

Reconnaissance Study of Potentially Eligible National Wild & Scenic Rivers in Delaware

Draft Dec 31, 2021

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TABLE OF CONTENTS

CHAPTER 1 INTRODUCTION	3
CHAPTER 2 NATIONAL WILD AND SCENIC RIVER SYSTEM.....	5
CHAPTER 3 RIVER RECONNAISSANCE	10
CHAPTER 4 ANALYSIS AND RESULTS.....	24
CHAPTER 5 CONCLUSIONS AND RECOMMENDATIONS	38
CHAPTER 6 REFERENCES	40
APPENDIX A	41
APPENDIX B	42

LIST OF FIGURES

Figure 1. Nationwide Rivers Inventory in Delaware.....	4
Figure 2. UDWRC water research students White Clay Creek State Park, Delaware (2021).....	4
Figure 3. National wild and scenic rivers in the U.S.	7
Figure 4. Nationwide Rivers Inventory (NRI) in the U.S.	10
Figure 5. Nationwide Rivers Inventory (NRI) in and around Delaware	11
Figure 6. Nationwide Rivers Inventory (NRI) stream systems in Delaware	12
Figure 7. Nationwide Rivers Inventory (NRI) segments in Delaware.....	13
Figure 8. White Clay Creek National Wild & Scenic River watershed in Delaware and Pennsylvania	23
Figure 9. Protected land in the National Rivers Inventory watersheds in Delaware.....	25
Figure 10. Public Open Space in the Nationwide Rivers Inventory watersheds in Delaware.....	26
Figure 11. Protected land in the Nationwide River Inventory watersheds of Delaware.....	26
Figure 12. Protected land in the Nationwide River Inventory watersheds of Delaware.....	27
Figure 13. Forests and wetlands of the Nationwide River Inventory watersheds in Delaware	28
Figure 14. Forests and wetlands of the Nationwide River Inventory watersheds in Delaware	29
Figure 15. Population Density of the Nationwide Rivers Inventory watersheds in Delaware	30
Figure 16. Urban/Suburban Land in Nationwide Rivers Inventory watersheds in Delaware	31
Figure 17. Poverty levels in Nationwide River Inventory watersheds in Delaware	32
Figure 18. Minority populations in Nationwide River Inventory watersheds in Delaware	33
Figure 19. Local governments with floodplain ordinances in Delaware.....	43
Figure 20. Local governments with stormwater ordinances in Delaware	43

LIST OF TABLES

Table 1. Nationwide Rivers Inventory segments in Delaware.....	14
Table 2. Outstandingly Remarkable Values of Nationwide Rivers Inventory segments in Delaware	24
Table 3. Public Open Space in the Nationwide Rivers Inventory watersheds in Delaware.....	24
Table 4. Forest and wetlands of the Nationwide Rivers Inventory watersheds in Delaware	28
Table 5. Population Density of the Nationwide Rivers Inventory watersheds in Delaware	30
Table 6. Urban/Suburban Land in Nationwide Rivers Inventory watersheds in Delaware	31
Table 7. National Rivers Inventory of Delaware	34
Table 8. Outstanding Resource Values in Delaware	35
Table 9. Review of floodplain and drainage standards in New Castle County.....	44
Table 10. Review of floodplain and drainage standards in Kent County.....	45
Table 11. Review of floodplain and drainage standards in Sussex County.....	45

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Chapter 1 Introduction

Background

The University of Delaware Water Resources Center (UDWRC) worked with the Coalition for the Delaware River Watershed (CDRW) and National Park Service (NPS) and to evaluate the potential eligibility and suitability of designating streams on the Nationwide Rivers Inventory (NRI) to the National Wild & Scenic River system (W&S) in Delaware. During the 1970s and 1980s, the NPS mapped the NRI that listed 41 river segments in Delaware as potentially eligible for W&S river designation (Figure 1). Since 2000, the White Clay Creek has been the sole W&S river in Delaware and after 20 years of successful management the thought is more rivers could be added to the system. UDWRC research students (Figure 2) assisted with the reconnaissance study that began in summer 2021 with delivery of a December 2021 draft report.

Eligible and Suitable Wild & Scenic Rivers: The 1968 Wild and Scenic Rivers Act provided three ways to add a W&S river system through studies of eligibility and suitability:

- Section 2(a)(ii) upon application of a governor of a state.
- Section 5(a) directs agencies to study specific rivers as authorized by Congress
- Section 5(d)(1) directs land agencies (NPS) to initiate wild & scenic river studies as planning processes.

Eligibility: To be eligible for designation, a river must be free-flowing and possess outstandingly remarkable values (ORV) that are river-dependent natural, cultural, or recreational resources and unique, rare, or exemplary at a regional or national scale. The eligibility analysis examines the river's hydrology, including man-made alterations, and an inventory of its natural, cultural, and recreational resources.

Suitability: The final step in the river assessment process for wild and scenic designation is determination of suitability which rivers should be recommended for addition to the National System and an agency's recommendation to Congress. The recommendation to Congress is made by the National Park Service via a document that complies with the National Environmental Policy Act (NEPA).

Scope

The UDWRC conducted the reconnaissance study in accordance with the following scope of work:

1. **National Rivers Inventory:** Map 41 rivers on the NPS NRI in Delaware and add Red Clay Creek and Christina River or 43 rivers total. Characterize river segment by land use, population, soils, geology, dams, demographics (diversity, equity, inclusion, and justice indicators), and political boundaries.
2. **Outstanding Resource Values:** Identify ORVs such as scenery, recreation, geology, fish, wildlife, prehistory, history, cultural (DEIJ) and for each of the 43 rivers.
3. **Local Partners:** Identify local environmental committees, watershed organizations/associations, nonprofits, NGOs, and stakeholders for each NRI who may support W&S designation.
4. **Eligibility/Suitability:** Prioritize and recommend rivers for further Phase I study of W&S eligibility by the NPS and Phase II study of suitability based on conserved land and local support in each NRI.
5. **Report:** Prepare report recommending NPS study of Delaware rivers most eligible & suitable for W&S river designation.

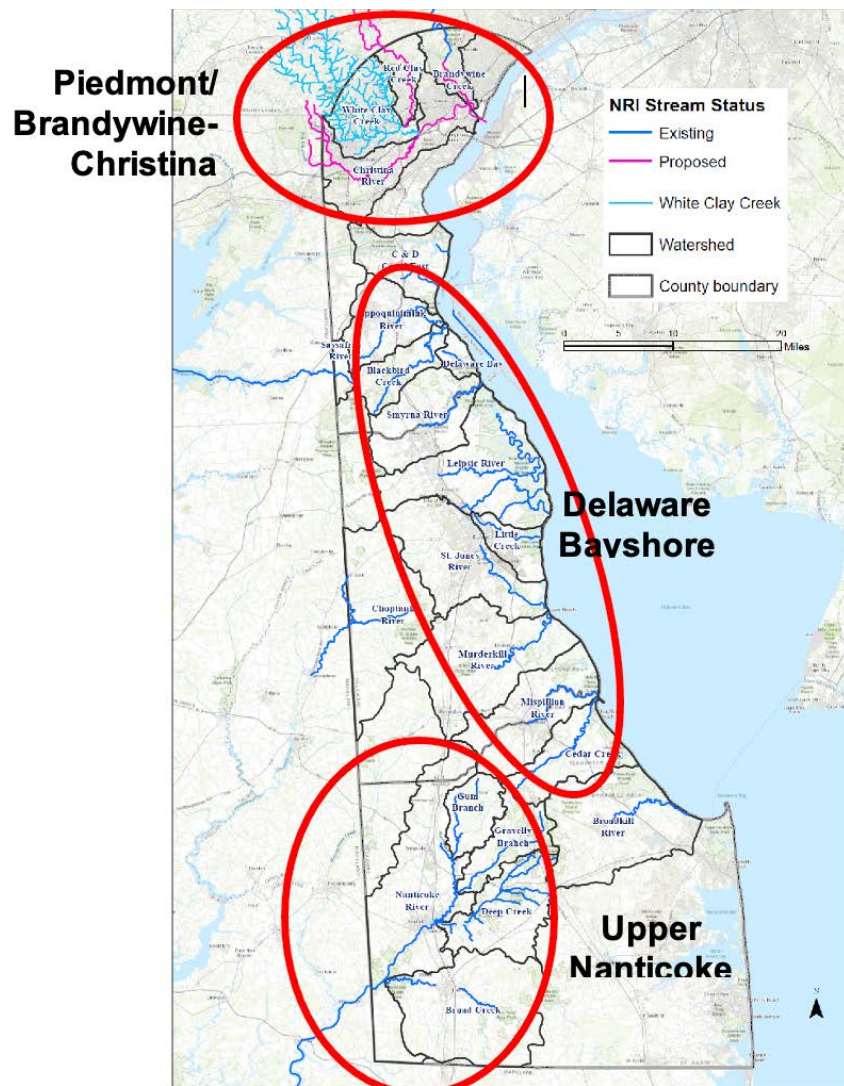


Figure 1. Nationwide Rivers Inventory in Delaware



Figure 2. UDWRC water research students White Clay Creek State Park, Delaware (2021)

Chapter 2 National Wild and Scenic River System

National Wild and Scenic Rivers Act of 1968

The National Park Service describes that Public Law 90-542 (National Wild and Scenic Rivers Act of 1968) was passed to preserve and protect rivers of America that possess valuable, unique qualities for the benefit of current and future generations (Figure 3). To complement policies focused on dams and other construction in or near watersheds of the U.S., the National Wild and Scenic Rivers Act seeks to protect and bolster water quality and similar conservation efforts of rivers or sections of rivers and watersheds. Outstanding Remarkable Values (ORVs) relating to scenery, recreation, geology, culture, fish and wildlife, and historic relevance that are river-related (within ¼ mile of the river), contribute to functioning of the river ecosystem, and owe existence to the presence of the river are organized under three classifications: Wild, Scenic, or Recreational.

Wild rivers are defined as being without impoundments and only accessible by trails with shorelines “essentially primitive” maintaining clean, unpolluted water (NPS 1994). Scenic rivers are similar to wild rivers but can be reached by road. Recreational rivers are accessible by road and railway and have previous development and/or diversion. Along with protection and advocacy for waterways, the National Wild and Scenic Rivers Act also determines best use practices and potential development planning in protected areas. The Act exists as a successful model of bipartisan cooperation for conservation efforts across the country.

Rivers in their free-flowing state are considered eligible for induction to the Act through a blueprint for the process by which rivers around the country can be considered for the Wild and Scenic Rivers System. This monumental victory for conservation provided many successes of river restoration and protection.

From its implementation under the National Wild and Scenic Rivers Act over six decades ago, the National Wild and Scenic River System has grown to include 13,413 miles of 226 rivers in 41 states and the Commonwealth of Puerto Rico. Most recently in 2019 amendments and additional designations extended recognition of the Wild and Scenic Rivers System to 18 new rivers and sections across the country. The White Clay Creek watershed, the sole W&S river in the First State, was designated by President Clinton and Congress in 2000. In the White Clay Creek watershed in Delaware and Pennsylvania, 26 stream miles are designated scenic and 173 miles are recreational for a total of 199 miles protected and in Delaware, 95 miles are designated as wild and scenic or 4% of the state's river miles.

Outstandingly Remarkable Values

Outstandingly Remarkable Values (ORVs) include Scenic, Recreational, Geologic, Fish, Wildlife, Cultural, Historic, and Other Similar Values such as Diversity, Equity, and Inclusion (DEIJ) values. The following eligibility criteria set minimum thresholds to establish ORVs and are illustrative but not inclusive.

Scenic: These rivers have landform, vegetation, water, and color that result in landscapes that are rare, unique, or exemplary. When analyzing scenic values the seasonality of flow variations, ice, and snow cover, and vegetation can also be considered, along with the impact of human development on the landscape. Scenery and visual attractions may be highly diverse over different parts of the river or river segment.

Recreational: High quality recreational opportunities attract visitors from throughout the region; or the recreational opportunities are unique, rare, or exemplary within the region. Additional rivers may provide highly valued settings and opportunities for healthy, active outdoor activities for people close to where they live. Others may uniquely connect communities, support or diversify local economies and provide needed access to open space and the outdoors. Activities may include sightseeing, wildlife observation, camping, photography, hiking, fishing, hunting, boating, and exceptional interpretive opportunities.

Geologic: Geologic features along the river corridor may be in an unusually active stage of development, represent a textbook example of geologic processes, or represent a unique or rare combination of geologic features (erosional,

cave formation, volcanic, glacial, or other geologic structures).

Fish: The river is nationally or regionally an important producer of resident and/or migratory fish species. Of particular significance are a diversity of fish species or the presence of wild stocks and/or federal or state listed (or candidate) threatened, endangered or species of conservation concern. The river provides uniquely diverse or exceptionally high quality habitat for fish species indigenous to the region of comparison. Of particular significance is habitat for wild stocks and/or federal or state listed (or candidate) threatened, endangered or species of conservation concern.

Wildlife: The river, or area within the river corridor, contains nationally or regionally important populations of indigenous wildlife species. Of particular significance are species diversity, species considered to be unique, and/or populations of federal or state listed (or candidate) threatened or endangered or species of conservation concern. The river, or area within the river corridor, provides uniquely diverse or exceptionally high quality habitat for wildlife of national or regional significance, and/or may provide unique habitat for federal or state listed (or candidate) threatened, endangered, or species of conservation concern. The river or riparian area may provide critical habitat connectivity for migratory species or for wildlife that utilizes a variety of habitat types during different life stages.

Cultural: The river corridor contains evidence of significant river-related occupation and use (e.g. pre-contact sites, ceremonial area, fishing area, sacred religious sites), by Native Americans in the past or at present. Site integrity may enhance education and interpretation significance (e.g. sites that are unmodified and retain their original character; important sites or river crossings; features that are in excellent condition). Sites or features currently listed in or eligible for listing in the National Register of Historic Places, particularly in abundance such as Archeological Districts and Cultural Landscapes, and National Historic Landmarks, contribute to the value. Not all listed/eligible resources equate to an ORV, but will still be afforded protections under cultural and historic resource protection laws

Historic: Sites or features are associated with historically significant river-related events, activity (e.g. major railroad sites, early settlement), or associated with exceptional people (e.g. John Wesley Powell, Brigham Young). A historic feature is at least 50 years old. Site integrity may enhance education and interpretation significance. The presence of exceptional examples of river-related structure architecture from a significant period of history, sites that are unmodified and retain their original character, or features that are exceptional examples within the region are also relevant considerations. Sites or features currently listed in or eligible for listing in the National Register of Historic Places, particularly in abundance such as Historic Districts and designated as National Historic Landmarks contribute to the value. Not all listed/eligible resources equate to an ORV, but will still have protections under cultural and historic resource protection laws.

Other Similar Value: Other similar outstandingly remarkable values can include, but are not limited to, botany, hydrology, ecology, paleontology, and science.

Potential Classifications include:

Wild: River areas are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America."

Scenic: River areas are "free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads."

Recreational: River areas are "readily accessible by road or railroad, that may have some shoreline development, and that may have undergone some impoundment or diversion in the past."

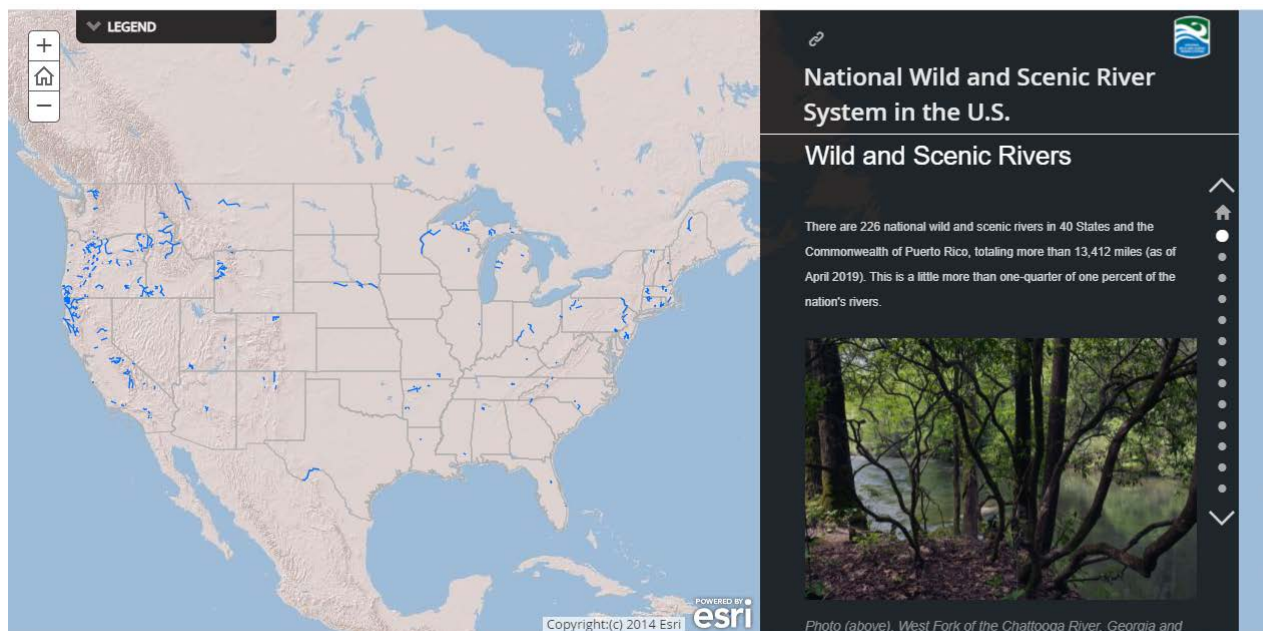


Figure 3. National wild and scenic rivers in the U.S.

Eligibility and Suitability

Before a river can be granted recognition under the National Wild and Scenic Rivers Act, it must meet standards of eligibility and suitability. Rivers and river segments in Delaware that already have status as part of the Nationwide Rivers Inventory, explored and defined in Section 2, are prominent and exist as having great potential for future introduction to the national system. Reconnaissance may be initiated in one of three ways: (1) submitted application by a state's governor, (2) Congressional authorization of study to be carried out by an agency, or (3) study by the National Park Service as part of routine planning process (NPS 2021b). Section 2(a)(ii) of the National Wild and Scenic Rivers Act allows the governor of a state to submit application to the Secretary of the Interior, which is then evaluated by the National Park Service who prepares a draft report and assessment of the environmental impacts of designation under the National Environmental Policy Act (NEPA). The Federal Registration listing process begins in Section 5(a) of the Act states agency studies of specific rivers as authorized by Congress. Section 5(d)(1) states the National Park Service can study river segments as a part of typical planning procedure where water and land resources are involved. Potential wild, scenic, and recreational designations may be decided upon review by Congress.

Clear definitions and factors for eligibility and suitability are provided by the National Park Service. For eligibility, there are two main requirements that must be met by any river under consideration for the national system: (1) existing in a free-flowing state and (2) bearing one or more river-dependent ORV. Eligibility is tested through a river's hydrology and a listing of associated cultural, natural, and recreational resources. Suitability, the final step in the assessment process for rivers under consideration, involves the decision making process of which rivers to recommend for selection, as well as the action by agencies to recommend those selections to Congress via NPS with appropriate documentation as determined by NEPA (NPS 2021b). It is through the successful completion of this process that a river may be deemed eligible and suitable for recommendation to join the National Wild and Scenic Rivers System.

Wild and Scenic River Reconnaissance Surveys: In cases when there is strong local interest in authorizing a formal study of a river's eligibility and suitability for designation under Section 5(a) of the WSRA, but where Congress has not yet approved such legislation, local congressional members may request that the NPS perform a preliminary evaluation of the river's qualifications. Such studies are commonly known as "reconnaissance surveys," which gather existing information about the river. Requests for these surveys are routed through the NPS. Authority for conducting reconnaissance surveys comes from 54 USC 100507(b)(5), "Additional Areas for the NPS

System,” which limits the cost to \$25,000. These costs are normally covered by the SRS fund source. Initiation of a reconnaissance survey may need to be phased due to competing funding and staffing needs from congressionally-authorized studies and other kinds of special studies.

Survey Scope and Findings: While WSR reconnaissance surveys utilize the same eligibility and suitability criteria that apply to all candidate rivers, the survey is far more limited in scope than a 5(a) study. Survey findings focus on the candidate river’s likely eligibility for WSR designation and are based solely on existing information, which may be quite limited. The survey report should note such limitations to help inform future work (e.g., a 2(a)(ii) designation nomination or Section 5(a) study) should the community choose to support such efforts.¹⁹ Notably, reconnaissance surveys are not subject to NEPA because they do not involve major federal decisions affecting the environment. Thus, while existing local and state land-use controls and the conservation status of riverfront lands will be described, if possible, along with gaps in available information, the survey’s findings with respect to suitability are very preliminary in nature. The WSR reconnaissance survey report should clearly and objectively explain the NPS’s river eligibility and suitability findings, while noting information gaps.

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Suitability: The final step in the river assessment process for wild and scenic designation is determination of suitability which rivers should be recommended for addition to the National System and an agency’s recommendation to Congress. The recommendation to Congress is made by the National Park Service via a document that complies with the National Environmental Policy Act (NEPA).

The National Wild and Scenic River System includes 212 rivers flowing along 12,734 miles. Important sections of the National Wild and Scenic Rivers Act of 1968 include:

- Section 1. Protects a river’s free flow, water quality, and “Outstandingly Remarkable” values.
- Section 7. No federally assisted water resource development projects permitted that have an adverse effect on designated river values.
- Section 10. Protects and enhances some “Outstandingly Remarkable” values.
- Section 11. Agreements allow flow of Federal funding to river partner organizations.

Wild and Scenic River Management Models

Successful governance and management models of W&S rivers include:

The Federal Administered Model: Managed as traditional administrative units of the National Park System such as Upper Delaware and Delaware Water Gap where the NPS owns adjoining lands. Staffing includes superintendent and law enforcement. Only the NPS has direct resource management responsibilities. A permitting system is established for special uses and recreation.

The Partnership Model: Not managed as units of the National Park System. The NPS provides technical assistance to local governments and NGOs. Rivers run through local, state, private, and tribal lands. No NPS land and no federal land acquisition. The NPS works in partnership with local governments and NGOs.

Partnership Wild and Scenic Rivers (PWSRs) are managed through long-term partnerships and collaboration between federal, state, and local stakeholders. A key component of the PWSR governance model is the increasing and active leadership role that Congress plays in the management of these rivers where rivers are designated as PWSRs to be administered by the Secretary of the Interior through the NPS in partnership with local governments, councils, watershed groups, and non-governmental organizations (NPS 2021a).

Over the last several decades those at the local, state, and federal level with watershed and river conservation interests have worked in cooperation to modify the National Wild and Scenic Rivers Act to establish an effective, partnership-based approach to Nationwide Rivers Inventory (NRI) management. These partnerships are conducted through cooperative agreements describing the collaborative approach. Currently, PWSR include 16 rivers, which share certain common criteria and principles in their management approach with the goals of meeting standards of river conservation mandated at the federal level, while also considering the local needs and traditional uses (Fosburgh et al. 2008).

Among the shared principles and management systems of the PWSRs is that there is no federal ownership or management of lands, and federal ownership is not authorized in the legislation or recommended in the management plan. Additionally, the Wild and Scenic designation does not automatically establish the area comprising the PWSR and surrounding area as a federal park or locally undesired federal land ownership and the National Park Service does not procure or plan to acquire the land in the river corridor or watershed. T

Due to the restricted role of the federal government, there is an increased focus on a more local management strategy founded on the actions of local governments in partnership with the county and state governments. The local-based strategy endeavors to minimize the concerns of local citizens regarding potential government regulation and loss of private lands, and also encourages local citizens to have a more active and participatory role in the PWSR management process. PWSR management strategies are designed and implemented through the local study committee and responsibilities related to managing and protecting the river and associated resources are shared amongst all the stakeholders - local, state, federal, and non-governmental (Molfetta 2016).

Chapter 3 River Reconnaissance

Nationwide River Inventory

Public Law 90-542 established the Wild and Scenic Rivers Act of 1968 which designated specific rivers for inclusion in the Wild and Scenic Rivers system. After the Wild and Scenic Rivers Act was established, the Department of the Interior Associate Solicitor for Parks and Recreation informed the Acting Director of the Bureau of Outdoor Recreation (BOR) that Section 5(d) of the Wild and Scenic Rivers Act authorized the Secretary of the Interior to conduct studies and investigate potential additional wild, scenic, and recreational river areas. In 1969, a memo was sent to all Regional Directors proposing 44 rivers for inclusion on a national list and in 1970 the assistant Director for State Grants and Resource Studies developed a further memo providing the necessary procedures for adding and deleting rivers on the Section 5(d) list, and an outline for compiling a Summary Report to determine a river's eligibility for inclusion on the list. The outline described the required information to be included in the Summary reports such as detailed river length, significant Outstanding Remarkable Values (ORVs), and surrounding land ownership.

The inventory process was initiated in the mid-1970's and proposed a national inventory of potential wild and scenic rivers. The NRI was first conducted in eastern states, with the National Park Service publishing and distributing an initial draft of the eastern states' segments in 1980, and evaluating the western states in the following years. The final version of the NRI with eastern and western segments was mapped in 1982.

Today, the NRI is a listing of more than 3,200 free-flowing river segments across the U.S. having one or more ORVs significant to the region or the United States at large (Figure 4). The NRI is also a source of information for statewide river assessments and federal agencies involved with stream-related projects, any group concerned with ecosystem management, as the inventory can provide the location of the nearest naturally-functioning system which might serve as a reference for monitoring activities, and for the recreationalist as it provides a listing of free-flowing, relatively undisturbed river segments. The NRI also serves as a listing of plant and animal species for restoration efforts on similar sections of river.

Nationwide Rivers Inventory



Figure 4. Nationwide Rivers Inventory in the U.S.

First State Rivers

The University of Delaware examined 41 rivers on the NRI (Figure 5) plus the Christina River and Red Clay Creek or 43 streams that cover 393 river miles (5% of the state's rivers), 1,650 square miles of watershed and a population of 755,000 home to $\frac{3}{4}$ of the state's residents (Table 1). The rivers in Delaware can be grouped into 3 watershed systems by geography, hydrology, and geologic province: (1) Brandywine-Christina or Piedmont, (2) Delaware Bayshore, and (3) Upper Nanticoke (Figures 6 and 7).

Brandywine-Christina (Piedmont)

Brandywine Creek
Red Clay Creek
Christina River
White Clay Creek (Existing W&S)

Delaware Bayshore

Blackbird Creek
Delaware Bay
Smyrna River
Leipsic River
Mispillion River
Cedar Creek
Broadkill River
Little Creek
St. Jones River
Murderkill River

Upper Nanticoke System

Gum Branch
Gravelley Branch
Deep Creek
Broad Creek
Nanticoke River

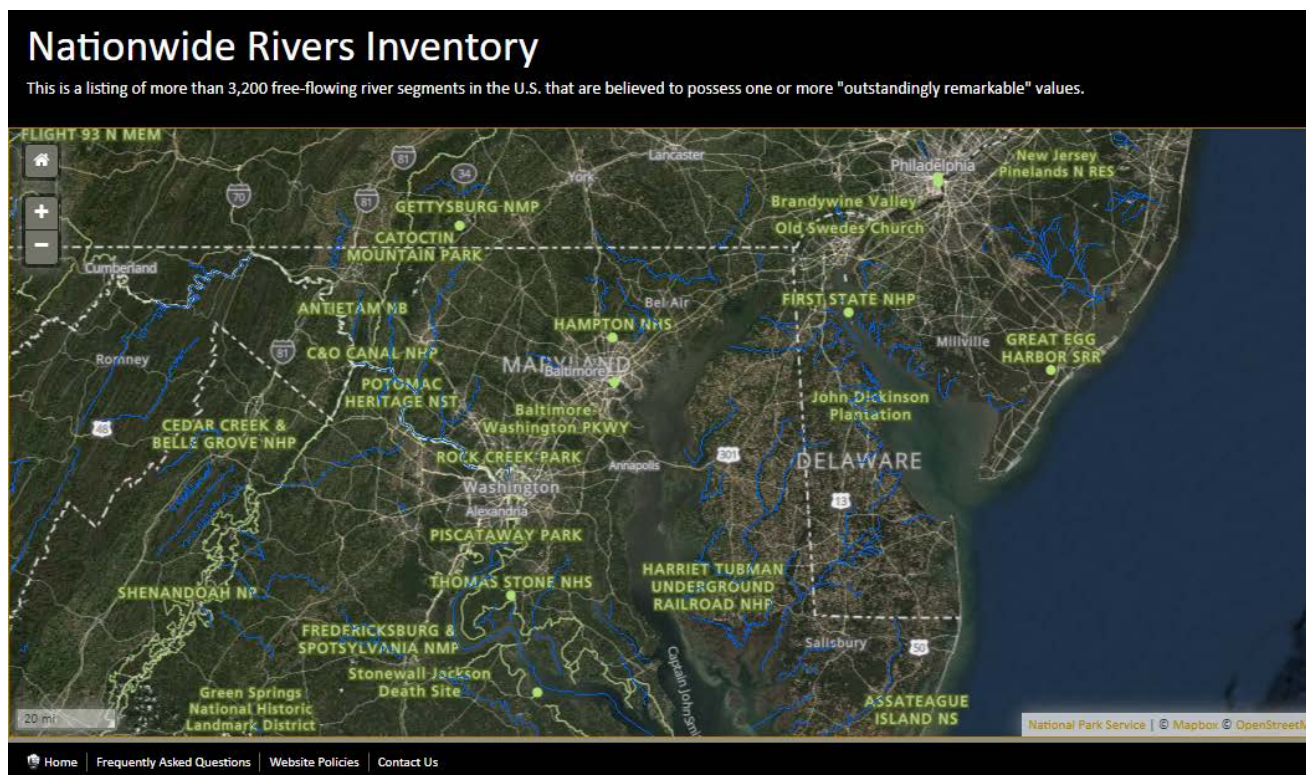


Figure 5. Nationwide Rivers Inventory in and around Delaware

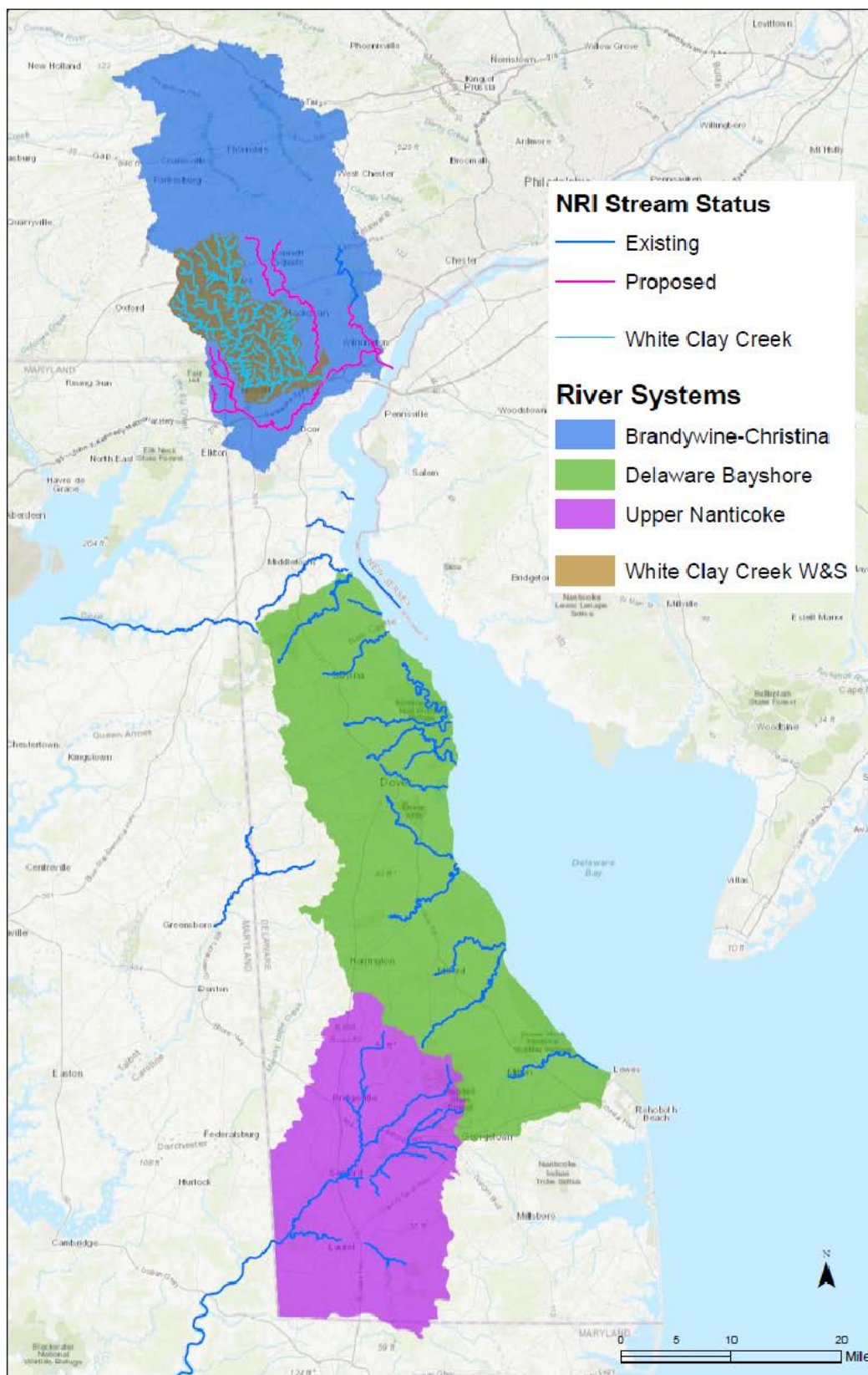


Figure 6. Nationwide Rivers Inventory stream systems in Delaware



Figure 7. Nationwide Rivers Inventory segments in Delaware

Table 1. Nationwide Rivers Inventory segments in Delaware

The Nationwide Rivers Inventory 41 Segments for the State of Delaware								
Reference Source: http://www.nps.gov/nrcr/programs/rtea/nri/ Note: Outstanding Resource Values (ORVs) Definitions at List Bottom								
For More Information Contact: Jamie Fosburgh, National Park Service, Rivers, Trails & Conservation Assistance, (617) 223-5191								
River	County	Reach	Length (miles)	Year Listed/Updated	Potential Classification	Description	ORVs	Other States
Brandywine Creek	New Castle	Rockland to Chadds Ford Junction.	6	1982		See Brandywine Creek Comments	R,H,C	PA
Brandywine Creek Comments: Historic -(Segment includes a National Historic Register District in Rockland.) Recreation -(Unique proximity to urban populations in Wilmington, Newark, and Philadelphia.) Cultural -(Creek and area renowned as the stream valley home of artists in the Wyeth family.)								
Choptank River	Caroline	Greensboro to headwaters of Tidy Island Creek at Marydel	16	1982		See Choptank River comments.	H,O	MD
Choptank River Comments: Botanic -(76% of the segment is an extensive undeveloped freshwater river swamp in a predominantly agricultural region.) Archeological -(Within corridor is the site of a buried forest estimated at 9,000 to 10,000 years of age which is believed to be the earliest appearance of Pleistocene oak forest in this region.) Historic -(Willow Grove, in the vicinity of Greensboro is on the National Register of Historic Places.)								
Cow Marsh Creek	Kent	Confluence with Choptank River to northeast of Petersburg	4	1982		See Cow Marsh Creek comments.	H,O	MD
Cow Marsh Creek Comments: Botanic -(76% of the segment is an extensive undeveloped freshwater river swamp in a predominantly agricultural region.) Archeological -(Within corridor is the site of a buried forest estimated at 9,000 to 10,000 years of age which is believed to be the earliest appearance of Pleistocene oak forest in this region.) Historic -(Willow Grove, in the vicinity of Greensboro is on the National Register of Historic Places.)								
River	County	Reach	Length (miles)	Year Listed/Updated	Potential Classification	Description	ORVs	Other States
Delaware River	New Castle, Salem	Delaware Bay to Salem Nuclear Power Plant.	4	1982		See Delaware River comments.	S,R,G,F,W,H,C,O	NJ
Appoquinimink River	New Castle	Mouth to headwaters.	15	1982		See Delaware River comments.	S,R,G,F,W,H,C,O	
Augustine Creek	New Castle	Confluence with the Delaware River to headwaters.	4	1982		See Delaware River comments.	S,R,G,F,W,H,C,O	
Blackbird Creek	New Castle	Mouth to headwaters.	15	1982		See Delaware River comments.	S,R,G,F,W,H,C,O	
Broadkill River	Sussex	Mouth of Milton.	10	1982		See Delaware River comments.	S,R,G,F,W,H,C,O	
Cedar Creek	Sussex	Mouth to headwaters.	7	1982		See Delaware River comments.	S,R,G,F,W,H,C,O	
Cedar Swamp	New Castle	Confluence with the Delaware River to Headwaters.	5	1982		See Delaware River comments.	S,R,G,F,W,H,C,O	
Little River	Kent	Confluence with the Delaware Bay to Dover.	5	1982		See Delaware River comments.	S,R,G,F,W,H,C,O	
Mispillion River	Sussex	Mouth to Silver Lake in Milford.	9	1982		See Delaware River comments.	S,R,G,F,W,H,C,O	

Murderkill River	Kent	Delaware Bay to Coursey Pond.	21	1982		See Delaware River comments.	S,R,G,F, W,H,C,O	
Smyrna River	New Castle, Kent	Mouth to Duck Creek Pond	11	1982		See Delaware River comments.	S,R,G,F, W,H,C,O	
St. Georges Creek	New Castle	Confluence with the Delaware River to Thousand Acre Marsh.	3	1982		See Delaware River comments.	S,R,G,F, W,H,C,O	
St. Jones River	Kent	Delaware Bay to Route 13 Bridge in Dover.	13	1982		See Delaware River comments.	S,R,G,F, W,H,C,O	

Delaware River Comments: **General**-(The Delaware River-Bay System represents an example of undeveloped rivers in an estuarine area. The area in total is composed of several distinct sub-areas which in combination form a highly exemplary, productive and important river mouth estuarine system. The area is the least developed of 16 similar identified areas in the northwest.) **Geologic**-(The main segment of the Delaware River is an outstanding example of a high order drowned river mouth.) **Cultural**-(Rivers and river segments include remnants of the once productive Middle Atlantic fishing industry.) **Historic**-(Segments include numerous National Historic Register Sites.) **Wild**-(System includes almost totally undeveloped river segments, dominated by tidal marsh, in a largely agricultural area.) **Recreation**-(System is accessible to high concentrations of urban populations in Wilmington, Del., Philadelphia, Pa., and Camden, N.J.) **Hydrologic**-(The Delaware River segment is a sparsely developed high order tidal river area.) **Wildlife**-(Areas within and adjacent to river corridors are important nesting, feeding, migrating and wintering sites for waterfowl along the Atlantic flyway.)

River	County	Reach	Length (miles)	Year Listed/Updated	Potential Classification	Description	ORVs	Other States
Leipsic River	Kent	Delaware Bay to DuPont Blvd.	19	1982		See Leipsic River comments.	W,H,O	
Herr Branch	Kent	Confluence with the Simons River to headwaters above Rte. 9.	3	1982		See Leipsic River comments.	W,H,O	
Duck Creek	Kent	Leipsic River to the Woodland Beach Area.	12	1982		See Leipsic River comments.	W,H,O	

Mahon River	Kent	Confluence with the Delaware Bay to the confluence with the Herr Branch.	3	1982		See Leipsic River comments.	W,H,O	
Muddy Branch	Kent	Confluence with the Leipsic River to headwaters above DE Rte. 9.	4	1982		See Leipsic River comments.	W,H,O	
Simons River and Green Creek	Kent	Delaware Bay to Boat Gut Bay.	5	1982		See Leipsic River comments.	W,H,O	

Leipsic River Comments: **Historic**-(3 National Historic Register sites in Leipsic.) **Wild**-(Almost totally undeveloped section of tidal marsh in a predominantly agricultural area. National Wildlife Refuge proposed Wilderness area.) **Botanic**-(63% of the segment flows through ecologically significant tidal wetlands which are significant contributors to the Delaware Bay estuarine system and possess excellent examples of a northern cordgrass prairie.) **Wildlife**-(A nationally recognized sanctuary for migratory waterfowl, birds of prey, and passerine species.)

River	County	Reach	Length (miles)	Year Listed/Updated	Potential Classification	Description	ORVs	Other States
Nanticoke River	Dorchester, Sussex	Tangier Sound to Seaford.	35	1982		See Nanticoke River comments.	H,O	MD
Nanticoke River	Sussex	Route 13 to Bridgeville.	10	1982		See Nanticoke River comments.	H,O	
Baker Mill Branch	Sussex	Concord Pond to Black Savannah Ditch.	2	1982		See Nanticoke River comments.	H,O	
Broad Creek	Sussex	Confluence with the Nanticoke River to near Laurel.	6	1982		See Nanticoke River comments.	H,O	
Deep Creek	Sussex	Confluence with Nanticoke near Route 13 to headwaters.	12	1982		See Nanticoke River comments.	H,O	
Gravelly Branch	Sussex	Confluence with Nanticoke to headwaters in Redden State Forest.	12	1982		See Nanticoke River comments.	H,O	

Gum Branch	Sussex	Confluence with Nanticoke to Rye Hole.	3	1982		See Nanticoke River comments.	H,O	
James Branch	Sussex	Records Pond to Trussum Pond to Trap Pond.	3	1982		See Nanticoke River comments.	W,H,O	
Layton-Vaughn Ditch	Sussex	Confluence with New Ditch to Route 28.	5	1982		See Nanticoke River comments.	H,O	
Marshy Hope Creek	Sussex	Confluence with the Nanticoke River to South of Federalsburg.	15	1982		See Nanticoke River comments.	H,O	
Mifflin Ditch	Sussex	Confluence with Deep Creek to headwaters in Redden State Forest.	5	1982		See Nanticoke River comments.	H,O	
New Ditch	Sussex	Confluence with Deep Creek to Route 28.	4	1982		See Nanticoke River comments.	H,O	
Rum Bridge Branch	Sussex	Confluence with Deep Creek to headwaters.	3	1982		See Nanticoke River comments.	H,O	
Toms Dam Branch	Sussex	Confluence with Gum Branch to headwaters.	7	1982		See Nanticoke River comments.	H,O	
Tubbs Branch	Sussex	Confluence with Deep Creek to headwaters.	4	1982		See Nanticoke River comments.	H,O	
Tyndall Branch	Sussex	Confluence/Deep Creek to Fleetwood Pond.	2	1982		See Nanticoke River comments.	H,O	

Nanticoke River Comments: **Archeological**-(Rare site which contains features of primarily Late Woodland Period occupation A.D. 900 to 1600)) **Botanic**-(Rare and endangered Box Huckleberry Shrub, which is possibly the oldest living plant present.) **Botanic**-(Segment includes one of the few remaining remnants of Cypress Gum forests in this region.) **Historic**-(Segment includes a river-related National Historic Register district at Bethel, a ship building and trading community. Also the site of the invention of the traditional Chesapeake Bay sailing vessel.)

River	County	Reach	Length (miles)	Year Listed/Updated	Potential Classification	Description	ORVs	Other States
White Clay Creek	New Castle, Chester	Northern boundary of the City of Newark to the confluence with Egypt Run.	10	1982		See White Clay Creek comments.	R,O	PA
White Clay Creek, Middle Branch	Chester	Confluence with the West Branch to Rt. 841 Cridge.	3	1982		See White Clay Creek comments.	R,O	
White Clay Creek, West Branch	Chester	Confluence with the main branch to the headwaters.	10	1982		See White Clay Creek comments.	R,O	

White Clay Creek Comments: **Botanic**-(Area includes the rare and endangered purple fringeless orchid. Segment is also recognized for the diversity of habitats and biota within such a small area at the edge of suburban and urban development.) **Recreation**-(Proximity to urban populations in Wilmington, Newark and Philadelphia.)

Outstanding Resource Values (ORV) Definitions:

Scenery (S): The landscape elements of landform, vegetation, water, color, and related factors result in notable or exemplary visual features and/or attractions. When analyzing scenic values, additional factors -- such as seasonal variations in vegetation, scale of cultural modifications, and the length of time negative intrusions are viewed -- may be considered. Scenery and visual attractions may be highly diverse over the majority of the river or river segment.

Recreation (R): Recreational opportunities are, or have the potential to be, popular enough to attract visitors from throughout or beyond the region of comparison or are unique or rare within the region. Visitors are willing to travel long distances to use the river resources for recreational purposes. River-related opportunities could include, but are not limited to, sightseeing, wildlife observation, camping, photography, hiking, fishing and boating.

- o Interpretive opportunities may be exceptional and attract, or have the potential to attract, visitors from outside the region of comparison.
- o The river may provide, or have the potential to provide, settings for national or regional usage or competitive events.

Geology (G): The river, or the area within the river corridor, contains one or more example of a geologic feature, process or phenomenon that is unique or rare within the region of comparison. The feature(s) may be in an unusually active stage of development, represent a "textbook" example, and/or represent a unique or rare combination of geologic features (erosional, volcanic, glacial, or other geologic structures).

<p>Fish (F): Fish values may be judged on the relative merits of either fish populations, habitat, or a combination of these river-related conditions.</p> <ul style="list-style-type: none"> ○ <i>Populations:</i> The river is nationally or regionally an important producer of resident and/or anadromous fish species. Of particular significance is the presence of wild stocks and/or federal or state listed (or candidate) threatened, endangered or sensitive species. Diversity of species is an important consideration and could, in itself, lead to a determination of "outstandingly remarkable." ○ <i>Habitat:</i> The river provides exceptionally high quality habitat for fish species indigenous to the region of comparison. Of particular significance is habitat for wild stocks and/or federal or state listed (or candidate) threatened, endangered or sensitive species. Diversity of habitats is an important consideration and could, in itself, lead to a determination of "outstandingly remarkable."
<p>Wildlife (W): Wildlife values may be judged on the relative merits of either terrestrial or aquatic wildlife populations or habitat or a combination of these conditions.</p> <ul style="list-style-type: none"> ○ <i>Populations:</i> The river, or area within the river corridor, contains nationally or regionally important populations of indigenous wildlife species. Of particular significance are species considered to be unique, and/or populations of federal or state listed (or candidate) threatened, endangered or sensitive species. Diversity of species is an important consideration and could, in itself, lead to a determination of "outstandingly remarkable." ○ <i>Habitat:</i> The river, or area within the river corridor, provides exceptionally high quality habitat for wildlife of national or regional significance, and/or may provide unique habitat or a critical link in habitat conditions for federal or state listed (or candidate) threatened, endangered or sensitive species. Contiguous habitat conditions are such that the biological needs of the species are met. Diversity of habitats is an important consideration and could, in itself, lead to a determination of "outstandingly remarkable."
<p>Prehistory (P): The river, or area within the river corridor, contains a site(s) where there is evidence of occupation or use by Native Americans. Sites must have unique or rare characteristics or exceptional human interest value(s). Sites may have national or regional importance for interpreting prehistory; may be rare and represent an area where a culture or cultural period was first identified and described; may have been used concurrently by two or more cultural groups; and/or may have been used by cultural groups for rare sacred purposes. Many such sites are listed on the National Register of Historic Places, which is administered by the NPS.</p>
<p>History (H): The river or area within the river corridor contains a site(s) or feature(s) associated with a significant event, an important person, or a cultural activity of the past that was rare or one-of-a-kind in the region. Many such sites are listed on the National Register of Historic Places. A historic site(s) and/or features(s) is 50 years old or older in most cases.</p>
<p>Cultural (C): The river or area within the river corridor contains archaeological sites or areas significant to traditional cultures. Examples might be American Indian burial grounds, petroglyphs, the oldest known human use site in a region, or streams that support traditional agriculture, subsistence fishing, or religious ceremonies.</p>
<p>Other Values (O): While no specific national evaluation guidelines have been developed for the "other similar values" category, assessments of additional river-related values consistent with the foregoing guidance may be developed -- including, but not limited to, hydrology, paleontology and botany resources.</p>

Brandywine River: Tributary of the Christina River in southeastern Pennsylvania and New Castle County in Delaware. The 6-mile reach of the Brandywine in Delaware stretches from Rockland to Chadds Ford and is characterized by its Historic, Recreational, and Cultural Outstandingly Remarkable Values (ORVs). It includes a National Historic Register District in Rockland, is close in proximity to Newark, Wilmington, and Philadelphia, and is the location of the stream valley home of the Wyeth family artists. The Brandywine River watershed drains an area of 23 square miles, has a population density of 2,057 people per square mile, and is 37.6% wetlands and forest. Portions of the Brandywine River are included under the floodplain/drainage ordinances of the City of Wilmington, DE (see Table 9).

Choptank River: Tributary of the Chesapeake Bay in Kent County, Delaware and runs through Caroline County, Maryland. The 16-mile portion of the Choptank River in Delaware begins at Choptank Mills near Tidy Island Creek and is characterized by its Historic and Other Values ORVs given that 76% of the segment is an extensive, undeveloped freshwater river swamp. Estimated at 9,000-10,000 years of age, this is the site of a buried forest believed to be the earliest appearance of Pleistocene oak forest. The Choptank River watershed drains an area of 97.1 square miles, has a population density of 107 people per miles squared, and is 44.8% wetlands and forest.

Cow Marsh Creek: Tributary of the Choptank River and runs from its confluence with the Choptank River to northeast of Petersburg in Kent County, Delaware. The creek is four miles long and is characterized by its Historic and Other Values ORVs with 76% of the creek is undeveloped freshwater river swamp area. This site includes a buried forest estimated at 9,000-10,000 years of age which is believed to be the earliest appearance of Pleistocene oak forest. The Choptank River watershed drains an area of 97.1 square miles, has a population density of 107 people per square mile, and is 44.8% wetlands and forest.

Delaware River: Major river on the East Coast and runs through New York, New Jersey, Pennsylvania, and Delaware. The four mile section running through New Castle County, Delaware from the Delaware Bay to the Salem Nuclear Power Plant is characterized by numerous ORVs related to the Scenery, Recreation, Geology, Fish, History, and Culture of the river and surrounding area. The Delaware River-Bay system represents an example of

undeveloped rivers in an estuarine area and includes an example of a high order drowned river mouth. Additionally, the river includes numerous National Historic Register Sites in close proximity to Wilmington, Philadelphia, and Camden, and provides important nesting, migrating, and wintering sites for waterfowl along the Atlantic flyway.

Appoquinimink River: Runs to the Delaware Bay starting near Townsend in New Castle County, Delaware. The 15 miles of the Appoquinimink run from mouth to headwaters entirely in New Castle County, Delaware and are characterized by numerous ORVs related to the Scenery, Recreation, Geology, Fish, History, and Culture of the river and surrounding area. The Appoquinimink River watershed drains an area of 46.3 square miles, has a population density of 623 people per square mile, and is 23.9% wetlands and forest. Portions of the Appoquinimink River are included in the floodplain/drainage ordinances of Odessa, Delaware (see Table 9).

Augustine Creek: Runs through Middletown, Delaware where it joins with the Delaware River to the headwaters in New Castle County, Delaware. The Augustine Creek is four miles long and is characterized by numerous ORVs related to the Scenery, Recreation, Geology, Fish, History, and Culture of the river and surrounding area. The ORVs associated with the Augustine Creek are similar to those of the Delaware River due to its confluence with the Delaware River (See Delaware River ORV description). The river is located in the C & D Canal East watershed which drains an area of 44 square miles, has a population density of 368 people per square mile, and is 36.6% wetlands and forest.

Blackbird Creek: Runs through New Castle County, Delaware with its headwaters at the Delaware River. The 15 miles of Blackbird Creek run from mouth to headwaters entirely in New Castle County, Delaware and are characterized by numerous ORVs related to the Scenery, Recreation, Geology, Fish, History, and Culture of the creek and surrounding area. The Blackbird Creek watershed drains an area of 31 square miles, has a population density of 195 people per square mile, and is 52.6% wetlands and forest.

Broadkill River: Runs from its headwaters in Wagamons Pond in Milton, Delaware with its headwaters in the Delaware Bay. The 10 miles of Broadkill River run from mouth to headwaters entirely in Sussex County, Delaware and are characterized by numerous ORVs related to the Scenery, Recreation, Geology, Fish, History, and Culture of the creek and surrounding area. The ORVs associated with the Broadkill River are similar to those of the Delaware River due to their proximity (See Delaware River ORV description). The Broadkill River watershed drains an area of 107.1 square miles, has a population density of 267 people per square mile, and is 44.1% wetlands and forest.

Cedar Creek: Cedar Creek runs through Sussex County, Delaware where it joins with Slaughter Neck Ditch. The seven miles of Cedar Creek are characterized by numerous ORVs related to the Scenery, Recreation, Geology, Fish, History, and Culture of the creek and surrounding area. The Cedar Creek watershed drains an area of 52 square miles, has a population density of 147 people per square mile, and is 38% wetlands and forest.

Cedar Swamp: Cedar Swamp runs through New Castle County, Delaware where it joins with the Delaware River. The five miles of Cedar Swamp are characterized by numerous ORVs related to the Scenery, Recreation, Geology, Fish, History, and Culture of the creek and surrounding area. The ORVs associated with Cedar Swamp are similar to those of the Delaware River due to their confluence (see Delaware River ORV description). The swamp is located in the Delaware Bay watershed which drains an area of 9.6 square miles, has a population density of 39 people per square mile, and is 67.4% wetlands and forest.

Little River: The Little River runs through Dover in Kent County, Delaware where it joins with the Delaware River. The five miles of the Little River are characterized by numerous ORVs related to the Scenery, Recreation, Geology, Fish, History, and Culture of the river and surrounding area. The ORVs associated with Little River are similar to those of the Delaware River due to their proximity (see Delaware River ORV description). The river is located in the Little Creek watershed which drains an area of 23.2 square miles, has a population density of 381 people per square mile, and is 33.3% wetlands and forest. Portions of the Little River are included in the floodplain/drainage ordinances of Dover, DE (see Table 10).

Mispillion River: The Mispillion River runs through Sussex County from its mouth to its headwaters at Silver Lake in Milford, Delaware. The nine miles of the Mispillion River in Sussex County, Delaware are characterized by numerous ORVs related to the Scenery, Recreation, Geology, Fish, History, and Culture of the river and surrounding area. The ORVs associated with the Mispillion River are similar to those of the Delaware River due to their proximity (see Delaware River ORV description). The Mispillion River watershed drains an area of 76.4 square miles, has a population density of 264 people per square mile, and is 39.5% wetlands and forest. Portions of the Fishing Branch of the Mispillion River are included in the floodplain/drainage ordinances of Milford, DE (see Table 10).

Murderkill River: The Murderkill River runs from its headwaters just west of Felton in Kent County, Delaware to the Delaware Bay. The 21 miles of the Murderkill River are characterized by numerous ORVs related to the Scenery, Recreation, Geology, Fish, History, and Culture of the river and surrounding area. The Murderkill River watershed drains an area of 106.7 square miles, has a population density of 261 people per square mile, and is 31.5% wetlands and forest. The Fan Branch of the Murderkill River is included in the floodplain/drainage ordinances in Felton, DE (see Table 10).

Smyrna River: The Smyrna River runs from its headwaters at Duck Creek Pond to the Delaware Bay covering area in both Kent and New Castle Counties of Delaware. The 11 miles of the Smyrna River are characterized by numerous ORVs related to the Scenery, Recreation, Geology, Fish, History, and Culture of the river and surrounding area. The Smyrna River watershed drains an area of 63.9 square miles, has a population density of 362 people per square mile, and is 31.5% wetlands and forest. Portions of the Smyrna River are included in the floodplain/drainage ordinances of Smyrna, DE (see Table 10).

St. Georges Creek: The St. Georges Creek runs from Thousand Acre Marsh to its confluence with the Delaware River in New Castle County, Delaware. The three miles of St. Georges Creek are characterized by numerous ORVs related to the Scenery, Recreation, Geology, Fish, History, and Culture of the creek and surrounding area. The creek is located in the C & D Canal East watershed which drains an area of 44 square miles, has a population density of 368 people per square mile, and is 36.6% wetlands and forest.

St. Jones River: The St. Jones River runs through Kent County, Delaware from the Route 13 bridge in Dover to the Delaware Bay. The 13 miles of the St. Jones River are characterized by numerous ORVs related to the Scenery, Recreation, Geology, Fish, History, and Culture of the river and surrounding area. The St. Jones River watershed drains an area of 90 square miles, has a population density of 837 people per square mile, and is 28% wetlands and forest. Some segments of the St. Jones River are included in the floodplain/drainage ordinances of Dover, DE (see Table 10).

Leipsic River: The Leipsic River runs from DuPont Boulevard to the Delaware Bay in Kent County, Delaware. The 19 miles of the Leipsic River are characterized by historic and other ORVs as it contains an almost completely undeveloped section of tidal marsh, a National Wildlife Refuge proposed Wilderness area, and has a nationally recognized sanctuary for migratory waterfowl, birds of prey, and passerine species. The Leipsic River watershed drains an area of 104.7 square miles, has a population density of 186 people per square mile, and is 48.2% wetlands and forest. Portions of the Alshon Branch of the Leipsic River are included in the floodplain/drainage ordinances of Cheswold, DE (see Table 10).

Herr Branch: Herr Branch runs from its headwaters above Route 9 to its confluence with the Simons River in Kent County, Delaware. The three miles of Herr Branch are characterized by Historic and Other ORVs similar to the Leipsic River due to their proximity (see Leipsic River ORV description). Herr Branch is located in the Leipsic River watershed which drains an area of 104.7 square miles, has a population density of 186 people per square mile, and is 48.2% wetlands and forest.

Duck Creek: Duck Creek runs from the Woodland Beach Area to the Leipsic River in Kent County, Delaware. The 12 miles of Duck Creek are characterized by Historic and Other ORVs, similar to the Leipsic River due to their

confluence (see Leipsic River ORV description). Duck Creek is located in the Leipsic River watershed which drains 104.7 square miles, has a population density of 186 people per square mile, and is 48.2% wetlands and forest.

Mahon River: The Mahon River runs from its confluence with the Delaware Bay to its confluence with Herr Branch in Kent County, Delaware. The three miles of the Mahon River are characterized by Historic and Other ORVs, similar to the Leipsic River due to their proximity. The Mahon River is in the Leipsic River watershed which drains an area of 104 square miles, has a population density of 186 people per square mile, and is 48.2% wetlands and forest.

Muddy Branch: Muddy Branch runs from its headwaters above Delaware Route 9 to its confluence with the Leipsic River in Kent County, Delaware. The four miles of Muddy Branch are characterized by Historic and Other ORVs, similar to the Leipsic River due to their confluence (see Leipsic River ORV description). Muddy Branch is located in the Leipsic River watershed which drains an area of 104.7 square miles, has a population density of 186 people per square mile, and is 48.2% wetlands and forest.

Simons River and Green Creek: The Simons River and Green Creek run from the Delaware Bay to Boat Gut Bay in Kent County, Delaware. The five miles of the Simons River and Green Creek are characterized by Historic and Other ORVs, similar to the Leipsic River due to their proximity (see Leipsic River ORV description). The Simons River and Green Creek are in the Leipsic River watershed which drains an area of 104.7 square miles, has a population density of 186 people per square mile, and is 48.2% wetlands and forest.

Nanticoke River (Section A): This section of the Nanticoke River (Section A) runs from the Tangier Sound to Seaford in Sussex County, Delaware and Dorchester County, Maryland. The 35 miles of the Nanticoke River (Section A) are characterized by Historic and Other ORVs as they contain a rare site featuring primarily Late Woodland Period occupation (900-1600 A.D.). The site also features the rare and endangered Box Huckleberry Shrub and one of the few existing remnants of Cypress Gum forests in this region. The Nanticoke River watershed, which drains an area of 144.2 square miles, has a population density of 230 people per square mile, and is 30.7% wetlands and forest. Portions of the Nanticoke River and its Cart Branch are included in the floodplain/drainage ordinances of Greenwood, DE (see Table 11).

Nanticoke River (Section B): This section of the Nanticoke River (Section B) runs from Route 113 to Bridgeville in Sussex County, Delaware. The ten miles of the Nanticoke River (Section B) are characterized by Historic and Other ORVs as they feature a rare site featuring primarily Late Woodland Period occupation (900-1600 A.D.). The site also features the rare and endangered Box Huckleberry Shrub and one of the few existing remnants of Cypress Gum forests in this region. The Nanticoke River watershed drains an area of 144.2 square miles, has a population density of 230 people per square mile, and is 30.7% wetlands and forest. Portions of this section of the Nanticoke River are included in the floodplain/drainage ordinances of Blades and Bridgeville, DE (see Table 11).

Baker Mill Branch: Baker Mill Branch runs from Concord Pond to Black Savannah Ditch in Sussex County, Delaware. The two miles of Baker Mill Branch are characterized by Historic and Other ORVs, similar to the Nanticoke River due to their proximity (see Nanticoke River ORV description). Baker Mill Branch is located in the Deep Creek watershed which drains an area of 63.4 square miles, has a population density of 176 people per square mile, and is 51.7% wetlands and forest.

Broad Creek: Broad Creek runs from its confluence with the Nanticoke River to near Laurel in Sussex County, Delaware. The six miles of Broad Creek are characterized by Historic and Other ORVs, similar to the Nanticoke River due to their proximity (see Nanticoke River ORV description). The Broad Creek watershed drains an area of 119.6 square miles, has a population density of 150 people per square mile, and is 40% wetlands and forest. Portions of the Broad Creek are included in the floodplain/drainage ordinances of Laurel, DE (see Table 11).

Deep Creek: Deep Creek runs from its confluence with the Nanticoke River near Route 13 to its headwaters in Sussex County, Delaware. The 12 miles of Deep Creek are characterized by Historic and Other ORVs, similar to the Nanticoke due to their confluence (see Nanticoke River ORV description). Deep Creek is located in the Deep Creek watershed which drains an area of 63.4 square miles, has a population density of 176 people per square mile, and is 51.7% wetlands and forest.

Gravelly Branch: Gravelly Branch runs from its headwaters in Redden State Forest to its confluence with the Nanticoke River in Sussex County, Delaware. The 12 miles of Gravelly Branch are characterized by Historic and Other ORVs, similar to the Nanticoke due to their confluence (see Nanticoke River ORV description). Gravelly Branch is located in the Gravelly Branch watershed which drains an area of 38.3 square miles, has a population density of 113 people per square mile, and is 63.7% wetlands and forest.

Gum Branch: Gum Branch runs from its confluence with Nanticoke to Rye Hole in Sussex County, Delaware. The three miles of Gum Branch are characterized by Historic and Other ORVs, similar to the Nanticoke due to their confluence. Gum Branch drains an area of 30.2 square miles, has a population density of 91 people per square mile, and is 47.1% wetlands and forest.

James Branch: James Branch runs from Records Pond to Trussum Pond to Trap Pond in Sussex County, Delaware. The three miles of James Branch are characterized by Historic and Other ORVs, similar to the Nanticoke River due to their proximity (see Nanticoke River ORV description). James Branch is located in the Broad Creek watershed which drains an area of 119.6 square miles, has a population density of 150 people per square mile, and is 40% wetlands and forest.

Layton-Vaughn Ditch: Runs from its confluence with New Ditch to Route 28 in Sussex County, Delaware. The five miles of Layton-Vaughn Ditch are characterized by Historic and Other ORVs, similar to the Nanticoke River due to their proximity (see Nanticoke River ORV description). Layton-Vaughn Ditch is located in the Deep Creek watershed which drains an area of 63.4 square miles, has a population density of 176 people per square mile, and is 51.7% wetlands and forest.

Marshy Hope Creek: Runs from its confluence with the Nanticoke River to south of Federalsburg in Sussex County, Delaware. The 15 miles of Marshy Hope Creek are characterized by Historic and Other ORVs, similar to the Nanticoke River due to their confluence (see Nanticoke River ORV description). Marshy Hope Creek is located in the Nanticoke River watershed which drains an area of 144.2 square miles, has a population density of 230 people per square mile, and is 30.7% wetlands and forest.

Mifflin Ditch: Mifflin Ditch runs from its headwaters in Redden State Forest to its confluence with Deep Creek in Sussex County, Delaware. The five miles of Mifflin Ditch are characterized by Historic and Other ORVs, similar to the Nanticoke River due to their proximity (see Nanticoke River ORV description). Mifflin Ditch is located in the Deep Creek watershed which drains an area of 63.4 square miles, has a population density of 176 people per square mile, and is 51.7% wetlands and forest.

New Ditch: New Ditch runs from its confluence with Deep Creek to Route 28 in Sussex County, Delaware. The four miles of New Ditch are characterized by Historic and Other ORVs, similar to the Nanticoke River due to their proximity (see Nanticoke River ORV description). New Ditch is located in the Deep Creek watershed which drains an area of 63.4 square miles, has a population density of 176 people per square mile, and is 51.7% wetlands and forest.

Rum Bridge Branch: Rum Bridge Branch runs from its headwaters to its confluence with Deep Creek in Sussex County, Delaware. The three miles of Rum Bridge Branch are characterized by Historic and Other ORVs, similar to the Nanticoke River due to their proximity (see Nanticoke River ORV description). Rum Bridge Branch is located in the Deep Creek watershed which drains an area of 63.4 square miles, has a population density of 176 people per square mile, and is 51.7% wetlands and forest.

Toms Dam Branch: Toms Dam Branch runs from its headwaters to its confluence with Gum Branch in Sussex County, Delaware. The seven miles of Toms Dam Branch are characterized by Historic and Other ORVs, similar to the Nanticoke River due to their proximity (see Nanticoke River ORV description). Toms Dam Branch is located in the Gum Branch watershed which drains an area of 30.2 square miles, has a population density of 91 people per square mile, and is 47.1% wetlands and forest.

Tubbs Branch: Runs from its headwaters to its confluence with Deep Creek in Sussex County, Delaware. The four miles of Tubbs Branch are characterized by Historic and Other ORVs, similar to the Nanticoke River due to their proximity (see Nanticoke River ORV description). Tubbs Branch is located in the Deep Creek watershed which drains an area of 63.4 square miles, has a population density of 176 people per square mile, and is 51.7% wetlands and forest.

Tyndall Branch: Tyndall Branch runs from Fleetwood Pond to its confluence with Deep Creek in Sussex County, Delaware. The two miles of Tyndall Branch are characterized by Historic and Other ORVs, similar to the Nanticoke River due to their proximity (see Nanticoke River ORV description). Tyndall Branch is located in the Deep Creek watershed which drains an area of 63.4 square miles, has a population density of 176 people per square mile, and is 51.7% wetlands and forest.

White Clay Creek: White Clay Creek runs from the northern boundary of the City of Newark to its confluence with Egypt Run in New Castle County, Delaware (Figure 8). The ten miles of White Clay Creek are characterized by Historic and Other ORVs, as the area is the habitat of the rare and endangered Purple Fringeless Orchid and is recognized for its diversity of habitats and biota at the edge of suburban and urban development. Additionally, White Clay Creek is recognized for its proximity to urban populations in Wilmington and Newark, Delaware and Philadelphia, Pennsylvania. White Clay Creek is located in the White Clay Creek watershed which drains an area of 46.2 square miles, has a population density of 2,040 people per square mile, and is 34.7% wetlands and forest. Portions of the White Clay Creek are included under the floodplain/drainage ordinances of the City of Newark, DE (see Table 9) .

Red Clay Creek: The Red Clay Creek runs from its headwaters to its confluence with the White Clay Creek in New Castle County, Delaware. The 13 miles of the Red Clay Creek have not yet been assessed to determine any associated ORVs. The Red Clay Creek drains an area of 21.1 square miles, has a population density of 1,187 people per square mile, and is 46.1% wetlands and forest.

Christina River: The Christina River runs from its headwaters to its confluence with the Delaware River at Wilmington in New Castle County, Delaware. The 35 miles of the Christina River have not yet been assessed to determine any associated ORVs. The Christina River watershed drains an area of 67.2 square miles, has a population density of 2,671, and is 26.9% wetlands and forest. Segments of the Christina River are included under the floodplain/drainage ordinances of Newport and the City of Wilmington, Delaware (see Table 9).

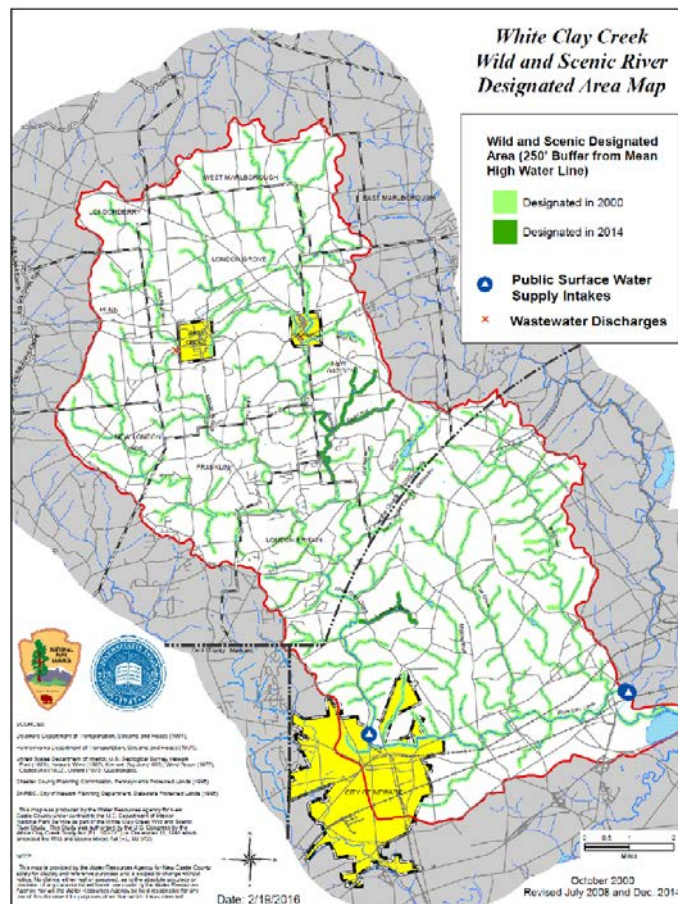


Figure 8. White Clay Creek National Wild & Scenic River watershed in Delaware and Pennsylvania

Chapter 4 Analysis and Results

Proposing potential river segments for consideration by the National Park Service for Wild and Scenic designation involved evaluating data related to the demographics of the populations (Table 5 & Figures 15, 17 & 18), land-use (Figures 9-14 & 16, and Tables 4 & 6), and Outstandingly Remarkable Values (ORVs) (Tables 2 & 8). Watershed data was gathered utilizing Geographic Information System Mapping and used to develop maps, charts, and graphs relating the data of each river segment's surrounding watershed. The maps, charts, and figures were presented at subcommittee meetings with the National Park Service and other stakeholders in order to gain feedback regarding where more data or research was necessary in the process of developing recommendations.

Table 2. Outstandingly Remarkable Values of Nationwide Rivers Inventory segments in Delaware

River	Watershed	County	Length (Miles)	Year Listed/Updated	# of ORV Categories
Appoquinimink River	Appoquinimink River	New Castle	15	1982	8
Augustine Creek	C & D Canal East	New Castle	4	1982	8
Blackbird Creek	Blackbird Creek	New Castle	15	1982	8
Broadkill River	Broadkill River	Sussex	10	1982	8
Ceder Creek	Ceder Creek	Sussex	7	1982	8
Ceder Swamp	Delaware Bay	New Castle	5	1982	8
Little River	Little Creek	Kent	5	1982	8
Misphillion River	Misphillion River	Sussex	9	1982	8
Murderkill River	Murderkill River	Kent	21	1982	8
Smyrna River	Smyrna River	New Castle, Kent	11	1982	8
St. Georges Creek	C & D Canal East	New Castle	3	1982	8
St. Jones River	St. Jones River	Kent	13	1982	8
Brandywine Creek	Brandywine Creek	New Castle	6	1982	3
Leipsic River	Leipsic River	Kent	19	1982	3
Herr Branch	Leipsic River	Kent	3	1982	3

Table 3. Public Open Space in the Nationwide Rivers Inventory watersheds in Delaware

River	Watershed	County	Length (Miles)	Year Listed/Updated	% Public Open Space
Brandywine Creek	Brandywine Creek	New Castle	6	1982	67.42
Nanticoke River	Nanticoke River	Dorchester, Sussex	35	1982	52.39
Nanticoke River	Nanticoke River	Sussex	10	1982	52.39
Leipsic River	Leipsic River	Kent	19	1982	44.14
White Clay Creek	White Clay Creek	New Castle, Chester	10	1982	34.36
White Clay Creek, Middle Branch	White Clay Creek	Chester	3	1982	34.36
White Clay Creek, West Branch	White Clay Creek	Chester	10	1982	34.36
Blackbird Creek	Blackbird Creek	New Castle	15	1982	23.75
Gravelly Branch	Gravelly Branch	Sussex	12	1982	22.89
Red Clay Creek	Red Clay Creek	New Castle	13	2021	20.44
Marshy Hope Creek	Nanticoke River	Sussex	15	1982	17.85
Deep Creek	Deep Creek	Sussex	12	1982	17.35
Christina River	Christina River	New Castle	35	2021	16
Broadkill River	Broadkill River	Sussex	10	1982	15.49
Appoquinimink River	Appoquinimink River	New Castle	15	1982	15.23

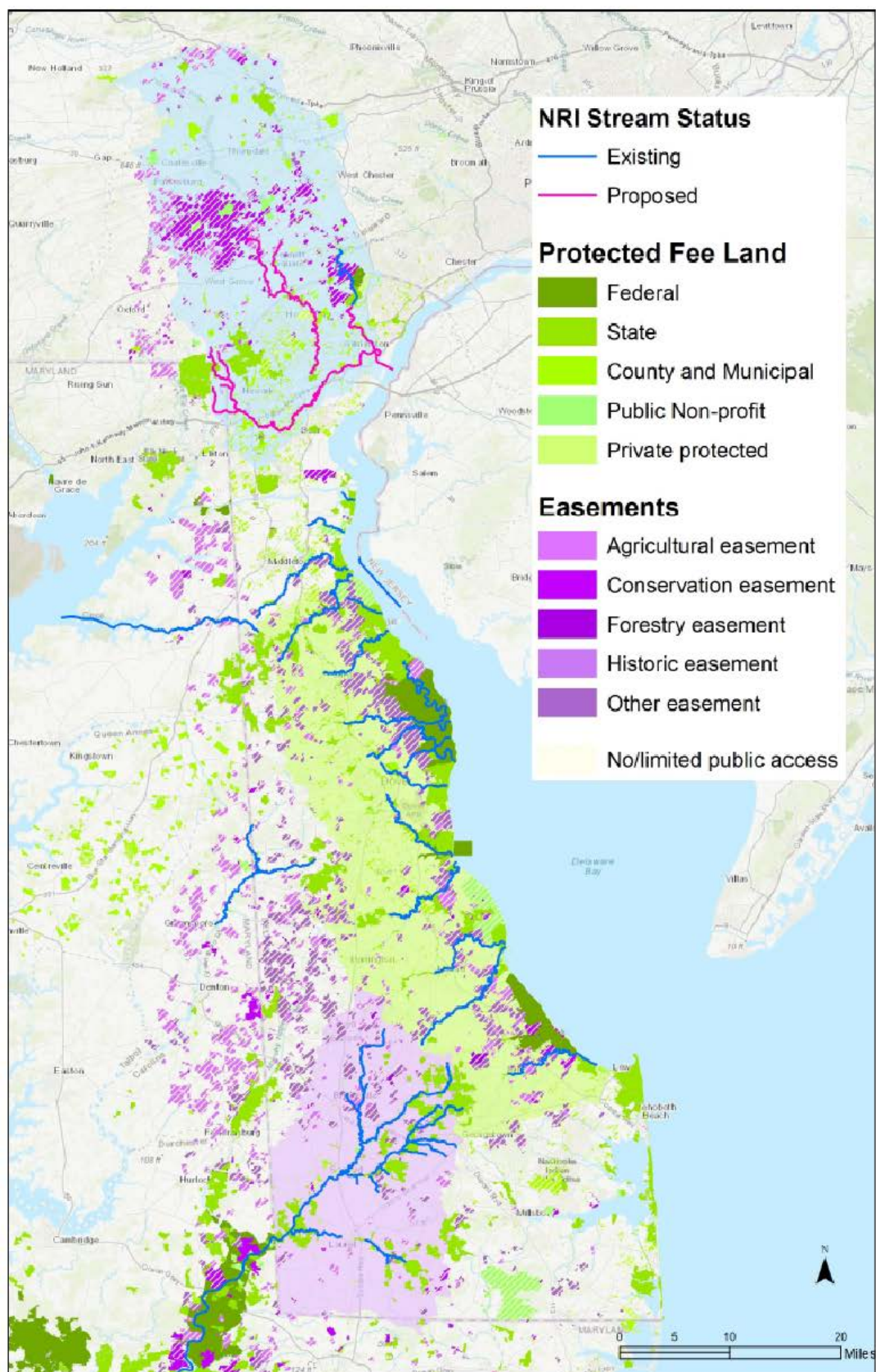


Figure 9. Protected land in the National Rivers Inventory watersheds in Delaware

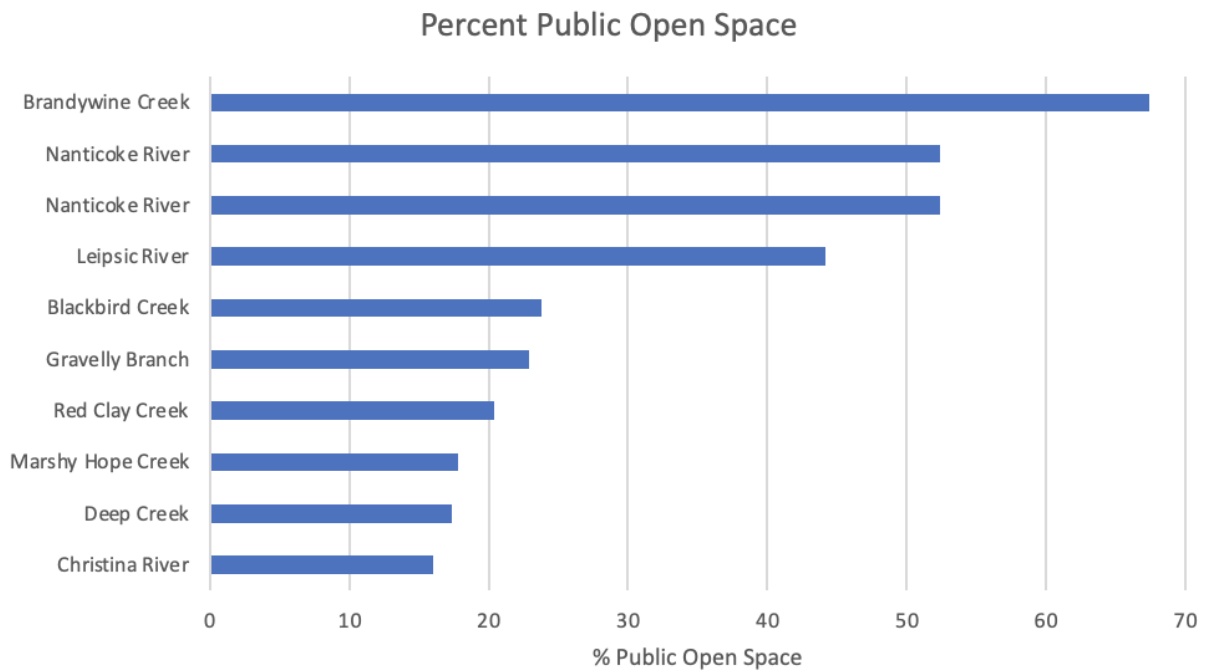


Figure 10. Public Open Space in the Nationwide Rivers Inventory watersheds in Delaware

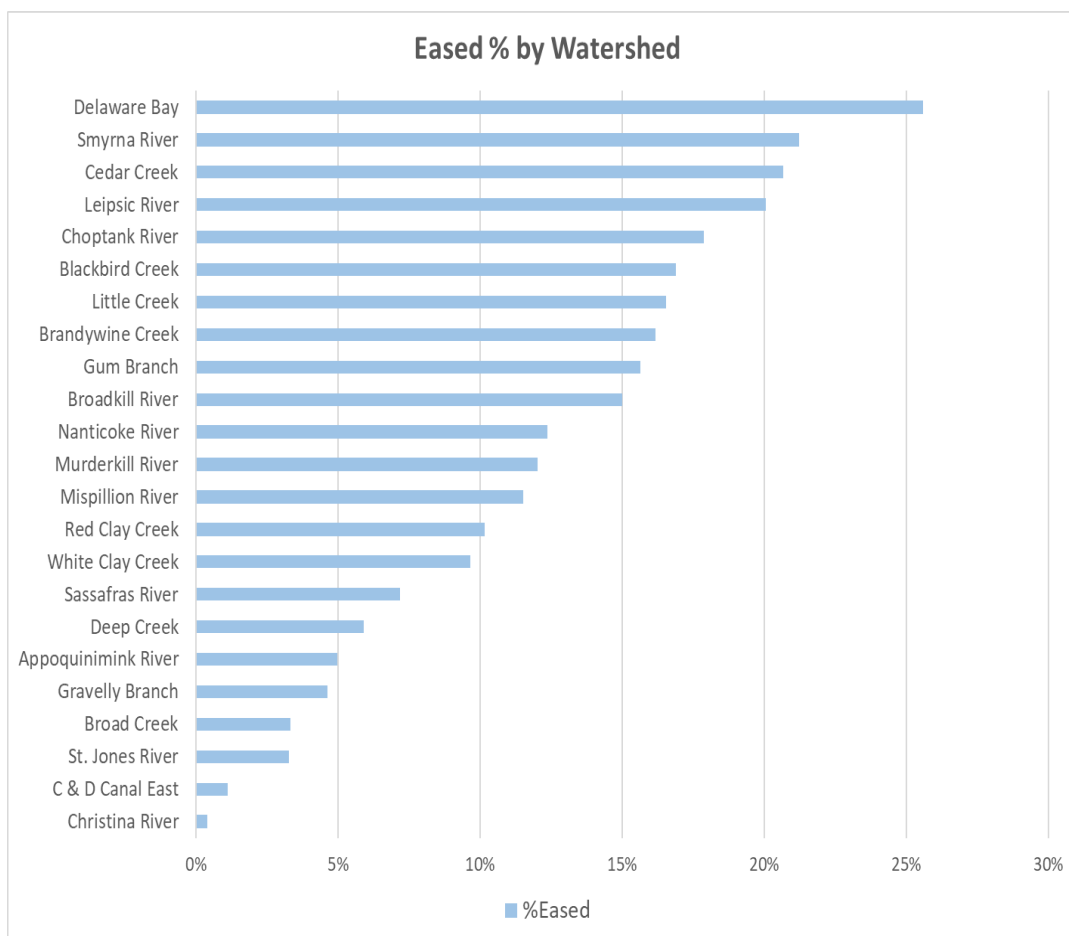


Figure 11. Protected land in the Nationwide River Inventory watersheds of Delaware

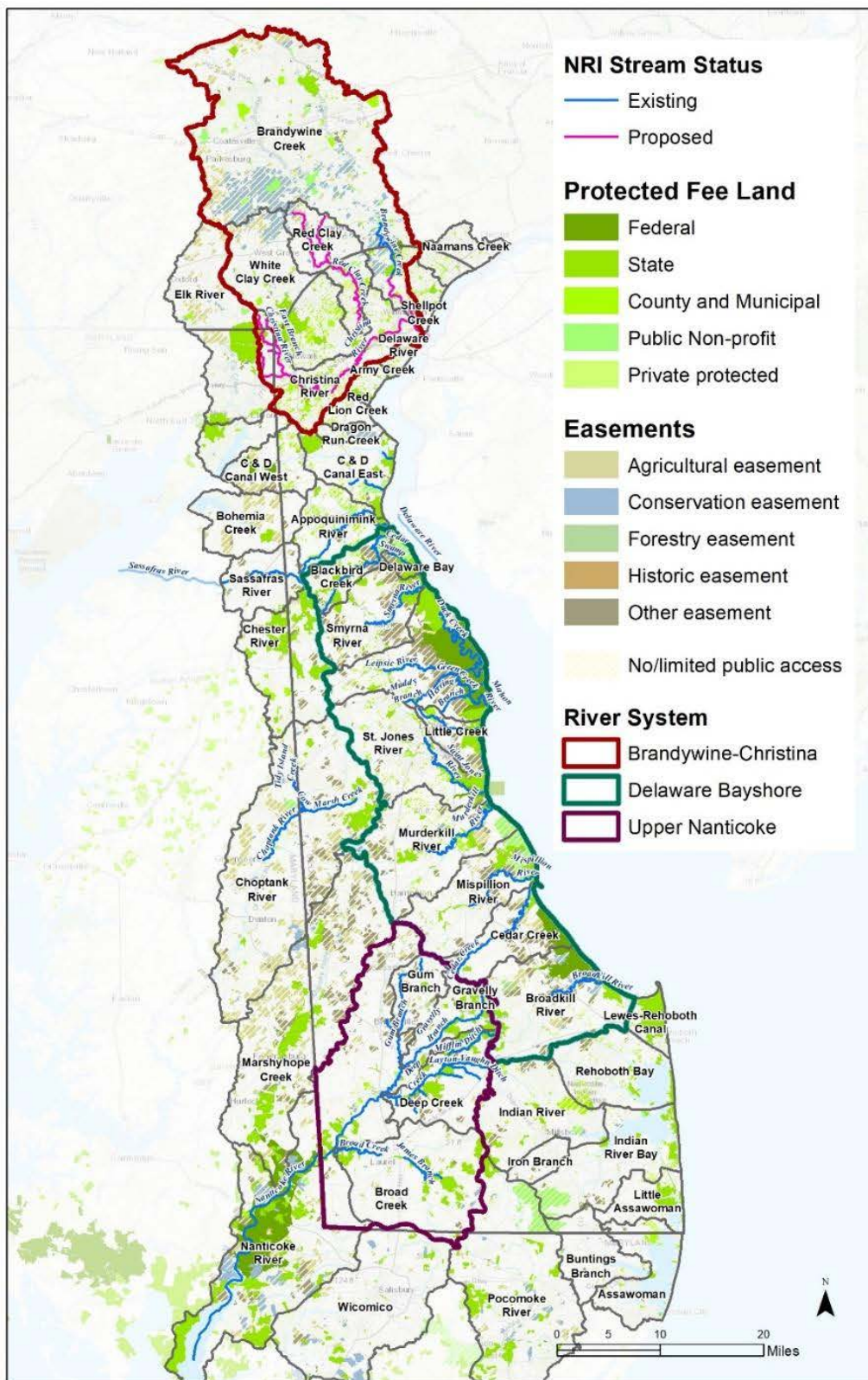


Figure 12. Protected land in the Nationwide River Inventory watersheds of Delaware

Table 4. Forest and wetlands of the Nationwide Rivers Inventory watersheds in Delaware

River	Watershed	County	Length (Miles)	Year Listed/Updated	% Forest & Wetlands
Ceder Swamp	Delaware Bay	New Castle	5	1982	67.4
Gravelly Branch	Gravelly Branch	Sussex	12	1982	63.7
Blackbird Creek	Blackbird Creek	New Castle	15	1982	52.6
Baker Mill Branch	Deep Creek	Sussex	2	1982	51.7
Deep Creek	Deep Creek	Sussex	12	1982	51.7
Layton-Vaughn Ditch	Deep Creek	Sussex	5	1982	51.7
Mifflin Ditch	Deep Creek	Sussex	5	1982	51.7
New Ditch	Deep Creek	Sussex	4	1982	51.7
Rum Bridge Branch	Deep Creek	Sussex	3	1982	51.7
Tubbs Branch	Deep Creek	Sussex	4	1982	51.7

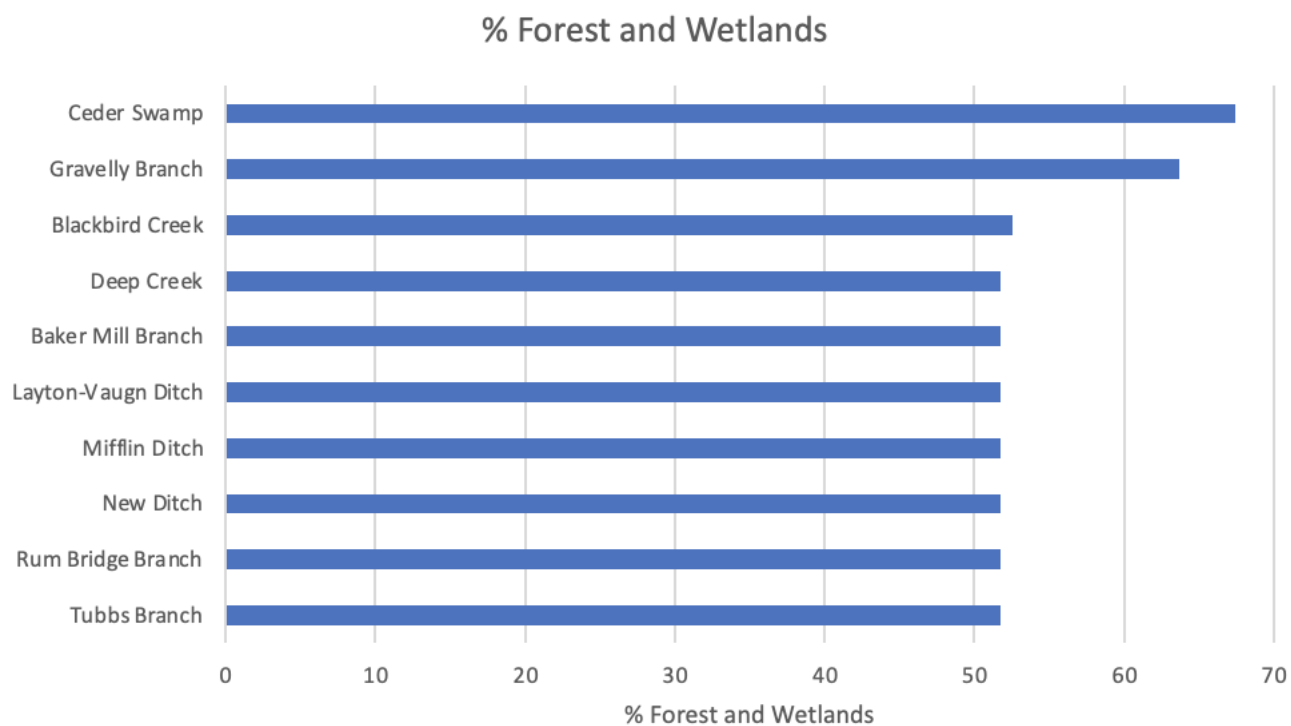


Figure 13. Forests and wetlands of the Nationwide River Inventory watersheds in Delaware

Table 5. Population Density of the Nationwide Rivers Inventory watersheds in Delaware

River	Watershed	County	Length (Miles)	Year Listed/Updated	Pop Density (p/sq mi)
Christina River	Christina River	New Castle	35	2021	2,671
Brandywine Creek	Brandywine Creek	New Castle	6	1982	2,057
White Clay Creek	White Clay Creek	New Castle, Chester	10	1982	2,040
White Clay Creek, Middle Branch	White Clay Creek	Chester	3	1982	2,040
White Clay Creek, West Branch	White Clay Creek	Chester	10	1982	2,040
Red Clay Creek	Red Clay Creek	New Castle	13	2021	1,187
St. Jones River	St. Jones River	Kent	13	1982	837
Appoquinimink River	Appoquinimink River	New Castle	15	1982	623
Little River	Little Creek	Kent	5	1982	381
Augustine Creek	C & D Canal East	New Castle	4	1982	368
St. Georges Creek	C & D Canal East	New Castle	3	1982	368
Smyrna River	Smyrna River	New Castle, Kent	11	1982	362
Broadkill River	Broadkill River	Sussex	10	1982	267
Mispillion River	Mispillion River	Sussex	9	1982	264
Murderkill River	Murderkill River	Kent	21	1982	261

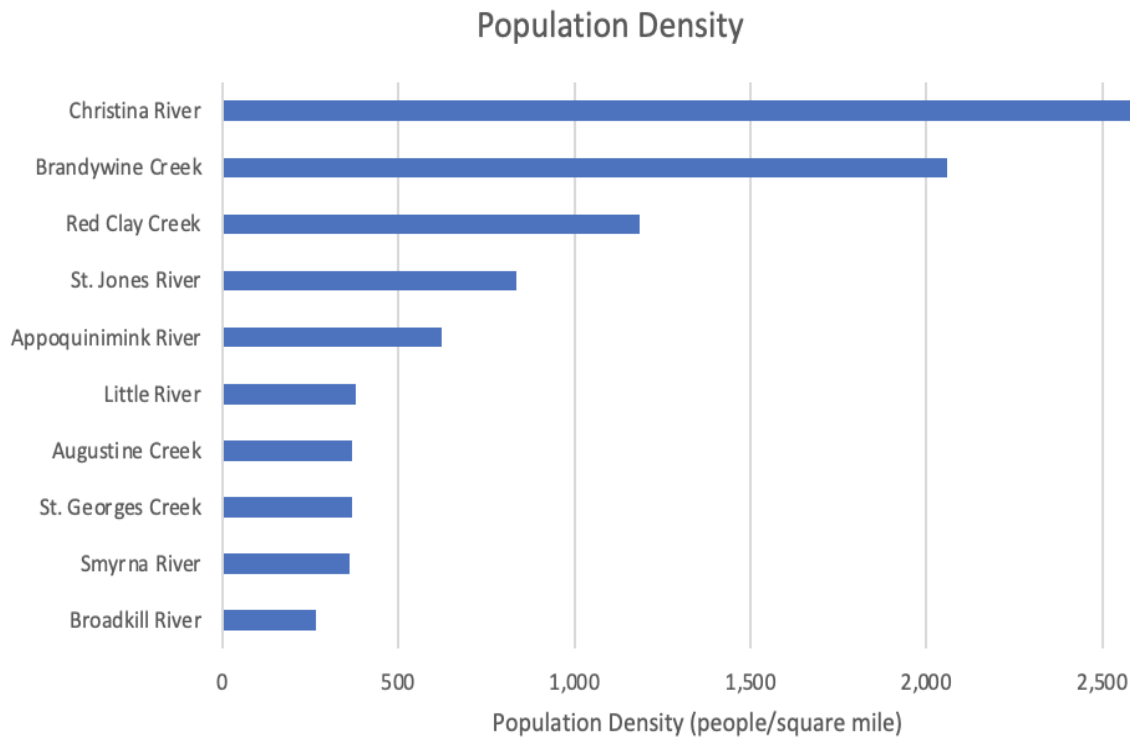


Figure 15. Population Density of the Nationwide Rivers Inventory watersheds in Delaware

Table 6. Urban/Suburban Land in Nationwide Rivers Inventory watersheds in Delaware

River	Watershed	County	Length (Miles)	Year Listed/Updated	% Urban/Suburban
Christina River	Christina River	New Castle	35	2021	67.0
White Clay Creek	White Clay Creek	New Castle, Chester	10	1982	57.6
White Clay Creek, Middle Branch	White Clay Creek	Chester	3	1982	57.6
White Clay Creek, West Branch	White Clay Creek	Chester	10	1982	57.6
Brandywine Creek	Brandywine Creek	New Castle	6	1982	46.5
Red Clay Creek	Red Clay Creek	New Castle	13	2021	39.8
St. Jones River	St. Jones River	Kent	13	1982	30.2
Appoquinimink River	Appoquinimink River	New Castle	15	1982	28.8
Little River	Little Creek	Kent	5	1982	23.5
Augustine Creek	C & D Canal East	New Castle	4	1982	20.2
St. Georges Creek	C & D Canal East	New Castle	3	1982	20.2
Smyrna River	Smyrna River	New Castle, Kent	11	1982	13.7
Broadkill River	Broadkill River	Sussex	10	1982	13.6
Mispillion River	Mispillion River	Sussex	9	1982	13.2
Murderkill River	Murderkill River	Kent	21	1982	12.1

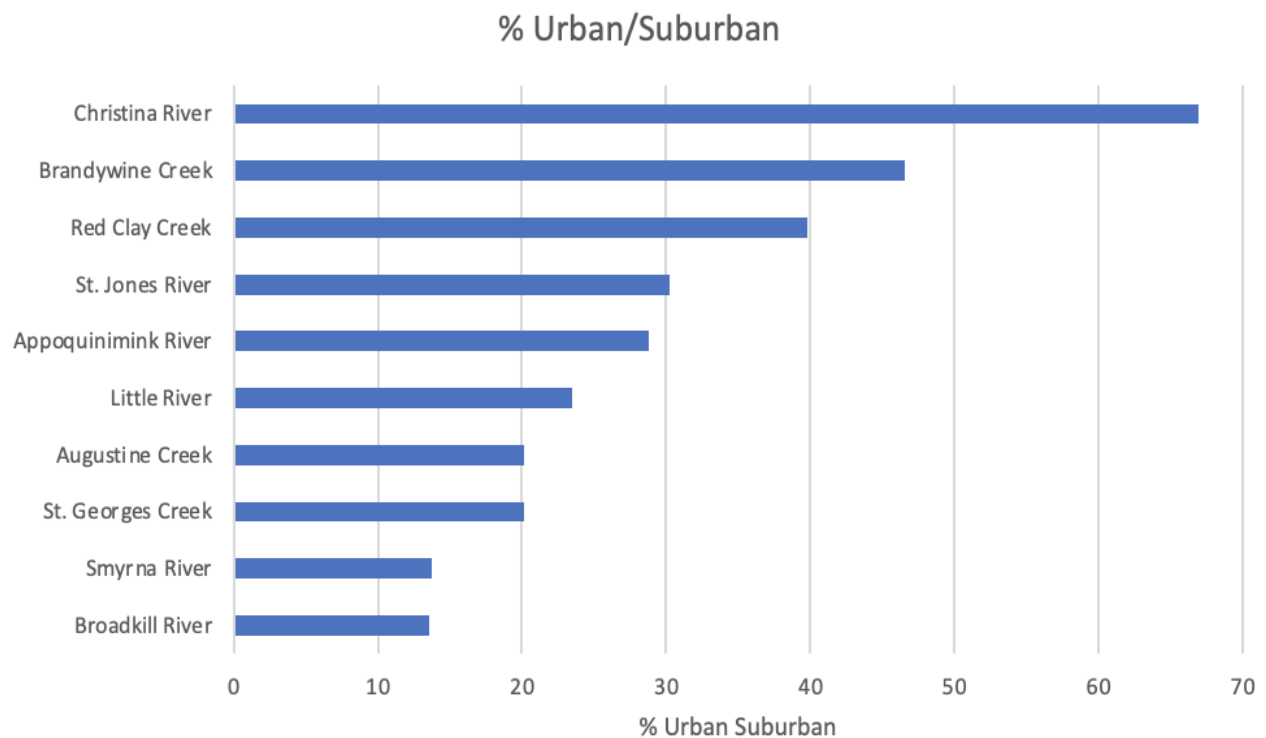


Figure 16. Urban/Suburban Land in Nationwide Rivers Inventory watersheds in Delaware

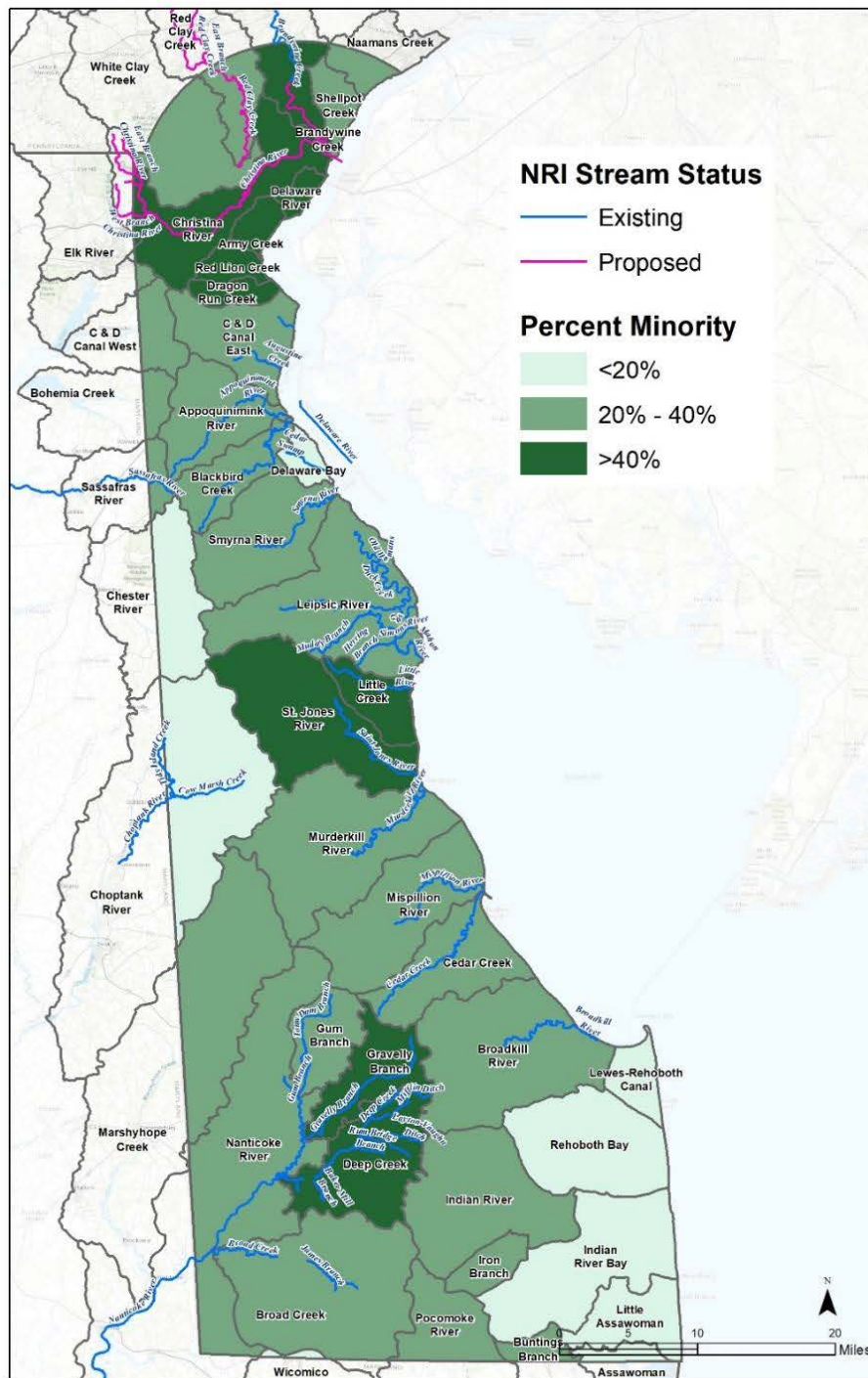


Figure 18. Minority populations in Nationwide River Inventory watersheds in Delaware

Table 7. National Rivers Inventory of Delaware

River	Watershed	County	Reach	Length (Miles)	Year Listed/Updated	ORVs	Other States	Watershed (ac)	Watershed (sq mi)	Comments
Brandywine Creek	Brandywine Creek	New Castle	Rockland to Chadds Ford Junction	6	1982	H, R, C	PA	14,699	23.0	National Historic Register District. Close proximity to Wilmington, Newark, Philly. Home area of the oldest and largest oyster fishery in the world.
Choptank River	Choptank River	Caroline	Greenboro to headwaters of Tidy Island Creek at Maryland	16	1982	H, O	MD	62,149	97.1	Extensive undeveloped freshwater swamps. Barred forest 9-10,000 yrs old with earliest example of Platanus oaks forest.
Cow Marsh Creek	Choptank River	Kent	Confluence with Choptank River to northeast of Petersburg	4	1982	H, O	MD	62,149	97.1	See Choptank comments
Delaware River	Delaware River	New Castle	Delaware Bay to Salem Nuclear Power Plant	4	1982	S, R, G, F, W, H, C, O				Highly exemplary, productive, and important river mouth estuarine system. Numerous Nat. Hist. Reg. sites. Important for nesting, feeding, migrating, and wintering waterfowl (Atlantic Flyway).
Appoquinimink River	Appoquinimink River	New Castle	Mouth to headwaters	15	1982	S, R, G, F, W, H, C, O		29,656	46.3	See Delaware River comments
Augustine Creek	C & D Canal East	New Castle	Confluence with the Delaware River to headwaters	4	1982	S, R, G, F, W, H, C, O		28,188	44.0	See Delaware River comments
Blackbird Creek	Blackbird Creek	New Castle	Mouth to headwaters	15	1982	S, R, G, F, W, H, C, O		19,811	31.0	See Delaware River comments
Brookkill River	Brookkill River	Sussex	Mouth of Milton	10	1982	S, R, G, F, W, H, C, O		68,571	107.1	See Delaware River comments
Cedar Creek	Cedar Creek	Sussex	Mouth to headwaters	7	1982	S, R, G, F, W, H, C, O		33,414	52.2	See Delaware River comments
Cedar Swamp	Delaware Bay	New Castle	Confluence with the Delaware River to headwaters	5	1982	S, R, G, F, W, H, C, O		6,152	9.6	See Delaware River comments
Little River	Little Creek	Kent	Confluence with the Delaware Bay to headwaters	5	1982	S, R, G, F, W, H, C, O		14,877	23.2	See Delaware River comments
Mispillion River	Mispillion River	Sussex	Mouth to Silver Lake in Milford	9	1982	S, R, G, F, W, H, C, O		48,875	76.4	See Delaware River comments
Murderkill River	Murderkill River	Kent	Delaware Bay to Coursey Pond	21	1982	S, R, G, F, W, H, C, O		68,309	106.7	See Delaware River comments
Smyrna River	Smyrna River	New Castle, Kent	Mouth to Duck Creek Pond	11	1982	S, R, G, F, W, H, C, O		40,913	63.9	See Delaware River comments
St. Georges Creek	C & D Canal East	New Castle	Confluence with the Delaware River to Thousand Acre Marsh	3	1982	S, R, G, F, W, H, C, O		28,188	44.0	See Delaware River comments
St. Jones River	St. Jones River	Kent	Delaware Bay to Route 13 Bridge in Dover	13	1982	S, R, G, F, W, H, C, O		57,601	90.0	See Delaware River comments
Leipic River	Leipic River	Kent	Delaware Bay to DuPont Boulevard	19	1982	W, H, O		67,011	104.7	Significant area of tidal marsh w/ proposed Wilderness area, and a nationally recognized sanctuary for migrating waterfowl.
Herr Branch	Leipic River	Kent	Confluence with the Simons River to headwaters above Rte. 9	3	1982	W, H, O		67,011	104.7	See Leipic River comments
Duck Creek	Leipic River	Kent	Leipic River to the Woodland Beach Area	12	1982	W, H, O		67,011	104.7	See Leipic River comments
Malon River	Leipic River	Kent	Confluence with the Delaware Bay to the confluence with Herr Branch	3	1982	W, H, O		67,011	104.7	See Leipic River comments
Muddy Branch	Leipic River	Kent	Confluence with the Leipic River to headwaters above DE Rte. 9	4	1982	W, H, O		67,011	104.7	See Leipic River comments
Simons River and Green Creek	Leipic River	Kent	Delaware Bay to Boat Gul Bay	5	1982	W, H, O		67,011	104.7	See Leipic River comments
Nanticoke River	Nanticoke River	Dorchester, Sussex	Tangier Sound to Seaford	35	1982	H, O	MD	92,303	144.2	Rare site of Late Woodland Period occupation (900-1600 AD). Rare/endangered Box Huckleberry shrub. Few remnants of Cypress Gum forests.
Nanticoke River	Nanticoke River	Sussex	Route 113 to Bridgeville	10	1982	H, O	MD	92,303	144.2	Rare site of Late Woodland Period occupation (900-1600 AD). Rare/endangered Box Huckleberry shrub. Few remnants of Cypress Gum forests.
Baker Mill Branch	Deep Creek	Sussex	Concord Pond to Black Savannah Ditch	2	1982	H, O		40,588	63.4	See Nanticoke River comments
Broad Creek	Broad Creek	Sussex	Confluence with the Nanticoke River to near Laurel	6	1982	H, O		76,528	119.6	See Nanticoke River comments
Deep Creek	Deep Creek	Sussex	Confluence with Nanticoke near Route 13 to headwaters	12	1982	H, O		40,588	63.4	See Nanticoke River comments
Gravelly Branch	Gravelly Branch	Sussex	Confluence with Nanticoke to headwaters in Redden State Forest	12	1982	H, O		24,506	38.3	See Nanticoke River comments
Gum Branch	Gum Branch	Sussex	Confluence with Nanticoke to Rye Hole	3	1982	H, O		19,321	30.2	See Nanticoke River comments
James Branch	Broad Creek	Sussex	Records Pond to Trussum Pond to Trap Pond	3	1982	H, O		76,528	119.6	See Nanticoke River comments
Layton-Vaughn Ditch	Deep Creek	Sussex	Confluence with New Ditch to Route 28	5	1982	H, O		40,588	63.4	See Nanticoke River comments
Marshy Hope Creek	Nanticoke River	Sussex	Confluence with the Nanticoke River to South of Federalsburg	15	1982	H, O		92,303	144.2	See Nanticoke River comments
Mifflin Ditch	Deep Creek	Sussex	Confluence with Deep Creek to headwaters in Redden State Forest	5	1982	H, O		40,588	63.4	See Nanticoke River comments
New Ditch	Deep Creek	Sussex	Confluence with Deep Creek to Route 28	4	1982	H, O		40,588	63.4	See Nanticoke River comments
Rum Bridge Branch	Deep Creek	Sussex	Confluence with Deep Creek to headwaters	3	1982	H, O		40,588	63.4	See Nanticoke River comments
Toms Dam Branch	Gum Branch	Sussex	Confluence with Gum Branch to headwaters	7	1982	H, O		19,321	30.2	See Nanticoke River comments
Tube Branch	Deep Creek	Sussex	Confluence with Deep Creek to headwaters	4	1982	H, O		40,588	63.4	See Nanticoke River comments
Tyndall Branch	Deep Creek	Sussex	Confluence/Deep Creek to Fleetwood Pond	2	1982	H, O		40,588	63.4	See Nanticoke River comments
White Clay Creek	White Clay Creek	New Castle, Chester	Northern boundary of the City of Newark to the confluence with Egypt Run	10	1982	H, O	PA	29,550	46.2	Rare/endangered Purple Fringed Orchid. Area w/ diversity of habitats & biota. Proximity to Wilm., Newark, and Philly.
White Clay Creek, Middle Branch	White Clay Creek	Chester	Confluence with the West Branch to Rt. 841	3	1982	H, O		29,550	46.2	Rare/endangered Purple Fringed Orchid. Area w/ diversity of habitats & biota. Proximity to Wilm., Newark, and Philly.
White Clay Creek, West Branch	White Clay Creek	Chester	Confluence with the Middle Branch to the headwaters	10	1982	H, O		29,550	46.2	Rare/endangered Purple Fringed Orchid. Area w/ diversity of habitats & biota. Proximity to Wilm., Newark, and Philly.
Red Clay Creek	Red Clay Creek	New Castle	Confluence with White Clay to the headwaters	13	2021			13,501	21.1	
Christina River	Christina River	New Castle	Confluence with the Delaware River at Wilmington	35	2021		PA	42,979	67.2	

Table 8. Outstanding Resource Values in Delaware

River	Watershed	County	Reach	Length (Miles)	Year Listed/Updated	ORVs	Other States	Watershed (sq mi)	Comments
Brandywine Creek	Brandywine Creek	New Castle	Rockland to Chadds Ford Junction	6	1982	H, R, C	PA	14,699	National Historic Register District. Close proximity to Wilmington, Newark, Philly. Home area of Wyeth Family artists.
Choptank River	Choptank River	Caroline	Greenboro to headwaters of Tidy Island Creek. Choptank River to confluence with Chesapeake Bay to northeast of Pritsburg.	16	1982	H, O	MD	62,149	Extensive undeveloped freshwater swamp, buried forest 9-10,000 yrs old with earliest example of Pleistocene oak forest.
Cow Marsh Creek	Choptank River	Kent		4	1982	H, O	MD	62,149	See Choptank comments
Delaware River	Delaware River	New Castle	Delaware Bay to Salem Nuclear Power Plant	4	1982	S, R, G, F, W, H, C, O			Highly exemplary, productive, and important river mouth estuarine system. Numerous Nat. Hist. Reg. sites. Important for nesting, feeding, migrating, and wintering waterfowl (Atlantic Flyway).
Appoquinimink River	Appoquinimink River	New Castle	Mouth to headwaters	15	1982	S, R, G, F, W, H, C, O		29,656	See Delaware River comments
Augustine Creek	C & D Canal East	New Castle	Confluence with the Delaware River to headwaters	4	1982	S, R, G, F, W, H, C, O		28,188	See Delaware River comments
Blackbird Creek	Blackbird Creek	New Castle	Mouth to headwaters	15	1982	S, R, G, F, W, H, C, O		19,811	See Delaware River comments
Broadkill River	Broadkill River	Sussex	Mouth of Milton	10	1982	S, R, G, F, W, H, C, O		68,571	See Delaware River comments
Cedar Creek	Cedar Creek	Sussex	Mouth to headwaters	7	1982	S, R, G, F, W, H, C, O		33,414	See Delaware River comments
Cedar Swamp	Delaware Bay	New Castle	Confluence with the Delaware River to headwaters	5	1982	S, R, G, F, W, H, C, O		6,152	See Delaware River comments
Little River	Little Creek	Kent	Confluence with the Delaware Bay to headwaters	5	1982	S, R, G, F, W, H, C, O		14,877	See Delaware River comments
Mispillion River	Mispillion River	Sussex	Mouth to Silver Lake in Millford	9	1982	S, R, G, F, W, H, C, O		48,875	See Delaware River comments
Murderkill River	Murderkill River	Kent	Delaware Bay to Coursey Pond	21	1982	S, R, G, F, W, H, C, O		68,309	See Delaware River comments
Smyrna River	Smyrna River	New Castle, Kent	Mouth to Duck Creek Pond	11	1982	S, R, G, F, W, H, C, O		40,913	See Delaware River comments
St. Georges Creek	C & D Canal East	New Castle	Confluence with the Delaware River to Thousand Acres Marsh	3	1982	S, R, G, F, W, H, C, O		28,188	See Delaware River comments
St. Jones River	St. Jones River	Kent	Delaware Bay to Route 13 Bridge in Dover	13	1982	S, R, G, F, W, H, C, O		57,601	See Delaware River comments
Leipic River	Leipic River	Kent	Delaware Bay to DuPont Boulevard	19	1982	W, H, O		67,011	Significant area of tidal marsh w/ proposed Wilderness area, and a nationally recognized sanctuary for migrating waterfowl.
Herr Branch	Leipic River	Kent	Confluence with the Simons River to headwaters above Rte. 9	3	1982	W, H, O		67,011	See Leipic River comments
Duck Creek	Leipic River	Kent	Leipic River to the Woodland Beach Area	12	1982	W, H, O		67,011	See Leipic River comments
Mahon River	Leipic River	Kent	Confluence with the Delaware Bay to the confluence with Herr Branch	3	1982	W, H, O		67,011	See Leipic River comments
Muddy Branch	Leipic River	Kent	Confluence with the Leipic River to headwaters above DE Rte. 9	4	1982	W, H, O		67,011	See Leipic River comments
Simons River and Green Creek	Leipic River	Kent	Delaware Bay to Boat Gut Bay	5	1982	W, H, O		67,011	See Leipic River comments
Nanticoke River	Nanticoke River	Dorchester, Sussex	Tangier Sound to Seaford	35	1982	H, O	MD	92,303	Rare site of Late Woodland Period occupation (900-1600 AD). Rare/endangered Box Huckleberry shrub remnants of late woodlands.
Nanticoke River	Nanticoke River	Sussex	Route 113 to Bridgeville	10	1982	H, O	MD	92,303	Rare site of late Woodland Period occupation (900-1600 AD). Rare/endangered Box Huckleberry shrub. Few remnants of Cypress Gum forests.
Baker Mill Branch	Deep Creek	Sussex	Concord Pond to Black Savannah Ditch	2	1982	H, O		40,588	See Nanticoke River comments
Broad Creek	Broad Creek	Sussex	Confluence with the Nanticoke River to near Laurel	6	1982	H, O		76,528	See Nanticoke River comments
Deep Creek	Deep Creek	Sussex	Confluence with Nanticoke near Route 13 to headwaters	12	1982	H, O		40,588	See Nanticoke River comments
Gravelly Branch	Gravelly Branch	Sussex	Confluence with Nanticoke to headwaters in Redden State Forest	12	1982	H, O		24,506	See Nanticoke River comments
Gum Branch	Gum Branch	Sussex	Confluence with Nanticoke to Rye Hole	3	1982	H, O		19,321	See Nanticoke River comments
James Branch	Broad Creek	Sussex	Records Pond to Trussum Pond to Trap Pond	3	1982	H, O		76,528	See Nanticoke River comments
Layton-Vaugh Ditch	Deep Creek	Sussex	Confluence with New Ditch to Route 28	5	1982	H, O		40,588	See Nanticoke River comments
Marshy Hope Creek	Nanticoke River	Sussex	Confluence with the Nanticoke River to South of Federalburg	15	1982	H, O		92,303	See Nanticoke River comments
Millfin Ditch	Deep Creek	Sussex	Confluence with Deep Creek to headwaters in Redden State Forest	5	1982	H, O		40,588	See Nanticoke River comments
New Ditch	Deep Creek	Sussex	Confluence with Deep Creek to Route 28	4	1982	H, O		40,588	See Nanticoke River comments
Rum Bridge Branch	Deep Creek	Sussex	Confluence with Deep Creek to headwaters	3	1982	H, O		40,588	See Nanticoke River comments
Toms Dam Branch	Gum Branch	Sussex	Confluence with Gum Branch to headwaters	7	1982	H, O		19,321	See Nanticoke River comments
Tubbs Branch	Deep Creek	Sussex	Confluence with Deep Creek to headwaters	4	1982	H, O		40,588	See Nanticoke River comments
Tyndall Branch	Deep Creek	Sussex	Confluence/Deep Creek to Fleetwood Pond	2	1982	H, O		40,588	See Nanticoke River comments
White Clay Creek	White Clay Creek	New Castle, Chester	Northern boundary of the City of Newark to the confluence with ELMR Run	10	1982	H, O	PA	29,550	Rare/endangered Purple Fringedless Orchid. Area w/ diversity of habitats & biota. Proximity to Wilm., Newark, and Philly.
White Clay Creek, Middle Branch	White Clay Creek	Chester	Confluence with the West Branch to Rt. 841	3	1982	H, O		29,550	Rare/endangered Purple Fringedless Orchid. Area w/ diversity of habitats & biota. Proximity to Wilm., Newark, and Philly.
White Clay Creek, West Branch	White Clay Creek	Chester	Confluence with the main branch to the headwaters	10	1982	H, O		29,550	Rare/endangered Purple Fringedless Orchid. Area w/ diversity of habitats & biota. Proximity to Wilm., Newark, and Philly.
Red Clay Creek	Red Clay Creek	New Castle	Confluence with White Clay to the headwaters	13	2021			13,501	
Christina River	Christina River	New Castle	Confluence with the Delaware River at Wilmington	35	2021		PA	42,979	

ORV	Site Type	River Segment	County	Description					
Dill Farm Site	National Register of Historic Places	Cow Marsh Creek	Kent	Prehistoric archaeological site					
Duck Creek Village	National Register of Historic Places	Duck Creek	Kent	National Historic District known now as Salisbury					
Fennimore Store	National Register of Historic Places	Leipsic River	Kent	Historic commercial building constructed between 1840-60					
Golden Mine	National Register of Historic Places	Mispillion River	Kent	Historic home built in about 1763					
Island Field Site	National Register of Historic Places	Murderkill River	Kent	An archaeological site where there is a museum.					
Alexander Laws House	National Register of Historic Places	Leipsic River	Kent	Historic home					
McClary House	National Register of Historic Places	Leipsic River	Kent	Home built in the 19th century					
Millfin-Marin Agricultural Complex	National Register of Historic Places	Leipsic River	Kent	Historic home and associated buildings constructed in the 18th century style					
Rawley House	National Register of Historic Places	Leipsic River	Kent	Historic home built in the 19th century					
Raymond Neck Historic District	National Register of Historic Places	Leipsic River	Kent	Historic district encompassing several buildings built between 1820-1867					
Reed House	National Register of Historic Places	Leipsic River	Kent	Historic home built in the first quarter of the 19th century					
Ruth Manson House	National Register of Historic Places	Leipsic River	Kent	Historic house of William Ruth, trustee of the first free school in Delaware					
Saxton United Methodist Church	National Register of Historic Places	Murderkill River	Kent	Historic church built in 1879					
Short's Landing Hotel Complex	National Register of Historic Places	Smyrna River	Kent	Historic hotel and farm complex - hotel built in 1780					
Slipple House	National Register of Historic Places	Leipsic Rive	Kent	Historic home built in 1885					
Shoeland	National Register of Historic Places	Leipsic River	Kent	Historic home built in 1790					
Wheel of Fortune (House)	National Register of Historic Places	Muddy Branch	Kent	Historic home built in the 18th century owned by Congressman John Nicholson (1827-1908) and US Sen. Hughes (1867-1953)					
J.H. Wilkerson & Son Brickworks	National Register of Historic Places	Mispillion River	Kent	Historic brickworks and district					
Jonathan Woodley House	National Register of Historic Places	Little River	Kent	Historic home built in the mid-19th century					
Augustine Paper Mill	National Register of Historic Places	Brandywine Creek	New Castle	Historic paper mill from the 19th century					
Bancraft and Sons Cotton Mills	National Register of Historic Places	Brandywine Creek	New Castle	Mill complex - site of some of the earliest and most famous mills near Wilmington					
Bellevue Range Rear Light Station	National Register of Historic Places	Christina River	New Castle	Light tower built in 1909 - operated by lightkeepers until 1943					
Brandywine Park	National Register of Historic Places	Brandywine Creek	New Castle	First city park established in Wilmington in 1886 - designed by Frederick Law Olmstead					
Brandywine Village Historic District	National Register of Historic Places	Brandywine Creek	New Castle	Historic district, Brandywine village developed as area with mills, millers, and artisans in the late 18th century					
Church Street Historic District	National Register of Historic Places	Brandywine/Christina	New Castle	Historic district developed between 1880-1920					
Continental Army Encampment Site	National Register of Historic Places	Brandywine Creek	New Castle	Location where troops from the Continental army camped before the Battle of Brandywine in 1777					
Delaware Academy of Medicine	National Register of Historic Places	Brandywine Creek	New Castle	Historic building originally built in 1815					
East Brandywine Historic District	National Register of Historic Places	Brandywine Creek	New Castle	Historic district developed between the late 18th and early 20th century					
Fort Christina	National Register of Historic Places	Christina River	New Castle	One of the first permanent European settlements in DE					
Harlan and Hollingsworth Office Building	National Register of Historic Places	Christina River	New Castle	Historic building constructed in 1912					
Howard High School	National Register of Historic Places	Brandywine Creek	New Castle	Named for General Oliver Otis Howard, who founded Howard University, opened in 1867					
Jackson-Wilson House	National Register of Historic Places	Brandywine Creek	New Castle	Historic home constructed in 1914					
Lower Market Street Historic District	National Register of Historic Places	Christina River	New Castle	Historic district developed between the mid-18th century and early 20th century					
Main Office of the New Castle Leather Company	National Register of Historic Places	Brandywine Creek	New Castle	Office building constructed in 1917					
New Castle Leather Raw Stock Warehouse	National Register of Historic Places	Brandywine Creek	New Castle	Historic warehouse built in 1917, originally used to store goatskins for a Wilmington kid leather manufacturer					
Old Asbury Methodist Church	National Register of Historic Places	Christina River	New Castle	Historic church originally built in 1789 - first Methodist church constructed in Wilmington					
Old First Presbyterian Church of Wilmington	National Register of Historic Places	Brandywine Creek	New Castle	Historic church built in 1740, used by British troops as a prison and hospital after the Battle of Brandywine					
Rockford Park	National Register of Historic Places	Brandywine Creek	New Castle	Historic park - one of the oldest in Wilmington, site of several notable memorials					
Frank E. Schoonover Studios	National Register of Historic Places	Brandywine Creek	New Castle	Historic building constructed in 1905 - used by students of illustrator Howard Pyle					
Starr House	National Register of Historic Places	Brandywine Creek	New Castle	Historic home built between 1801-1806 - last example of colonial architecture in the city of Wilmington					
Torbert Street Livery Stables	National Register of Historic Places	Brandywine Creek	New Castle	Historic livery stable built in 1887					
Wilmington Amtrak Station	National Register of Historic Places	Christina River	New Castle	Railroad station built in 1907, originally called Pennsylvania Station					
Wilmington Rail Viaduct	National Register of Historic Places	Christina River	New Castle	Rail line originally constructed in 1837					
Augustine Beach Hotel	National Register of Historic Places	Delaware River	New Castle	Historic hotel constructed in 1814, named for early DE resident Augustine Hermann					
Corbit-Sharp House	National Register of Historic Places	Appoquinimink River	New Castle	Historic house museum built in 1772-4, one of the best examples of brick Georgian style houses in the Mid-Atlantic					
Fleming House	National Register of Historic Places	Smyrna River	New Castle	Historic home built in 1830					
Hill Island Farm	National Register of Historic Places	Appoquinimink River	New Castle	Historic home built in 1790					
Huguenot House	National Register of Historic Places	Blackbird Creek	New Castle	Historic home near Taylors Bridge built in 1711					
Lisbon Range Front Lighthouse	National Register of Historic Places	Delaware River	New Castle	Lighthouse built in 1906 in the Delaware River					
Noxontown	National Register of Historic Places	Appoquinimink River	New Castle	Country mill site and village important trading and milling center throughout the Colonial period					
Odessa Historic District	National Register of Historic Places	Appoquinimink River	New Castle	Area in the shipping and trading center of Odessa, primarily developed through the 18th and 19th centuries					
Old Brick Store	National Register of Historic Places	Smyrna River	New Castle	Also known as Old Brick Hotel and the Granary, historic commercial building constructed in 1764					
Old St. Anne's Church	National Register of Historic Places	Deep Creek	New Castle	Historic church built in 1768 on the site of an earlier wooden church built in 1705					
Port Penn Historic District	National Register of Historic Places	Delaware River	New Castle	Historic district with various buildings, the oldest dating back to 1755					
Amstel House	National Register of Historic Places	Delaware River	New Castle	Historic building constructed in the 1730s					
Armstrong Lodge No. 26, A.F. & A.M.	National Register of Historic Places	Christina River	New Castle	Historic building constructed in 1913 in the restrained Colonial Revival style					
Ashland Bridge	National Register of Historic Places	Red Clay Creek	New Castle	Covered bridge over Red Clay Creek built about 1860					
Auburn Mills Historic District	National Register of Historic Places	Red Clay Creek	New Castle	Historic district mostly developed between 1890 and 1910					
Brandywine Manufacturers Sunday School	National Register of Historic Places	Brandywine Creek	New Castle	Historic school constructed in 1817					
Breck's Mill Area	National Register of Historic Places	Brandywine Creek	New Castle	Historic district, mill built in 1813 then rebuilt in 1846 after a fire					
John Carney Agricultural Complex	National Register of Historic Places	Brandywine Creek	New Castle	Historic farm complex					
Chambers House	National Register of Historic Places	White Clay Creek	New Castle	Historic home built in 1890					
Christiana Historic District	National Register of Historic Places	Christina River	New Castle	National Historic district with structures dating from the mid-18th century to the mid-19th century					
Clyde Farm Site	National Register of Historic Places	White Clay Creek	New Castle	Prehistoric archaeological site w/ items dated to 1000 BCE					
Cooch's Bridge	National Register of Historic Places	Christina River	New Castle	Battle of Cooch's Bridge on September 3, 1777 won by the British; only battle of the Revolutionary War fought on DE soil					
Cooch's Bridge Historic District	National Register of Historic Places	Christina River	New Castle	Historic district the site of the 1777 Battle of Cooch's Bridge, the original bridge did not survive the American Revolution					
Curtis Paper Mill Workers Houses	National Register of Historic Places	White Clay Creek	New Castle	Historic family dwellings built in 1888, built to house workers at Curtis Paper Mill					
Joseph Dean & Son Woolen Mill	National Register of Historic Places	White Clay Creek	New Castle	Historic woollen mill					
S P Dixon Farm	National Register of Historic Places	Red Clay Creek	New Castle	Historic farm dating back to the late 18th or early 19th century					
Eleutherian Mills	National Register of Historic Places	Brandywine Creek	New Castle	Gunpowder mill site used for explosives manufacturing between 1802 and 1921					

ORV	Site Type	River Segment	County	Description					
Andrew Fisher House	National Register of Historic Places	Christina River	New Castle	Historic home built in 1777					
Fort Delaware on Pea Patch Island	National Register of Historic Places	Delaware River	New Castle	Used as a prison during the Civil War					
Fort DuPont Historic District	National Register of Historic Places	Delaware River	New Castle	Defended the Delaware River from 1900 to 1942, originally called Fort Reynolds built in 1863					
Gateway-Walker House	National Register of Historic Places	Christina River	New Castle	Historic home constructed in the 18th century					
Glebe House	National Register of Historic Places	Delaware River	New Castle	Historic house built between 1821-1823					
John Lewden House	National Register of Historic Places	Christina River	New Castle	Historic home built around 1770					
Louvers	National Register of Historic Places	Brandywine Creek	New Castle	Historic home built in 1833					
Lower Louvers and Chicken Alley	National Register of Historic Places	Brandywine Creek	New Castle	Historic home built in 1811 originally owned by the Du Pont family					
Meeser Store House	National Register of Historic Places	White Clay Creek	New Castle	Historic home built between 1822 and 1828, built by prominent milling family					
Mount Cuba	National Register of Historic Places	Red Clay Creek	New Castle	Historic home of Lamont du Pont Copeland built in 1937					
Mount Cuba Historic District	National Register of Historic Places	Red Clay Creek	New Castle	Historic district with buildings in mid to late 19th century style					
New Castle County Court House	National Register of Historic Places	Delaware River	New Castle	One of the oldest courthouses in the US, built in 1730					
New Castle Historic District	National Register of Historic Places	Delaware River	New Castle	Historic area with ~500 historic buildings dating from 1700 to 1940.					
New Castle Ice Piers	National Register of Historic Places	Delaware River	New Castle	Historic ice breaks constructed between 1803 and 1882					
Newport National Bank	National Register of Historic Places	Christina River	New Castle	Historic bank constructed in 1864.					
Thomas Phillips Mill Complex	National Register of Historic Places	Christina River	New Castle	Historic mill complex with 18th century mill owners home and grist mill constructed in 1795.					
George Read II House	National Register of Historic Places	Delaware River	New Castle	Historic house museum built in 1797-1804					
Rockland Historic District	National Register of Historic Places	Brandywine Creek	New Castle	Historic district encompassing 6 buildings constructed in the late 18th to late 19th century					
Rotherham Mill House	National Register of Historic Places	Red Clay Creek	New Castle	Historic home constructed in 1740.					
Springer-Cranston House	National Register of Historic Places	Red Clay Creek	New Castle	Historic home constructed in the late-18th century and constructed of local Brandywine granite.					
Strand Millas and Rock Spring	National Register of Historic Places	Brandywine Creek	New Castle	Historic home built in 1701 with springhouse.					
Joseph Tinnall House	National Register of Historic Places	Christina River	New Castle	Historic home constructed in the mid 18th century.					
Walker's Mill and Walker's Bank	National Register of Historic Places	Brandywine Creek	New Castle	Historic spinning cotton mill built between 1813 and 1815.					
Lewis Weldin House	National Register of Historic Places	Christina River	New Castle	Historic home constructed in the late 18th century. (Demolished between 2007 and 2009)					
Welsh Tract Baptist Church	National Register of Historic Places	Christina River	New Castle	Historic Primitive Baptist church built by Welsh settlers in 1746.					
Wooddale Bridge	National Register of Historic Places	Red Clay Creek	New Castle	Covered bridge over Red Clay Creek, marked on map from 1868.					
Wooddale Historic District	National Register of Historic Places	Red Clay Creek	New Castle	Historic district encompassing 6 buildings including a mill site - part of Delaware Iron works which operated from 1826-1870.					
Building at 200-202A High Street	National Register of Historic Places	Nanticoke	Sussex	Historic store built in 1910.					
Building at 218 High Street	National Register of Historic Places	Nanticoke	Sussex	Historic store built in 1885.					
Burton Hardware Store	National Register of Historic Places	Nanticoke	Sussex	Historic commercial built in 1900.					
Cannon's Ferry	National Register of Historic Places	Nanticoke	Sussex	Cable ferry, on eed the oldest ferries in continuous operation in the US, across the Nanticoke since 1740s.					
Carlisle House	National Register of Historic Places	Mispillion River	Sussex	Historic home constructed in 1794.					
J. W. Cox Dry Goods Store	National Register of Historic Places	Nanticoke River	Sussex	Historic commercial building constructed in 1885.					
Dr. Dawson House	National Register of Historic Places	Mispillion River	Sussex	Historic home built in the mid-19th century.					
First National Bank of Seaford	National Register of Historic Places	Nanticoke River	Sussex	Historic building constructed in 1868.					
Laurel Historic District	National Register of Historic Places	Broad Creek	Sussex	Historic district including 701 buildings dating from the late-18th century to the 1930s.					
Milford Railroad Station	National Register of Historic Places	Mispillion River	Sussex	Historic rail station built in the 1860s.					
Milford Shipyard Area Historic District	National Register of Historic Places	Mispillion River	Sussex	Historic district including 18 buildings including the original shipyard and buildings dating from the late 19th century.					
Mispillion Lighthouse and Beacon Tower	National Register of Historic Places	Cedar Creek	Sussex	Original lighthouse built in 1831.					
Portville Lighthouse	National Register of Historic Places	Broad Creek	Sussex	Historic house/wharf, not functioning lighthouse.					
Jesse Robinson House	National Register of Historic Places	Nanticoke River	Sussex	Historic home built in 1820.					
Edgar and Rachel Ross House	National Register of Historic Places	Nanticoke River	Sussex	Historic home built between 1894 and 1897.					
St. Luke's Protestant Episcopal Church	National Register of Historic Places	Nanticoke River	Sussex	Historic church built in 1843.					
Seaford Station Complex	National Register of Historic Places	Nanticoke River	Sussex	Railway station complex built in 1905.					
Sussex National Bank of Seaford	National Register of Historic Places	Nanticoke River	Sussex	Historic bank built in 1888.					
Dravo Plaza Shipbuilding	Historic	Christina River	New Castle	Main shipbuilding hub during WWII.					
Old Brandywine Village	Historic	Brandywine	New Castle	Built around mills that used the end of the Brandywine to generate renowned quality flour.					
Dupont Church	Historic	Christina	New Castle	Dates back to 1638, when Swedish and Finnish settlers arrived and established Fort Christina in what is now Wilmington, Delaware					
Dupont Mills	Historic	Brandywine	New Castle	Made most of the gunpowder used by American troops in the War of 1812. Union troops during the Civil War and by U.S. soldiers in WWI.					
Tubman Garrett Riverfront Park and Statue	Historic	Brandywine	New Castle	Named for abolitionists Thomas Garrett and Harriet Tubman.					
Captain John Smith Chesapeake National Historic Trail	Historic	Nanticoke	Sussex	A series of water routes following the routes of the voyages of Capt. John Smith between 1607-1609.					
Bombay Hook National Wildlife Refuge	Wildlife	Leipsic River	Kent	A refuge that protects one of the largest remaining expanses of tidal salt marsh in the mid-Atlantic region established in 1937.					
Prime Hook National Wildlife Refuge	Wildlife	Delaware Bay	Sussex	A 10,144 acre refuge officially established in 1963 which is an important stopover site for migratory birds as they travel up and down the Atlantic Flyway.					
Russell W. Peterson Urban Wildlife Refuge	Wildlife	Christina River	New Castle	Dynamic wetland preserve of flora and fauna.					
Blackbird Creek Reserve	Wildlife	Blackbird Creek	New Castle	The Reserve is part of the Delaware National Estuarine Research Reserve (DNERR), which is one of 29 National Estuarine Research Reserves across the country.					
Gov. Peterson Marsh Coastal Zone Protection	Wildlife	Christina	New Castle	Area where the outh of the Christina meets the Delaware at Port of Wilmington is protected by Gov. Peterson as part of the DE Coastal Zone.					
Atlantic Sturgeon Habitat	Wildlife	Christina	New Castle	Part of the "critical" designation for Atlantic Sturgeon habitat-aimed to help support recovery of the population.					
Red Clay Creek Scenic Byway	Wildlife	Red Clay	New Castle	28 mile system that is the first in the US to be based on the watershed model.					
DE Coastal Zone	Wildlife	Delaware River	All	Passed by then-Governor Russel Peterson in 1971; regulations associated with the Act were specified under then-governor Tom Carper in 1999.					
Dupont Environmental Education Center	Education	Christina River	New Castle	In association with Delaware Nature Society public education and recreational destination on the Christina.					
Native Lenape Land	Indigenous	Christina, Red Clay, Brandyw	New Castle, Kent	Northern DE was part of the original lands of the Lenape Native Americans.					
Native Nanticoke Land	Indigenous	Nanticoke	Sussex	Southern DE was part of the original lands of the Nanticoke Native Americans.					

Chapter 5 Conclusions and Recommendations

Conclusions

The University of Delaware Water Resources Center (UDWRC) evaluated 43 streams in Delaware with 41 streams listed on the National Park Service (NPS) National River Inventory (NRI) (Table 7). Given their inclusion in the NRI, the streams qualify for potential suitability and eligibility for the National Wild and Scenic River System (W&S). These evaluations present the following relevant conclusions and findings:

1. **White Clay Creek W&S:** Since the induction by President Clinton and Congress in 2000, 200 miles of the White Clay Creek and its tributaries in New Castle County, Delaware and Chester County, Pennsylvania have been designated in the National Wild and Scenic River System.
2. **National Rivers Inventory:** During the 1970s and '80s, the NPS listed 41 streams in Delaware on the National Rivers Inventory. As a result, these waterways are potentially eligible for W&S River status. More recently, the UDWRC played a role in two new additions to the NRI: Red Clay Creek (a tributary of the White Clay Creek) and Christina River. These additions bring the list of streams evaluated to 43 total.
3. **Piedmont NRIs:** Three Piedmont streams in northern Delaware--the Brandywine River, Red Clay Creek, and Christina River--feature high proportions of forest and protected land, as well as many historic sites in their watersheds. These watersheds simultaneously flow through some of Delaware's largest urban areas, such as the City of Wilmington, that are home to disadvantaged and low socioeconomic neighborhoods. Focus given to the Piedmont streams presents a great opportunity to address issues of diversity, inclusion, and environmental justice (DEIJ) that have constantly prevailed, and continue to do so, in these areas for generations.

When considered together as an interconnected system in Northern Delaware, their crucial resources, histories, and unique characteristics can be highlighted in unison. From a research standpoint, the three streams present a practical focus for study given their proximity to each other, proximity to Delaware's only current Wild and Scenic River White Clay Creek, and the connectivity of their tributaries. By viewing them as a unit, the National Park Service will find the process streamlined and the outcome valuable. These three streams rank top three in population density per capita (Brandywine 2,057, Red Clay 1,187, and Christina 2,671), top three in public open space (Brandywine 67%, Red Clay 20%, and Christina 16.0%), and high density of ORVs such as Brandywine (Historic, Recreational, Cultural; National Historic Registry District, Rockland and habitat 37.6% wetlands plus forest), Red Clay (each branch of White Clay Creek Wild and Scenic River; 46.1% wetlands plus forests), and Christina (26.9% wetlands and forests).

If not studied as part of the larger Northern Delaware trio, the Brandywine Creek alone would be recommended. The Brandywine is rich in ORVs, supportive organizations, and would be a manageable focus for the National Park Service to carry out. There is ample support for the Brandywine Creek given the relative population density and heightened level of historic, recreation, and conservation interests that lie in connection with this system with 46.5% suburban/urban land cover, 67.4% public open space, 2,057 per capita population density, and high amounts of ORVs.

4. **Delaware Bay NRIs:** The collection of Coastal Plain tidal tributaries that flow east to the Delaware Bay along Routes 9 and ,1 from Blackbird Creek in New Castle County, to Leipsic Creek and Little River in Kent County, to Broadkill River in Sussex County are protected by State wildlife land and USFWS National Wildlife Refuges. Beyond officially protected segments, this area features high percentages of forest and wetlands.
5. **Nanticoke River:** As the largest watershed in Delaware, the Nanticoke flows west to the Chesapeake Bay in southwestern Sussex County Delaware near Seaford. Recognized as a John Smith National Historic Trail, the Nanticoke holds over half of the watershed's forest and wetlands.

Recommendations

The National Park Service should consider the following options for further study of the eligibility and suitability of the Nationwide Inventory Rivers in Delaware for designation in the National Wild and Scenic Rivers System.

Option 1 (Study all streams). Conduct a reconnaissance study of all 43 NRI streams in Delaware for potential Wild and Scenic River status.

Option 2. (Study watershed system). Conduct a reconnaissance study of the Piedmont streams (Brandywine, Red Clay, Christina) collectively for Wild and Scenic River eligibility. In future years, study the Nanticoke watershed and then the Delaware Bay stream system for additional W&S eligibility consideration. The Brandywine, Red Clay Creek, and Kennett Pike in Delaware are National Scenic Byways administered by the National Park Service

Option 3 (Study single river). Conduct a reconnaissance study of the Brandywine River stretching from the confluence of the east and west branches above Chadds Ford, Pennsylvania down to the mouth of the river in downtown Wilmington, Delaware for W&S river eligibility. The Brandywine is currently a Pennsylvania State Scenic River and becomes part of a reviewed floodplain/drainage code system in Wilmington (see Appendix B).

Option 4 (Study single river). Conduct a reconnaissance study of the Red Clay Creek as the east branch hydrologically connected to the White Clay Creek National Wild & Scenic River watershed.

Implementation

1. **Congressional Staff.** Schedule meetings with Delaware Congressional staff to discuss legislation to conduct a wild and scenic river eligibility study for the recommended rivers in Delaware. Coordinate with Delaware and Pennsylvania congressional offices including the office of PA Congressman (retired) Joe Pitts who co-sponsored the White Clay W&S river study and legislation
2. **Watershed Organizations:** Schedule meetings with watershed organizations such as the Brandywine Conservancy, Brandywine Red Clay Alliance, and Brandywine Shad 2020 and others.
3. **Legislation:** Draft a congressional bill for the National Park Service to study the Brandywine River for wild & scenic eligibility and suitability (see Appendix A) which could bring the National Park Service three years of funding.

Chapter 6 References

Fosburgh, J., J. DiBello, and F. Akers, 2008. Partnership Wild and Scenic Rivers. The George Wright Forum, 25(2).

Molfetta, K. A., 2016. Governance of Federally Protected Rivers: An Institutional Analysis of the Partnership Approach to Wild and Scenic River Management in the White Clay Creek.

National Park Service, 1994. America's National Park System: The Critical Documents.

National Park Service, 2016. Nationwide Rivers Inventory Eligibility.

National Park Service, 2021a. Partnership Wild and Scenic Rivers.

National Park Service, 2021b. Wild and Scenic Rivers Program Eligible and Suitable.

National Wild and Scenic Rivers System, undated. Map of White Clay Creek River System.

National Wild and Scenic Rivers System, 2007. Technical Report of the Interagency Wild and Scenic Rivers Coordinating Council.

Appendix A

110TH CONGRESS
1ST SESSION

H. R. 3667

To amend the Wild and Scenic Rivers Act to designate a segment of the Missisquoi and Trout Rivers in the State of Vermont for study for potential addition to the National Wild and Scenic Rivers System.

IN THE HOUSE OF REPRESENTATIVES

SEPTEMBER 25, 2007

Mr. WELCH of Vermont introduced the following bill; which was referred to the Committee on Natural Resources

A BILL

To amend the Wild and Scenic Rivers Act to designate a segment of the Missisquoi and Trout Rivers in the State of Vermont for study for potential addition to the National Wild and Scenic Rivers System.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

3 SECTION 1. SHORT TITLE.

4 This Act may be cited as the “Missisquoi and Trout
5 Rivers Wild and Scenic River Study Act of 2007”.

1 SEC. 2. DESIGNATION FOR STUDY.

2 Section 5(a) of the Wild and Scenic Rivers Act (16
3 U.S.C. 1276(a)) is amended by adding at the end the fol-
4 lowing:

5 “() MISSISQUOI AND TROUT RIVERS,
6 VERMONT.—The segment from the headwaters of
7 the rivers downstream to the confluence of that seg-
8 ment with the Missisquoi Bay of Lake Champlain.”.

9 SEC. 3. STUDY AND REPORT.

10 Section 5(b) of the Wild and Scenic Rivers Act (16
11 U.S.C. 1276(b)) is amended by adding at the end the fol-
12 lowing:

13 “(19) MISSISQUOI AND TROUT RIVERS,
14 VERMONT.—Not later than 3 years after the date of
15 enactment of this paragraph, the Secretary of the
16 Interior shall—

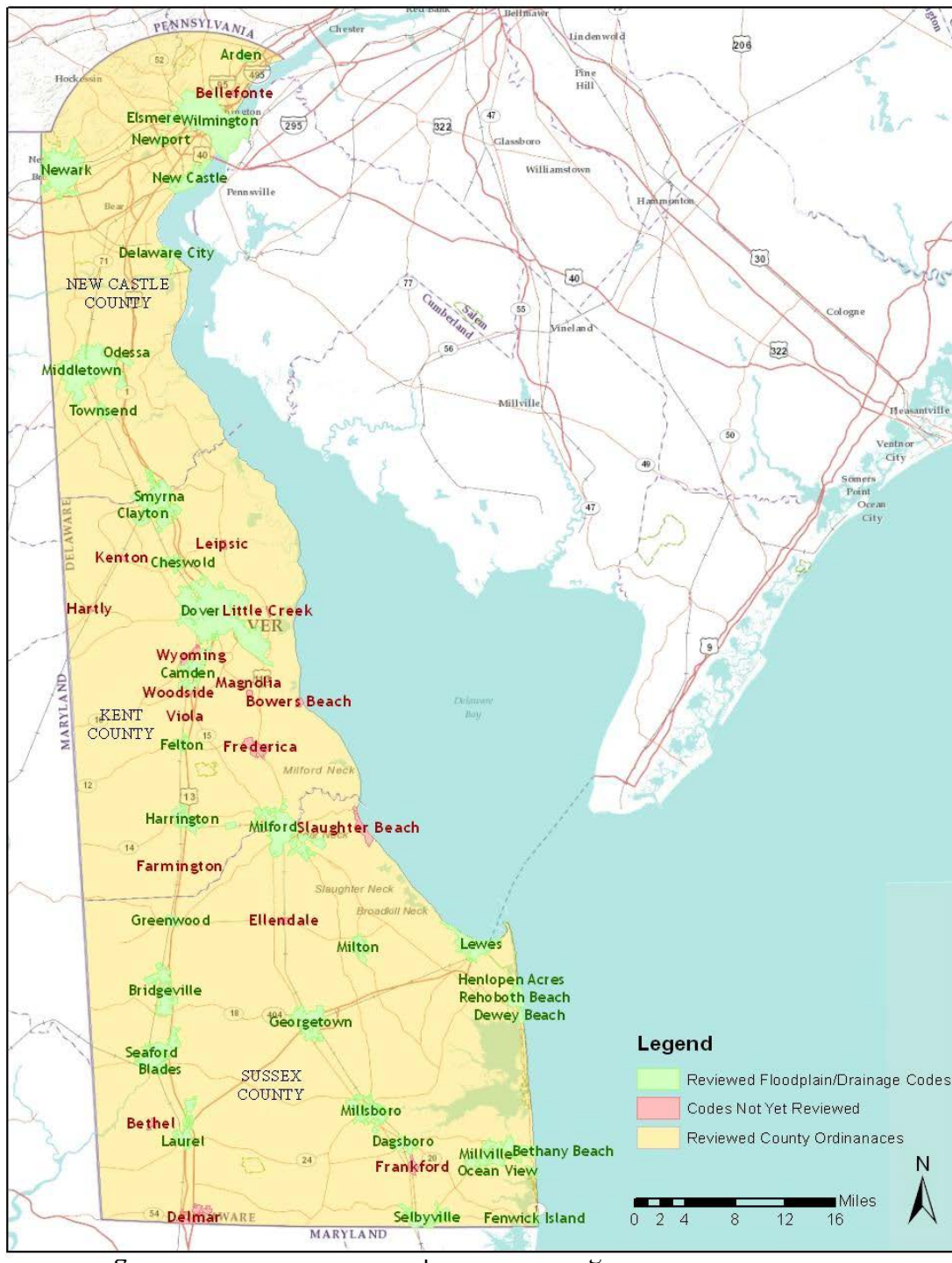
17 “(A) complete the study of the Missisquoi
18 and Trout Rivers, Vermont, described in sub-
19 section (a)(140); and

20 “(B) submit a report describing the results
21 of that study to the appropriate committees of
22 Congress.”.

1 SEC. 4. AUTHORIZATION OF APPROPRIATIONS.

2 There are authorized to be appropriated such sums
3 as are necessary to carry out this Act and the amendments
4 made by this Act.

Appendix B



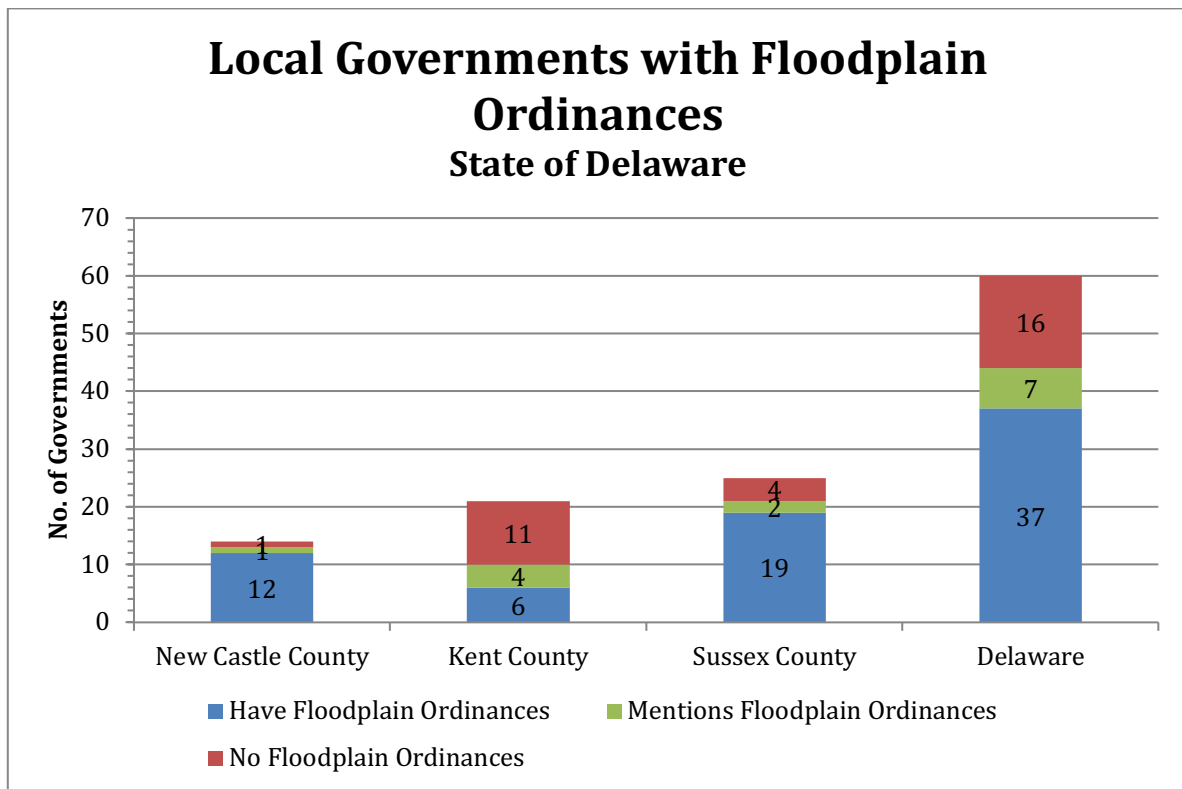


Figure 19. Local governments with floodplain ordinances in Delaware

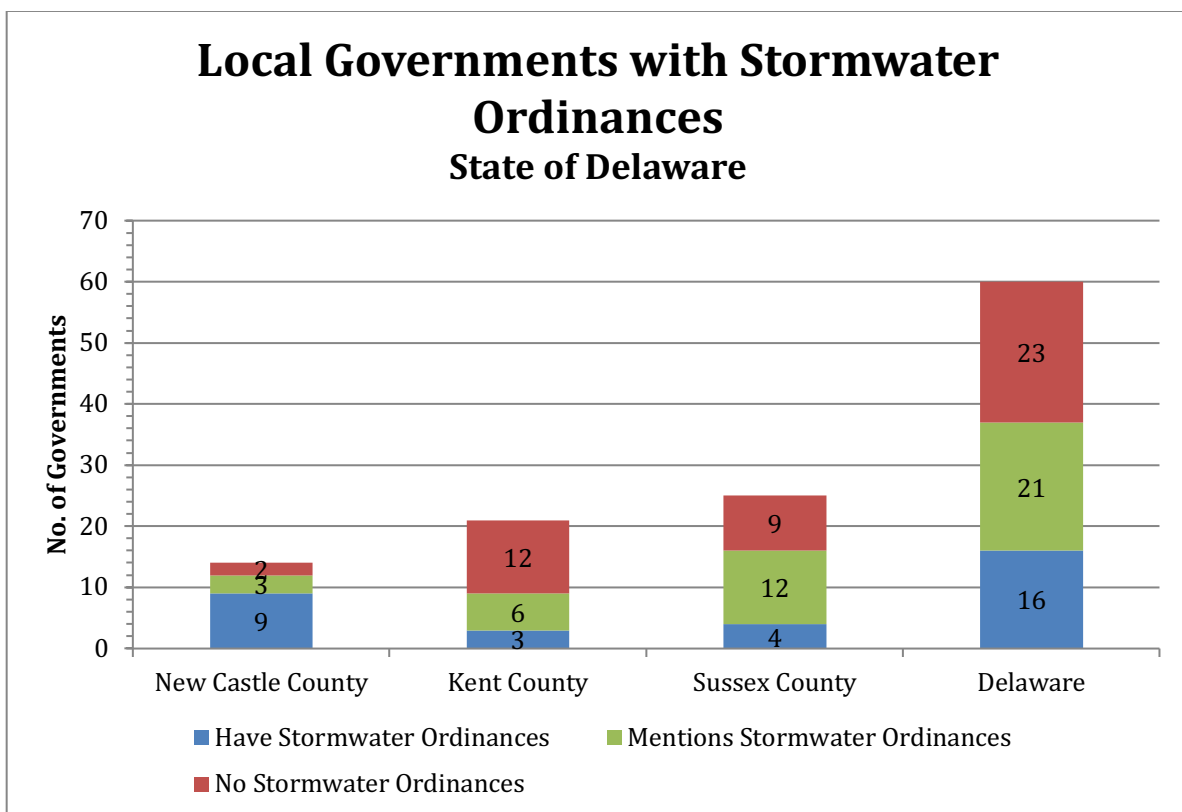


Figure 20. Local governments with stormwater ordinances in Delaware

Table 9. Review of floodplain and drainage standards in New Castle County

Government	Floodplain Standards															Drainage Standards						
	1	2	3	4	5	6	7	7a	8	9	10	11	12	13	14	15	1	2	3	4	5	6
New Castle Co.	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y			Y			Y		Y	Y	Y	Y
Arden	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y			Y			Y		Y	Y	Y	Y
Ardencroft	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y			Y			Y		Y	Y	Y	Y
Ardentown	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y			Y			Y		Y	Y	Y	Y
Bellefonte ^A																						
Delaware City					Y	Y				Y	Y											
Elsmere						Y					Y				Y							
Middletown										Y	Y				Y							
New Castle								Y	Y	Y					Y							
Newark ^B																						
Newport										Y	Y				Y						Y	
Odessa ^A																						
Townsend		Y								Y				Y								
Wilmington								Y		Y					Y							
Total	4	5	4	4	5	6	4	2	5	10	8	0	0	5	5	0	4	0	4	4	5	4

A. Bellefonte and Odessa not yet reviewed. B. Newark reviewed by the City with assistance by UDWRA.

Floodplain:

1. Flood study required in unmapped floodplains.
2. Flood study required in Zone A (no BFE) FEMA mapped floodplains.
3. Only FEMA approved and BFE data on record plans and development documents.
4. Use accepted base flood elevations in building permit application documents.
5. Floodplain information included on permitting documentation.
6. Require use of elevation and flood proofing certificates.
7. Require 18 inches of freeboard. 7a. Requires one foot of freeboard.
8. Require 18 inches of freeboard for manufactured homes.
9. Shallow fill above BFE will not exempt a structure from floodplain regulations.
10. Hydrostatic vents required.
11. Prohibit below-grade crawl spaces or enclosures.
12. Newly subdivided floodplain shall remain deed restricted open space.
13. Prohibit new non-water dependent structures in floodplains on new lots.
14. Prohibit encroachments that would cause more than 0.1 foot of rise without compensation.
15. Incorporate FEMA technical bulletins in local floodplain regulations.

Drainage:

1. Adequate easements required.
2. Obstruction prohibited.
3. Conveyance systems meet 10-year storm events.
4. Lot grading away from buildings.
5. Topographic plan submittal.
6. As-built submittal.

Table 10. Review of floodplain and drainage standards in Kent County

Government	Floodplain Standards															Drainage Standards						
	1	2	3	4	5	6	7	7a	8	9	10	11	12	13	14	15	1	2	3	4	5	6
Kent County		Y	Y	Y	Y			Y			Y		Y		Y		Y			Y	Y	
Bowers Beach																						
Camden			Y	Y	Y	Y					Y		Y	Y	Y		Y			Y	Y	Y
Cheswold			Y	Y	Y						Y		Y	Y			Y	Y		Y	Y	Y
Clayton																	Y				Y	Y
Dover				Y		Y					Y				Y							
Farmington																						
Felton			Y	Y	Y									Y	Y		Y	Y		Y	Y	Y
Frederica																						
Harrington		Y	Y	Y		Y		Y			Y				Y			Y			Y	Y
Hartly																						
Houston																					Y	
Kenton																						
Leipsic																						
Little Creek																						
Magnolia																						
Milford			Y	Y	Y	Y		Y			Y		Y		Y		Y	Y				
Smyrna					Y												Y		Y		Y	Y
Woodside																						
Wyoming																						
Total	0	2	6	7	6	4	0	3	0	0	6	0	4	3	6	0	7	4	1	4	8	6

Table 11. Review of floodplain and drainage standards in Sussex County

Government	Floodplain Standards															Drainage Standards						
	1	2	3	4	5	6	7	7a	8	9	10	11	12	13	14	15	1	2	3	4	5	6
Sussex Co.	Y				Y						Y				Y		Y				Y	
Bethany Bch.			Y	Y	Y	Y											Y	Y		Y	Y	Y
Bethel																						
Blades			Y	Y	Y						Y						Y				Y	
Bridgeville			Y	Y	Y						Y				Y		Y				Y	Y
Dagsboro			Y	Y	Y												Y			Y	Y	
Delmar																						
Dewey Beach			Y	Y	Y			Y			Y									Y		
Fenwick Island			Y	Y	Y		Y				Y											
Georgetown			Y	Y	Y						Y										Y	Y
Greenwood					Y						Y				Y							Y
Henlopen Acres			Y	Y	Y		Y	Y			Y				Y							
Laurel			Y	Y	Y						Y				Y							
Lewes			Y	Y	Y						Y											Y
Millsboro			Y	Y	Y						Y				Y					Y	Y	
Millville			Y	Y	Y			Y							Y		Y				Y	Y
Milton			Y	Y	Y		Y	Y	Y		Y				Y						Y	Y
Ocean View			Y	Y													Y			Y	Y	Y
Rehoboth Bch									Y		Y										Y	
Seaford			Y	Y	Y						Y							Y				
Selbyville			Y	Y	Y						Y				Y						Y	
S. Bethany			Y	Y	Y						Y						Y			Y	Y	Y
Total	1	0	17	17	18	1	3	4	2	0	16	0	0	0	9	0	8	2	0	6	13	9

Senate Bill 64 Floodplain and Drainage Standards Checklist (DE)

Community: New Castle County County: New Castle State: DE CID:

State Reviewer: UDWRA Date: 1/11/13 State Determination:

Flood Zones: ☐A ☐AE ☐AE (w/o FW) ☐AO ☐VE

Item Description	State Review	Revised
Senate Bill 64 Floodplain Standards		
1. For all new development activities which exceed 50 lots or 5 acres in locations contiguous to streams without a FEMA-delineated floodplain, a flood study shall be conducted.	Meets Standard	
2. For all new development which exceed 50 lots or 5 acres in Zone A FEMA floodplains, a flood study shall be submitted to FEMA for approval prior to record plan approval.	Sec. 40.10.312	
3. Only FEMA approved floodplain and BFE data shall be shown on record plans and development documents.	Sec. 40.10.312	
4. Only base flood elevation approved by county, municipality or FEMA may be used in building permit application.	Unsure if meets std. Sec. 40.10.313	
5. Floodplain information must be included on permitting documentation.	Unsure if meets std. Sec. 40.10.313	
6. Require use of FEMA elevation certificate and flood-proofing certificate.	Sec. 40.10.316 No floodproofing certificate	
7. Require 18 inches of freeboard for all new construction and substantial improvements.	Sec. 40.10.316 does not contain dry-floodproofing in lieu of freeboard	
7a. Require 12 inches of freeboard for all new construction and substantial improvements.	NA	
8. Require 18 inches of freeboard for manufactures homes.	Sec. 40.10.317 not specified to include basement or new/substantially improved	
9. Fill placed in the floodplain which results in land having an elevation less than 18 inches above base flood elevation will not result in a relaxation of floodplain standards.	Yes because doesn't mention exemptions	
10. Hydrostatic vents shall be required within 1 foot grade.	Sec. 40.10.316 specifically for parking, building access or storage in other than the basement	

2. For all new development which exceed 50 lots or 5 acres in Zone A FEMA floodplains, a flood study shall be submitted to FEMA for approval prior to record plan approval.		
3. Only FEMA approved floodplain and BFE data shall be shown on record plans and development documents.		
4. Only base flood elevation approved by county, municipality or FEMA may be used in building permit application.		
5. Floodplain information must be included on permitting documentation.		
6. Require use of FEMA elevation certificate and flood-proofing certificate.		
7. Require 18 inches of freeboard for all new construction and substantial improvements.		
7a. Require 12 inches of freeboard for all new construction and substantial improvements.	48-436	
8. Require 18 inches of freeboard for manufactures homes.		
9. Fill placed in the floodplain which results in land having an elevation less than 18 inches above base flood elevation will not result in a relaxation of floodplain standards.	Within floodway	
10. Hydrostatic vents shall be required within 1 foot grade.		
11. Elevation of the lowest floor beneath an elevated building, must be above lowest adjacent grade at least one side.		
12. Prohibit subdividing land in floodplain. Newly subdivided floodplain shall remain deed restricted open space.		
13. Prohibit new non-water dependent structures dependent structures in floodplains in newly subdivided lands.		
14. Prohibit encroachments that would cause more than 0.1 foot of rise without compensation.		
15. Incorporate FEMA technical bulletins in local floodplain regulations.		

Senate Bill 64 Drainage Standards

1. Easements of an adequate width shall be required over drainage conveyance systems within any proposed subdivision.		
2. The willful or negligent obstruction of any drainage conveyance shall be prohibited.		
3. Drainage conveyance systems within proposed subdivisions shall meet the minimum 10-year storm event.		
4. Lot grading shall ensure adequate drainage away from buildings and accessory structures without creating an adverse impact to adjacent structures or lands.		
5. A topographic plan submittal shall be required for all construction activity greater than 5,000 square feet.		
6. An as-built submittal shall be required for any construction with an approved topographic plan.		