laurel Lake to Union Lake Dam	Millville	3.6
Upper Manumuskin River #2	From Cumberland Pond at State Route 49 to source	Buena Vista Vineland Maurice River	7.7
Muskee Creek	From its confluence with the Maurice River to the Pennsylvania Reading Seashore Line Railroad Bridge	Maurice River	2.7

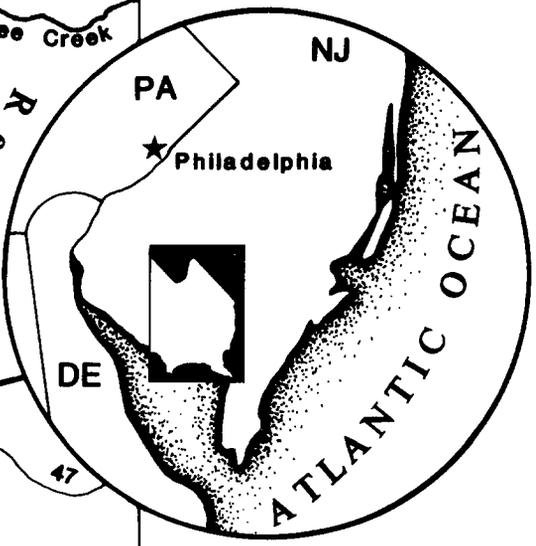


LEGEND:

STUDY SEGMENTS

 Congressional

 Additional



**MAURICE, MANUMUSKIN AND MENANTICO
CONGRESSIONAL WILD AND SCENIC RIVERS STUDY**

II. NATIONAL WILD AND SCENIC RIVERS SYSTEM

A. The Wild and Scenic Rivers Act

The Wild and Scenic Rivers Act (Public Law 90-542, as amended) 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. In passing the Act, Congress declared that the established policy of building dams, levees, and other river construction would be complemented by a policy to preserve selected rivers, or sections thereof, in their free-flowing condition. These selected rivers collectively form the National Wild and Scenic Rivers System.

The Wild and Scenic Rivers Act provides a basis for determining whether river areas are eligible for inclusion in the national system. To be eligible a river or river segment must be free-flowing, with a relatively undeveloped shoreline, and possess at least one outstandingly remarkable scenic, recreational geologic, fish and wildlife, historical, cultural or other similar value.

Eligible segments are classified as either a wild, scenic or recreational river based on water quality, and existing shoreline development and accessibility (for further explanation, see Appendix B, page 33).

- (1) Wild river areas - Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.
- (2) 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.
- (3) 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.

B. Nationwide Rivers Inventory

From 1976 to 1981, the Department of the Interior conducted a systematic, nationwide inventory and evaluation of rivers and their adjacent lands. The purpose of the Nationwide Rivers Inventory (NRI) was to determine which rivers or river segments appear to meet the minimum criteria for further study and/or potential inclusion in the National Wild and Scenic Rivers System. In 1982 the Department of the Interior published the Nationwide Rivers Inventory (NRI) which included portions of the Maurice and Manumuskin Rivers, recognized for their free-flowing nature and unique cultural resources related to the oyster harvesting and processing industry. In 1987, an internal draft assessment of the Menantico Creek and additional segments of the Manumuskin River was prepared to determine the eligibility of these segments for inclusion on the NRI.

The following NRI listing was used as the basis for the legislation authorizing the study of the Maurice and Manumuskin Rivers for potential inclusion in the National Wild and Scenic Rivers System.

<u>Name</u>	<u>Segment Description</u>	<u>Miles</u>
Maurice River	Shellpile to three miles north of Laurel Lake Area	16.4
Including:		
Manumuskin River	Confluence with Maurice River to the Pennsylvania Reading Seashore Lines	3.5

C. Wild and Scenic Rivers Study Process

The study segments of the Maurice, Manumuskin, Menantico and Muskee Rivers were examined to determine their eligibility and classification for potential inclusion in the National Wild and Scenic Rivers System based on the Wild and Scenic Rivers Act (Public Law 90-542, as amended) and the Final Revised Guidelines for Eligibility, Classification and Management of River Areas (Federal Register, Tuesday, September 7, 1982, pp. 39454 to 39461). Used to evaluate the rivers and prepare this report were information gathered during the Nationwide Rivers Inventory, site visits with resource experts and members of the Cumberland County task force, research of published sources, aerial photographic analysis and interviews with local and regional experts on the resource values of the study area. Eligibility and classification for segments of the Maurice River and its tributaries were determined using the following three-step process.

1. The study segments were examined to determine if they were free-flowing. The only impoundments within the study area were found on Menantico Creek at Menantico Lake and on Panther Branch and Cedar Branch. Impounded sites were identified using U.S. Geological Survey maps and aerial photos and were verified by site visits.
2. Each remaining river segment was then evaluated to determine if any outstandingly remarkable resource values existed. An outstandingly remarkable resource value is defined as being of either national or multi-state significance. A river segment was declared eligible if at least one significant resource value could be documented. Federal, state and local agencies, the Pinelands Commission, private conservation organizations, Rutgers University Research Laboratory and individual

resource experts were contacted to provide any literature, information or maps relating to the Maurice, Manumuskin and Menantico Rivers and their resources.

3. The Maurice, Manumuskin and Menantico Rivers then were analyzed to determine the level of existing development one-quarter mile from the banks of the river. Using a system developed for the Nationwide Rivers Inventory, a Development Point Index value was calculated mile-by-mile and then averaged by the total number of river miles. Segments with certain types of land uses determined to be inappropriate for a potential National Wild and Scenic River and/or with an average index value of more than 100 points were disqualified. U.S. Geological Survey topographic maps and aerial photographs of the rivers were used to determine existing levels of development and were verified with field checks.

III. MAJOR FINDINGS

A. Eligible Segments and Proposed Classification

A total of 42.4 miles of the Maurice River, Manumuskin River, Menantico Creek and Muskee Creek qualify for inclusion in the National Wild and Scenic Rivers System

River	Segment Description	Classification	Miles
Lower Maurice	From U.S. Geological Survey Control Station Matts at Shellpile to Route 548 bridge at Mauricetown	Recreational	7.0
Middle Maurice #1	From Route 548 bridge at Mauricetown to 3.6 river miles upstream (at drainage ditch upstream of Fralinger)	Scenic	3.8
Middle Maurice #2	From drainage ditch upstream of Fralinger to 3.1 river miles upstream (0.5 river miles upstream from U.S. Geological Survey control station Burcham at Laurel Lake)	Recreational	3.1
Upper Maurice #1	From 0.5 river miles upstream from U.S. Geological Survey control station Burcham at Laurel Lake to 2.5 river miles upstream (3.0 river miles upstream from Laurel Lake area)	Scenic	2.5
* Upper Maurice #2	From point 3 river miles north of Laurel Lake area to south side of Millville Sewage Disposal Plant	Scenic	1.1
Lower Manumuskin	From its confluence with the Maurice River to 2 river miles upstream	Recreational	2.0
Upper Manumuskin #1	From 2 river miles upstream of confluence with Maurice River to Route 49 bridge at Cumberland Pond	Scenic	4.6

17.5

River	Segment Description	Classification	Miles
* Upper Manumuskin #2	From backwater of Cumberland Pond near Route 49 to source, at Route 557.	Scenic	7.7 <u>14.3</u>
Lower Menantico	From confluence with Maurice River to Route 55 bridge	Recreational	1.4
Upper Menantico	From Route 55 bridge to base of impoundment at Menantico Lake	Scenic	6.5 <u>7.9</u>
* Muskee	From confluence with the Maurice River to the Pennsylvania Reading Seashore Line Railroad Bridge	Scenic	2.7 <u>10.6</u>
			<u>42.4</u>
* Denotes those river segments added to the Congressionally authorized area.			

B. Basis for Finding of Eligibility and Classification

1. Rivers must be free-flowing. The eligible sections of the Maurice, Manumuskin, Menantico and Muskee Rivers are free of impoundments, diversions and major shoreline modifications.

2. Rivers and their adjacent land areas must possess one or more outstandingly remarkable resource values. The Maurice, Manumuskin, Menantico and Muskee Rivers possess several outstandingly remarkable values of regional and national significance:

a. Surface Water Quality: The Manumuskin is one of two rivers within the Pinelands National Reserve determined to meet water quality standards of pristine, a completely undisturbed, natural river system, according to the criteria established by the Pinelands Comprehensive Management Plan. The Menantico meets pristine standards in all areas except total suspended solids, as reported by Pollution Abatement Consultants and Services (PACS). PACS concluded that "the higher suspended solids were due to the velocity of the water at the point of sampling" and that the Menantico would "probably be within pristine limits at points on the creek where the channel is wider and would therefore produce a less turbulent current flow."

b. Vegetation: One third of the global population of sensitive joint vetch, Aeschynomene virginica, a candidate for federal endangered species listing, grows along the Manumuskin River. Also within the study area are the globally rare Parker's pipewort, Eriocaulon parkeri, a sedge, Carex barrattii, and a bonset, Eupatorium resinsum. The study rivers support New Jersey's most extensive system of wild rice which is significant habitat for migratory waterfowl along the Atlantic flyway. The area also supports a variety of plant species unofficially listed as threatened or endangered in the State of New Jersey.

c. Wildlife: The watershed has been identified by the New Jersey Department of Environmental Protection as the "last remaining suitable habitat for the bald eagle in the state." The bald eagle, Haliaeetus leucocephalus, is listed as endangered by the U.S. Fish and Wildlife Service. Studies have shown six to eight bald eagles roosting and feeding in the area on a given day with as many as 14 individual birds using the area during the course of winter. The Maurice and its tributaries are daily feeding grounds for New Jersey's last remaining pair of nesting eagles. This habitat is crucial for the successful fledging of the young from the nest. This documented use qualifies the area to be listed as "Critical Habitat for Endangered Species" as defined by the regulations of the New Jersey Coastal Zone Management Program, as well as "Essential Habitat" as defined by the Northern States Bald Eagle Recovery Team. Four historic nest sites, two along the Menantico and two along the Maurice, are located within the study area. These nest sites are considered key components in recovery of the state's bald eagle population. Also supported by the study area are the federally endangered Peregrine Falcon and Black Duck. Ornithologists have recognized the Maurice as playing an irreplaceable role in the migration of over a million shorebirds (Myers, 1986). The adjacent lands also provide habitat for a variety of reptiles and amphibians listed by the State of New Jersey as threatened or endangered.

d. Fisheries: The federally endangered shortnose sturgeon, Acipenser brevirostrum, has historically inhabited the Maurice River. The Maurice is also one of only three rivers in New Jersey where striped bass, Morone saxatilis, spawn and overwinter.

e. Cultural Resources: Fralinger Farm on the Maurice River is the site of a Prehistoric American Indian settlement and is considered to be eligible for designation as a National Historic Landmark. The artifacts found on the site show over 3,000 years of occupation. This site is one of 10 prehistoric occupation sites within the study area listed on the New Jersey State Museum's State Site Survey.

Dorchester-Leesburg and Port Elizabeth-Bricksboro are designated Pineland Villages. The Pinelands Commission identifies these villages as being eligible for designation in the National Register of Historic Places. A survey of glass factories done for the state identified two historic sites in Port Elizabeth which are also considered to be eligible for designation as National Register sites.

The unique folklife of the study area is documented in Pinelands Folklife, a cooperative study led by the Library of Congress Folklife Center. The Maurice River area is highlighted in the folklife study for traditional hunting, trapping, shipping, shipbuilding, fishing, oyster harvesting and salt hay farming.

f. Pinelands National Reserve: Designated by Congress in 1978 as the country's first national reserve (Public Law 95-625), the Pinelands is recognized for rivers of high water quality, unique patterns of natural habitats, and unusual varieties of plant and animal species. The watershed of the Maurice, Manumuskin and Menantico are listed by the Pineland Comprehensive Management Plan as an "adjacent area of importance... characteristic of a pristine Pinelands environment" with high water quality and numerous threatened or endangered animals and plants. Moreover, the Manumuskin contains the highest category of ecological values deemed necessary to maintain the character and integrity of the Pinelands; the lower Maurice River contains the second highest category.

Portions of the Maurice and Manumuskin Rivers are identified by the Comprehensive Management Plan as scenic corridors of special significance to the Pinelands. The Manumuskin is further designated as a Pinelands wild and scenic river. A segment of the Manumuskin River, from its confluence with the Maurice River to Route 49, recently became listed on the State Register of Natural Areas. The purpose of the state listing is to provide official recognition and encourage voluntary preservation of this important wetland ecosystem and habitat for threatened and endangered species.

The study rivers are an important physical and biological link between the Pinelands National Reserve, an internationally designated Biosphere Reserve and the Delaware Bay, which is now a priority estuary under the newly established National Estuary Program of the Water Quality Act of 1987 (Public Law 100-4).

3. Shoreline Development.

a. For Scenic Classification: Segments of the shorelines of the Maurice, Manumuskin, Menantico and Muskee Rivers are largely primitive and undeveloped. The presence of small communities, dispersed dwellings and/or structures are present in the study area.

b. For Recreational Classification: Segments of the shorelines of the Maurice, Manumuskin and Menantico Rivers exhibit substantial evidence of human activity with the presence of extensive residential development and commercial structures.

4. Accessibility.

a. For Scenic Classification: Portions of the Maurice, Manumuskin, Menantico and Muskee Rivers are accessible in places by roads. Roads occasionally reach and/or cross the rivers. Short stretches of conspicuous and/or longer stretches of inconspicuous roads and railroads are present.

b. For Recreational Classification: Portions of the Maurice, Manumuskin, Menantico and Muskee Rivers are readily accessible by roads. Parallel roads and/or railroads on one or both banks and bridge crossings are present.

5. Water Quality. No criteria are prescribed by the Wild and Scenic Rivers Act for scenic and recreational classification.

See Appendix C, page 35, for more indepth evaluation of each eligible segment's eligiblity and classification.

C. Ineligible Segments

A total of 10.1 miles of Menantico Creek, including Panther Branch and Cedar Branch, and 2.5 miles of the Maurice River, from Millville Sewage Plant to Sharp Street Bridge at Union Lake, do not qualify for inclusion in the National Wild and Scenic Rivers System.

River	Segment Description	Miles
Menantico	From the base of the Menantico Lake impoundment to the source of Menantico Creek (interpreted to include Panther Branch and Cedar Branch)	10.1
* Maurice	From north side of Millville Sewage plant to Sharp Street Bridge at Union Lake	2.5

D. Basis for Finding of Ineligibility

1. Rivers must be free-flowing.

a. Menantico Creek is impounded at Menantico Lake. The headwater streams, Panther Branch and Cedar Creek, exhibit small impoundments associated with irrigation withdrawal. The numerous bridge crossings, at half-mile intervals, above Menantico Lake impact the flow of these tributary streams.

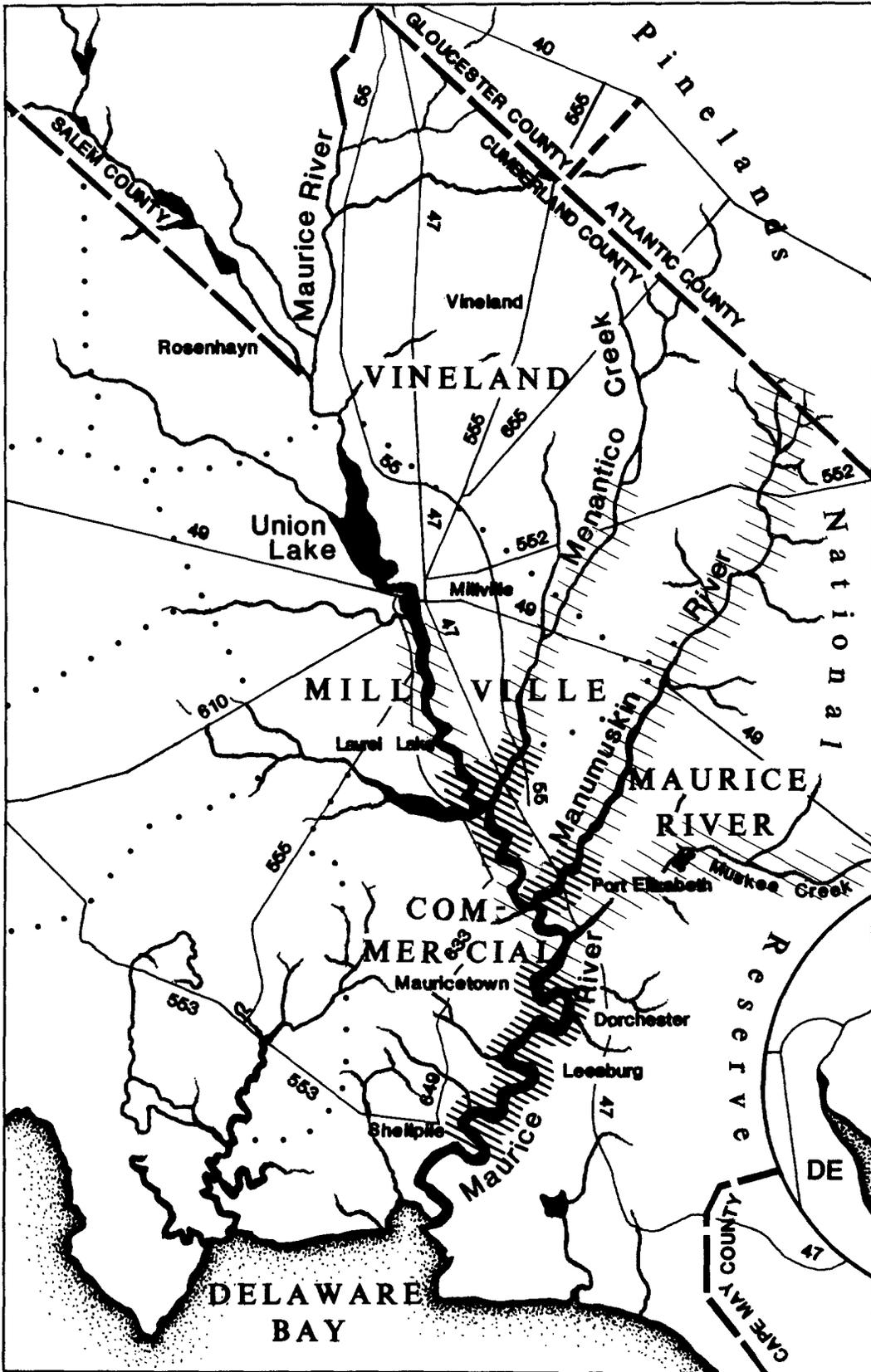
b. This segment of the Maurice is free of impoundments, diversions and major shoreline modifications.

2. Rivers and their adjacent lands must possess one or more outstandingly remarkable resource value.

a. Menantico Creek, above Menantico Lake, does not appear to possess any outstandingly remarkable resource value of national or regional significance.

b. This segment of the Maurice does not appear to possess any outstandingly remarkable resource values of national or regional significance within the adjacent quarter-mile study area.

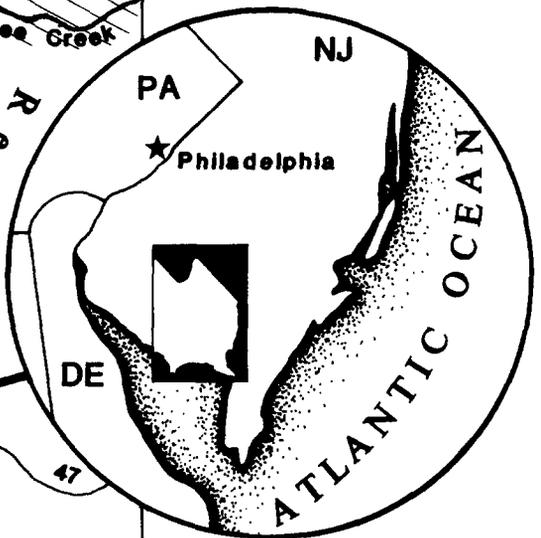
* This segment of the Maurice was nominated for addition to the study and is not in the legislation.



LEGEND:

ELIGIBLE SEGMENTS

-  Scenic Classification
-  Recreational Classification



**MAURICE, MANUMUSKIN AND MENANTICO
CONGRESSIONAL WILD AND SCENIC RIVERS STUDY**

IV. DESCRIPTION OF THE STUDY AREA

A. Regional Setting

The Maurice River rises in Gloucester County, New Jersey and flows south forming the eastern boundary between Salem and Cumberland Counties. The lower half of the Maurice River is centered in Cumberland County. The drainage basin encompasses some 380 square miles, emptying into the Delaware Bay between Cape May Point and Egg Island Point. Major tributaries include Muddy Run, Buckshutem Creek, Menantico Creek, Manumuskin River and Muskee Creek. The Manumuskin River and Menantico Creek rise in Atlantic County, with the majority of their drainage area in Cumberland County. The congressional study area is largely within Cumberland County, with the headwater sections of Menantico Creek in Atlantic County.

The cities of Vineland and Millville, along with seven smaller communities, are situated in the study area. The study area is serviced by a number of roads and by the Pennsylvania-Reading Railroad Seashore Line. Portions of Route 55, a major cross-state, limited access highway, are currently being completed. Major east coast urban centers including New York, Philadelphia, Baltimore and Washington, D.C., are within a one to three hour drive from the Maurice study area.

B. Land Use

The Maurice River study area is characterized by a variety of land uses and development. In general, the adjacent lands of the Manumuskin River and Menantico Creek, as well as portions of the Maurice, are largely wetlands, forest and agricultural lands. The upper portions of the Maurice River and Menantico Creek tend to be developed with more land devoted to commercial and residential uses. Small population centers occur in the historical river communities of Dorchester, Leesburg, Port Elizabeth and Mauricetown. Existing, traditional commercial activities include agriculture and

agricultural services, glass manufacturing, sand and gravel extraction, ship building and fish and shellfish harvesting and processing.

Impoundments are present near and in the study area. The Maurice River impoundment created Union Lake. Other impoundments include Laurel Lake on Buckshutem Creek, Menantico Lake on Menantico Creek and Cumberland Pond on the Manumuskin River. Small ponds were created at Leamings and Fries Mill on the Menantico and Manumuskin, respectively, but are no longer in existence. Menantico Ponds Wildlife Management Area is on the site of a former sand and gravel extraction area which has created a broad channel with numerous islands.

Extensive uplands and lowlands border a majority of the rivers supporting a variety of vegetation types and providing habitat for a variety of aquatic and wildlife species. Open space is defined by the New Jersey Coastal Management Program as land areas owned and maintained by federal, state, county and municipal agencies and private non-profit groups. Currently this open space land along the Maurice, Manumuskin and Menantico corridors totals some 36,000 acres.

Private Nature Conservancy, Manumuskin River, 750 acres

Municipal Leesburg, Maurice River, 11 acres
Mauricetown, Maurice River, 0.31 acres
Millville, Maurice River, 40 acres

State Fish and Wildlife Management Areas:
Menantico Ponds, Menantico Creek, 295 acres
Peaslee, Manumuskin Rivers, 18,000 acres
Heislerville, Maurice River, 3,410 acres
Turkey Point, Maurice River, 1,611 acres
Edward G. Bevan, Maurice River, 12,056 acres

Federal None

C. Physiography and Geology and Groundwater

The Maurice River watershed lies within the Embayed Section of the Atlantic Coastal Plain physiographic province. Characteristics of this province are

low, flat land areas, extensive wetlands and broad meandering rivers (Fenneman, 1938).

The rivers also flow through the New Jersey Pine Barrens which are characterized by rolling terrain with deep deposits of sandy, droughty soils. The area has no rock outcrops or mountains. The meandering streams and unique vegetation are underlain by a series of unconsolidated layers of sand, clays and marls in the shape of a wedge. Those layers, in turn, rest atop bedrock which dips gently to the southeast and extends into the submerged Atlantic Continental Shelf.

Vast quantities of water are stored in the extensive sand aquifers of the Cohansey and Kirkwood formations beneath the surface of the Pine Barrens. This reservoir of groundwater is replenished solely by precipitation that percolates through the sandy soils surface. This groundwater resource plays an important role in the Pine Barrens hydrology and ecology.

D. Surface Water

The Maurice River has a drainage area of 386 square miles and meanders south for 50 miles to the Delaware Bay. Major tributaries include Menantico Creek and the Manumuskin River. The river is tidal below Union Lake.

Because the Pine Barrens streams are so well fed by groundwater, they maintain an even flow year-round tending not to freeze in the winter. Historically they have provided dependable sources of water. The porous nature of the ground in the Pine Barrens makes the groundwater and surface water resources vulnerable to land use disturbances. Maurice River, receiving its flow from agricultural areas and from Vineland and Millville, is subject to a wide range of influences. A water quality report prepared by the State of New Jersey indicates that the Maurice River, south of Union Lake, meets the fishable goal of the Clean Water Act, but probably does not

meet the swimmable goal. This finding is based on professional documented judgement as no ambient monitoring is being carried out on the study area waterways. The river is considered to have moderate levels of nutrient enrichment. New Jersey Division of Water Resources does sampling for bacterial quality in shellfish harvesting waters of the tidal portion of the Maurice River. During recent reconstruction at Union Lake dam, the lake level was lowered and testing indicated that bottom sediments of Union Lake contain unsafe levels of arsenic. Data regarding the possible contamination of bottom sediments in the study area is being compiled by the U.S. Environmental Protection Agency and New Jersey Department of Environmental Resources.

Data for the Menantico and Manumuskin indicate excellent water quality. In 1980, sampling prepared for the Pinelands Comprehensive Management Plan showed Manumuskin River to meet the criteria for rating of "pristine." Menantico Creek, in a subsequent water quality test, was found to meet all pristine criteria except in the suspended solids category.

Maurice River and its tributaries exhibit a range of water habitats and wetland habitats due to their tidal nature. The Maurice River is tidal to Union Lake; Menantico Creek to the railroad tressel at Menantico Pond; and the Manumuskin River to Fries Mill and the Railroad Bridge.

E. Vegetation

The study rivers traverse natural zones of uplands and lowlands. Uplands support two major vegetation associations, pine-oak forest and oak-pine forests. Lowlands support cedar swamps, hardwood swamps, pitch pine lowlands, bogs, inland and coastal marshes. The watershed provides habitat for a large variety of rare intertidal plant species as well as rare upland plant species.

The pristine nature of the Manumuskin wetlands supports a great variety of plants. The Nature Conservancy, a non-profit national conservation group which acquires and manages critical habitats, reports the occurrence of 50 or more species per acre along the river corridor.

North of Mauricetown, the study area marshes support New Jersey's single largest occurrence of wild rice, Zizania aquatica (Berger & Sinton, 1985), which attracts thousands of migratory birds in the fall and which grows in a relatively freshwater environment. Between Manumuskin Creek and Mauricetown, the wetlands vegetation gradually change from freshwater to brackish. South of this area, the marshes include a mixture of plants dominated by salt meadow grass, Spartina patens.

Several rare plant species were listed by the state's Natural Heritage Program as being documented within the study area. Using the U.S. Fish and Wildlife Service and the Nature Conservancy's categories of endangered and threatened plants, the following list of plant species occurring in the study area was prepared. It represents those species that are considered imperiled or rare at the global or state levels. Several of these species may be suitable for federal listing as threatened or endangered. An explanation of the categories cited is provided in Appendix D, page.

Species	Category
Sensitive joint vetch, <u>Aeschynomene virginica</u>	G2S1
Parkers pipewort, <u>Eriocaulon parkeri</u>	G2S2
Bur marigold, <u>Bidens bidenoides</u>	G3S2
Butterfly pea, <u>Clitoria marana</u>	G5S1
Pine Barren boneset, <u>Eupatorium resinosum</u>	G3S2

F. Wildlife

The Maurice River basin contains vast tracts of forest and agricultural land. This combination provides suitable habitat for a variety of animals. Within the vicinity of the study area are large tracts of state wildlife management areas. Hunting, fishing and trapping are practiced throughout the region for sport and subsistence.

A variety of mammals, birds and reptiles are found in the study area that include the Tuckahoe masked shrew, Sorex cinereus nigriculus, a subspecies of the common masked shrew and a candidate for listing as a federally endangered species. It is thought to inhabit the west bank of the Manumuskin River. Further research is being conducted to confirm the species actual occurrence. Typical species of other mammals found within the watershed are the white-tailed deer, red and grey fox, opossum, striped skunk, raccoon, bats, and grey, red and flying squirrel. Mammals closely associated with river resources are the long-tailed weasel, mink, beaver, river otter, and muskrat.

The diversity of birdlife of the Maurice River drainage is unusually rich and well documented. The wild rice wetlands are an important migratory stopover and wintering area for over 13,000 waterfowl. At least 230 species of birds have been recorded with 92 confirmed breeding in the watershed. Many of the spring migratory birds also gather along the mud flats of the Maurice River area to feed. The river area's vast tidal mud flats, marshes and high water quality contribute to the Delaware Bay's unique environment. The bay is designated in the Western Hemisphere Shorebird Reserve System, a network of reserves sponsored by the International Association of Fish and Wildlife Agencies and the World Wildlife Fund - U.S. The Bay's shore in Cumberland and Cape May Counties is one of only four places in North America to accomodate more than 1,000,000 shorebirds during migration. During May, birds gather there enroute to the Artic to feed upon horseshoe crab eggs.

Seventeen of the twenty-five threatened and endangered species of birds listed by the State of New Jersey occur in the study area. These include:

Species	Status
Bald Eagle, <u>Haliaeetus leucocephalus</u>	Federal and State endangered
Pergrine Falcon, <u>Falco peregrinus</u>	Federal and State endangered
Pied-billed Grebe, <u>Podilymbus podiceps</u>	State endangered
Least Tern, <u>Sterna albifrons*</u>	State endangered
Cooper's Hawk, <u>Accipiter cooperii</u>	State endangered

Cooper's Hawk, <u>Accipiter cooperii</u>	State endangered
Northern Harrier (Marsh Hawk) <u>Circus cyaneus</u>	State endangered
Osprey, <u>Pandion haliaetus</u> *	State threatened
Barred Owl, <u>Strix varia</u> *	State threatened
Red-headed Woodpecker, <u>Melanerpes erythrocephalus</u>	State threatened
Redshouldered Hawk, <u>Buteo lineatus</u>	State threatened
Bobolink (Reedbirds), <u>Dolichonyx oryzivorus</u>	State threatened
Great Blue Heron, <u>Ardea herodias</u>	State threatened
Black Skimmer, <u>Rynchops niger</u>	State endangered
Short-eared Owl, <u>Asio flammeus</u>	State endangered
Cliff Swallow, <u>Petrochelidon pyrrhonota</u>	State endangered
Vesper Sparrow, <u>Poocetes gramineus</u>	State endangered
Savannah Sparrow, <u>Passerculus sandwichensis</u>	State endangered

* Nesting along rivers confirmed

During a sampling program by Herpetological Associates, private wildlife consultants, in 1986-1987, over 2,280 individuals in 44 different species were captured, several of which are considered to be threatened or endangered in New Jersey.

Species	Status
Pine Snake, <u>Pituophis mananoleucus</u>	State threatened
Corn Snake, <u>Elaphe guttata</u>	State endangered
Pine Barrens Treefrog, <u>Hyla andersonii</u>	State endangered
Southern Gray Treefrog, <u>Hyla chrysoscelis</u>	State endangered
Eastern Tiger Salamander, <u>Ambystoma tigrinum</u>	State endangered

*Note: The most common snake of all species identified was the Scarlet Snake. This snake is so rare that New Jersey has not yet determined its status.

6. Fisheries

The fishery resources of the Maurice River and adjacent Delaware Bay have traditionally provided great economic and recreational benefits to residents and visitors to the area. There is extensive recreational fishing for striped bass, large mouth bass and perch. Habitat in the study rivers ranges from typical Pine Barrens to transitional Pine Barrens to tidal. According to fish survey of portions of the Maurice, Manumuskin, Menantico and Muskee fish habitat ranges from good to excellent.

Historical species which intermittently inhabit the rivers include the

Atlantic sturgeon, the short-nosed sturgeon and the American shad. The short-nosed sturgeon is listed as endangered by the U.S Fish and Wildlife fishing for striped bass, large mouth bass and perch. Habitat in the study rivers ranges from typical Pine Barrens to transitional Pine Barrens to tidal. According to fish survey of portions of the Maurice, Manumuskin, Menantico and Muskee fish habitat ranges from good to excellent.

Historical species which intermittently inhabit the rivers include the Atlantic sturgeon, the short-nosed sturgeon and the American shad. The short-nosed sturgeon is listed as endangered by the U.S Fish and Wildlife Service. All of them are legally protected by the state. The Maurice is one of only three rivers in New Jersey where striped bass, Morone saxatilis, spawn and overwinter. A rare and disappearing species, the ironcolor shiner, Notropis chalybaeus, is also found in the study area. It is a key nursery and spawning area for most of the recreationally important species of the Bay.

The oyster, Crassostrea virginica, is a shellfish species which historically has been a major industry for the area. However, oyster breeding and spawning in the Delaware Bay has been severely impacted since 1956 due to a disease organism known as MSK. While the Maurice River does not currently support an extensive production of oysters, Rutgers Shellfish Laboratory believes the Maurice is important to the shellfish industry. Oysters would grow well and due to the reduced salinity, predators such as the MSX parasite, would be less of a threat. Currently, the Maurice's wetlands contribute food for phytoplankton that benefit oysters.

H. Prehistoric Archaeology

Scattered throughout the Maurice River basin on well drained uplands adjacent to rivers are sites containing artifacts of the Indian. Many of the sites have been studied and documented by a variety of archeologists and amateur collectors. The New Jersey State Museum records 10 sites within the study area listed on the State Site Inventory in addition to numerous unrecorded sites. One of the sites, a large relatively

undisturbed concentration of artifacts ranging from 500 to 4000 years ago, is considered to be eligible for the National Register of Historic Places.

Alan Mounier, Cumberland County archeologist, has observed a pattern of prehistoric site locations within the Maurice River basin that may begin to reveal the lifestyle of the native people who lived in this region for thousands of years. According to Mounier, sites are most concentrated at places of ecological diversity. In the vicinity of the extensive wetlands near Delaware Bay, sites are small and show evidence of discrete resource exploitation, such as oyster consumption. The pattern seems to indicate that the larger sites were permanent settlement sites, with smaller, seasonal use sites up - and downstream. Major hunting and nut gathering activities would most likely occur upstream during the fall and winter season with oyster gathering occurring during the summer months.

I. Historic Resources

The study area encompasses historic archeologic sites and existing buildings which span the range of traditional uses within the Pine Barrens and the Delaware Bay. These include vestiges of colonial and early American industries such as salt hay farming saw and grist milling, glass and iron manufacturing and shipping. Current settlements developed around the cordwood and lumber industries maritime trade and the shellfishing industries. The lifestyle of many area residents depend upon traditional resource based activities of fishing, hunting, trapping, boating, shipbuilding, and wildlife exploration.

The vast forests of New Jersey served to provide building timber as well as cordwood for export to cities. Sawmills were operated in the study area at Buckshutem Creek, at Leamings and Clarks Mill on the Menantico, Fries Mill, Cumberland Pond and Bennett's Mills on the Manumuskin and at Dorchester. Today, the sites still exist, although their buildings have disappeared.

Farming in the river area historically depended upon diking the meadowlands using mud, clay, wood, derelicts and old boat hulls. There were continuous dikes along the riverbanks to Millville allowing cultivation of food crops and salt hay. Small horse drawn barges used the dikes to carry goods and produce to market. Sluice gates built prior to 1782 on the Manumuskin, located at what now is the Route 47 bridge, regulated the water level in the wetlands farmed upstream of the gates. Use of the gates ended in 1889 or 1890 after a storm washed them out. Dikes for farming were largely abandoned in the watershed by the 1940's. On the Maurice, however, remains one diked meadow in farmland, having been handed down through three generations since the Civil War.

During the beginning of the 19th century, the development of an iron foundry and two glassworks in the study area aided the industrial development of the river areas and Cumberland County. The Route 49 bridge crosses a dam on the Manumuskin River which is historically linked to Cumberland Furnace circa 1800. Another dam about a mile upstream impounded waters for operation of Cumberland, or Concord forge, circa 1810. Ore was brought in and products of the furnace and forge shipped out from Schooner Landing, on Menantico Creek. Old Schooner Landing Road connected the shipping point with the furnace. Iron pigs, stoves and other products were distributed to Philadelphia and the northeast. Iron from this furnace contributed to an important, albeit short, iron industry in New Jersey.

Port Elizabeth, established in 1785, was a port of delivery for the U.S. Customs. Port Elizabeth was home for Eagle Glassworks, circa 1799, and Union Glassworks, circa 1810. Both businesses produced window glass and hollow ware. The sites have not been redeveloped for commercial uses, however, two homes have been built on the Eagle Glass property. The sites are considered important historic archaeological resources by the state of New Jersey.

Mauricetown, Dorchester, Leesburg and Port Norris all were first developed for the shipping of cord wood and lumber. Mauricetown became a center for the coastal trade. Ships sailed up and down the coast from Nova Scotia to Texas and Louisiana on the Gulf Coast and sometimes to West Indies and South America. Mauricetown today is noted for its Victorian architecture. A few colonial homes also remain.

Dorchester and Leesburg became shipbuilding towns. Shipyards also were located at Mauricetown and Port Norris. Between 1831 and 1927, 167 wooden sailing vessels, were built on the river, 62 of them sea-going. Between 1846 and 1930, 182 sea captains were registered in the Maurice River area, piloting the oyster fleet and the coastal schooners (captains in many cases had small shares, if any, in the vessels they piloted and management was by major shareholders). A decline of commerce on the river and changes in technology have left one operating shipyard, Dorchester Shipyard, which has the capacity to build and repair both wooden and metal hulled ships. The 19th century saw development of the most dramatic and unique cultural aspect of the Maurice River, that of the shipbuilding, coasting and oyster harvesting trades. At the turn of the century, 90 box cars of oysters were exported per week from the Port Norris area. Port Norris was also the site of the Revolutionary War Battle of Dallas Ferry (an earlier name for Port Norris), which took place on the river between the wharf at the end of what is now Main Street (the area today called Peak O' the Moon) and Menhaden on the Maurice River township side.

J. Recreation

Recreational use of the Maurice, Manumuskin, Menantico and Muskee Rivers is primarily water-based. Traditional sports such as hunting, fishing and trapping also play a significant role in the community.

In 1976, the New Jersey Department of Environmental Protection completed a comprehensive evaluation of the recreational and commercial use of New Jersey estuaries, including the Maurice River area. The study, conducted

From October 1975, to September 1976, indicated that on the Maurice River and its tributaries, 52,178 man days were expended by recreational and commercial fishermen, boaters, oystermen, bathers, salt hayers, hunters and trappers. The rivers serve recreationists from the local area, as well as the New York and Delaware Valley metropolitan areas.

As the Pinelands Comprehensive Management Plan has recognized, southern New Jersey will experience a steady increase in the demand for recreation opportunities due to increasing population and mobility of people. In a 1979 survey conducted by the Cumberland County Planning Board, 50% of all marina owners indicated they were planning to enlarge their existing facilities to meet additional needs.

APPENDICES

Appendix A
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TABLE 2.
CLASSIFICATION CRITERIA FOR WILD, SCENIC AND RECREATIONAL RIVER AREAS *

ATTRIBUTE	WILD	SCENIC	RECREATIONAL
Water Resources Development	Free of impoundment.	Free of impoundment.	Some existing impoundment or diversion. The existence of low dams, diversions or other modifications of the waterway is acceptable, provided the waterway remains generally natural and riverine in appearance.
Shoreline Development	Essentially primitive. Little or no evidence of human activity. The presence of a few inconspicuous structures, particularly those of historic or cultural value, is acceptable. A limited amount of domestic livestock grazing or hay production is acceptable. Little or no evidence of past timber harvest. No ongoing timber harvest.	Largely primitive and undeveloped. No substantial evidence of human activity. The presence of small communities or dispersed dwellings or farm structures is acceptable. The presence of grazing, hay production or row crops is acceptable. Evidence of past or ongoing timber harvest is acceptable, provided the forest appears natural from the riverbank.	Some development. Substantial evidence of human activity. The presence of extensive residential development and a few commercial structures is acceptable. Lands may have been developed for the full range of agricultural and forestry uses. May show evidence of past and ongoing timber harvest.
Accessibility	Generally inaccessible except by trail. No roads, railroads or other provision for vehicular travel within the river area. A few existing roads leading to the boundary of the river area is acceptable.	Accessible in places by road. Roads may occasionally reach or bridge the river. The existence of short stretches of conspicuous or longer stretches of inconspicuous roads or railroads is acceptable.	Readily accessible by road or railroad. The existence of parallel roads or railroads on one or both banks as well as bridge crossings and other river access points is acceptable.
Water Quality	Meets or exceeds Federal criteria or federally approved State standards for aesthetics, for propagation of fish and wildlife normally adapted to the habitat of the river, and for primary contact recreation (swimming) except where exceeded by natural conditions.	No criteria prescribed by the Wild and Scenic Rivers Act. The Federal Water Pollution Control Act Amendments of 1972 have made it a national goal that all waters of the United States be made fishable and swimmable. Therefore, rivers will not be precluded from scenic or recreational classification because of poor water quality at the time of their study, provided a water quality improvement plan exists or is being developed in compliance with applicable Federal and State laws.	

* Table to be used only in conjunction with text.

Appendix C
ELIGIBILITY AND CLASSIFICATION EVALUATION

SEGMENT: LOWER MAURICE - From U.S. Geological Survey control station Matts at Shellpile to Route 548 bridge at Mauricetown.

PROPOSED CLASSIFICATION: RECREATIONAL

CRITERIA	EXISTING CHARACTERISTICS AND CONDITIONS
Free flowing Quality	The Lower Maurice River segment has existing bulkheading and riprapping on the segment's shore. This development does not disqualify the river segment based on the criteria established in the guidelines which state "existing low dams, diversion works, rip-rap and other minor structures will not bar recreational classification, provided the waterway remains generally natural and riverine in appearance".
Outstanding Resources	The lower Maurice is a vital link to the Delaware Bay and the Pinelands National Reserve, provides habitat for the federally endangered bald eagle, wetlands used by migratory shorebirds and nationally significant duck population, spawning area for strip bass, is the site of oyster production, and Dorchester and Leesburg, designated Pineland villages.
Shoreline Development	Existing uses and development include the river communities of Shellpile, Leesburg, Dorchester and Mauricetown, commercial marinas, private docks, operating sand and gravel extraction machinery and shipyards. The federal guidelines for determining classification in the Wild and Scenic Rivers System for recreation clarifies that "lands may include some residential, commercial or similar development."
Accessibility	Segment is readily accessible by roads and crossed by Route 548 bridge.
Water Quality	Segment meets fishable goal of the Clean Water Act but insufficient information is available to determine if it meets swimmable goal.

ELIGIBILITY AND CLASSIFICATION EVALUATION

SEGMENT: MIDDLE MAURICE #1 - Route 548 bridge at Mauricetown to 3.6 river-miles upstream (at drainage ditch upstream of Fralinger).

PROPOSED CLASSIFICATION: SCENIC

CRITERIA	EXISTING CHARACTERISTICS AND CONDITIONS
Free Flowing Quality	The Middle Maurice #1 segment is free of impoundments and modifications.
Outstanding Resources	The Middle Maurice #1 is a vital link to the Delaware Bay and the Pinelands National Reserve, provides habitat for the federally endangered bald eagle as well as the striped bass and shortnose sturgeon, has the remains of a prehistoric Indian settlement, and the designated Pineland historic villages of Port Elizabeth and Bricksboro.
Shoreline Development	The Middle Maurice #1 segment is largely undeveloped, extensively wooded and dominated by wetlands. The only evidence of human activity is dispersed residential dwellings. This meets the criteria for scenic classification, from the federal guidelines which states "any structures or concentration of structures must be limited to relatively short reaches of the total area under consideration for designation".
Accessibility	Segment is paralleled by roads on both sides of the river and accessible in places.
Water Quality	Segment meets fishable goal of the Clean Water Act but insufficient information is available to determine if it meets swimmable goal.

ELIGIBILITY AND CLASSIFICATION EVALUATION

SEGMENT: MIDDLE MAURICE #2 - From drainage ditch upstream of Fralinger to 3.1 river-miles upstream (0.5 river-miles upstream from USGS control station Burcham at Laurel Lake).

PROPOSED CLASSIFICATION: RECREATIONAL

CRITERIA	EXISTING CHARACTERISTICS AND CONDITIONS
Free flowing Quality	The Middle Maurice #2 segment has an existing diked farm and some riprapping on the segment's shore. The segment was found eligible based on the criteria established in the guidelines which state "existing low dams, diversion works, rip-rap and other minor structures will not bar recreational classification, provided the waterway remains generally natural and riverine in appearance".
Outstanding Resources	The Middle Maurice #2 is a vital link to the Delaware Bay and the Pinelands National Reserve, provides habitat for the federally endangered bald eagle, and has federally and globally endangered vegetation.
Shoreline Development	Existing uses and development include residential dwellings, private docks, a commercial marina, and an abandoned wharf. The federal guidelines for determining classification in the Wild and Scenic Rivers System for recreation clarifies that "lands may include some residential, commercial or similar development."
Accessibility	Segment is readily accessible by roads.
Water Quality	Segment meets fishable goal of the Clean Water Act but insufficient information is available to determine if it meets swimmable goal.

ELIGIBILITY AND CLASSIFICATION EVALUATION

SEGMENT: MIDDLE MAURICE #2 - From drainage ditch upstream of Fralinger to 3.1 river-miles upstream (0.5 river-miles upstream from USGS control station Burcham at Laurel Lake).

PROPOSED CLASSIFICATION: RECREATIONAL

CRITERIA	EXISTING CHARACTERISTICS AND CONDITIONS
Free flowing Quality	The Middle Maurice #2 segment has an existing dyked farm and some riprapping on the segment's shore. The segment was found eligible based on the criteria established in the guidelines which state "existing low dams, diversion works, rip-rap and other minor structures will not bar recreational classification, provided the waterway remains generally natural and riverine in appearance".
Outstanding Resources	The Middle Maurice #2 is a vital link to the Delaware Bay and the Pinelands National Reserve, provides habitat for the federally endangered bald eagle, and has federally and globally endangered vegetation.
Shoreline Development	Existing uses and development include residential dwellings, private docks, a commercial marina, and an abandoned wharf. The federal guidelines for determining classification in the Wild and Scenic Rivers System for recreation clarifies that "lands may include some residential, commercial or similar development."
Accessibility	Segment is readily accessible by roads.
Water Quality	Segment meets fishable goal of the Clean Water Act but insufficient information is available to determine if it meets swimmable goal.

ELIGIBILITY AND CLASSIFICATION EVALUATION

SEGMENT: UPPER MAURICE #1 - From 0.5 river-miles upstream from USGS control station Burcham at Laurel Lake to 2.5 river-miles upstream (3.0 river-miles upstream from Laurel Lake area).

PROPOSED CLASSIFICATION: SCENIC

CRITERIA	EXISTING CHARACTERISTICS AND CONDITIONS
Free Flowing Quality	The Upper Maurice #1 segment is free of impoundments and modifications.
Outstanding Resources	The Upper Maurice #1 is a vital link to the Delaware Bay, provides habitat for the federally endangered bald eagle as well as habitat for the striped bass and historically shortnose sturgeon and is the site of federally and globally endangered vegetation.
Shoreline Development	The Upper Maurice #1 segment is largely undeveloped, extensively wooded and dominated by marshlands. The only examples of human activity present in this segment include a trailer park, abandoned storage bins and a beach area. The segment meets the criteria for scenic classification established from the federal guidelines which states that "any structures or concentration of structures must be limited to relatively short reaches of the total area under concentration for designation".
Accessibility	Segment is accessible through five unimproved roads.
Water Quality	Segment meets fishable goal of the Clean Water Act but insufficient information is available to determine if it meets swimmable goal.

ELIGIBILITY AND CLASSIFICATION EVALUATION FOR ADDITIONAL SEGMENTS

SEGMENT: UPPER MAURICE #2 - From point 3 river miles north of Laurel Lake area to south side of Millville sewage disposal plant.

PROPOSED CLASSIFICATION: SCENIC

CRITERIA	EXISTING CHARACTERISTICS AND CONDITIONS
Free Flowing Quality	The Upper Maurice #2 segment is free of impoundments and modifications.
Outstanding Resources	The Upper Maurice #2 is a vital link to the Delaware Bay, provides habitat for the federally endangered bald eagle, as well as habitat for the striped bass and historically shortnose sturgeon, and is the site of Parker's pipewort, <u>Eriocaulon parkeri</u> , listed as rare by the U.S. Fish and Wildlife Service.
Shoreline Development	The segment is largely undeveloped, extensively wooded and dominated by wetlands. There is little evidence of human activity on the shoreline beyond one residential dwelling. This meets the criteria for scenic classification from the federal guidelines which state the adjacent lands must be "largely primitive and undeveloped [with] no substantial evidence of human activity."
Accessibility	Segment has portion of two-lane road on east side of river but is accessible only through two unimproved roads.
Water Quality	Segment meets fishable goal of the Clean Water Act but insufficient information is available to determine if it meets swimmable goal.

ELIGIBILITY AND CLASSIFICATION EVALUATION

SEGMENT: LOWER MANUMUSKIN - From confluence with the Maurice River to 2 river-miles upstream.

PROPOSED CLASSIFICATION: RECREATIONAL

CRITERIA	EXISTING CHARACTERISTICS AND CONDITIONS
Free Flowing Quality	The Lower Manumuskin segment is free of impoundments and modifications.
Outstanding Resources	The Lower Manumuskin is a vital link to the Delaware Bay and the Pinelands National Reserve, provides habitat for the federally endangered bald eagle, has pristine water quality, and has the designated Pineland village of Port Elizabeth.
Shoreline	Existing uses and development include the river community of Port Elizabeth, clustered residential dwellings, private docks, and one camp. The federal guidelines for determining classification in the Wild and Scenic Rivers System for recreation clarifies that "lands may include some residential, commercial or similar development."
Accessibility	Segment is accessible by road and Route 47 bridge crossing.
Water Quality	Segment exceeds all federal and state standards in the Clean Water Act as fishable and swimmable.

ELIGIBILITY AND CLASSIFICATION EVALUATION

SEGMENT: UPPER MANUMUSKIN #1 - From 2 river-miles upstream of confluence with Maurice River to Route 49 bridge at Cumberland Pond.

PROPOSED CLASSIFICATION: SCENIC

CRITERIA	EXISTING CHARACTERISTICS AND CONDITIONS
Free Flowing Quality	The Upper Manumuskin #1 segment is free of impoundments and modifications.
Outstanding Resources	The Upper Manumuskin is a vital link to the Delaware Bay and the Pinelands National Reserve, provides habitat for the federally endangered bald eagle, has pristine water quality, and supports federally endangered wildlife and the sensitive joint vetch, <u>Aeschynomene virginica</u> , a globally imperiled plant.
Shoreline Development	The segment is largely undeveloped, extensively wooded and dominated by marshlands. The only evidence of human activity is dispersed residential dwellings. This act meets the criteria for scenic classification established in the federal guidelines which state "any structures or concentration of structures must be limited to relatively short reaches of the total area under consideration for designation".
Accessibility	Segment is crossed by the Pennsylvania-Reading Seashore Railroad bridge, Fries Mill Bridge which is a closed-to-traffic bridge and a parallel road on the east side.
Water Quality	Segment exceeds all federal and state standards in the Clean Water Act as fishable and swimmable.

ELIGIBILITY AND CLASSIFICATION EVALUATION FOR ADDITIONAL SEGMENTS

SEGMENT: UPPER MANUMUSKIN #2 - From end of backwater at Cumberland Pond to source at Route 557.

PROPOSED CLASSIFICATION: SCENIC

CRITERIA	EXISTING CHARACTERISTICS AND CONDITIONS
Free Flowing Quality	The Upper Manumuskin #2 segment is free of impoundments and modifications.
Outstanding Resources	The Upper Manumuskin is a vital link to the Delaware Bay and the Pinelands National Reserve, provides habitat for the federally endangered bald eagle, has pristine water quality, supports endangered wildlife and a sedge, <u>Carex barrattii</u> , and two globally endangered plants, a boneset, <u>Eupatorium resinosum</u> , and sensitive joint vetch, <u>Aeschynomene virginica</u> .
Shoreline Development	The segment is largely undeveloped, extensively wooded and dominated by marshlands. The only evidence of human activity is dispersed residential dwellings. This meets the criteria for scenic classification established in the federal guidelines which states "any structures or concentration of structures must be limited to relatively short reaches of the total area under consideration for designation".
Accessibility	Segment has one paved road bridge crossing and is accessible through six unimproved roads.
Water Quality	Segment meets or exceeds all federal and state standards in the Clean Water Act as fishable and swimmable.

ELIGIBILITY AND CLASSIFICATION EVALUATION

SEGMENT: LOWER MENANTICO - From confluence with Maurice River to Route 55 bridge.

PROPOSED CLASSIFICATION: RECREATIONAL

CRITERIA	EXISTING CHARACTERISTICS AND CONDITIONS
Free flowing Quality	The Lower Menantico segment is free of impoundments or modifications.
Outstanding Resources	The Lower Menantico is a vital link to the Delaware Bay, provides habitat for the federally endangered bald eagle, and may meet pristine water quality.
Shoreline Development	Existing uses and development include dispersed and clustered residential dwellings and private docks. The federal guidelines for determining classification in the Wild and Scenic Rivers System for recreation clarifies that "lands may include some residential, commercial or similar developments."
Accessibility	Segment is accessible by roads, and crossed by Route 47 and Route 55 road bridges.
Water Quality	Segment meets or exceeds all federal and state standards in the Clean Water Act as fishable and swimmable.

ELIGIBILITY AND CLASSIFICATION EVALUATION

SEGMENT: UPPER MENANTICO - From Route 55 bridge to base of impoundment at Menantico Lake.

PROPOSED CLASSIFICATION: SCENIC

CRITERIA	EXISTING CHARACTERISTICS AND CONDITIONS
Free flowing Quality	The Upper Menantico segment is free of impoundments or modifications.
Outstanding Resources	The Upper Menantico is a vital link to the Delaware Bay, provides habitat for the federally endangered bald eagle, is thought to be eligible for meeting pristine water quality, and hosts federally and globally endangered plant and animal species.
Shoreline Development	The segment is largely undeveloped, extensively wooded and dominated by wetlands. The only evidence of human activity is dispersed residential dwellings. This meets the criteria for scenic classification established in the federal guidelines which state "any structures or concentration of structures must be limited to relatively short reaches of the total area under consideration for designation.
Accessibility	Segment is accessible and crossed at Pennsylvania-Reading Seashore Line Bridge, Route 49 bridge, and Newcompton Road bridge.
Water Quality	Segment meets or exceeds all federal and state standards in the Clean Water Act as fishable and swimmable.

ELIGIBILITY AND CLASSIFICATION EVALUATION FOR ADDITIONAL SEGMENTS

SEGMENT: MUSKEE - From its confluence with the Maurice River to the Pennsylvania Reading Seashore Line Railroad Bridge at Jones Mill.

PROPOSED CLASSIFICATION: SCENIC

CRITERIA	EXISTING CHARACTERISTICS AND CONDITIONS
Free Flowing Quality	The Muskee is free of impoundments and modifications.
Outstanding Resources	The Muskee is a vital link to the Pinelands National Reserve and provides habitat for the federally endangered bald eagle.
Shoreline Development	The segment is largely undeveloped, extensively wooded and dominated by marshlands. The only evidence of human activity is dispersed residential dwellings of Port Elizabeth and Bricksboro. This meets the criteria for scenic classification established in the federal guidelines which states "any structures or concentration of structures must be limited to relatively short reaches of the total area under consideration for designation".
Accessibility	Segment is crossed by paved road bridges at Route 47 and Route 548 river and is accessible by three unimproved roads.
Water Quality	Segment meets or exceeds all federal and state standards in the Clean Water Act as fishable and swimmable.

APPENDIX D
The Nature Conservancy

EXPLANATION OF ELEMENT RANKS

GLOBAL ELEMENT RANKS:

- G1 = Critically imperiled globally because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor of its biology making it especially vulnerable to extinction. [Critically endangered throughout range.]
- G2 = Imperiled globally because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of other factors demonstrably making it very vulnerable to extinction throughout its range [Endangered throughout range.]
- G3 = Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range (e.g., a single western state, a physiographic region in the east) or because of other factors making it vulnerable to extinction throughout its range; in terms of occurrences, in the range of 21 to 100. [Threatened throughout range.]
- G4 = Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.
- G5 = Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.
- GA = Accidental in North America, i.e. not part of the established biota.
- GE = An exotic species established in North America.
- GH = Of historical occurrence throughout its range, i.e. formerly part of the established biota, with the expectation that it may be rediscovered.
- GU = Possibly in peril range-wide but status uncertain; need more information. This rank is used sparingly. Whenever possible, the most likely rank is assigned and a question mark added (e.g., G2?) to express uncertainty or to indicate a range two ranks are combined (e.g., G1G2, G1G3).
- GX = Believed to be extinct throughout range.

STATE ELEMENT RANKS:

- S1 = Critically imperiled in state because of extreme rarity usually 5 or few sites or 1,000 or fewer individuals. In New Jersey, this rank primarily includes species which are restricted to fragile specialized habitats or microhabitats which are few in number and/or restricted to an extremely small geographical area of the state. Included also are species which were formerly more abundant, but now through habitat destruction or through some other critical factor of its biology, has been demonstrably reduced in abundance. Simply put, these are species that even with intensive searching of suitable habitat, sizeable additional occurrences are unlikely to be discovered.
- S2 = Imperiled in state because of rarity, on the order of 6 to 20 occurrences and/or fewer than 3,000 total individuals. In general, these are species

restricted to less specialized habitats (e.i. limestone wetlands as opposed to limestone river bank seeps). Historically many of these species may have been more frequent but are now known from very few extant occurrences. Habitat destruction being the primary cause. Searching of suitable habitat may yield additional occurrences.

- S3 = Rare in state with 20 to 50 occurrences. Includes species which are widely distributed in the state but with small populations, or species with restricted distribution, but locally abundant. Not yet imperiled in state but may soon be if current trends continue. Searching of suitable habitat routinely yields additional occurrences.
- S4 = Apparently secure in state, generally with 100 or more occurrences and over 10,000 individuals.
- S5 = Demonstrably secure in state, with larger numbers of occurrences and individuals, and at least passive protection through presence on preserves or other managed areas.
- SA = Accidental in state, including species which only sporadically breed in state.
- SE = A species clearly exotic in New Jersey which includes those species not native to North America as well as any other species deliberately or accidentally introduced into the state from other parts of North America and are therefore not a conservation priority (viable introduced occurrences of G1 or G2 species may be exceptions).
- SE? = A species native to North America that may be adventive in New Jersey. This includes species which although their native range is very near to New Jersey, there exists some doubt as to whether their occurrence in the state is wholly natural. Since it is difficult, if not impossible, to determine whether these species represent species which are naturally extending their ranges or may in fact, represent species passively introduced (i.e., via railroads, migratory birds, etc.), species so ranked are treated as native to the state.
- SH = Despite some searching of both historic occurrences and suitable habitat, no extant occurrences currently are known. Not all historic occurrences have been checked, and unsearched potential habitat remains. Until all leads are reasonably exhausted, species ranked SH are considered possibly extant. While the last observed dates for most species ranked SH are 50 or more years old, species observed much more recently are also included when the only known occurrences have been destroyed and additional suitable habitat is lacking or has been reasonably searched.
- SU = Believed to be in peril but status uncertain. More information is needed to rank accurately. This rank is used sparingly. Whenever possible the most likely rank is combined with a question mark (e.g. S2?) to express uncertainty or a range is indicated by combining two ranks (e.g. SIS2).
- SX = Apparently extirpated from state. All historic occurrences checked and a thorough search of potential habitat completed. In New Jersey, the occurrences of nearly all these species are based

on single collections, most of which were made prior to 1900. The localities for many these species have been destroyed or greatly altered.

Note: A 'T' appearing in either the G Rank or S Rank, indicates that the infraspecific taxa is being ranked differently than the species. A 'Q' in the rank indicates that there is taxonomic uncertainty about the taxa being ranked (e.i., taxa is being accepted as full species in this list but may be treated as a variety or form by others).