December 9, 2011

Michael Krancer
Secretary of Department of Environmental Protection
P.O. Box 2063
Harrisburg, PA 17105-2063

Dear Mr. Krancer,

On behalf of our fellow co-petitioners, Delaware Riverkeeper Network is pleased to submit to the Department of Environmental Protection a stream redesignation petition for the Upper and Middle Delaware River Watershed. We believe this region of the Delaware River is deserving of special protection and Exceptional Value status and enclose a 70-page petition to begin the petition process.

Co-petitioners for the Delaware River redesignation petition include American Rivers, The PA Council of Trout Unlimited, Clean Water Action and over twenty other organizations. In addition to these important partner organizations, over 150 watershed residents have joined in as original co-petitioners to encourage protection of the Delaware River at this critical time in its history. A full list of co-petitioner letters are found in the submitted materials. Delaware Riverkeeper Network will be assembling a CD with additional data subsequent to this petition. If your staff has questions about the petition, please contact Faith Zerbe at 215-369-1188 ext 110 or at faith@delawareriverkeeper.org.

We look forward to working with the Department to make this redesignation petition a reality.

Thank you for your time and consideration.

Sincerely,

Maya van Rossum
the Delaware Riverkeeper

cc: Tony Shaw

Delaware Riverkeeper Network
300 Pond Street, Second Floor
Bristol, PA 19007
tel: (215) 369-1188
fax: (215) 369-1181
drkn@delawareriverkeeper.org
www.delawareriverkeeper.org

December 9, 2011

Michael L. Krancer, Chair Person
Environmental Quality Board
Secretary of Environmental Protection
15th Floor, RCSOB
400 Market Street
Harrisburg, PA 17101-2301

Dear Secretary Krancer,

On behalf of the 24 undersigned organizations and businesses residing and operating within the Delaware River Watershed and beyond, we are writing as co-petitioners in full support of the regional stream redesignation petition being submitted to the PA Department of Environmental Protection and the Environmental Quality Board that requests an upgrade or stream redesignation of the main stem Delaware River and all Pennsylvania tributaries that flow into the Upper and Middle Delaware River from their current designated use status of High Quality or lower designation to Exceptional Value (EV) status. We believe it is critical that PADEP accepts this petition for review and takes immediate actions to see this redesignation through in an expedited redesignation process to ensure this national treasure and treasure of the Commonwealth is protected.

The Delaware River and its tributary streams are deserving of this highest designation status as it meets many of the qualifiers put forth in the anti-degradation guidelines that are summarized in the submitted petition. The Upper and Middle Delaware and its tributary streams are a treasure for Pennsylvanians and other northeast residents and the region who enjoy fishing, boating, and swimming its waters. This wilderness provides the region $22 billion in economic benefits from activities like hiking, hunting, fishing, boating, and farming. Its headwaters are home to threatened and endangered species, including diverse populations of native freshwater mussels that live in the main stem and tributary streams. The Delaware River is the largest undammed River east of the Mississippi, flowing freely for 330 miles, and is home to diverse wildlife, including forty species of resident and migrating fish.

Delaware Riverkeeper Network
925 Canal Street, Suite 3701
Bristol, PA 19007
Office: (215) 369-1188
fax: (215)369-1181
drn@delawareriverkeeper.org
www.delawareriverkeeper.org

Furthermore, the Delaware River Basin provides drinking water for more than 15 million Americans - 42% of Pennsylvanian residents, 34% of New Jersey residents, 81% of Delaware residents, and 35% of New York residents rely on the River for the water they drink, cook, and bathe in. The Delaware River delivers 1,803 mgd to public water supplies. That's about 5% of the Nation's population from a relatively small watershed, only .4% of the land mass of the continental U.S. The Delaware River is one of the largest water supply basins in the mid-Atlantic, providing more drinking water than any adjacent basin. For instance, the Susquehanna River Basin (27,500 square miles) is more than twice as large as the Delaware River Basin (12,769 square miles) yet the Susquehanna provides 6.2 million people with water, less than half of what the Delaware provides each day. That's why river historian Richard Albert recounted that the river has been dubbed —A Little Giant because of the command performance it must meet every day. The value of this water supply has recently been calculated by a University of Delaware study at $3,767,000. Looking at the many aspects of economic value that the River provides, this study concludes —The Delaware Basin contributes close to $22 billion in annual market/non-market value to the regional economy.

There are 2,271,000 jobs in Pennsylvania's portion of the Delaware River Basin and 43% of Pennsylvania's population lives in the Watershed, even though only 14% of the State is contained here. The Delaware River supports the largest freshwater port in the world. The Delaware Watershed may be relatively small but it is a great provider and is intensely used.

The Delaware River is a National Wild and Scenic River, designated by Congress for its outstanding attributes and resources, a National Estuary, and the exceptional water quality of the nontidal Delaware. The water quality of the Delaware River is so high that the entire 197-mile nontidal river is protected by a special regulatory program enacted by the Delaware River Basin Commission (DRBC) over the past two decades to prevent water quality degradation. In fact, the Delaware River is the longest stretch of anti-degradation waters in the Nation – and it is the longest undammed river east of the Mississippi. These distinctions make the Delaware an irreplaceable resource, an extraordinary natural asset, a unique and powerful provider that is deserving of the highest designation Pennsylvania has to offer – Exceptional Value status.

The Upper Delaware River and its tributary streams' current PA designated use status does not reflect its quality as one of the most pristine bodies of water in Pennsylvania, or the nation for that matter, nor does it provide adequate protections against the threat of gas drilling currently pending approval of special gas drilling regulations by the Delaware River Basin Commission. If those regulations are approved, there could be up to 64,000 wells drilled within the watershed.

Dr. Erik Silldorff, an aquatic biologist with the DRBC, testified that, "exploratory well drilling projects within the drainage area of Delaware River Basin Special Protection Waters pose a substantial risk to the water quality and ecological condition of these waterways." DRBC macroinvertebrate data, in coordination with PADEP, will be submitted as part of this upgrade petition to illustrate the diverse benthic community residing in the Delaware's tributary streams. Because of the threat gas drilling poses to the Upper and

Middle Delaware River (with 36% of the Delaware underlain with Marcellus shale), American Rivers designated the Upper Delaware River the most endangered River in the Nation in 2010.

An Exceptional Value designation will not stop gas drilling or other development in the Basin. It will, however, require that the necessary steps are taken to ensure preservation of the outstanding quality of the Upper Delaware watershed. Those steps include complete antidegradation reviews for drilling permits, individual permit filing processing instead of general permit processing, and ensuring that the protected waterway is not affected by stormwater runoff and other impacts of drilling through Clean Water Act requirements.

Protecting the Delaware River and its tributary streams for all of the communities that rely on it for healthy clean water is the right thing to do and we are in support of the proposed petition being submitted to the Pennsylvania EQB to rightly designate the Upper and Middle Delaware River Region as Exceptional Value so that Pennsylvania residents and the region can continue to enjoy the beauty, drinking water, and life-giving qualities of the Delaware River.

Thank you for your consideration and your timely action on this redesignation at a critical time.

Sincerely,

William Robert Irvin, American Rivers
Maya K. van Rossum, Delaware Riverkeeper Network
Ken Undercoffer, PA Council of Trout Unlimited
Myron Arnowitt, Clean Water Action
Dan Plummer, Friends of the Upper Delaware
Barbara Benson & Thomas Au, Sierra Club, Pennsylvania Chapter
Heide Marie Cebrick, Stanley Cooper Trout Unlimited Chapter
Robert Sedwin, Brodhead Watershed Association
Marion M. Kyde Ph.D., Delaware River Greenway Partnership
Carole Linkiewicz, The Lackawaxen River Conservancy
Jim Monroe, Delaware River Shad Fisherman’s Association
Steven Schwartz, Delaware Valley Ramps
Michael Riska, Delaware Nature Society
Kate Hudson, Riverkeeper, Inc.
Barbara Arrindell, Damascus Citizens for Sustainability
Mark Zakutansky, Appalachian Mountain Club
Maria Payan, Peach Bottom Concerned Citizens Group
The Rev. Sandra L. Strauss, Pennsylvania Council of Churches
Robert E. Hughes, Eastern PA Coalition for Abandoned Mine Reclamation (EPCAMR)
Dan Smith, Friends of Lower Beaverdam Creek
Iris Marie Bloom, Protecting Our Waters
Cinda M. Waldbuesser, National Parks Conservation Association
Joy Bergey, Citizens for Pennsylvania's Future (PennFuture)
Paulette Hammond, Maryland Conservation Council

0120-FM-PY0004 Rev. 3/2003

COMMONWEALTH OF PENNSYLVANIA
ENVIRONMENTAL QUALITY BOARD

PETITION FORM

I. PETITIONER INFORMATION

Name: Delaware Riverkeeper Network (in partnership with 23 additional co-petitioners)

Mailing Address: 925 Canal Street, 7th floor
Suite 3701
Bristol, PA 19007

Telephone Number: 215-369-1188 ext 110

Date: 12/8/11

II. PETITION INFORMATION

A. The petitioner requests the Environmental Quality Board to (check one of the following):

☐ Adopt a regulation

☒ Amend a regulation (Citation 25 Pa.Code 93.9a and 93.9b, and 93.9c.)

☐ Repeal a regulation (Citation _____)

Please attach suggested regulatory language if request is to adopt or amend a regulation.

B. Why is the petitioner requesting this action from the Board? (Describe problems encountered under current regulations and the changes being recommended to address the problems. State factual and legal contentions and include supporting documentation that establishes a clear justification for the requested action.)

Please see attached information

C. Describe the types of persons, businesses and organizations likely to be impacted by this proposal.

Please see attached information

D. Does the action requested in the petition concern a matter currently in litigation? If yes, please explain.

No

E. For stream redesignation petitions, the following information must be included for the petition to be considered complete. Attach supporting material as necessary.

1. A clear delineation of the watershed or stream segment to be redesignated, both in narrative form and on a map.
2. The current designated use(s) of the watershed or segment.
3. The requested designated use(s) of the watershed or segment.
4. Available technical data on instream conditions for the following: water chemistry, the aquatic community (benthic macroinvertebrates and/or fishes), or instream habitat. If such data are not included, provide a description of the data sources investigated.
5. A description of existing and proposed point and nonpoint source discharges and their impact on water quality and/or the aquatic community. The names, locations, and permit numbers of point source discharges and a description of the types and locations of nonpoint source discharges should be listed.
6. Information regarding any of the qualifiers for designation as high quality waters (HQ) or exceptional value waters (EV) in §93.4b (relating to qualifying as High Quality or Exceptional Value waters) used as a basis for the requested designation.
7. A general description of land use and development patterns in the watershed. Examples include the amount or percentage of public lands (including ownership) and the amount or percentage of various land use types (such as residential, commercial, industrial, agricultural and the like).
8. The names of all municipalities through which the watershed or segment flows, including an official contact name and address.
9. Locational information relevant to items 4-8 (except for contact names and addresses) displayed on a map or maps, if possible.

All petitions should be submitted to the
Secretary of the Department of Environmental Protection
P.O. Box 2063
Harrisburg, PA 17105-2063

Petition to Upgrade the Upper and Middle Delaware River Watershed to Exceptional Value

December 9, 2011

Submitted by: Delaware Riverkeeper Network and American Rivers in Partnership with over 20 Organizations and 150 Individual Co-Petitioners

Section B: Upgrade Background and Justification

Problems Encountered Under Current Designation

The current High Quality designation of the Upper and Middle Delaware River tributaries does not accurately depict the outstanding water quality of the Upper and Middle Delaware River Watershed, and will not adequately protect the outstanding natural resource values from new sources of degradation based in Pennsylvania. The Upper and Middle segments of the Main Stem Delaware River currently are deemed Special Protection Waters (SPW) by the Delaware River Basin (DRBC) but the Pennsylvania level of protection does not compliment this same high quality standard/designation. In addition, the tributaries feeding into the Special Protection Waters of the Delaware River do not have Exceptional Value (EV) status throughout and as a result protections of tributaries necessary to protect the mainstem are lacking. An upgrade to EV status for the Upper and Middle Delaware River Watershed would offer greater protection from any future Pennsylvania-based discharges that would adversely influence water quality and ensure the watershed's exceptional water quality is maintained and protected as outlined in the Chapter 93 anti-degradation regulations (25 Pa.Code § 93.4a(c)). This EV designation throughout the Pennsylvania portion of the watershed that feeds the Upper and Middle Delaware would also be more in line with the DRBC SPW Program and designation. This EV designation would also be in line with what New Jersey has done in recent years to ensure Category 1 (C1) protections of the tributary streams in New Jersey that flow into the main stem Delaware River SPW region. Failing to provide the designation denies these high quality waterways the protection they need to maintain their high quality as is otherwise promised by State and Federal anti-degradation laws. Development surrounding the Upper and Middle Delaware River and its tributaries is likely to increase in the near future. Consequently, a close examination of new data taken on this pristine River resource has led to the conclusion that the Upper and Middle Delaware River Watershed should be protected from degradation by the highest standard of Exceptional Value.

Threats to the Watershed

Much of the Poconos area covered by this petition is undergoing rapid development similar to Pike County (fastest growing county in PA) and Wayne County (ninth fastest growing county in PA) which are considered bedroom communities for families in metropolitan areas of New York, New Jersey, and Philadelphia seeking vacation homes in these beautiful forested and rural places. This escalation of population density indicates widespread urbanization, corresponding forest loss, and an increase in impervious surfaces. While the Poconos area is already home to many HQ and some EV watersheds, there are still watersheds covered by this petition that are left under-protected, including those that carry the HQ designation which does not provide the same highest quality protection that the requested EV designation would.

Furthermore, the Upper and Middle Delaware River and its watershed are located over a geological formation known as the Marcellus Shale – DRBC estimates 36% of the Delaware River's headwaters are underlain by the shale. In order to access the reserves of natural gas in the shale, energy companies have acquired drilling rights to large tracts of land in the watershed. The Delaware River Basin Commission (DRBC), Environmental Protection Agency, and National Park Service have variously estimated that the natural gas industry

could drill between 16,000 and 64,000 wells in the Delaware River Basin in coming years. Because of the Special Protection Waters designation of the Delaware River, DRBC has maintained a moratorium on gas drilling while gas drilling regulations are developed for the Delaware River Basin. DRBC was set to approve gas drilling regulations on November 21, 2011 which would have opened the region to gas drilling but the meeting was cancelled when the five Commissioners could not reach agreement on the vote. The science coming out on drilling also raises concerns. An Academy of Natural Sciences' preliminary study has found that even in areas where spills and large pollution events from industrial gas drilling are not evident, stream quality and diversity are declining in the intensely developed drilling areas of neighboring Pennsylvania counties. Public concern is at an all time high. With New York still working out an EIS, if drilling were to be approved in the Delaware River Basin, Pennsylvania communities would be the first to experience the gas drilling boom.

Dr. Erik Silldorff, an aquatic biologist with the DRBC, testified that, "exploratory well drilling projects within the drainage area of Delaware River Basin Special Protection Waters pose a substantial risk to the water quality and ecological condition of these waterways; this risk is expected to increase commensurately with the number of exploratory well projects. The juxtaposition of highly sensitive resources in an area that could see unprecedented industrial activity through exploratory well projects highlights the need for appropriate environmental safeguards." "Such safeguards provide a means to minimize the risks from exploratory wells, risks that could undermine the considerable efforts across the preceding decades to prevent degradation of these resources," said Dr. Sildorff. This expert testimony pinpoints the need to ensure that the Upper and Middle Delaware River Watershed is protected from degradation using the strongest possible safeguards— in this case an Exceptional Value designation. It is important to note that Dr. Silldorff had this high level of concern when merely talking about exploratory well projects, if drilling is allowed the concerns he expressed will be tremendously magnified.

<u>Changes Recommended to Address the Problems</u>

An EV designation will not stop residential development or natural gas development; however, the upgrade will provide stronger mechanisms to ensure the watershed is protected as these changes take place. EV designation will ensure that an antidegradation review is conducted for proposed new discharges (such as wastewater disposal or stormwater discharges) and that nondischarge alternatives for permits will be applied whenever possible. EV status will also require applicants to apply for individual permits instead of general permits in many cases, which will ensure a closer evaluation of the local conditions and incorporate appropriate site-specific considerations into the permit that will protect water quality. Furthermore, in the event that a viable nondischarge alternative is not possible, the public is made aware of, and has the opportunity to comment on, the proposed discharge in HQ/EV watersheds.

Proposed well sites must ensure that stormwater run-off during and after construction will not degrade water quality in the designated waterway. All earth disturbances, regardless of size, that may come to impact EV/HQ waterways must include an erosion and sedimentation plan and must implement "special protection" best management practices (BMPs) to minimize soil erosion and sedimentation to the receiving stream. When land is cleared and well pad sites are constructed, a plan for controlling erosion and sedimentation

will be critical to protect the River. As with construction activities associated with development, shale operators in HQ and EV watersheds must implement "Special Protection" BMPs that are not usually required in watersheds that do not have HQ or EV designation.

If a proposed development in the Upper Delaware involves disturbance or encroachment into wetlands, streams, ford crossings, or other surface water within the floodplain of an EV stream, an Encroachment Permit is required to ensure the proper level of protection and care are given to the local waterways. In addition, individual permits would be required for pipeline stream crossings, minor road crossings, and temporary road crossings. Increased truck traffic from gas drilling in the area and the need for trunk lines and other distribution pipelines from each gas pad site would lead to many of these crossings being proposed in the watershed so better regulation of these crossings will be essential.

Proposed new dams in EV watersheds require an environmental assessment review. Some gas companies are proposing new or temporary dams in order to increase water available for hydraulic fracturing. An environmental review of dams proposed to aid withdrawals will ensure that adequate flows and ecological integrity are maintained for the health of the exceptional system. Low level radioactive waste disposal facilities and hazardous waste treatment and disposal facilities cannot be sited in EV watersheds. This is critical, as Marcellus Shale exploration is known to produce radioactive wastewater that requires disposal.

The measures required in EV watersheds help protect the resource while still allowing development to take place using BMPs. These protections and anti-degradation regulations will prove to be critical to ensure this exceptional resource that serves as the drinking water supply for 15 million Americans is protected as these major landuse changes unfold.

What will EV/HQ status not do?

The elevation of the Delaware River Watershed to EV status will not stop development, but it will provide better mechanisms to ensure the watershed is protected and not degraded. EV status will not affect agricultural plowing or tilling practices or pesticide use. Regardless of the stream designation, agricultural plowing that disturbs 5,000 square feet or more of land, must be preceded by an implemented Erosion and Sediment Control Plan. Current Nutrient Management Regulations for CAOs and CAFOs remain the same for all streams, regardless of their designated use. In most cases, existing facilities, such as sewage facilities, are permitted to continue to operate under all existing applicable approvals and permits. Permits to these facilities may also be renewed without any additional requirements after EV designation. EV status does not affect winter maintenance on roads, or bridge and culvert maintenance, repair, or replacement.

Justification for the Requested Re-designation of the Upper and Middle Delaware Watershed

This petition will summarize a compendium of evidence that illustrates that the Upper and Middle Delaware River and the Pennsylvania tributaries that flow into these segments of the Delaware River are deserving of an upgrade from HQ to EV: from its current water quality conditions, demonstrated aquatic diversity, presence of endangered and threatened species, land preservation investments in the region, importance as a drinking water supply, natural and historical importance, free-flowing conditions of the main stem, diverse recreational opportunities and abundant ecotourism industry, and the existing grass-roots and governmental commitment in the region for strong protections like DRBC's Special Protection Waters designation which applies to the longest stretch of anti-degradation waters in the nation. It was critical to the co-petitioners that we gathered strong evidence that supports this petition as well as garner local and regional support. Key justification to support this petition includes the following points:

Drinking Water Supply

The Delaware River supplies water to 15.6 million people in Pennsylvania, New York, New Jersey, and Delaware and a recent University of Delaware study estimated the worth of this water supply at $3.8 billion. New York City gets at least half of its drinking water supply from the headwaters of the Delaware River in the Cannonsville, Pepacton, and Neversink Reservoirs. It is the largest unfiltered water supply in the world and New York has recognized this by investing in efforts to protect forested and rural areas of the watershed. The Delaware River is also a major source of drinking water for Philadelphia and surrounding PA areas and river towns, three million New Jersey residents and residents of Delaware. Supplying water for at least 5% of the U.S. population, maintenance of high quality water standards that ensure clean fresh drinking water, is paramount in this watershed. As a drinking water supply, the Commonwealth should afford streams flowing into this basin the highest protection available.

A clean Delaware River reduces the cost of water treatment and increases property values for homes and businesses. By protecting and restoring the River we earn tremendous economic and ecological benefits while the quality of life for residents throughout the

Delaware River watershed increases. Once damage has been done to the natural ecosystems of the Delaware River, it can be difficult and costly, if not impossible, to undo.

The Delaware River is Designated a Wild & Scenic River

Three quarters of the non-tidal Delaware River is designated a National Wild and Scenic River. One section extends 73 miles from the confluence of the River's East and West branches at Hancock, N.Y. downstream to Milrift, PA (the second is a 40-mile stretch from just south of Port Jervis, N.Y. downstream to the Delaware Water Gap near Stroudsburg, PA (both designated in 1978). Combined, these two river corridors take in 124,929 acres and make up a large part of the proposed upgrade area in this petition. The Lower Delaware Wild and Scenic Rivers Act, signed into law on November 1, 2000, added another 38.9-mile section of the main stem Delaware (and about 28 miles of selected tributaries) to the national system, linking the Delaware Water Gap and Washington Crossing, PA, just upstream of Trenton, N.J. Sections of the Maurice River in New Jersey (a Delaware Bay tributary) and the Musconetcong River in New Jersey (a Delaware River tributary), as well as the White Clay Creek in Pennsylvania and Delaware (which flows into the Christina River, a tributary to the Delaware) also have been included in the national system. According to the National Park Service's web site, the U.S. has 3.5 million miles of rivers, but only about 12,600 river miles (just over one-quarter of one percent) are included in the National Wild and Scenic Rivers System, making the Delaware River a crown jewel for the nation and the northeast. The Wild and Scenic Rivers Act states that the River must be protected in its free-flowing condition and that it must be managed for the benefit and enjoyment of present and future generations.

The Delaware River is a world class fishery

The Upper and Middle Delaware is recognized by sportsmen and fisheries biologists as one of the finest fishing rivers in the northeastern United States. The River offers a high quality fishing experience in close proximity to major metropolitan areas. According to the 1976 New York Angler Survey, the Upper Delaware is one of the five most heavily fished river areas in the state. In 1982, it was estimated that there were nearly 60,000 angler days for the river area between Hancock and Port Jervis. Since 1978, the estimated fishing days in the 27 mile reach between Hancock and Calicoon have increased by ninety percent.

In Delaware, New Jersey, New York, and Pennsylvania, the U. S. Fish and Wildlife Service (2008) estimated the annual economic value of fishing, hunting, birding and wild-life/bird watching recreation was $9.2 billion in $2006. Trip-related expenditures include food and lodging, transportation, and hunting, fishing, and wildlife watching equipment. The Delaware Basin includes 50% of Delaware's land area, 40% of New Jersey's land area, 5% of New York State's land area, 14% of Pennsylvania's land area. Prorating based on the ratio of the area of the state within the basin to total state area, estimated economic value of fishing, hunting, and wild-life associated recreation in the Delaware Basin is $1,477 million/yr in $2006 or $134 million/yr in Delaware, $574 million/yr in New Jersey, $160 million/yr in New York, and $608 million/yr in Pennsylvania (see University of Delaware's Socioeconomic Report for more details).

The annual economic value of recreational fishing to the Upper Delaware area has been estimated at nearly $5,000,000. Fisheries biologists from Pennsylvania and New York

recognize the upper segment of the River as one of the foremost trophy trout streams in the Northeast. Depending on the time of year and volume of cold water releases from tributary reservoirs, this significant trout fishery ranges between the hamlets of Hancock and Callicoon. Trout and other fish have been subjected periodically to extreme changes in flows and water temperature due to sudden changes in the release schedules of the upstream reservoirs. American eels are found throughout the corridor, sustaining one of the finest commercial eel fisheries in the world during the fall, when mature eels return to the sea to spawn.

The Upper Delaware also provides key spawning and nursery habitat for the American shad along its entire length. The Delaware is the only natural shad river in the Northeast (from Maine to West Virginia) that is sufficiently free of man-made barriers and industrial pollution to allow passage of these migratory fish to their upper reach spawning habitats. According to the NY Dept of Conservation 2009 report, up to 750,000 American shad migrate to the upper reaches annually. The most important spawning occurs above the Delaware Water Gap, with nursery areas at or downstream of spawning grounds due to the downstream dispersal of young shad. The most important nursery areas are located from Belvedere to Hancock and up into the East Branch, and centered near Tusten and Lordville. The American shad spawning period runs from mid-April through June. From Port Jervis up into the East Branch the peak of the spawning period usually occurs in June due to the slower warming waters. Populations of American shad along the Atlantic coast have been declining in recent years. Protection of exceptional spawning habitat for this species in the Delaware River is critical to its overall sustainability.

It has been reported by the Pennsylvania Fish and Boat Commission that in 1986, recreational shad fishers fishing on the Delaware River for shad spent about $1.6 million during just a 9 week fishing season; in 2007 this would be equivalent to approximately $3 million. PAFBC 2011 reports show that shad fishers are willing to spend twice as much as this ($3.2 million in 1986 dollars; $6.5 million adjusted in 2010 dollars). This is an important boost for local economies to the Delaware River with ripple effects beyond.

According to a 2011 University of Delaware Report, the annual value of fish landings in the tidal Delaware River and Bay is $25.4 million in $2000 or $34.1 million in $2010 as reported to the National Marine Fisheries Service and tabulated by the National Ocean Economics Program (2007). The most lucrative fisheries in the Delaware Estuary as blue crab ($14.4 million/yr), summer flounder ($5.3 million/yr), Atlantic menhaden ($4.3 million/yr), eastern oyster ($3.7 million/yr), striped bass ($2.3 million/yr), and American eel ($0.8 million/yr).

PAFBC Fishing Hot Spots in the Upper and Middle Delaware River
(Excerpts and data descriptions from PAFBC hotspot mapping tool online, http://fishandboat.com/hotspots.htm.) Wild trout streams in the proposed upgrade area: Devils Hole Creek, Toms Creek, Upper Delaware River, West Branch Delaware River, and Bushkill Creek

Delaware River (Wayne County)
The upper reaches of the Delaware River in Wayne County have excellent wild trout fishing and the scenery is great, especially in the fall. The West branch (PA's Eastern border) has mostly browns with some rainbows (some brookies occur in the feeder streams). The West

and East branches meet at Hancock and the river becomes big trout water with riffles, long pools and steep drop-offs. Wild trout fishing is good as far as 30 miles below Hancock. This portion of the main stem contains both wild brown trout and rainbow trout, and chances of encountering a wild rainbow trout are greater in the main stem portion of the Delaware River (view August 2003 field report for more). Wading is possible, but tricky. Fishing from shore or boats is better for those not familiar with this part of the river.

White Oak Pond (Wayne County, PA)
The Commission owns this 175-acre lake north of Prompton Lake State Park. Only electric motors are permitted.

West Branch Delaware River (Wayne County, PA)
The upper reaches of this River in Wayne County have excellent wild trout fishing and the scenery is great, especially in the fall. The West branch (PA's Eastern border) has mostly browns with some rainbows (some brookies occur in the feeder streams). The West and East branches meet at Hancock and the River becomes big trout water with riffles, long pools and steep drop-offs. Wild trout fishing is good as far as 30 miles below Hancock. This portion of the main stem contains both wild brown trout and rainbow trout, and chances of encountering a wild rainbow trout are greater in the main stem portion of the Delaware River (view August 2003 field report for more). Wading is possible, but tricky. Fishing from shore or boats is better for those not familiar with this part of the River. Delayed Harvest Artificial Lures Only regulations apply.

Lower Woods Pond (Wayne County) (manmade impoundment and current high hazard dam)
This 91-acre lake is nestled in Wayne County and is Commission-owned. Only electric motors are permitted. Lower Woods is great for bass, pickerel and panfish. Upper Woods is good if you know how to fish for deep-water trout. Upper Woods is under the Early Season Trout-Stocked Lake Program.

Upper Woods Pond (natural lake)
This 80 acre natural lake located in State Game Lands 159 in Wayne County is managed as primarily a stocked trout fishery, focusing on rainbow trout. However a 2008 survey found a small but nice large mouth bass fishery has developed in the lake, as well. Only electric motors are allowed and ice fishing is permitted.

Dyberry Creek Hotspot
Dyberry Creek can be accessed from PA 191 North out of Honesdale and is a beautiful high quality waterway with tremendous high value scenery along its banks.

Lackawaxen River
The waters from this River in Wayne and Pike Counties flow from Pleasant Mount through Hawley and eventually to the town of Lackawaxen where it empties into the Delaware River. Along the way it picks up water from Dyberry Creek, Middle Creek and Lake Wallenpaupack. It receives a fall stocking and there always seems to be a good supply of trout, even a few big holdovers. If you don't have luck on the Lackawaxen, then give Dyberry Creek a try, but make sure you consult the PFBC Summary Book for information on its special regulation area.

Delaware River at Narrowburg, NY
Most areas along this reach of river have good smallmouth bass fishing. Particularly good sections are located around Zane Grey, Narrowsburg and Smithfield.

Delaware River (Zane Grey) (Pike County, PA)
Most areas along this reach of river have good smallmouth bass fishing, Pike, muskellunge, and walleye. Particularly good sections are located around Zane Grey, Narrowsburg and Smithfield. The best walleye and musky fishing in the River is from the Lackawaxen River, Pike County down to the Commission's Access below Martin's Creek.

Lake Wallenpaupack (Pike County PA)
This 5,700 acre man-made lake is huge, but the bass fishing is good and ice fishing is great for big perch, crappies, trout and bass. There are also largemouth bass, rock bass, walleye, muskellunge, pickerel, rainbow trout, brown trout and yellow perch. Striped bass have been stocked. There's stream fishing in both the Wallenpaupack Creek and Lackawaxen River, which are stocked. Anglers should be aware of sudden water-level rises on the Lackawaxen River due to periodic releases from the hydroelectric plant. Walt's Cove at the north end and opposite of the Wilsonville Campground is a good place to focus fishing efforts.

Shohola Lake (Pike County PA)
The PA Game Commission owns this 1,100-acre lake. It is located in Pike County. Only electric motors are permitted. It's a great ice fishing destination for trophy largemouth bass and big pickerels.

Pecks Pond (Pike County PA)
This 315-acre lake is owned by DCNR and is located in Pike County. It is also a popular spot for ice fishing. It has lots of pickerel and the occasional big largemouth bass.

Promised Land Lake (Pike County PA)
The 422-acre Promised Lake and the 173-acre Lower Lake offer great opportunities for fishing. The common fish species are largemouth and smallmouth bass, pickerel, muskellunge, yellow perch, sunfish and catfish. Lower Lake is approved trout waters and is stocked with brook, brown and rainbow trout. Bait may be purchased from the seasonal boat rental on Promised Land Lake. Panfish Enhancement special regulations apply.

Lower Lake in Promised Land Lake State Park (Pike County, PA)
The 422-acre Promised Lake and the 173-acre Lower Lake offer great opportunities for fishing. The common fish species are largemouth and smallmouth bass, pickerel, muskellunge, yellow perch, sunfish and catfish. Lower Lake is approved trout waters and is stocked with brook, brown and rainbow trout. Bait may be purchased from the seasonal boat rental on Promised Land Lake. Panfish Enhancement special regulations apply.

Toms Creek (Pike County)
Toms Creek in Pike County is great for wild trout especially if you like small-stream flyfishing and nice scenery. This stream flows through the Delaware Water Gap National Recreational Area. There are plenty of brown trout and the waters seem to stay cool all year. This creek also has some nice deep pools, riffles and plenty of rocks and boulders for cover.

Bushkill Creek (Monroe County)
This creek in Monroe County flows out of the Pocono Plateau. It has lots of rocks - from boulder size to small stones, which provide plenty of trout hiding places. Fly-Fishing Only regulations. In addition to the special regulation area, anglers should try fishing the section of stream in the Delaware Water Gap National Recreation Area (Saw Creek Road downstream to its confluence with the Delaware River).

Devils Hole Creek (Monroe County)
This Class A Wild Trout stream is located in Monroe County and the heart of the "Poconos." It borders one side of State Game Lands 221.

Hidden Lake (Monroe County)
This lake is 40 acres and situated in Monroe County within the boundaries of the Delaware Water Gap National Recreational Area. It offers the following fisheries panfish, pickerel and bass, furthermore it is stocked by the PFBC both preseason and inseason (spring and late winter) with catchable trout.

Delaware River (Smithfield Beach Access)
Most areas along this River have good smallmouth bass fishing. Particularly good sections are located around Zane Grey, Narrowsburg and Smithfield. The best walleye and musky fishing in this River is from the Lackawaxen River, Pike County down to the Commission's Access below Martin's Creek.

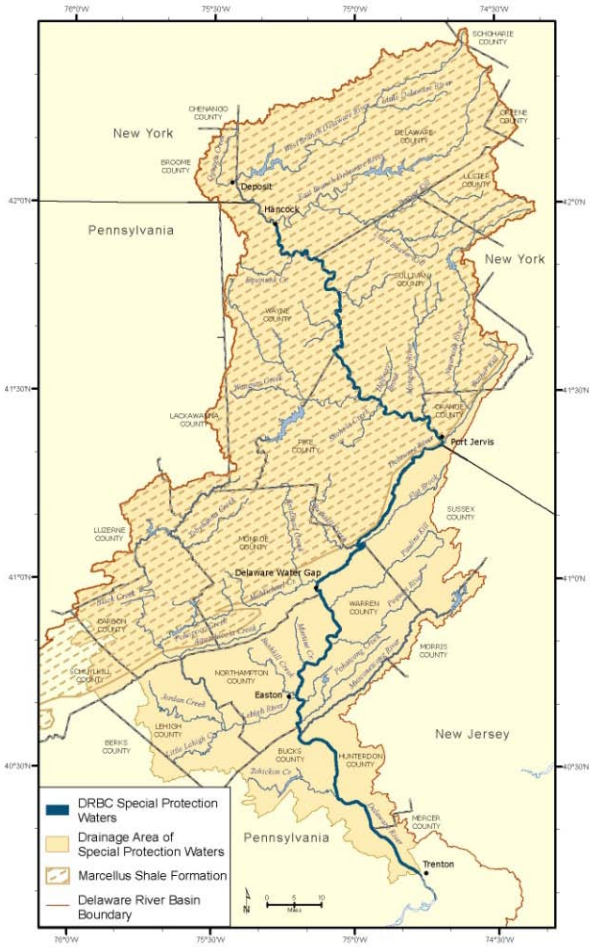
Brodhead Creek (Monroe County)
This popular stream in Monroe County is nestled between the Boroughs of Stroudsburg and East Stroudsburg surrounded by Stroud Township provides good public access to the stream. These local governments in recent years have and continue to develop greenway areas along the stream providing a host of outdoor activities for visitors. The entire section of stream from Analomink downstream of the Exit 309 Bridge on I-80 is stocked with trout and managed under Commonwealth Inland Water regulations. While the stream is stocked from from March through May, it provides angling opportunities throughout the summer, fall, and winter seasons as well. Additionally, the area from the Stroudsburg Water Company on Stokes Avenue downstream to the confluence of McMichaels Creek is also stocked during the fall season.

Special Protection Waters – Largest Protected River in the US

In September 1989, Delaware Riverkeeper Network petitioned the DRBC to designate the Upper Delaware River an Outstanding National Resources Waters due to its incredible water quality and diversity. In response, in 1992, the Delaware River Basin Commission (DRBC) designated the Upper Delaware River and its tributaries as Special Protection Waters. This area was designated in order to protect existing high water quality in areas of the Delaware River Basin deemed "to have exceptionally high scenic, recreational, ecological, and/or water supply values" from degradation by point source discharges and non-point source pollutant loadings carried by runoff. In these waters there shall be, "no measurable change in existing water quality except towards natural conditions."

The DRBC has classified as "Outstanding Basin Waters" the Upper Delaware Scenic and Recreational River (Delaware River between River Mile 330.7 and 258.4), those portions of intrastate tributaries located within the established boundary of the Upper Delaware Scenic and Recreational River Corridor, the Middle Delaware Scenic and Recreational River (Delaware River between River Miles 250.1 and 209.5), and those portions of tributaries located within the established boundary of the Delaware Water Gap National Recreation Area. The DRBC has classified as "Significant Resource Waters" the Delaware River between River Miles 258.4 (the downstream boundary of the Upper Delaware Scenic and Recreational River) and 250.1 (the upstream boundary of the Delaware Water Gap National Recreation Area).

Outstanding Basin Waters "shall be maintained at their existing water quality." This is the DRBC's Tier III, or Exceptional Value, equivalent designation. An upgraded designation by the State of Pennsylvania would allow consistent protection from the State and closer monitoring of these critically important waters. It will also help the Commonwealth ensure that water quality is met as required boundary control points used to ensure the protection of existing water quality in the main stem. The DRBC has recognized the importance of maintaining the highest water quality in the Upper Delaware River Basin with their Outstanding Basin Waters designation.



A large portion of the Special Protection Waters (SPW) in the Delaware River Basin overlies the Marcellus Shale (see map above). Recently, the Delaware River Basin Commission has

been developing regulations to increase the protection of the Upper Delaware River from the impacts of natural gas development. As part of their draft regulations, the DRBC acknowledges that a key component of the management of natural gas development will be the designation of Special Protection Waters, in order to avoid pollution and injury to the water resources in the Basin. The draft regulations note that, "An applicant for approval of a natural gas development project located in the drainage area of Special Protection Waters must comply with all SPW regulations in addition to [principles of sound watershed management discussed in Article 7.1 of the DRBC Compact]." The draft regulations also note that thousands of wells are likely to be drilled proximate to the drainage area of the Special Protection Waters. Therefore, the threat to these waters is imminent, and the State of Pennsylvania must take the greatest precautions and elevate the designation of these waters to ensure protection of this important drinking water resource.

Water Quality Data

The water quality in the Upper Delaware River Basin is extraordinary. For instance, the U.S. Environmental Protection Agency recommends the concentration of total dissolved solids to be at or below 500 mg/L. This limit is set to protect aquatic organisms from negative impacts of excessive suspended solids. However, the Delaware River and its Special Protection Waters currently maintain concentrations of dissolved solids typically between 50 mg/L and 100 mg/L, five-to-ten times below the EPA-recommended criteria.

Similarly, the concentrations of nutrients in the Upper Delaware River are low relative to recommended nutrient criteria. Many waters throughout the United States are heavily impacted by high nutrient levels and resultant water quality impairments. New York recently proposed nutrient criteria ranging from 30 to 65 μg/L for total phosphorus, and 0.7 mg/L for total nitrogen. However, water quality testing within Delaware River Basin Special Protection Waters indicate low nutrient concentrations, with median values around 20 μg/L for total phosphorus and 0.30 mg/L for total nitrogen, indicating healthy water conditions.

Ecological Diversity

The consistently high water quality in the Upper and Middle Delaware River Basin provides habitat for diverse biological communities, including numerous species of mammals, over 130 species of birds, 17 reptile species, and 14 amphibian species. Revenue coming from fish and wildlife is estimated at $1.5 billion annually. There are more than 40 resident and migratory fish species that are supported by these waters. Due to the free-flowing condition of the Delaware River (the Delaware River is the longest undammed River east of the Mississippi), migratory fish can move freely throughout the system. The Upper Delaware River and its tributaries maintain strong populations of many diminishing fish species, including American eel, American shad, alewife, and blueback herring. These species all serve commercial fisheries, so the health of the River is critically linked not only to the survival of the species, but also to the local economy.

The River also is home to abundant freshwater mussel populations. Freshwater mussel populations have been declining for decades, and they are one of North America's most endangered groups of animals. The Delaware River is a northeastern Atlantic stronghold for native mussels. Mussels are particularly successful in the Delaware River as the main

stem Delaware River is undammed and they have a symbiotic relationship with the abundant population of American eel in the river is allowed to continue and thrive. The prevalence of mussels in the river helps to maintain the historic biodiversity that has existed in the River for hundreds of years and the mussels also help maintain high water quality as they filter out nutrients. High mussel abundance and biodiversity filters the water in the River, heightening the maintenance of exceptionally clean water.

Federally endangered dwarf wedge-mussels and other T&E species

Additionally, in 2001 and 2002, William Lellis (U.S. Geological Survey) documented previously undiscovered populations of the dwarf wedgemussel (*Alasmidonta heterodon*) in the mainstem of the Upper Delaware River between Hancock, New York, and Callicoon, New York. The dwarf wedgemussel is a federally designated endangered species. This discovery expanded the range of known populations of the species within the Delaware Basin. Furthermore, one of the largest remaining populations of this particular mussel species lies within the Special Protection Waters of the Upper Delaware River Basin in the Neversink River, overtop of the Marcellus Shale formation. According to Erik Silldorff, DRBC, "A diverse and imperiled mussel fauna occupies the central area within Special Protection Waters and could be affected by any negative environmental impacts from exploratory natural gas development projects in shale formations underlying the area."

The Partnership for Delaware Estuary and Academy of Natural Science's in the summer of 2010 also documented seven healthy native mussel populations in the main stem Delaware River between Trenton, NJ and Chester, PA. "The alewife floater and tidewater mucket were previously thought to no longer exist in Pennsylvania", said Dr. Danielle Kreeger. Scientists have spent years looking for mussels in about 40 streams in southeastern Pennsylvania, Kreeger said, but have found only a single species — the common eastern elliptio — in just three waterways: Perkiomen, Brandywine and Ridley creeks. The eastern elliptio was also found in the Delaware. Two other species discovered — the pond mussel and yellow lampmussel— are considered critically imperiled, while another pair — the creeper and the eastern floater — are considered vulnerable.

The Delaware River Basin is also home to a number of other federal and state listed endangered or threatened species, including the Indiana bat, bridle shiner, bog turtle, shortnose sturgeon, loggerhead and Kemp's ridley sea turtles, and Northeastern bullrush. Pike County's 2011 Natural Heritage Diversity Index Report documented 555 existing occurrences of endangered, threatened, or rare species – ranking third out of the Commonwealth's 67 counties. Over 200 species of migratory birds have been identified within the drainage area of the Upper Delaware River Basin, including the largest wintering population of bald eagles within the Northeastern United States. Migratory birds breed in, or migrate through, the high quality riparian corridors of the Basin.

Macroinvertebrates

In 2005, the U.S. Geological Survey determined that the Delaware River is home to a healthy and diverse assemblage of over 800 species of aquatic invertebrates, including hundreds of species of insects, snails, clams, and other groups. Stroud Water Research Center conducted macroinvertebrate sampling of Raymondskill Creek and Pond Eddy in 2009, both streams are located within the proposed upgrade area. Stroud found diverse and healthy benthic populations and compared these streams with other EV streams of the Delaware Basin and found them to exceed the existing EV watersheds. DRBC has also

documented diverse and healthy populations of macroinvertebrates for both the main stem and headwater tributaries that feed it. Data included in this petition from Pike County Conservation District, Delaware Riverkeeper Network, Stroud Water Research Center, Delaware River Basin Commission, PADEP and other sources, shows high numbers of EPT species, excellent Hilsenhoff scores and overall diverse conditions for the tributaries and the main stem Delaware River in the proposed upgrade area (see Appendix and electronic files for datasets).

The ecological diversity of the Upper Delaware River can be further observed through its abundance of native aquatic plants. The Upper Delaware is host to the largest population in the region of a New York state-listed species called threadfoot or riverweed (*Podostemum ceratophyllum*). This species is also found in some of the Special Protection Water tributaries to the Upper Delaware. Threadfoot is particularly relevant because it is acutely sensitive to industrial activity, and would serve as an indicator species for the impacts of shale development in the watershed.

Land Use Statistics

The Upper and Middle Delaware River watershed areas are upwards of 80% forested and rural in nature. The Delaware River Basin covers 58 percent of the land area of New York City's watershed west of the Hudson River. Nearly 36 percent of the 13,539 square-mile Delaware River Basin is located over the Marcellus Shale formation.

New York City has spent almost $1.5 billion to protect New York City's drinking water supply. The City has used that money to purchase land to serve as a buffer for pollutants, upgrade sewage plants, and regulate human activity.

According to the U.S. Geological Survey's 2010 report on *Water Quality of the Upper Delaware Scenic and Recreational River and Tributary Streams, New York and Pennsylvania*, the percentage of agricultural land in the Upper Delaware River Basin varies from 0 to 30 percent, the percentage of forested land varies from 65 to 100 percent, and the percentage of suburbanization varies from 0 to 17 percent. Most of the agriculture in the Upper Delaware River Basin is located within the basins of four tributaries: the West Branch Delaware River, Callicoon Creek, Calkins Creek, and the Lackawaxen River. The small towns located within the watershed comprise a small proportion of the overall land use, and their impact on the watershed is minimized by the high flows coming from the headwaters and the high degree of forestland in the watershed. Ecosystem goods and services provided from the Delaware Basin on an annual basis include $6.8 billion from wetlands in the Basin, $4.8 billion from agricultural lands, and $8.6 billion from forests.

In 2007, the National Park Service identified sixty-nine vegetation associations occurring in the Delaware Water Gap National Recreational Area. The vegetation of the region is generally classified as Appalachian Oak Forest, typically dominated by white oak and northern red oak, with sugar maple, sweet birch, bitternut hickory, American beech, and tuliptree. Dry Oak – Heath Forest (4,416.7 ha.) and Dry Oak – Mixed Hardwood Forest (2,915.9 ha.) were the most dominant associations. Many environmental factors, such as geology, topography, soils, hydrology, and fire, affect the types and distribution of vegetation within Delaware Water Gap National Recreation Area.

In 2008, the National Park Service conducted vegetation classification and mapping in the Upper Delaware Scenic and Recreational River. Researchers found that the most abundant vegetation classification in the national park is Hemlock-Beech-Oak forest covering approximately 4,385.2 ha (10,836 ac) of the park area. There are 14 riparian vegetation associations, five forested, two shrubland, and seven herbaceous, collectively covering approximately 642.05 ha (1,586.5 ac) of the park. Riparian vegetation collectively accounted for 2.9% of the total coverage within the boundaries of the Upper Delaware Scenic and Recreational River.

In 2009, The Nature Conservancy did a survey of the riparian vegetation in the Upper Delaware Scenic and Recreational River and Delaware Water Gap National Recreation Area, classifying a total of 17 community types. Riparian forests were the dominant community type totaling approximately 45% of the total study area. Forested communities occurred on high to low terraces on the mainstem, tributary mouths, and on islands and bars within the channel. The two shrubland communities accounted for greater than 5% of the total riparian habitat. Both communities are subject to frequent floods, high river velocity, and ice-scour.

Strong commitment by many entities to ensure adequate protection to the Delaware River Basin from shale gas development

Because of the Delaware River's Special Protection Waters designation that encompasses a 197 mile stretch of the non-tidal Delaware River and that was put in place decades ago to protect the ecological and economic significance of the Region, DRBC has a responsibility through these designations to regulate harmful activity.

On May 19, 2009, Carol Collier, DRBC Commissioner, announced a determination notifying natural gas extraction project sponsors that they may not commence any natural gas extraction project located in shale formations within the drainage area of the Delaware River Basin Special Protection Waters without first applying for and obtaining DRBC approval. "This determination explains DRBC regulatory requirements on an interim basis and asserts commission review over all aspects of natural gas extraction projects in shale formations within the drainage area of the basin's Special Protection Waters, regardless of the amount of water withdrawn or the capacity of domestic sewage treatment facilities accepting fracking wastewater," Collier said.

In taking this action, Collier considered and determined that as a result of water withdrawals, wastewater disposal, and other activities, natural gas extraction projects in shale formations may individually or cumulatively affect the water quality of Special Protection Waters by altering their physical, biological, chemical or hydrological characteristics. This finding is in accordance with Section 2.3.5 B.18 of the DRBC's Rules of Practice and Procedure, which state that the Executive Director may specifically require review if a project is determined to have "a potential substantial water quality impact on waters classified as Special Protection Waters." The public, the city of New York, the city of Philadelphia, over twenty-five Pennsylvania legislators, and tens of thousands of other entities that live within the Delaware River Basin have overwhelmingly urged DRBC to keep a moratorium on drilling in place until the science and cumulative impact studies that would examine the full footprint of the industry if it were permitted to drill 20,000 or more gas wells in the Upper and Middle Delaware River Basin are conducted and examined.

Public comments regarding gas drilling in the Delaware River Basin have far exceeded any other DRBC matter in its history as a Commission.

In July 2011, the New Jersey legislature voted to ban hydraulic fracturing in the state. Legislators felt a ban would be necessary to protect public health and preserve natural resources, particularly in the Delaware River Basin. The Governor conditionally vetoed this Ban this fall but a 2/3 override by the legislature may occur by the end of 2011. Banning wastewater discharges of flowback water in NJ is also working through committees in the NJ legislature in 2011. NJ legislators observed incidents in Pennsylvania and expressed their concern over the need to protect their water and air supply. One of the avenues that Pennsylvania can take to increase protection of clean water in the Upper and Middle Delaware River for all users is to upgrade this region to Exceptional Value status. This would indicate a commitment to the strongest protection of water quality in the watershed on the Pennsylvania portion of the Basin.

Downstream in Philadelphia, the Philadelphia City Council unanimously passed the *Resolution on Marcellus Shale Drilling Environmental and Economic Impacts*. The resolution states that the City Council is concerned that, "Every natural gas well project inherently has the potential to endanger water resources and pollute the environment," and, "Natural gas extraction injects toxic water into the well to fracture the rock and poses a risk to our public health and the potability of our drinking water." The Council also issued a directive refusing to purchase Marcellus Shale gas because they believe that the dumping of flowback water is polluting their water supply.

Nearby, municipal bans on hydraulic fracturing have been issued in Lehman Township (Luzerne County) and Washington Township (Franklin County). Nockamixon Township (Bucks County) has passed a resolution calling for closing of the 'Halliburton loophole' in the federal Safe Drinking Water Act. Just across the border in New York, Broome County has issued a ban on hydraulic fracturing on county lands, and waste restrictions for hydraulic fracturing cuttings and flowback water. This municipal activity indicates a public concern over the potential water quality degradation that could be caused by natural gas development in the proposed upgrade area.

Protected Open Space & Recreation

In 1978, Congress recognized the exceptional value of the water of the Upper Delaware River when they designated it a National Scenic and Recreational River. The Upper Delaware National Scenic and Recreational River and Delaware Water Gap National Recreation Area have 5.4 million visitors annually that fish, boat, float, swim, camp, hike, bike, jog, bird watch, and generally enjoy the beautiful habitat that the River provides.

Many rural river towns are supported by seasonal tourist revenue. Recreation is a $730 billion annual contribution to the United States economy. In New York, New Jersey, and Pennsylvania alone, the total economic contribution of outdoor recreation exceeds $38 million annually, generating over 350 thousand jobs and adding additional economic sales and tax revenues of more than $32 million. The total economic contribution of fishing in Pennsylvania, New York, and New Jersey exceeds $3 million. Another $2.5 million is supplied from paddle-based boating. Nearly $2 million is spent on the gear to support these industries, with another $3 million generated from related travel. In addition, nearly

$750,000 is generated in state and federal taxes on all of these water recreation income streams.

The Delaware is the longest un-dammed river east of the Mississippi, extending 330 miles from the confluence of its East and West branches at Hancock, New York, to the mouth of the Delaware Bay where it meets the Atlantic Ocean. Because the Delaware is undammed, it is ideal for popular recreational activities such as canoeing and kayaking. The River is fed by 216 tributaries, the largest being the Schuylkill and Lehigh Rivers in Pennsylvania and the Musconetcong in New Jersey. Boating options throughout the watershed include canoeing, kayaking, rafting, jet skiing, motorboats, paddleboats, different types of historic riverboats, and sailing. Those who enjoy whitewater particularly enjoy the Delaware River's upper reaches. In 1986, the Upper Delaware attracted 232,000 whitewater paddlers who spent $13.3 million, adding $6.2 million to the local economy and supporting 291 jobs. The Water Gap is also a tremendous resource for whitewater paddlers. In 1986, this reach of the River was responsible for attracting 135,400 whitewater paddlers who spent $6,929,000, contributing $3,695,200 of local economic value and supporting 156 jobs. Adjusting for 3% annually, river recreation economic output along the Upper Delaware River and Delaware Water Gap is roughly $27.1 million and $14.1 million, respectively, or $41.2 million total in 2010, according to a May 2011 University of Delaware study.

A recent University of Delaware Study outlined 24 canoe liveries operating on the Delaware River main stem (mostly operating along the proposed upgrade area) and 11 additional liveries on the Lehigh, Schuylkill, and Brandywine Rivers. The total annual revenue for just canoe and kayak liveries operating in the Basin totaled $9,000,000 dollars and 225,000 river trips.

The Delaware River is known for its world class fisheries. Both commercial and recreational fishing abound on the river and help support local economies. Fish commonly found in the Delaware River include striped bass, trout, and large and smallmouth bass. Other fish present in the river include weakfish, American shad, Atlantic sturgeon, catfish, pike, bullhead, perch, walleye, and sunfish. A 1996 survey found that 31,390 anglers spent 265,970 days fishing just the New York reaches of the Delaware River. That survey also determined that in the Upper Delaware, wild trout fishing resulted in $17.69 million for local business revenue, that there was $7.25 million of spending by anglers in Delaware County, New York alone, and that about 41% of this spending remained in the local communities surrounding the tail water fisheries area. The cycling of this 41% of angler expenditures in the region ultimately results in $29.98 million in local economic activity. Research has also shown that revenues generated by anglers in this region supported 348 jobs with total wages of $3.65 million, and provided $719,350 in local taxes.

In Pennsylvania, Bucks County is distinguishing itself as an ecotourism destination. Wineries, breweries, local coffee houses, nature parks, historic hotels, museums, bed and breakfasts, and Delaware River access points all bring visitors to the area. Places like the Bowman's Hill Wildflower Preserve, 1000 acres with over 134 native plant species near New Hope, provide opportunities for day trips as well as complementing longer stays. Visitors to the area supply revenue to local businesses and keep the importance of preservation and conservation of resources at the forefront of county planning. Consequently, voters overwhelmingly approved spending $59 million towards preserving

open space throughout Bucks County in 1997. Since then, more than 15,000 acres have been protected establishing new parks, preserving agricultural land, providing natural habitat for wildlife, improving historical buildings and grounds, and rejuvenating the Delaware River waterfront. This downstream economic value is fueled by the clean river waters flowing from upstream.

Recognizing the value of recreation to communities and its dependence on clean water, beautiful and scenic vistas, and natural areas, it is important that we take the most protective action possible to preserve water quality, river corridors, and the natural areas in the watershed. Clean water increases park attendance and recreation revenue. Every type of river recreation is diminished if the health of the Delaware River diminishes. With the jobs and economy supported by recreation and ecotourism, it is vital that the Upper and Middle Delaware River Basin be protected as an Exceptional Value watershed.

Importance to Pennsylvania Fish and Boat Commission

The Pennsylvania Fish and Boat Commission (PFBC) is in the process of finalizing a Delaware River Management Plan to protect, conserve, and enhance the aquatic resources of, and provide fishing and boating opportunities on, the Delaware River. In their draft Plan, the PFBC notes the importance of maintaining the wild and scenic characteristics of the Upper Delaware River for the millions of yearly visitors from nearby metropolitan areas. PFBC mentions that advances in the treatment of municipal and industrial waste have led to improved water quality in many parts of the Delaware River Basin. However, they caution that the development of natural gas poses a new threat to the health of the ecosystem. PFBC emphasizes the importance of maintaining high water quality and managing water withdrawals to ensure the health of species throughout the Basin and an attractive healthy environment for recreation.

Pennsylvania Natural Heritage Program Priority Conservation Areas

The Pennsylvania Natural Heritage Program has classified the watersheds in Pennsylvania according to their quality of aquatic community. The Pennsylvania Aquatic Community Classification was designed to systematically identify stream community and habitat types for the freshwater mussels, macroinvertebrates, and fish that reside in Pennsylvania's streams. The main stem Upper Delaware River contains two 'Tier 1' segments, which indicates that the watershed is in the best 10% (or 90th percentile) of all stream reaches in the state. The River Basin also contains a number of Tier 1 and Tier 2 watersheds (see enclosed PNDI reports). Watersheds in-between the 80th and 90th percentiles were identified as 'Tier 2'. In order to protect these areas that data analysis has shown to have high quality habitats, high levels of biological diversity, and low levels of human disturbance, the waters of the Upper and Middle Delaware River should be elevated to Exceptional Value.

National Recognition of Watershed Importance

Recently, the America's Great Waters Coalition, an alliance of national, regional, state and local organizations working to protect, preserve, and restore our nation's Great Waters, designated the Delaware River as a Great Water of national significance. This designation recognizes the importance of the preservation of this watershed as essential to the

lifeblood of our nation, driving regional economies and shaping American's daily lives. The America's Great Waters Coalition also acknowledged a concern over the future impacts that natural gas extraction using hydraulic fracturing will have on the watershed. The Coalition calls for prompt action to ensure the health, safety, and livelihoods of the millions of Americans that depend upon the Delaware River. The Coalition notes that this waterway is beneficial not only because of its economic, social, and environmental importance, but because it is a national treasure that supports our nation's economy and provides rich resources for future generations.

Cultural History

The Delaware River holds a spiritual and cultural significance to those living within the watershed and beyond. With such a long history, the Delaware River Valley holds significant opportunities for people looking to rediscover events of the past. From the formation of the river to the first human settlement, its colonial history, the revolutionary war, and more recent accomplishments, several places of interest bring in visitors year round. Many historic sites are located along the Delaware River or one of its tributaries. Keeping the water clean as it flows past and through these sites entices people to continue visiting them. A bad smell, dirty water, or degraded streams detract from the historic presence of a site.

Native Americans from the valley continue to meet and spread their stories and history to the community. Pre-dating European settlement, Native Americans, the Lenape, inhabited the land along the Delaware River and Bay. Their "Lenapehoking" (land of the Lenape) encompassed southern Connecticut, New York, all of New Jersey, eastern Pennsylvania, and Delaware. The Lenape made canoes and used the Delaware River for both transportation and sustenance. Today, archaeologists from American University's Department of Anthropology have found more than 55,000 Lenape artifacts from 25% of what is believed to be the total site area in the Upper Delaware River Valley region. Archeological evidence of the region's native people and their settlements has been found up and down the River and its Watershed. There have even been some findings that may prove ancient cultures that pre-date the Lenape.

More recently, prehistoric Native American artifacts were found along the Delaware River in Philadelphia, at the site of the proposed Sugar House casino. Common artifacts found at Native American archaeological sites include arrowheads and other tools used during the time the Lenape inhabited the area. Museums throughout the Basin describe Lenape history and culture. The Delaware River still holds a very spiritual and cultural connection to their descendants. The
river is a link to the life and spirit cherished by the Lenape.

Henry Hudson was the first European to discover the Delaware River when he and the crew of the Dutch Half Moon entered the mouth of Delaware Bay on August 28, 1609. They quickly ran aground in the Bay, making a U-turn. The English discovered the Delaware the following year, and Dutch, Swedish, Finnish, German and other settlers from Europe followed over the next 166 years.

Today, the site where George Washington crossed the Delaware on December 25th, 1776, is one of the most heavily visited locations on the River, particularly on Christmas Day when

this event is reenacted. On the other side of the River in Trenton, NJ, there are annual reenactments of the Battle of Trenton which ensued on Christmas night, and the second Battle of Trenton that occurred seven days later. These Revolutionary War and other reenactments attract re-enactors and visitors from all over the country.

The story of the Upper Delaware is much more than just a collection of beautiful pictures. Joseph Brandt, John Roebling, and Zane Grey lend a texture to the landscape that helps tell the tale of frontier life and the rapid growth of America during the 1800's. The Upper Delaware Valley is rich in structures and sites that reflect its history and cultural development. Prehistoric archaeological sites, historic architecture, and historic engineering and industrial sites are all abundant in the Upper Delaware Valley. Portions of the D & H Canal, including the Delaware Aqueduct, were designated a National Historic Landmark in 1968. The Delaware Aqueduct is also designated a National Civil Engineering Landmark.

Delaware Canal and the Historic Roebling Bridge

The Delaware and Hudson (D & H) Canal and Gravity Railroad was a system of transportation between coal fields of northeastern Pennsylvania and markets on the Hudson River. It operated from 1828 until 1898, with enlargements after the 1840s. The Upper Delaware Scenic and Recreational River is the home of the oldest existing wire suspension bridge in the United States - the Delaware Aqueduct, or Roebling Bridge as it is now known. Begun in 1847 as one of four suspension aqueducts on the Delaware and Hudson Canal, it was designed by and built under the supervision of John A Roebling, who also engineered the Brooklyn Bridge.

Downstream, Valley Forge Park along the Schuylkill River and Pea Patch Island are other historical locations of significance that depend on the clean water of the Delaware River Basin to attract tourists and recreators throughout the year.

Maintaining the highest level of protection for the Upper and Middle Delaware River Basin is imperative so that the River and its tributaries can continue to serve as a remnant of the past culture and pristine nature for future generations.

Section C: Types of Persons, Businesses, and Organizations Likely to be Impacted by this Proposal

Most persons, businesses, and organizations in the Upper and Middle Delaware River Basin will benefit from this upgrade. First and foremost, the 15.6 million people who get their drinking water from the Delaware River Basin will feel more confident that the state is supporting the best interests of the public as permits for natural gas and other development are considered in the watershed.

For individual landowners, property values will rise due to the increased protection of their water quality and the healthy ecosystem surrounding them. In some areas of Pennsylvania, property owners have seen the value of their property drop when their water became contaminated from natural gas extraction. Ensuring the higher level of protection for the water supply will help to protect the value of properties in this area

where unconventional natural gas development has yet to be permitted. In addition, landowners will see increased protection from hazardous waste sites and other threats to their high water quality.

An Exceptional Value designation will also benefit the farmers of the region who will be able to continue production of healthy crops and livestock, which depend on clean water to contribute to the country's food supply. Many of the farmers in the watershed already have their farms in conservation easements or have implemented stream restoration projects on their property to help preserve the character of the area – Calkins Creamery and Highlands Farm, a multi-generational family farm for over 170 years, are an example of a dairy farm with grass-fed animals located along Calkins Creek that have riparian buffers established along Calkins Creek, solar powered watering operations for their cows, and established conservation easements. There are also many younger generation organic farmers, like Willow Wisp Organic Farm in Abrahamsville PA, who have come to the Delaware River Valley to grow sustainable organic food and unique businesses like Delaware Valley Ramps that forages, harvests and procures local wild foods. The Ant Hill Farm in Honesdale PA is another unique organic business that focuses on vegetables, fruits, nuts, and mushrooms. These CSA farmers took over an old dairy farm in 2007 and have begun growing vegetables in 2008 and sell their produce at the Wayne County Farmers Market which occurs every Saturday in the growing season in Honesdale, PA.

In addition, the array of recreational opportunities that are so important to the local and regional economy will be enhanced by the upgraded river status. For example, research has shown that revenues generated by wild trout anglers in this region supported 348 jobs with total wages of $3.65 million, and provided $719,350 in local taxes while generating over $17 million in local business revenue. Other research has shown that multiple towns in the New York reaches of the Upper Delaware River Watershed are benefiting from the clean water and resulting healthy fish populations found in tributary streams. Friends of the Upper Delaware have reported that the world famous Upper Delaware River is a dynamic tourism and economic engine that has not yet reached its potential. They estimate that fly-fishing in the region could generate $58 million per year in economic activity, creating new jobs with virtually no infrastructure or environmental threat, for which there is already a trained work force and where control would remain local.

In another example, clean and healthy water is essential for the survival of paddling and canoeing businesses that currently thrive in the Delaware River Watershed. The threat of pollution or contaminated water turns many families away for health and safety reasons. When it was learned that the Village of Deposit was discharging 450,000 gallons per day of chlorinated raw sewage into the Delaware River during the summer months (July-August) in 2006, it was recognized immediately as a threat to recreation along the river. The highest quality water is essential to maintain the important recreational opportunities and the revenue that they bring to the region.

The thousands of visitors each year to the Upper Delaware Scenic and Recreational River and the Delaware Water Gap National Recreation Area will feel safer playing, paddling, and enjoying the outdoors in those parks if the water is more highly protected. Stynes and Sun (2002) estimated the Delaware Water Gap National Recreation Area recorded 4,867,272 visits in 2001 that generated $106 million in sales, 7,563 direct/indirect jobs, and $100 million wages.

Any businesses which depend on clean water will directly benefit from the upgrade, including outfitters, restaurants, municipal water suppliers, medical professionals, plant nurseries, daycare facilities, real estate companies, bakeries, coffee shops, hotels, fishing guides, riverboat tours, golf courses, artists, livestock growers, wineries, farmers, and so forth. Support for this petition has been given by local businesses, including canoe liveries that paddle along the Delaware, farmers that grow food in the Upper and Middle Delaware, and outdoor outfitters.

According to the University of Delaware 2011 study, the Delaware River Basin is a jobs engine that supports over 600,000 direct and indirect jobs with $10 billion in annual wages in the coastal, farm, ecotourism, water/wastewater, recreation, and port industries. Within the Delaware Basin are 3,480,483 jobs earning $172.6 billion in annual wages including:

- Delaware (316,014 jobs, $16.5 billion wages)
- New Jersey (823,294 jobs, $38.1 billion wages)
- New York (69,858 jobs, $2.5 billion wages)
- Pennsylvania (2,271,317 jobs, $115.5 billion wages)

The Upper and Middle Delaware River area has a plethora of summer camps for children, and boyscout camps that operate in the region and rely on a clean environment for their children to enjoy and thrive. The Pocono Environmental Education Center (PEEC) based out of Dingmans Ferry, PA holds many environmental programs and has approximately 24,000 visitors a year. Just in Pike County alone, there are at least six summer camps for children to enjoy, including places like Pine Forest Camp, Camp Shohola, Camp Netimus, Camp Timber Tops, and Camp Greeley to name a few.

Many river festivals, fishing tournaments, concerts, races, historic reenactments, and other events are dependent upon a healthy clean river. For example, every year the American Canoe Association sponsors the Delaware River Sojourn, where participants spend eight days paddling and camping along the River to heighten awareness of, and appreciation for, the ecological, historical, recreational, and economic significance of the Delaware River. The Lackawaxen River is also home to annual canoe trips to highlight the beauty of this tributary stream and in 2010, the Lackawaxen was voted the River of the Year for the Commonwealth of Pennsylvania by the Department of Conservation and Natural Resources (DCNR). And any warm day during the season, hundreds of visitors and locals find cool swimming holes along the Delaware River and its tributaries to enjoy and cool off.

EV designation will not limit economic growth, natural gas or other development plans, but rather it will allow for development in a way that preserves the integrity of the watershed by requiring Best Management Practices that foster better planning and implementation of development in the watershed. There are many users within the Upper and Middle Delaware watershed that could have a cumulatively large degradation impact if they are not monitored closely and do not use best practices. All users should be held responsible for maintaining this exceptional river system in its best condition. Any immediate costs will surely be outweighed by the benefits of protecting drinking water and water-dependent jobs and agriculture for millions of people in this still clean watershed.

Section D

The current petition upgrade does not relate to any legal cases regarding EV watersheds in the Delaware River Basin.

Section E1. Clear Delineation of the watershed or stream segment to be redesignated, both in narrative form and on a map

The petitioners are requesting consideration for an upgrade of Exceptional Value (EV) designation to all Delaware River tributaries throughout the entire Middle and Upper Delaware watersheds. This designation includes all PA named and non-named tributaries feeding the main stem Delaware River and the main stem Delaware River itself. Specifically, the proposed upgrade area includes the tributaries that feed into the most southern part of the Delaware Water Gap, and extends North to the Sherman Creek tributary near the border of Pennsylvania's and New York's Wayne and Broom Counties, near the junction of Slate Route 4303 and Slate Route 4037. The watershed's area encompasses parts of Wayne, Pike, Monroe, Northampton, and Carbon counties, spanning approximately 113 miles from Stroudsburg, PA to Hancock, NY.

Major sub-watersheds within the Middle and Upper Delaware include the following tributaries in Drainage Lists A, B, and C of the 025 PA. Code. §93.9a. All tributaries within this list are classified as having a hydraulic order of two:

- **Drainage List A:** West Branch Delaware River, Shingle Hollow, Stockport Creek, Factory Creek, Equinunk Creek, Weston Brook, Little Equinunk Creek, Cooley Creek, Hollister Creek, Schoolhouse Basin Creek, Beaver Dam Creek, Calkins Creek, Peggy Run, Masthope Creek.
- **Drainage List B:** Lackawaxen River
- **Drainage List C:** Panther Creek, Shohola Creek, Twin Lakes Creek, Pond Eddy Creek, Bush Kill, Rosetown Creek, Cummins Creek, Crawford Branch, Vandermark Creek, Deep Brook, Vandermark Creek, Saw Kill Creek, Raymond Kill, Conashaugh Creek, Dry Brook, Adams Creek, Dingman's Creek, Hornbecks Creek, Toms Creek, Brodhead Creek, Cherry Creek, Caledonia Creek, Slateford Creek, Jacoby Creek, Allegheny Creek, Oughoughton Basin Creek, Martins Creek, Mud Run, Bushkill Creek.

2. Current Designated Use for Watershed or Segment

The tributaries within the proposed upgrade region of the Middle and Upper Delaware watersheds are designated within drainage lists A, B, and C, of the Pennsylvania Code 25, Chapter 93. These tributaries flow through Monroe, Northampton, Pike, Carbon and Wayne Counties. Below is a listing of their current designated uses (this does not include "existing use" designations but rather listings in the PA Code).

- All unnamed PA tributaries to the West Branch Delaware River including the Sherman Creek branch to Starboard Creek, are designated HQ-CWF, MF. In addition, all PA sections of Sherman and Starboard creeks and all unnamed tributaries are designated CWF, MF as outlined in Chapter 93.
- The West Branch Delaware River from the state border to its confluence with East Branch Delaware River is designated as CWF, MF. All unnamed tributaries to the West

Branch are designated HQ-CWF, MF. The tributaries of the West Branch Delaware River, Faulkner Brook, Balls Creek, and Shehawken Creek are designated HQ-CWF, MF.

- The following tributaries to the main stem Delaware River, Shingle Hollow, Stockport Creek, Factory Creek, Equinunk Creek, Weston Brook, Little Equinunk Creek, Cooley Creek, Hollister Creek, School House Creek, Beaver Dam Creek, and Calkins Creek, are all designated HQ-CWF, MF.
- All unnamed tributaries to the Delaware River extending from the PA 652 Bridge to the Lackawaxen River are designated HQ-CWF, MF. The tributaries Peggy Run and Masthope Creek within the Lackawaxen Watershed are also currently designated HQ-CWF, MF.
- The portion of the West Branch Lackawaxen River from its headwaters to Prompton Reservoir is designated HQ-CWF, MF, while the main stem from the reservoir to its confluence with Dyberry Creek is HQ-TSF. Van Auken Creek is also designated HQ-TSF. All unnamed tributaries of the West Branch Lackawaxen River from Prompton Reservoir to its confluence with Dyberry Creek are designated HQ-CWF, MF. Dyberry Creek and West Branch Dyberry Creek Tributaries to the West Branch Lackawaxen River are currently designated as HQ-CWF, MF. The East Branch of Dyberry Creek is already currently designated Exceptional Value.
- Book Brook a tributary to Dyberry Creek is already currently designated as EV, while the confluence of East Branch and West Branch Dyberry Creek is currently designated as HQ-CWF.
- Portions of the main stem Lackawaxen River such as the confluence of West Branch Lackawaxen River and Dyberry Creek are designated HQ-TSF, MF. All unnamed tributaries flowing to the Lackawaxen River in the same zone are currently designated HQ-CWF.
- The streams of Carly Brook, Middle Creek, Swamp Brook Tinkwig Creek, Decker Creek, Teddyuskung Creek, Blooming Grove Creek, Little Blooming Grove Creek, Kirkham Creek, West Falls Creek, Mill Creek, O'Donnell Creek, and Lords Creek, are all designated HQ-CWF, MF throughout their entire length. The Wallenpaupack Creek from its headwaters to Lake Wallenpaupack Dam is designated HQ-CWF, and its segment from Lake Wallenpaupack Dam to the mouth at the Lackawaxen River is designated HQ-WWF, MF.
- The following tributaries within Drainage List C are already designated as Exceptional Value (EV): Bush Kill, Roosetown Creek, Deep Brook Creek, Saw Kill Creek, Adams Creek, Toms Creek, Little Bush Kill Creek, Buck Hill Creek, Spruce Cabin Run, Mill Creek, Rattle Snake Creek, Stony Run, Poplar Run, Devils Hole, McMichael Creek, Sand Spring Run, Wolf Swamp Run, and Slateford Creek. PADEP has recently conducted surveys which have added EV streams to the Existing Uses Table but these changes are not yet reflected in Chapter 93 nor in this petition).
- All unnamed tributaries to the Delaware River, flowing from the Lackawaxen River to Tocks Island are designated as HQ-CWF, MF.
- The majority of tributaries in Drainage List C are designated as HQ-CWF, MF, they include: Panther Creek, Shohola Creek, Twin Lakes Creek, Pond Eddy Creek, Rosetown Creek, Cummins Creek, Crawford Branch, Vandermark Creek (source to Deep Brook), Vantine Brook, Raymond Kill, Conashaugh Creek, Dry Brook, Dingman's Creek, Hornbecks Creek, Bushkill (source to Saw Kill), Saw Creek, all unnamed tributaries to Bush Kill, Sand Hill Creek, Little Bush Kill, Brodhead Creek (mainstem, source to LR 45060, SR 2022 Bridge), Spruce Mountain Run, Leavitt Branch, Griscom Creek, Buck Hill

Creek, Goose Pond Run, Mill Creek, Rattlesnake Creek, Lucky Run, Pine Mountain Run, Paradise Run, Devils Hole Creek (South boundary of state game lands No. 221 to mouth, Yankee Run, Swift Water Creek, Cranberry Creek , Butz Run, Michael Creek (source to T434), McMichael Creek (T434 to Pocono Creek), Pocono Creek (main stem), Dry Sawmill Run, Scot Run, Bulgers Run, Reeders Run, Wigwam Run, Flager Run, Big Meadow Run, Marshall Creek, Cherry Creek, Greenwalk Creek, and Waltz Creek.

- The following streams in drainage list C are designated CWF, MF: Sambo Creek, Cherry Creek (LR 45010 Bridge to Mouth), Slateford Creek (T734 Bridge to Mouth), Jacoby Creek, Oughoughton Creek, East Fork Martins Creek (source to Confluence with East Fork), Brushy Meadow Creek (main stem, East Bangor Dam to mouth), Waltz Creek (source to Greenwalk Creek), Little Martins Creek, and Mud Run.
- The following streams in drainage list C are listed TSF, MF: Bush Kill (source to Saw Creek), Bush Kill, Brodhead Creek (main stem, LR 45060 [SR 2022] bridge to mouth), McMichaels Creek (basin, Pocono Creek to mouth), Martins Creek (main stem, confluence of East and West Forks to mouth).
- Shoeneck Creek is designated WWF, MF.

The information provided in the listing above was compiled using 025 PA. Code. §93.9a,b,c. and does not include "existing use" listings that may provide additional protections to some of the streams listed above that are not yet outlined in the regulations.

3. The requested designated use of the watershed or segment:

The Petitioners are requesting all tributaries within the Middle and Upper Delaware River Watersheds as well as the main stem Delaware River be designated Exceptional Value (EV). All of these tributaries flow into Delaware River Basin Commission's (DRBC's) Special Protection Waters of the Delaware River and all have the requisite high level water quality to support such designation.

E.4 Available Technical Data on Instream Conditions

Delaware River Basin and Delaware Riverkeeper Network Macroinvertebrate Data
The Delaware River Basin Commission (DRBC) and DRN collected baseline data for the tributary streams of the Upper and Middle Delaware River in 2011. As part of the planning and coordination for the redesignation petition, PADEP and DRBC collaborated on collection of macroinvertebrate data that will be used for assessment for this petition. As a result, DRBC sampled 35 stations in the Spring of 2010 for this project in Pennsylvania. DRBC worked with PADEP to select EV reference streams including East Branch Dyberry, Big Brook and Alder Marsh Brook to represent different sized reference streams in the region. A list of stream stations sampled by DRBC is compiled in the Appendices.

In addition, DRN coordinated with DRBC to fill gaps for the tributary streams and sampled 6 stations in the Spring of 2011 in the proposed upgrade area for macroinvertebrates using the same protocols used by DRBC and PADEP. In the Spring of 2010, an additional seven stations were sampled downstream of drainage areas of the Upper Delaware where exploratory gas drilling well sites were being implemented. Analysis of 2010 benthic data indicated three stations having an "excellent" water quality score (12-15 EPT taxa; Hilsenhoff scores ranged from 3.3-3.9) and four stations rated as "very good" (12-16 EPT

taxa; Hilsenhoff scores ranged from 3.75-4.14). This data is available electronically and provided on CD.

Stroud Water Research Macroinvertebrate Data

In 2008 and 2009, Stroud Water Research Center (SWRC) conducted a detailed analysis of conditions in seven Exceptional Value tributaries in the upper/middle Delaware – all of these sites were expected to be in excellent condition, and several were considered Exceptional Value reference sites (i.e., the best of the best). Streams included: Bush Kill Creek, East Branch Dyberry Creek, Sawkill Creek, Adams Creek, Toms Creek, Little Bushkill Creek, Stony Run, Pond Eddy, and Raymondskill Creek. Pond Eddy and Raymondskill Creek, at the time of sampling, were not designated EV but had the same or better macroinvertebrate quality as the other sampled streams that were EV or that were used as EV reference stations by PADEP (best of the best). SWRC provides more details and graphs of this data in their letter found in the Appendix.

Other Agency Data

Pike County Conservation District (PCCD) operates an extensive stream sampling program and monitors many of the major tributaries feeding into the Delaware River within the county – these tributaries continue to have excellent water quality and diversity that includes many EPT species. PCCD data from 1995 to 2008 includes 32 different tributaries sampled by Conservation District staff and is available electronically on the enclosed CD. In addition, 2006 – 2010 annual water quality reports compiled by PCCD are available for download at http://www.pikeconservation.org/watershed.htm. PCCD also performs visual and water chemistry assessments and data are available and summarized in the 2006-2010 annual reports.

Delaware Riverkeeper Network is coordinating with Monroe County to obtain copies of their macroinvertebrate datasets that are also available for many of the streams in their jurisdiction and that show healthy water quality conditions. This data will be forwarded onto the PADEP shortly.

PADEP Benthic Data

PADEP Biologist, Tim Daley conducted macroinvertebrate sampling of Delaware River tributaries in 2007, 2008, and 2010 in the Upper and Middle Delaware Region. Datasets were provided by Gary Walters, PADEP and are included electronically on CD for this petition

Macroinvertebrate data available from these diverse sources indicate excellent conditions that are equivalent or equal to other Exceptional Value Streams in the Delaware River Basin. And streams in the proposed upgrade region support a wide variety of macroinvertebrates that are indicative of clean water and good habitat. Dr. John Jackson, SWRC also noted, "There was some evidence that the macroinvertebrate communities in these tributaries were not identical to Exceptional Value streams in the northcentral, southeast, and southwest PA streams – some species common in the Water Gap area were not common in other areas, and vis-a-versa. We (SWRC) believe these regional differences are evidence of natural ecological variation associated with being in separate drainage basins as well as differences in climate (rainfall and temperature), hydrology, underlying geology and soils, and forest cover. It also shows that there is not much redundancy among

the limited number of stream miles throughout Pennsylvania that have received special protection associated with the Exceptional Value designation."

PA Fish and Boat Commission Data
Shad Spawning Biologist Reports
Pennsylvania Fish and Boat Commission (PFBC) sampled adult American shad at two locations in the Delaware River at Raubsville (RM 178.9) and Smithfield Beach (RM 218.0) in 2011 – both of these locations are within the proposed upgrade area of the Main Stem Delaware River. Annual spring sampling using electrofishing at Raubsville was carried out from 1997 through 2001, was re-initiated in 2010 and continues to date. For the 2011 American shad run, sampling started the last week of March (3/31/2011) and ended the second week of May (5/10/2011). Sampling was not accomplished during the second, fourth, and fifth weeks due to excessive high river flows, and logistical constraints.

A total of 66 American shad, including 33 females and 33 males, were collected, for an overall average catch-per-unit-effort (CPUE) of 20.97 shad/hour. Mean total lengths were 21.1inches TL for females and 19.5 inches TL for males. Sizes ranged from 18.8 to 23.2, and 17.2 to 21.3 inches TL for female and male American shad, respectively. Comparison of the CPUE among years suggests that the 2011 relative abundance (i.e., CPUE) was slightly lower than the 2010 run (Figure 1). The lower CPUE was unexpected, considering the strong 2005 young-of-year class, now age 6, are returning to the Delaware River as spawning adults, and a high CPUE was observed at Smithfield Beach for the 2010 and 2011 runs. Typically American shad migrate in schools up-river. The loss of sampling during the peak runtime, likely contributed to an under-estimate of American shad relative abundance at Raubsville.

The upturn in the Smithfield Beach CPUE is encouraging. Annual surveys of American shad young-of-the-year in the Delaware River by the New Jersey Division of Fish and Wildlife have suggested that sampling of 2005 and 2007 stocks indicate strong year class production. Mature American shad return to the Delaware River typically at four to five years-of-age for females and three to four years-of-age for males. Hopefully the increasing trend in relative abundance will continue in the 2012 season as the 2005 year class continues to return, and as the 2007 year class recruits to the adult spawning population (Daryl Pierce, PAFBC Biologist). In 2010, PAFBC estimated 20 plus shad fishing days on the Delaware River, indicating a recreational resource for avid fisherman. The full report is provided on CD for this petition.

The American Shad are celebrated in several cities throughout the watershed during their spring spawn including Fishtown in Philadelphia, Easton, Pennsylvania and Lambertville, New Jersey bringing in people from all over the basin. The annual Shad fishing tournament held each year following the Easton Shadfest charges a $20 entry fee, and with over 1000 competitors in 2006, the tournament raised $20,000 in proceeds. Lambertville's Shadfest has been an annual part of the community for 26 years, attracting 30,000 to 35,000 visitors during the two day event.125 The Shad population has rebounded from decades ago because of renewed efforts to maintain water quality allowing the Shad to make the spawning journey up the Delaware.

Other Delaware River Basin Datasets and Integrated Datasets
For this petition, Delaware River Basin Commission provided a series of electronic datasets of water quality data from their ongoing and targeted monitoring initiatives. They are

included on CD for DEP review. DRBC water quality reports are also provided. Data are also available through STORET. Datasets include:

- DRBC's Scenic River Monitoring Program data from 2000-2009 – (2010 dataset will be provided when available). This monitoring program is the Antidegradation water quality network for 200 miles of the non-tidal portion of Delaware River and tributaries
- Historic data available from DRBC that integrates USGS, USEPA and state agency water quality datasets into the 1980's

This water chemistry data indicate healthy conditions for the main stem Delaware River, as would be expected for this stretch of Special Protection Waters region. Low total dissolved solids and conductivity levels, healthy dissolved oxygen and temperature levels indicative of watersheds that have a high percentage of forested cover.

DRBC is also in the process of establishing water-quality objectives for nutrients in the tidal and non-tidal portions of the Delaware River and presently implementing a strategy to scientifically develop nutrient criteria for the Delaware River and its estuary. Part of that strategy is to investigate the effects of nutrient enrichment on aquatic life of the Delaware River and to gather a weight of evidence toward establishing nutrient-concentration thresholds. The USGS report on the progress of this study is provided on CD.

The Upper and Middle Delaware has many "Least Disturbed Stream" Reaches
PA's Aquatic Community Classification System catalogues and prioritizes stream life throughout the Commonwealth to help better protect streams in pristine conditions and restore those needing help. The proposed upgrade area of the Upper and Middle Delaware has a plethora of "Least Disturbed Streams" or LDS reaches that are considered high priority for conservation and protection. These high quality stream segments have little human disturbance and influences and demonstrate natural ecological function. A map of these streams are provided on CD.

Natural Heritage Areas Indicate High Diversity and High Conservation Needs
Natural areas abound throughout the proposed upgrade area highlighting glacial ponds, diverse headwater tributaries, and the presence of important plant, animal, and bird species. Hard copy of each counties' plans are provided and a description of and more detailed summary of identified high conservation areas located within the proposed upgrade area are provided in a latter section under specific qualifiers.

Freshwater Mussels Data
The Natural Capital Team at the Partnership for the Delaware Estuary has developed tools over the past two years to assist in various projects in the Delaware Estuary, including freshwater mussel restoration, climate change planning, and regional restoration planning. One case study focused on the ecosystem benefits provided by the freshwater mussel, *Ellipito complanata*. Specific ecosystem services furnished by *E. complanata* were identified and estimated based on literature values for key physiological rate functions and ecosystem process functions. These included production, clearance rate, total suspended solids removal, chlorophyll-a removal, sediment organic enrichment, sediment stabilization, macroinvertebrate habitat improvement, nutrient processing flux, and the sequestration of nitrogen and phosphorus. These metrics were related to the estimated

population biomass of *E. complanata* in the Delaware Estuary and conditions such as loadings of pollutants. Mass balance estimates suggest that even the diminished current population of mussels represents ecologically important natural capital because of the ecosystem services that are furnished, including stormwater pollutant reduction and nutrient control. Estimating the services provided by *E. complanata* and other bivalve mollusks has implications for water quality standards and total maximum daily load (TMDL) attainment strategies. Restoration of freshwater mussels such as *E. complanata* provides opportunities to enhance these services, improve water quality and habitat conditions, and build system resilience as an offset for the effects of climate change and continued watershed development. With rare native mussel assemblages being found in the Delaware River and some of its tributary streams, this natural capital needs to be protected where they still exist.

Water Chemistry Data

Delaware Riverkeeper Network has been collecting data for conductivity, TDS, chloride, and temperature on a monthly . Since February 2010, we have collected a dataset for 70 stations on tributary streams in the proposed upgrade area (N=354). For all parameters, the tributary streams sampled are in healthy conditions with ideal cool temperatures indicative of a healthy fishery (average temperatures of 14°C, and average conductivity readings of 72 µg/l and 46 ppm TDS). Even during winter rain events conductivity levels remained low. On the main stem Delaware River, DRBC 2000-2004 data indicate very healthy levels for the River and the 15 tributaries sampled for TDS (N=1028 samples). The average total dissolved solids (TDS) was 183 ppm, the median was 160 ppm, and TDS ranged from 10 ppm – 618 ppm. Visual assessments collected by DRN volunteer monitors also indicate minimum consolidation and embeddedness, indicative to good benthic habitat. This dataset is available electronically and provided on disk.

National Park Service Data

Various datasets collected by the National Park Service are provided electronically on CD.

Delaware Riverkeeper Network will continue to investigate additional data sources that become available for the proposed upgrade area and provide these sources to PADEP during the upgrade process.

5. A description of existing and proposed point and nonpoint source dischargers and their impact on water quality and/ or the aquatic community

The upgrade regions of the Middle and Upper Delaware have approximately 25 active or inactive point-discharge facilities holding NPDES permits. The majority of point dischargers are located near the southern end of the proposed upgrade area in Monroe County, surrounding the city of Stroudsburg and the Delaware Water Gap. Specifically, seven facilities are present throughout Wayne County and 18 facilities located in Monroe County. The regulatory characteristics of these dischargers are classified as, Industrial Waste, Stormwater-Industrial, and Stormwater-Municipal. The information on these facilities was collected through using Pennsylvania DEP's Emap PA system.

Facility Name	NPDES #	Nature of Discharge	County
APS Recycling INC	PAR602248	Stormwater-Industrial	Monroe
Bestway of Pa Inc. Lumber Treatment Center	PAS222202	Industrial Waste	Monroe

Blue Ridge Peat Farms	PAS322202	Stormwater-Industrial	Monroe
Bunnell Recycling CTR INC	PAS602207	Industrial Waste	Wayne
Burroughs Fuels Inc WTP	PA0063835	Industrial Waste	Monroe
Chroma Tube Plant	PA0029637	Stormwater-Industrial	Wayne
Crossroads Trave lCTR INC	PA0013676	Industrial Waste (Inactive)	Monroe
East Stroudsbourg Mun Auth	PA0020168	Industrial Waste	Monroe
Gustin Stone Supply INC	PAS212214	Industrial Waste	Wayne
Laird Tech	PA0060241	Industrial Waste	Monroe
LKQ Thru Way Auto Parts	PAR602243	Stormwater-Industrial	Monroe
Mcgraw-Edison Co	PA0013269	Industrial Waste	Monroe
Milford Boro IWTP-Backwash	PA0063848	Stormwater-Industrial	Monroe
Nolan Oil	PAG052215	Groundwater Cleanup	Monroe
Patterson Kelly Co	PA0012394	Industrial Waste	Monroe
Penna Power & Light	PA0027201	Industrial Waste	Wayne
Pleasant Mt. Hatchery PA Fish & Boat Comission	PA0044024	Stormwater-Industrial	Wayne
Rock Hill Materials CO	PAS212203	Stormwater-Industrial	Monroe
Rock Tenn Co	PA0012963	Stormwater-Industrial	Monroe
Sanofi Pasteur	PA0060071	Industrial Waste	Monroe
Sibums Auto Parts	PAS602206	Industrial Waste	Monroe
Stroudsburg Water Filtration P	PA0060992	Industrial Waste	Monroe
Texaco Refining & Marketing	PA0063452	Stormwater-Industrial	Wayne
UPS SVC Stroudsburg	PAS802213	Stormwater-Industrial	Monroe
Waste Management of Pennsylvania	PAS602207	Industrial Waste	Wayne

Nonpoint Source Dischargers in the Middle and Upper Delaware Watersheds

Nonpoint source pollution is often carried as storm water runoff from the following sources:

- Roads and parking lots (hydrocarbons, heavy metals, road salt)
- Lawns (fertilizers, pesticides, pet waste)
- Cultivated fields (soil erosion/sedimentation)
- Livestock pastures (manure, soil erosion/sedimentation)
- Stormwater management facilities (MS4)
- On-lot septic systems

The majority of nonpoint source pollution in the proposed upgrade region is likely to occur in the form of nutrient pollution (eutrophication), stemming from agricultural sites and livestock, within the middle and lower portions of the Middle Delaware. New development projects within the region, particularly within Pike and Monroe counties, have increased soil erosion and sedimentation (DRBC State of the Delaware Basin Report, 2008).

7.3 (f)(i): High Quality Qualifiers

The majority of the streams in the proposed upgrade area of the Upper and Middle Delaware River already have HQ designation. Some of the tributaries in the proposed upgrade area also have EV designation.

7.3(f)(i)(A): Water Chemistry qualifier

Section E4, the electronic appendices and disks include a plethora of water chemistry data from various agency and private sources for the proposed upgrade area, including the tributaries and the main stem Delaware River. In general, dissolved oxygen levels and temperature data show optimum conditions, even in warmer summer temperatures for the majority of tributaries sampled. Recent monthly data collected by Delaware Riverkeeper

Network at 70 stations within the proposed upgrade area (from March 2010-Present) for Total Dissolved Solids, conductivity and chlorides indicates very low conductivity readings and low chlorides, an important necessity for the diverse benthic life that flourish here. DRBC data for the main stem also shows healthy conductivity readings indicative to the forested nature of this region even in the main stem Delaware River. Please see submitted datasets on CD for more details.

7.3(f)(i)(B): Biological assessment qualifier
Macroinvertebrate data for the proposed upgrade area is available for many of the tributary streams and the main stem in the proposed upgrade area. That data is submitted with this petition with the exception of DRBC's datasets from Spring 2011 which will be submitted when available. Data indicate healthy and diverse benthic populations of macroinvertebrates present. EPT taxa are abundant and Hilsenhoff scores are good. Please see section E.4 and electronic datasets.

7.3(f)(i)(C): Class A Wild Trout Stream Qualifier
The proposed upgrade area supports populations of naturally produced trout and is considered a world class fishery by the PA Council of the Trout Unlimited.
As indicated in Section E.4, the PA Fish and Boat Commission includes "fishing hot spots" where wild trout are abundant for the following streams and the main stem Delaware River: West Branch Delaware River and Upper Delaware River, Devils Hole Creek, Toms Creek, and Bushkill Creek. PAFBC lists the following streams as Class A wild trout streams found in the following table (http://fishandboat.com/classa.pdf).

In Wayne County – Faulkner Brook (rainbow trout), Sherman Creek (brown trout), and Stiles Creek (brook trout)

Pike County is also identified as prime fishing area with Mill Brook, Bushkill Creek, Burchards Creek, Birchy Creek, and Pond Eddy Creek all having Class A trout populations for native brook trout. Sawkill Creek, Toms Creek and Pond Eddy also have Class A designations for brown trout.

In Monroe County – Mill Creek, Poplar Run, Middle Creek, Devils Hole Creek, Appenzell Creek, Aquashicola, Cranberry, Middle Branch of the Brodhead, Dotters Creek, Singer Run, and Wolf Swamp Run are all designated Class A Wild Trout.

Naturally producing wild trout populations
The proposed upgrade area also has an abundant number of streams that PAFBC cites as having naturally reproducing wild trout populations and many fisher people flock to these regions to recreate http://fishandboat.com/trout_repro.pdf . The list of streams for the Upper and Middle Delaware River region includes 10 stream segments in Monroe County.

7.3(f)(ii): EV Qualifiers.
The majority of streams in the proposed upgrade area already have HQ designation.

§ 7.3(f)(ii)(A): Location in National Wildlife Refuge or state game propagation and protection area. **NO**

§ 7.3(f)(ii)(B): Location in a State Park Natural Area, State

Forest Natural Area, National Natural Landmark, Federal or State Wild River, Federal Wilderness Area or National Recreational Area. YES
The proposed upgrade area of the Upper and Middle Delaware River includes National Natural Landmarks, State Park Natural Areas, Federal Wild & Scenic River designation, and National Recreation Areas.

Wild & Scenic Rivers Designation
As outlined in Section B, The Delaware River is a federally designated Wild & Scenic River. The wilderness river has over 290 square miles of open space and water for the community to enjoy. Three quarters of the non-tidal Delaware River is designated a National Wild and Scenic River. One section extends 73 miles from the confluence of the River's East and West branches at Hancock, N.Y. downstream to Milrift, PA; the second section is a 40-mile stretch from just south of Port Jervis, N.Y. downstream to the Delaware Water Gap near Stroudsburg, PA (both designated in 1978). Combined, these two river corridors take in 124,929 acres and make up a large part of the proposed upgrade area in this petition. The Lower Delaware Wild and Scenic Rivers Act, signed into law on November 1, 2000, added another 38.9-mile section of the main stem Delaware (and about 28 miles of selected tributaries) to the national system, linking the Delaware Water Gap and Washington Crossing, PA, just upstream of Trenton, N.J. Sections of the Maurice River in New Jersey (a Delaware Bay tributary) and the Musconetcong River in New Jersey (a Delaware River tributary), as well as the White Clay Creek in Pennsylvania and Delaware (which flows into the Christina River, a tributary to the Delaware) also have been included in the national system. According to the National Park Service's web site, the U.S. has 3.5 million miles of rivers, but only about 12,600 river miles (just over one-quarter of one percent) are included in the National Wild and Scenic Rivers System, making the Delaware River a crown jewel for the nation and the northeast. The Wild and Scenic Rivers Act states that the River must be protected in its free-flowing condition and that it must be managed for the benefit and enjoyment of present and future generations.

State Park Natural Areas in Proposed Upgrade Region

Bender and Black Bear Swamps are made up of 1,600 acres of acidic swamps, sphagnum moss, rare plants and animals located in Monroe County and are part of Tobyhanna State Park. Tobyhanna State Park is in scenic Monroe and Wayne counties in northeastern Pennsylvania. The 5,440-acre park includes the 170-acre Tobyhanna Lake. Tobyhanna is derived from an American Indian word meaning "a stream whose banks are fringed with alder."

Downstream of the proposed upgrade area there are two more state park natural areas. Delaware Canal State Park in Bucks County contains seven riverine islands (consisting of 80 acres) that are home to natural plant communities and many rare plants. Also in Bucks County, Neshaminy State Park provides 71 acres of tidal marsh habitat containing many rare plants along the shores of the Delaware River and Neshaminy Creek.

National Natural Landmarks (NNLs) in the Upper and Middle Delaware River Watershed
According to the National Park Service, there are 591 designated landmarks in the United States. The Upper and Middle Delaware River upgrade area contains three of these national treasures. Sites are designated as NNLs because they contain the best remaining

examples of specific biological and/or geological features. The natural features represented include aquatic and terrestrial ecosystems, geological processes and resultant landforms, and records of geologic history. Each site is a piece of the larger picture that is the illustration of the great diversity of our Nation's natural landscape.

The Upper and Middle Delaware River upgrade area in PA includes two National Natural Landmarks (out of a total of only 27 that are located in the state of PA). Lake Wacanac, designated in 1968, located adjacent Lake Wallenpaupack in Wayne County, PA, is one of the 27 National Natural Landmarks in Pennsylvania. This private 400-acre lake in Paupack, PA is one of the southernmost lakes of glacial origin in the northeastern United States. The site contains a mixture of northern and southern forests and a portion of relict forest.

The 185-acre privately owned Tannersville Cranberry Bog Preserve in Monroe County (Pocono Creek drainage), designated in 1974, is one of the most archetypal boreal bogs in Pennsylvania and perhaps the most southern black spruce-tamarack bog along the Eastern Seaboard, according to the National Park Service.

Located within Worthington State Forest (NJ) and draining into the Middle Delaware River is Sunfish Pond, a 188-acre spring-fed mountain lake surrounded by a hardwood forest. It is an outstanding illustration of glacial sculpture that was designated in 1970. Popular hiking trails in the forest take many hikers to this unique and favorite feature that drains into the Delaware River north of Depue Island and south of Tocks Island where a dam was proposed in the 1950's and deauthorized in 2002. This is one of only eleven National Natural Landmarks in the state of New Jersey.

State Forest Natural Areas

Delaware State Forest

The Delaware State Forest contains a total of 80,267 acres in Pike, Monroe, Northampton, and Carbon counties, however most of the forest lies in Pike County. This forest is characteristic of the Pocono region, with remote glacial lakes and bogs rich with plants, wildlife and scenic beauty. The Delaware State Forest derives its name from the Delaware River that drains the entire area. The River was named after the Delaware Indians, also known at the Lenni Lenape, a tribe of the Algonquian Nation, who inhabited its shores, valleys, and cliffs. The area is easily accessible and within a two hour drive of New York City and Philadelphia. The scenic beauty is outstanding and the area draws millions of visitors annually, according to the DCNR. A map of the forest can be downloaded at http://www.dcnr.state.pa.us/ucmprd2/groups/public/documents/document/D_000883.pdf and is provided on CD.

Lackawanna State Forest

Lackawanna State Forest is named after the Native American phrase, "a place where the river forks." The forest's more than 30,000 acres blanket more than a few of the mountains near the confluence of the Susquehanna and Lackawanna rivers, thus its moniker. This forest contains some of the most pristine headwaters of the Delaware River, and provides extensive corridors for wildlife and abundant recreational opportunities to the public. A map of the forest can be downloaded at

http://www.conservationfund.org/news/lackawanna-state-forest-pennsylvania-2010 and is provided on CD.

Delaware Water Gap National Recreation Area

The Delaware Water Gap National Recreation Area, designated September 1, 1965 includes 68,714 acres on the Pennsylvania/New Jersey border, 90 miles from Philadelphia and 64 miles from Newark. This scenic area preserves relatively unspoiled land on both the New Jersey and Pennsylvania sides of the Middle Delaware River. The river segment flows through the famous gap in the Appalachian Mountains. The park sponsors a craft village and several environmental education centers. Visitors to the park enjoy camping, hiking, bicycling, mountain climbing, swimming, canoeing, tubing, fishing, hunting, auto touring, snowmobiling, cross-country skiing, wildlife viewing, and guided tours. More than 25 miles of the Appalachian Trail traverse the Delaware Water Gap National Recreation Area. This is the only backpacking area in the park. The National Park Service recorded 4.8 million visits to the Delaware Water Gap National Recreation Area in 2007. It was the fifth most visited park in the United States that year.

Upper Delaware Scenic and Recreational River

The Upper Delaware Scenic and Recreational River was added to the Wild and Scenic Rivers System on November 10, 1978. On November 24, 1968 portions of the Delaware & Hudson Canal were designated a National Historic Landmark and the Delaware Aqueduct (Roebling Bridge) was designated a National Civil Engineering Landmark. The Upper Delaware Scenic and Recreational River encompasses 55,575 acres of which 30 acres is federal and 55,545 is non-federal. Visitation to this recreation area includes: 2005 – 251,083 visitors, 2004 – 227,695 visitors, and 2003 – 259, 116 visitors. The annual budget for 2005 was $2,836,000. This park is managed by cooperation between private landowners, municipalities, the federal and state governments through the River Management Plan is available at: http://www.nps.gov/upde/parkmgmt/planning.htm and every year progress reports are completed.

§ 7.3(f)(ii)(C): The Delaware River is an outstanding national, state, regional or local resource water. YES

See Section § 7.3(f)(ii)(B) that outlines some of the federal and state owned or managed lands. Additional points listed below for this qualifier.

Multi-state protective measures

In 2011, the Delaware River was recognized as one of "America's Great Waters" by America's Great Waters Coalition for its national significance and role in the nation's prosperity and the need for renewed commitment to protecting this lifeblood River which serves as an economic engine for the region. America's Great Waters Coalition envisions a day when America embraces its Great Waters and ensures they are healthy, valued, and productive resources for our nation. A map of the Great Waters of the Nation can be found at:http://www.nwf.org/~/media/PDFs/Water/032511Americas%20Great%20Waters%20Watershed%20Map.ashx and is included on CD.

Special Protection Waters Designation for Delaware River

197 miles of the Delaware River, including the Middle and Upper Delaware, have been designated by the multi-state Delaware River Basin Commission out of recognition for its high quality waters. The SPW program, according to the DRBC, "is designed to prevent degradation in streams and rivers considered to have exceptionally high scenic, recreational, ecological, and/or water supply values …." The SPW program focuses on both point and nonpoint sources of pollution and is intended and implemented so as to protect the high quality waters of designated SPW reaches. The creation and implementation of this program was accomplished through and with the participation of each of the four watershed states and the federal representative to the DRBC and is a prime example of how they have worked together to protect the River from degradation out of recognition of its irreplaceable values to the region and the nation.

Delaware River Water Resources Plan

The Delaware River Water Resources Plan, created in 2004, is another multi-state effort that illustrates the commitment at the state and local levels to protect the Delaware River Basin because of its importance to the welfare of the public. This Plan was developed after a resolution by the four Governors of the adjoining states was passed in September, 1999 to protect the Delaware River. The plan in its entirety is located at this link: http://www.state.nj.us/drbc/BPSept04/index.htm. Every year a progress report is provided to continue to work towards the guiding principles of protection of the Delaware River Basin.

Nature Conservancy Protected Lands with Easements

The Nature Conservancy has established a strong presence in the region to ensure the Upper Delaware River maintains its integrity. Most recently, the Conservancy began assisting the Delaware River Basin Commission with designing a system to monitor and manage water diversions in the River's tributaries that disrupt natural flooding, temperature, and flow patterns further downstream. These actions – combined with ongoing efforts to connect important habitats, influence sustainable land uses, and combat non-native vegetation – will go a long way in ensuring the Upper Delaware River continues to possess outstanding natural, recreational, historical and cultural resource values that led to its designation as one of the nation's "Wild and Scenic Rivers." The TNC has preserved more than 650 acres of forests and important vernal pools near the Delaware Water Gap, adding significantly to the protection of this impressive natural area.

Pennsylvania State Gamelands in Proposed Upgrade Region

The proposed upgrade area is home to 14 state game lands managed by the PA Game Commission encompassing more than 76,032 acres. These gamelands include:

Monroe County

- **SGL 038 –** Pennsylvania State Game land 038 is located within part of Chestnut Hill Township, Tunkhannock Township, and Pocono Township. Large sections of Sand Spring Run, Wall Swamp Run and Deep Lake, reside within the area. The game land boarders Interstate 80 and encompasses 5,477 acres.

- **SGL 127 -** Pennsylvania State Game land 127 extends into Coolbaugh and Tobyhanna Townships. Largest tracts of swamps and wetlands, including major sections of Tobyhanna Creek, Kistler Run and Bradys Lake. The game land encompasses 25,227 acres.

- **SGL 186 –** Pennsylvania State Game land 186 is located in Jackson Township between Grubers Lake, Trout Lake and Appenzel Creek. The game land is situated between Pine Road and PA Rt. 715 and encompasses 976 acres.

- **SGL 221 -** Pennsylvania State Game land 221 is located in between Coolbaugh and Paradise Townships, and boarders PA Rt. 191. The game land is comprised of 4,618 acres and includes major tracts of Rattlesnake and Mill Creeks.

Pike County

- **SGL 116 -** Pennsylvania State Game land 116 is located between Shohola and Lackawaxen Townships. The area extends 3,024 acres and is boarded by Shohola Creek and Pennsylvania Rt. 434.

- **SGL 180 –** Pennsylvania State Game land 180 encompasses 11,372 acres of land between Blooming Grove, Dingham and Shohola Townships. Interstate 84 travels through the game land and includes a large stretch of Shohola Creek.

- **SGL 183 -** Pennsylvania State Game land 183 is boardered by Pike and Wayne Countiess near Palmyra Township and the town of Hawley. The Lackawaxen River runs along the game lands' Northern Boarder and encompasses 2,778 acres.

- **SGL 209 -** Pennsylvania State Game land 209 is located in Shohola Township along the Delaware River. Pond Eddy Stream runs through the game land where it comes to its confluence with the Delaware River. The game land encompasses 4,391 acres.

- **SGL 316 -** Pennsylvania State Game land 316 is located along the Delaware River in Lackawaxen Township. The area includes stretches of Rattlesnake and Masthope Creek, as well as Coby Pond. The game land extends 2,715 acres.

Wayne County

- **SGL 070 –** Pennsylvania State Game land 070 is spread throughout Wayne and Susquehanna County. The area includes large tracts of Sherman and Hemlock Creeks.

- **SGL 159 –** Pennsylvania State Game land 159 is located in Lebanon and Manchester Township and encompasses 9,368 acres. The game land includes Adler Marsh Pond, Upper Woods Pond, and a segment of Adler Marsh Brook runs through the game land.

- **SGL 299 -** Pennsylvania State Game land 299 borders the West Branch of the Delaware River and contains large portions of the tributaries of Start Creek and Faulkner Brook. The game land encompasses 1,054 acres.

- **SGL 310** – Pennsylvania State Game land 310 boarders Lake Henry and encompasses the majority of Silkmans Swamp. The game land is located within Lake Township and spans 1,120 acres.

- **SGL 312 –** Pennsylvania State Game land 312 is located on the boarder of Wayne and Lackawanna Counties within Lehigh and Coolbaugh townships, near Tobyhanna State Park. The game land includes a major tract of the West Fork Leigh River, Lehigh Pond, and Pepperidge Swamp. The area includes 3,912 acres.

State Forestlands (see section 4.2)
Federally owned or managed lands
As indicated under Section 4.2(b), the upgrade area is part of the Delaware Water Gap National Recreation Area and the Upper Delaware Scenic River. Both of these areas combined include 142,000acres of which about 95,000 acres are federally protected.

State Parks located in the Upper and Middle Delaware River Region
Prompton State Park, Varden State Park and Conservation Area, Promised Land State Park, Jacobsburg Environmental Education Center are all located within the proposed upgrade area.

Water Management
In 2007, USGS developed a decision support framework for water management in the Upper Delaware River.

DCNR's CLI Program and Pocono CLI in the Proposed Upgrade Region
The CLI program is a prime example of municipalities, state agencies, and civic organizations, working together to implement effective strategies to protect watersheds including the Upper and Middle Delaware. In 2004 the Pennsylvania Department of Conservation and Natural Resources (DCNR) developed the "Conservation Landscape Initiative" (CLI). The mission of the Initiative is to recognize the collaborative effort between state agencies, local governments, municipalities, and nonprofit organizations, who are implementing strategies to efficiently manage, conserve, and develop important landscapes throughout Pennsylvania. The goal of this integrated approach is to make a positive economic and ecological impact in the designated region through investment in sustainability, conservation, and economic revitalization initiatives. Conservation Landscape Initiative regions are usually areas that have the following characteristics: a large presence of DCNR state owned lands; a sense of common place and identity; a landscape made ready to commit to conservation due to either threat or opportunity; a region with strong civic engagement; and a presence of strategic investments on behalf of state agencies, regional, and statewide partners, which are able to provide financial and technical support to the regions conservation, and "sustainable economic initiatives".

The proposed upgrade region of the Upper and Middle Delaware Watershed is home to the "Pocono Forest and Waters Conservation Landscape Initiative". This CLI encompasses tracts of land within Carbon, Pike, Monroe, Lackawanna, Luzerne, and Wayne counties. The region is notable for its large expanses of ecologically sensitive lands and vast recreational opportunities. The Pocono Forests and Water region for example, contains approximately 54,536 acres of state parks, 115,000 acres of state forests and several hundred miles of trails and other outdoor recreational facilities such as hunting and fishing clubs. The region also is composed of the highest concentration of wetlands within the state of Pennsylvania. Although this region contains merely 8% of the state's land area, it harbors over 20% of the state's wetlands, 4,700 miles of streams, and 74 miles of lakes and ponds.

County, municipal officials, and community members within the Pocono Forest and Water Region have identified that unchecked development and urban sprawl is one of the most significant threats to the ecological sanctity of this CLI. Therefore, the members of Pocono Forests and Waters have identified progressive planning as a necessity to preserve the natural character of the region. Other objectives of the Pocono Forests and Waters plan call for expanding resource protection initiatives to enhance the foundation of existing recreation and ecotourism opportunities. The plan also seeks to foster community development by implementing region-focused educational initiatives for municipalities and community members, expanding markets for nature based tourism, and promoting community workforce development. The Pocono Forests and Waters CLI encourages an integrated approach amongst federal, state, and local governments, as well as civic organizations to meet these objectives.

A Pocono CLI project includes (Delaware Riverkeeper Network is investigating other CLI projects in the proposed upgrade area and will provide to PADEP):

- The Bethlehem Authority was recently approved to receive a $20,000 grant from the Pocono Forest and Waters CLI to help complete a forest stewardship plan through the Forest Stewardship Council. This will benefit approximately 23,000 acres of mostly forested watershed property in Carbon and Monroe counties. The mountain reservoirs and watersheds at Wild Creek and Penn Forest, as well as the Tunkhannock Creek backup supply near Long Pond, serve as the water supply for Bethlehem's water system which serves approximately 115,000 people in Bethlehem and 10 surrounding municipalities.

Other Conservation Easement and Protection Programs

Pike County began an agricultural easement program in 2006 to begin preserving important farmland. The Pike County Agricultural Land Preservation Board works with landowners who are interested in selling the development rights to their property. The county is eligible to obtain matching funds from the state to preserve agricultural properties.

Pike County's Scenic Rural Character Preservation Program

The mission of this Pike Countyh Scenic Rural Character Program run by PCCD is, "To provide for the protection of drinking water; wildlife habitat; preservation of scenic ridges and critical open space; protection of water quality of rivers, lakes and streams; parks and recreational areas; improved county and municipal planning; and related acquisitions of real property or interests therein from willing sellers on a voluntary basis and to provide education, outreach and the provision of funds for such purposes."

This program is now in its 3rd year of accepting grant applications for funding. At this time, projects eligible for funding include:

- Municipal Planning Initiatives (Comprehensive Plans, Open Space Plans, and Ordinance Updates)
- Conservation Easements from willing sellers
- Parcel Acquisition from willing sellers

- Donated Conservation Easements

In November 2005, Pike County voters affirmed the importance of preserving and protecting the natural resources of Pike County and the County's scenic rural character, by voting "Yes" with a margin of more than 2 to 1 on the Scenic Rural Character Preservation $10 Million bond referendum placed on the ballot by the County Commissioners.

This vote was consistent with the findings of the Pike County Planning Commission's Community Survey completed in summer 2004 as part of the update of Pike County's Comprehensive Plan. Approval of the Scenic Rural Character Preservation Bond was an important step in protecting the County's natural resources, preserving sensitive natural areas and critical open space, providing parks and recreation areas and improving planning efforts at both the County and Municipal levels.

In September 2006, the Pike County Commissioners voted in favor of financing a portion of the $10 million SRCP Bond to jump start the program. Initially $1.2 million will be financed over three years. Also in Fall 2006, the Preservation Board presented a Municipal Planning Initiatives Grant Manual to the Commissioners for their review. The Commissioners approved the Manual on October 18, 2006, and it was distributed to the thirteen municipalities in the county. The Municipal Planning Initiatives Manual contains the guidelines for Pike County municipalities to access Scenic Rural Character Preservation Program funds for the purposes of "municipal planning." Grant funds under this aspect of the program are provided for municipalities to undertake the development or update of Municipal Comprehensive and/or Open Space Plans or the update of land use ordinances such as Subdivision and Land Development (SALDO), Zoning, Stormwater or Floodplain Ordinances.

Monroe County

On April 9, 2011, the Pennsylvania Land Trust Association presented Monroe County with the Government Conservation Leadership Award. The county was recognized for its "proactive land protection strategies and commitment to protecting sensitive and scenic areas and critical natural resources". Monroe County's 2020 open space program was successful in incentivizing all 20 municipalities in the county to create local multi-municipal open space plans, and other planning initiatives as well as full participation in one of six regional multi-municipal open space-planning initiatives. Overall, the county has been successful in preserving over 12,000 acres of land since 1999, and over 6,000 acres through the county's Agricultural Lands Preservation program. Monroe is the second fastest growing county in Pennsylvania after Pike County. Monroe County's 2020 Open Space Program was developed in part to initiate a community-based approach in dealing with urban sprawl issues detracting from much of their pristine rural environment.

Monroe County was also recently designated by EPA Region 3 as one of their "Green Communities." The EPA Green Communities program aims to help develop environmental stewardship at the local level by bringing together community leaders and providing information on how a given community can integrate sustainable practices to solve local problems. This program is designed to support communities that are actively seeking ways to promote the quality of their environment. Much of what propagated Monroe County adopting the 2020 Open Space Plan was EPA Region 3 partnering with Harvard University,

the Commissioners and Planning Commission, the Monroe County Conservation District, and the USDA Forest Service to develop planning and development strategies for the county.

Jackson Township
Jackson Township has just recently received a grant of $225,000 from DCNR to preserve 85 acres along Sherwood Forest Road for greenway, passive recreation, and watershed protection.

Pocono Heritage Land Trust a $258,300 grant for the acquisition of "60 acres owned by the Fairview Water Co. along Route 940 in Mount Pocono Borough for habitat and watershed protection, open space and passive recreation". These projects are part of the Pocono Forest and Waters CLI.

These initiatives show a tie between legally binding sound land use measures coupled with conservation easement programs and other methods for real estate to be protected for the long term. Delaware Riverkeeper Network is investigating other conservation easements and will provide additional data to PADEP when it becomes available.

Designated River of the Year 2011: The Delaware River
(In 2010 the Lackawaxen River was designated River of the Year)
This past January, the Pennsylvania Department of Conservation and Natural Resources (DCNR) and the Pennsylvania Organization for Watersheds and Rivers (POWR), named the Delaware River "River of the Year" for 2011. This award has been presented annually to a river in Pennsylvania since 1983; last year's winner was the Lackawaxen River, a major tributary to the Delaware.

"The Delaware River is the longest un-dammed river east of the Mississippi and is steeped in history, diverse in resources, and is vital to protect," Department of Conservation and Natural Resources Secretary John Quigley said. "Its waters serve the needs of more than 15 million people from four different states, including more than 5 million Pennsylvanians. It boasts the largest freshwater port in the world, as well as threatened and endangered species, and a thriving tourism industry."

The mission of this award is to show support for, and recognize the tremendous qualities, as well as economic and ecological services, that the rivers throughout the state provide. The award is also given to promote conservation efforts and to continue the river's functioning as a valuable resource. This year's vote was particularly significant as it was the first time a river was awarded this honor through a public vote. With over 10,000 votes casts for rivers throughout Pennsylvania, the Delaware earned 2,500 votes. As a public vote, this honor is especially meaningful because it shows a strong public consciousness on behalf of the River as a precious resource and for its continued conservation. The Delaware River Basin Commission and the Delaware Sojourn Steering Committee partnered to nominate the Delaware River.

Other partners of the 2011 Pennsylvania River of the Year and Delaware River Sojourn include environmental civil organizations as well as several municipal and county and agencies such as: The American Canoe Association, Delaware and Raritan Canal State Park, Delaware Canal State Park, Friends of the Delaware Water Gap National Recreation Area,

Monroe County Transit Authority, National Canoe Safety Patrol, the National Park Service – Delaware Water Gap National Recreation Area, the National Park Service – Upper Delaware Scenic and Recreational Rivers, Northeast Wilderness Experience, Nurture Nature Foundation, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Environment Council, Pennsylvania Organization for Watersheds and Rivers, Pike County Conservation District, Pocono Environmental Education Center, Pocono Mountains Visitors Bureau, PPL Corporation, Silver Lake Nature Center, the Lackawaxen River Conservancy, the Shawnee Inn and Golf Resort, Tidewaters Gateway Partnership, Upper Delaware Preservation Coalition, and Wayne Conservation District.

The Delaware River and Lackawaxen Sojourn

In commemoration of the 2011 River of the Year, June 18 – June 25 marked the 17th annual Delaware River Sojourn. The Delaware River Sojourn is an eight-day, 75 mile paddling trip down the Delaware from upper Wayne County to Lower Bucks County. The Sojourn combines kayaking/canoeing, with educational programs, and historical interpretations, bringing together paddlers from all levels of experience. Last year's Sojourn took place on the Lackawaxen River, a tributary to the Delaware, in conjunction with the Lackawaxen being named the 2010 Pennsylvania River of the Year. The mission of the Sojourn is to "heighten awareness of, and appreciation for, the ecological, historical, recreational, and economic significance of the Delaware River". The Sojourn has been successful in bringing hundreds of people to the River to enjoy and appreciate its value. Because the River flows through some of the most populated areas in the country, it is easily accessible to people from all over the region. By taking part in the Sojourn participants can experience first hand the importance of the River, and can better understand why the conservation of this resource is so important. Lawmakers and elected officials from local, state, and federal levels have participated in the Sojourn and come away with a better understanding of how protecting the River can benefit their constituents. The Sojourn has received heightened attention from the media as well as local river communities, which has led to the promotion of greater environmental stewardship on behalf of the watershed.

2011 Delaware River Conservation Act

On June 23, 2011, congressional and senatorial leaders from both sides of the political arena in Washington D.C. acknowledged the value of the Delaware River through the introduction of H. R. 2325, the *Delaware River Conservation Act of 2011*. The goal of the proposed legislation is to encourage and support efforts throughout the Delaware River Basin to promote and restore water quality; enhancing the quality of the habitat for the 15 million people, fish and wildlife who rely on this resource for survival. If passed, this act would establish a program known as the "Delaware River Restoration Program" under the direction on the U.S Fish and Wildlife Service. The primary focus of the program is to implement a "*coordinated approach* to sustain and enhance habitat, water quality and flood control, and improvements for fish, wildlife, and people." Public planning and community outreach and education, to increase citizen involvement, would also be a major facet to this program. To maximize success in achieving these goals, monitoring, water quality research and evaluation will also be implemented.

One of the most defining features of this legislation is the proposed competitive grant program. Under the Act's grant program, the USFWS Director in conjunction with partner organizations will provide strategic funding to support on-the-ground projects. These would include initiatives such as the restoration of wetlands, forests and streams;

revitalization of waterfronts to benefit communities by modernizing their river resources; and addressing stormwater runoff and toxic pollution issues to improve water quality, habitat, and recreational uses. A proposed allocation of $5 million dollars would be the funding request for the program. A minimum of 75% of this allocation must be directed to the grant program as well as other technical assistance projects.

Main provisions of the restoration program include: facilitating coordination between states, local governments, and conservation organizations throughout the basin; carrying out coordinated restoration activities throughout the basin including, habitat restoration and protection and sustaining and enhancing drinking water quality; enhance water management throughout the basin by implementing flood mitigation strategies; encourage environmentally sensitive land use planning; improve opportunities for public recreation; encourage the capacity for the implementation of conservation projects through basin wide community outreach and education initiatives, to promote citizen involvement; and coordinate, conduct and support research activities related to conservation and restoration initiatives.

DCNR Rivers Conservation Plans and Implementation Projects (1995-2010)
DCNR has conducted a Rivers Conservation Planning Study for the Sawkill and Van Der Mark Creeks (RCP-9-19), Brodhead Creek (RCP-5-3), Northeast Northampton Watershed (RCP-12-9), and the Lehigh & Delaware Rivers/Bushkill Creek (RCP-1995-05). There are many more Conservation Plans for the Delaware River Watershed farther south outside of the upgrade area as well.

Implementation projects have also been conducted by DCNR at 5 locations in the proposed upgrade area and include: Lehigh and Delaware River/Bushkill Creek (RCI-6-23), Brodhead Creek Invasive Plant Management (RCI 11-5), Upper Delaware Knotweed Control Project (RCI-11-15), Brodhead GIS study (RCI 13-9), and Brodhead and Cherry Creek Invasive Mgmt (RCI-13-3-506).

§ 7.3(f)(ii)(G): Surface water of exceptional ecological significance. YES

Designated Important Bird Areas (IBA)
Pike County contains three Important Bird Area (IBAs) – Promised Land State Park – Bruce Lake Natural Area, Shohola Waterfowl Management Area – SGL 180, and Upper Delaware Scenic River. Two of the IBAs extend beyond Pike County, therefore, features described below pertain to the entire IBA and are not necessarily confined to the county.

Upper Delaware Scenic River IBA
The Delaware River creates the eastern border in Pike County. This IBA crosses into Wayne County and encompasses a strip of land one mile wide on the Pennsylvania side of the River. This area contains a variety of habitat types, including riparian areas, woodlands, fields, scrub habitat, hillsides, cliff, bogs, and wetlands. This IBA is important migrating habitat for many species and is a major Bald Eagle wintering location.
This area satisfies the following IBA criteria:

- Great Blue Heron colony of approximately 25 nests
- Breeding Bald Eagle and Osprey and wintering Bald Eagle
- Breeding Northern Goshawk, breeding Pied-billed Grebe and large numbers during fall migration

- Northern bogs with characteristic vegetation and rare plants that support Canada Warbler, Whitethroated
- Sparrow, Northern Waterthrush, Alder Flycatcher, and Common Merganser.

Shohola Waterfowl Management Area (SGL 180 IBA)
This IBA is a large man-made lake on State Game Lands 180. There are two wildlife propagation areas in Shohola Lake that are closed to the public. Bald Eagles were released in the area in the 1980s and currently breed here. Standing dead trees and marshy areas provide habitat for waterfowl, wading birds, birds of prey, and shorebirds.
This area satisfies the following IBA criteria:

- Large numbers of Wood Duck, American Black Duck, Mallard, and Canada Goose occur here during spring migration, fall migration, and the breeding season.
- Bald Eagles are known to breed at this location.
- The PA Game Commission publishes an annual report of the waterfowl banding data.

Promised Lake State Park – Bruce Lake Natural Area IBA
Located along the western border of Pike County and into Monroe County, this IBA contains a man-made lake and several wetlands. Coniferous forests surround the open wetlands and provide a diverse array of habitat types that support a variety of species.
This area satisfies the following IBA criteria:

- The diverse habitats support 197 documented species of birds
- Bald Eagles are known to breed at this location, Olive-sided Flycatcher is a possible breeder that is currently considered extirpated in the breeding season.
- This area contains a variety of wetland types – emergent, submergent, shrub, and spruce/fir.
- The Pennsylvania Society for Ornithology is currently conducting a Special Areas Project. Mallards and Wood Ducks are banded in the pre-hunting season.

Designated Important Mammal Areas
Delaware State Forest Bushkill Creek Area
This IMA covers just over 96,000 acres. Most of that is part of Delaware State Forest, with some privately owned areas. Most of the land in private ownership is large landowners, such as hunting and fishing clubs, recreational camps, and resorts. Several residential subdivisions are also located within the IMA boundary.
This area satisfies the following IMA criteria:

- The IMA supports habitat specific mammals, such as river otter, snowshoe hare, northern water shrew, and porcupine, as well as wide-ranging mammals such as black bear and bobcat.
- The IMA includes a landscape scale mosaic of habitats typical of the Pocono Mountains.
- There is a confirmed viable local population of snowshoe hare that is listed as a Candidate – At Risk species. Snowshoe hares regularly occur in and near spruce bogs in the IMA.

Delaware Water Gap/Pocono Environmental Center
This IMA covers over 100,000 acres, most of which is located in southern Pike County. Parts of the Upper Delaware River corridor and Delaware Water Gap National Recreation

Area are included in this IMA. This protected area provides habitat for species affected by heavy development pressure in the area. The IMA also includes Pocono Environmental Education Center and the Pinchot Institute for Environmental Studies. More than half of the IMA is privately owned.

This area satisfies the following IMA criteria:

- There are significant populations of species with specific habitat requirements, including: Allegheny woodrat, northern river otter, and northern long-eared bat.
- The habitat is representative, rare, threatened, or unique, with over 40 miles of protected river frontage, tributary streams, cliffs, caves, and talus slopes.
- Significant colonies of little brown bat and big brown bat within the park.
- Important core populations or population segments of beaver noted along major tributaries.
- Possibly active Allegheny woodrat colony. The woodrat colony is a historic location that is part of a metapopulation extending to the south and west.
- There is a confirmed viable local population of northern river otter, northern long-eared bat, and snowshoe hare.
- Numerous sites within the Delaware Water Gap National Recreation Area and Pocono Environmental Education Center allow for the viewing of mammals in their natural habitat.
- An established educational program interprets the natural history of resident mammals and other wildlife. Pocono Environmental Education Center has conducted wildlife interpretation experiences for more than 30 years.

Pennsylvania Natural Heritage Program Data

The Upper and Middle Delaware has many "Least Disturbed Stream" Reaches

PA's Aquatic Community Classification System catalogues and prioritizes stream life throughout the Commonwealth to help better protect streams in pristine conditions and restore those needing help. The proposed upgrade area of the Upper and Middle Delaware has a plethora of "Least Disturbed Streams" or LDS reaches (see map on CD). These high quality stream segments have little human disturbance and influences and demonstrate natural ecological function.

The Upper and Middle Delaware has many Tier 1 and Tier 2 Priority Conservation Watersheds (NPDI Aquatic Classification Study for PA)

The PA Aquatic Community Classification also categorized tiers with the greatest conservation needs based on their exceptional aquatic diversity for mussels, macroinvertebrates, and fish species. To select the watersheds that were of greatest conservation value, each watershed was categorized as 'Tier 1', 'Tier 2', or 'non-priority' for each of the three variables. Tier 1 status for a particular variable indicates that the watershed is in the 90th percentile or greater for that particular variable; i.e., Tier 1 represents the best 10% of all stream reaches. Those in between the 80th-90th percentiles were identified as 'Tier 2'. Watersheds that fell below the 80th percentile for a variable did not receive a ranking for that particular variable. West Branch Dyberry Creek, Carly Brook (Lackawaxen River), and Big Brook are Tier 1 and 2 Priority Conservation Areas. Tier 2 Enhancement areas include: South Branch Calkins Creek and North Branch Calkins Creek.

Important Natural Heritage Areas

Wayne County Natural Heritage Areas

The primary purpose of the Wayne County Natural Heritage Inventory has been the mapping of the locations of the most important natural areas within Wayne County. The inventory has included not only exemplary natural communities, but also the locations of plant and animal species of concern (endangered, threatened, or rare) in Wayne County, and the locations of several areas that cannot be deemed natural but may be of significance because they harbor a diverse flora. Natural Heritage Areas include both the immediate habitat and surrounding lands important in the support of these elements and are mapped according to their sensitivity to human activities. There are many glacial bogs and lakes scattered throughout Wayne County that are considered to have statewide significance. In addition rookeries and rare plant communities are also noted in abundance. There are also many areas of local significance in Wayne County based on size, diversity of wildlife and plant life, water quality protection, and recreation potential. The Delaware River is ranked as high priority for Wintering Bald Eagle area; bird migration corridor; shad spawning grounds; rare plants; water supply; river recreation; and aesthetics.

Wayne County abounds with natural heritage areas – too extensive to include all locations in the body of this petition. We summarize the number of areas for each township in Wayne County within the proposed upgrade area below. We are also including the 1991 Heritage Area Report and it is being submitted as hard copy in the Appendices.

Below is a listing of 59 Natural Heritage Areas listed in Wayne County listed by township that are part of the proposed upgrade area.

Canaan Township (3)
Hoadley Pond
Salem Hill Barren
Aldenville Mud
Clinton Township (5)
Carr Pond
Dyberry Creek Rookery
Elk Lake
Lower Woods Pond
Miller Pond

Damascus Township (9)
Lovelace Pond
Narrowsburg Bend
West Damascus Rookery
Milanville Riverwash
South Milanville Riverwash
Carley Brook Bog
Clonkling Hill
Girdland Bog
Delaware River (SA502)

Dyberry Township (1)
Prompton Bog

Lake Township (2)

Lake Ariel
Lake Henry

Manchester Township (3)
Dripping Cliffs
Lookout Bog
Peterson Lake

Palmyra Township (1)
Hawley Bog

Paupack Township (1)
Wangum Creek Rookery

Preston Township (17)
Hiawatha Lake
Lakewood Bog
Crooked Mud Pond
Spruce Pond
Bigelow Lake
Flat Rock Bog
Howell Pond
Island Lake
Maple Grove
Mt. Ararat
Poyntelle Lake
Shehawken Lake
Holberts Pond
Sly Lake
Buckingham Boat Access
Finnegan Corners
Little Bigelow Lake

Salem Township (5)
Topps Bog
Clemo Pond
Lackawac Lake
Lake Ariel
Marsh Pond

Sterling Township (6)
Lehigh Pond
Thousand Acre Swamp
Bender Swamp
Freytown Swamp
Gas Hallow
Snag Pond

Scott Township (2)

Hancock River
Stockport Woods

Texas Township (4)
Chestnut Lake
Crockenburg Pond
Pipeline Bog
Bear Swamp

Pike County Natural Heritage Areas
Pike County abounds with natural heritage areas – too extensive to include all locations in the body of this petition. We summarize the number of areas for each township in Pike County within the proposed upgrade area below. The extensive and updated Heritage Area 274-page report (updated July 2011) is being submitted in hard copy as part of this petition and on electronic disk for reference. Both core habitat and supporting landscape maps are also included.

In summary, Pike County contains 555 extant occurrences of endangered, threatened, and rare species and natural communities, ranking third out of the Commonwealth's 67 counties. Many of these species are found in the glacial wetlands and other unique habitats in the county. Municipal breakdowns of this data are presented in the full report in Figure 10.

According to the updated Natural Heritage Inventory, Pike County is one of the top counties in terms of biodiversity within the state of Pennsylvania. Inventory scientists recommend that protection of privately-owned sites and careful management of publicly-owned sites should be a priority to protect the unique habitats and the species they support. Several globally rare species are found in the unique habitats of Pike County, many of these occurring in the glacial wetlands; therefore, upstream watershed protection is critical for the persistence of these species. A breakdown of the rare, threatened, and endangered species found in Pike County by their official state legal status is presented below (and in Table 12 of the Inventory).

State conservation status of species of concern in Pike County.

State Status	# of occurrences
PA Endangered (PE)	51
PA Threatened (PT)	119
PA Candidate (PC)	34
PA Rare (PR)	88
Tentatively Undetermined (TU)	7
No Status/Unknown Status	199
PNHP Watch List	57

There is a tremendous abundance of water-dependent species from dragonflies, to plants, to freshwater mussels that are identified in the Inventory that thrive and rely on clean water quality and that are endangered, threatened, rare, or a candidate for endangered species. Freshwater mussel populations are found throughout the main stem of the Delaware River reaches. Dragonfly species and plant species are found in areas of the main stem, and in wetlands, ponds, and glacial lakes of the region that are dependent upon

maintaining good water quality. These species are sensitive to pollution, sedimentation, and other degradation of the water quality and deserve Exceptional Value protection. Roads, residential and agricultural areas, and other breaks in the forested buffer surrounding the Delaware River allow more of these pollutants to be carried by runoff into the water without being filtered. Damming and other alteration of the natural flow of the River and its tributaries would impact the habitats that these species of concern rely upon to persist.

Exceptional Value designation for these regions will allow for the goals of the Inventory to better be achieved in protecting these diverse habitats and threatened species.

Blooming Grove Township Natural Heritage Areas

There are 26 natural heritage areas in Blooming Grove Township. The second largest of Pike County's townships, Blooming Grove covers 77.1 square miles. Seventy-seven percent of the township is forested and another 10% is covered by forested and emergent wetlands. Blooming Grove is the only township in Pike County that does not share a border with another county or state. Public lands within the township include portions of Delaware State Forest and Bruce Lake Natural Area, a small section of Promised Land State Park, Little Mud Pond Natural Area, and portions of State Game Lands #180 and 183. The headwaters for Shohola Creek begin in the western part of the township. The creek flows eastward and then north into Shohola Township on its way to the Delaware River. A portion of the border between Blooming Grove and Dingman Townships is delineated by the Shohola Marsh Dam, an 1,137 acre lake built on the Shohola Creek within State Game Lands #180. Sandstone, siltstone, mudstone, and some conglomerates make up the bedrock. The southwest corner of the township contains a large forest block over 37,500 acres in size that covers portions of three other townships as well as the northeastern corner of Monroe County.

26 Blooming Grove Township Natural Heritage Areas identified include:

Beaver Lake
Billings Creek
Billings Pond
Blooming Grove Creek
Bruce Lake
Egypt Meadow Lake
Gates Run Wetland
High Knob
Lake Giles
Lake Laura
Lake Scott
Little Mud Pond North
Long Pond Swamp
Mainses Pond
Maple Swamp
Pecks Pond
Promised Land Lake
Rock Hill Ridge
Shohola Falls West
Shohola Lake

Smiths Swamp
Spring Brook Wetland
Taylortown Swamp
Wells Road Swamp
White Birch Swamp
White Deer Lake
Delaware State Forest
Bruce lake Natural Area
Little Mud Pond Swamp Natural Area
Public land: Promised Land State Park, State Game Lands #180, State Game Lands #183

Dingman Township Contains 15 Natural Heritage Areas
Dingman Township covers 59.9 square miles. The western half of the township sustains a forest block of over 5000 acres. Sixty-nine percent of the township is forested, with another 11% made up of forested and emergent wetlands; residential areas cover 6.5 % of the landscape. According to the 2000 US census bureau, 8,788 people resided in Dingman Township; this makes it the township with the greatest population in Pike County. The eastern two-thirds of the township are drained by the Raymondskill Creek that flows into the Delaware River; the western third is drained by Rattlesnake Creek, which flows northward into Shohola Creek.

Heritage areas in Dingman Township include:
Adams Creek Ravine
Big Bear Swamp
Big Bear Swamp Wetland
Delaware River between Handsome Eddy and Dingmans Ferry
Delaware River South of Dingmans Ferry
Dingmans Falls
Dry Brook
Shale Barren
Fulmer Falls
Glenside Shale Barren
Lake Maskenozha and Wetlands
Public Lands: Delaware State Forest, Stillwater Natural Area, Delaware Water Gap National Recreation Area

Ten heritage areas in Greene Township
Greene Township has 10 natural heritage areas. Eighty percent of Greene Township is forested, plus another 6% contains forested and emergent wetlands. Less than 5% of the township is in agricultural usage, which is the highest percentage for any township in Pike County. Greene Township covers 61.9 square miles along the western side of Pike County. Publicly owned lands within the township include portions of the Pine Lake Natural Area and sections of Promised Land State Park and Delaware State Forest. A large forest block of 37,500 acres covers the
eastern third of the township as well as portions of three other townships and extends into Monroe County.

Green County Natural Heritage Areas Include:
East Branch Wallenpaupack Creek

East Mountain
Goose Pond
Lake Belle
Lake Laura
Lake Paupack
Lake Wallenpaupack
Pine Lake (designated a natural area of the State Forest)
Promised Land Lake
Route 507 Wetland
Public lands include: Delaware State Forest, Pine Lake Natural Area, Promised Land State Park

Lackawaxen Township Natural Heritage Areas
The largest of Pike County's townships, Lackawaxen Township covers 81.1 square miles at the north end of the county. The township was named after the Lackawaxen River that cuts east through the township on its way to the Delaware River. The Delaware River marks the boundary between Lackawaxen Township and New York State. Land along this boundary is part of the National Park Service's Upper Delaware Management Area. Both the Delaware and Lackawaxen Rivers have cut deeply down through the rock layers made up of sandstone, conglomerate, and siltstone. A large forest block covers much of the south-central portion of the township. **Eighty-three percent of the township is forested.** A section of the Delaware State Forest along with four State Game Lands (SGLs) occurs within the township. SGL #316 covers 2,761 acres,
while SGL #116 (3113 acres) straddles rather equally the Lackawaxen/ Shohola Township line. Only small portions of SGL #180 and SGL #183 occur in Lackawaxen Township.

19 Lackawaxen Township Natural Heritage Areas include:
Corilla Lake
Delaware River North of Handsome Eddy
Forest Lake
Fourmile Pond Wetland
Germantown Swamp
Lackawaxen River at Baoba
Lackawaxen River at Rowland
Lake Greeley
Little Teedyuskung Lake
Masthope Creek
Panther Lake
Point Peter
Spring Brook Wetland
State Game Lands #316 Slopes
Teedyuskung Lake
Tinkwig Creek Roadside
Welcome Lake
Westcolang Pond
Wolf Lake
Public Lands: Delaware State Forest, State Game Lands #116, State Game Lands #180, State Game Lands #183, State Game Lands #316

The Delaware River North of Handsome Eddy has many aquatic dependent species of concern:

Alewife floater (*Anodonta implicata*) – mussel
Triangle floater (*Alasmidonta undulata*) – mussel
Green-faced clubtail (*Gomphus viridifrons*) – dragonfly
Maine snaketail (*Ophiogomphus mainensis*) – dragonfly
Mustached clubtail (*Gomphus adelphus*) – dragonfly
Rapids clubtail (*Gomphus quadricolor*) – dragonfly
Slaty skimmer (*Libellula incesta*) – dragonfly
Spine-crowned clubtail (*Gomphus abbreviatus*) – dragonfly

Lehman Township Natural Heritage Areas

Seventy-eight percent of Lehman Township is forested and it contains 16 natural heritage areas; some portions are part of the Delaware State Forest. Lehman Township covers 50.1 square miles. Toms Creek drains the northeastern portion of the township and flows into the Delaware River while Saw Creek and Little Bush Kill flow south through the township into the Bush Kill Creek which then empties into the Delaware River. The Delaware River marks the boundary between Lehman Township and New Jersey. The Delaware Water Gap National Recreational Area, part of the National Park Service holdings, stretches along the entire length of this eastern boundary. Other publicly owned lands include portions of Delaware State Forest and State Game Lands #180. The bedrock geology of Lehman Township is predominately sandstone, siltstone, and shale. The steep forested slopes along the Delaware River open up in several locations where shale barrens occur. These steep cliffs along the river have thin soils and shale outcrops that provide habitat for a unique group of species that are adapted to these harsh conditions. Red cedar (*Juniperus virginiana*) and pitch pine (*Pinus rigida*) are found growing in some of these openings. All of these locations provide habitat for a species of concern not named at the request of the agency overseeing its protection. Bushkill Shale Cliff and Glenside Shale Barren also contain a natural community of concern. Shoemakers Barren is located along Bush Kill. This habitat is composed of a little bluestem.

16 Lehman Township Natural Heritage Areas identified include:

Bushkill Shale Cliff
Deckers Creek Ravine
Delaware River South of Dingmans Ferry
Dickinson Road Bluff
Eschbach Heights Shale Barren
First Pond
Glenside Shale Barren
Lake Maskenozha and wetlands
Little Bush Kill Swamp
Minks Pond
Second Pond
Shoemakers Barren
Stuckey Lake
Sugar Mountain Swamp
Sunset Lake Woodlands
Third Pond

Public Lands include: Delaware State Forest and Delaware Water Gap National Recreation Area

Delaware River South of Dingmans Ferry Natural Heritage Areas
The Delaware River forms the eastern border of Pike County. The River creates a variety of unique habitats, including scour areas, floodplains, steep forested slopes, and vertical cliffs. Maintaining the natural character of the River is necessary to maintain these habitats. Rivers naturally change their course over time and need to remain free-flowing systems to allow for this movement. The Delaware River has remained undammed, allowing movement of the aquatic species found here.

This entire site is part of the Delaware Water Gap National Recreation Area, protecting it from further disturbance. Many of the floodplains have been cleared for agricultural fields. The gravel river bottom provides habitat for alewife floater (*Anodonta implicata*), brook floater (*Alasmidonta varicosa*), and triangle floater (*Alasmidonta undulata*). These three mussel species of concern are found embedded in the bottoms of rivers and small streams. A population of barrens buckmoth (*Hemileuca maia*), a moth species of concern, was found on Sambo Island located at the southern end of this site in Monroe County. Riverine sand cherry (*Prunus pumila var. depressa*) was found at several locations along the shoreline of the river. Tall tick-trefoil (*Desmodium glabellum*), sedge (*Carex sprengelii*), and white heath aster (*Symphyotrichum ericoides*) are three additional plant species of concern found along the Delaware River in the southern end of this site.

Milford Township Natural Heritage Areas
The small township of Milford contains 7 Natural Heritage areas. Milford Borough is the county seat of Pike County. Milford Township, at 12.6 square miles, is Pike County's smallest township; Milford Borough occupies 0.5 square miles. Milford Township, along with adjacent sections of Shohola and Westfall Townships, supports a large forest block of over 23,000 acres. Eighty percent of the township is forested. The eastern edge of both the township and the borough are formed by the Delaware River. The Delaware Water Gap National Recreational Area, owned by the National Park Service, stretches along the entire length of this eastern boundary. Sawkill Creek flows south and east through the township and into the Delaware River on the south side of Milford Borough, while Vandermark Creek enters the Delaware River on the north side of the borough. Sandstone, siltstone, and shale make up the bedrock geology.

Milford Township Natural Heritage Areas Include:
Buckhorn Oak Barren
Delaware River between Handsome Eddy and Dingmans Ferry
Dimmick Meadow Brook Wetlands
Lily Pond Brook Headwaters
Pinchot Brook Wetlands
Pinchot Falls
Sawkill Mud Pond
Public Lands include: Delaware State Forest and Delaware Water Gap National Recreation Area

Pinchot Falls – As Sawkill Creek flows toward the Delaware River, it cuts through the rock to form Pinchot Falls. This is a waterfall and rapids, a geologic feature of concern. Standing

over 85 feet tall, the mist from the falls creates habitat on the surrounding rocks for mosses, liverworts, ferns, and a variety of other plants, forming a waterfall and plungepool natural community.

Palmyra Township Natural Heritage Areas
Palmyra Township contains eight Natural Heritage Areas. Palmyra Township occupies a 39.7 square mile area along the western side of Pike County. Sixty-six percent of the township is forested – the least amount of any township in the county and 14% is covered by water, which is the most found in any township in Pike County. Thirteen mile long Lake Wallenpaupack forms most of the northwestern border between Pike and Wayne Counties and covers approximately 5,700 acres. Sandstone, siltstone, and mudstone comprise the bedrock in most of the township along with some conglomerate in the southern portion. Publicly owned lands within the township include a section of Delaware State Forest, State Game Lands 183, and portions of the Bruce Lake Natural Area and Promised Land State Park.

Palmyra Township Natural Heritage Areas include:
Buckhorn Mountain Slopes
Decker Pond
Egypt Meadow Lake
Fairview Lake
Lackawaxen River at Baoba
Lake Wallenpaupack
Mainses Pond
Promised Land Lake
Public Lands include: Delaware State Forest, Bruce lake Natural Area, Promised Land State Park, and State Game Lands #183

Lackawaxen River at Baoba – The stretch of the Lackawaxen River at Baoba runs east of Hawley just past Glen Eyre. The river itself provides habitat for several aquatic species of concern. Riffle snaketail (*Ophiogomphus carolus*), a dragonfly species of concern, was found in this section of the river. White water-crowfoot (*Ranunculus aquatilis var. diffusus*) is an aquatic plant species of concern that grows rooted to the river bottom. Riverweed (*Podostemum ceratophyllum*), a plant species on the PNHP Watch List, was found in several locations along the Lackawaxen River. Mountain starwort (*Stellaria borealis*) and an additional species of concern, not named at the request of the agency overseeing its protection, were found along the shoreline of the Lackawaxen River.

Porter Township Natural Heritage Areas
Porter Township contains 15 natural heritage areas. According to the 2000 US census bureau, 385 people reside in Porter Township, making it the township in Pike County with the fewest residents. With respect to land area, it is one of the larger townships in Pike County measuring 60.4 square miles in size. Eighty percent of the township is forested and another 14% consists of forested and emergent wetlands. Sandstone, siltstone, and mudstone make up the bedrock geology. Along its western edge, Porter Township shares a portion of a large forest block approximately 37,500 acres that covers portions of three other townships and extends into Monroe County. Bush Kill Creek flows out of Pecks Pond in the northern end of the township and eventually empties into the Delaware River. Much of the land within the township is state owned. Public lands include the Pennel Run Natural

Area, a section of the Stillwater Natural Area, and extensive sections of Delaware State Forest.

Porter Township Natural Heritage Areas Identified Include:
Bald Hill Swamp
Beaver Run Club Pond
Big Swamp
Bushkill Road
Edgemere Road
Elbow Swamp
Lake Minisink
Little Mud Pond
Painter Swamp
Pecks Pond
Pit Road
Porters Lake
Sap Swamp
Twelvemile Pond
White Birch Swamp
Public Lands include: Delaware State Forest, Pennel Run Natural Area, and Stillwater Natural Area

Bald Hill Swamp – This wetland is located to the west of Bush Kill. Bald Hill Swamp is dominated by red spruce (*Picea rubens*). The majority of the wetland is a red spruce palustrine woodland. The ends of Bald Hill Swamp are red spruce palustrine forests. Both of these are natural communities of concern, differentiated by the amount of tree cover. The stream flowing to the east of Bald Hill Swamp provides nesting habitat for a pair of Osprey (*Pandion haliaetus*), a bird species of concern. Nearby bodies of water, such as Silver Lake and Little Mud Pond, also provide important foraging habitat.

Elbow Swamp – This wetland is dominated by red spruce (*Picea rubens*) with some black spruce (*Picea mariana*), eastern hemlock (*Tsuga canadensis*), and a thick shrub understory. The forested portion of Elbow Swamp is a red spruce – mixed hardwood palustrine forest. This natural community of concern also supports dwarf mistletoe (*Arceuthobium pusillum*), a plant species of concern. A population of arctic skipper (*Carterocephalus palaemon mandan*), a butterfly species of concern, was seen along the roadside north of Elbow Swamp. This species uses several species of grasses as its larval host plant and can also be found in graminoid wetlands.

Lake Minisink – Although the shoreline has been highly modified, the lake provides habitat for several plant species of concern. Water bulrush (*Schoenoplectus subterminalis*) and a large population of bayonet rush (*Juncus militaris*) grow along the shallow edge of Lake Minisink. Flat-leaved bladderwort (*Utricularia intermedia*) and floating-heart (*Nymphoides cordata*) both are found in the shallow edges of the lake floating on the water's surface. Small beggar-ticks (*Bidens discoidea*), a plant species of concern, was found in several locations along the shoreline. This species is able to persist in modified habitat better than many other species of concern. The shallow water along the shoreline also provides habitat for golden club (*Orontium aquaticum*), a plant species on the PNHP Watch List.

Twelvemile Pond is an acidic glacial lake, a natural community of concern. Surveys located populations of three plant species of concern. A small population of water lobelia (*Lobelia dortmanna*) grows in the shallow water along the southern edge of Twelvemile Pond, while bayonet rush (*Juncus militaris*) occurs along the northern edge of the lake. Floating-heart (*Nymphoides cordata*) is found along the entire lake edge. This species is rooted in the lake bottom, with leaves and flowers that float on the surface. An additional species of concern, not named at the request of the agency overseeing its protection, was also found at Twelvemile Pond.

White Birch Swamp – This small wetland is a hemlock – mixed hardwood palustrine forest, a natural community of concern. White Birch Swamp is dominated by red maple (*Acer rubrum*) and black gum (*Nyssa sylvatica*) and also contains eastern hemlock (*Tsuga canadensis*), red spruce (*Picea rubens*), and white pine (*Pinus strobus*).

Shohola Township Natural Heritage Areas

Shohola Township contains 10 natural heritage areas. Shohola Township measures 45.9 square miles in size. Forest makes up 85% of the landscape in Shohola Township. Shohola Creek flows to the north and east through the township and serves as a major drainage for the central portion of Pike County. Pond Eddy and Twin Lakes Creek drain the eastern two thirds of the township. All streams within the township drain into the Delaware River, which forms a natural border between Shohola Township and New York State. The National Park Service manages land along the river as part of the Upper Delaware Management Area. Sandstone, siltstone, and mudstone make up the bedrock geology. Portions of State Game Lands #116 and #180 occur at the western end of the township. State Game Lands #209, a section of Delaware State Forest, and the Buckhorn Natural Area cover much of the eastern third of Shohola Township. This eastern section of the township, along with portions of Westfall and Milford Townships, is part of a large forest block covering over 29,000 acres.

Ten Shohola Township Natural Heritage Areas identified include:
Bald Hill
Bushkill Swamp
Delaware River between Handsome Eddy and Dingmans Ferry
Delaware River North of Handsome Eddy
Shohola Falls Swamp
Shohola Falls
Shohola Lake
State Game Lands #209 Wetland
Twin Lakes and Wetland
Walker Lake
Delaware State Forest
Buckhorn Natural Area
Stairway Wild Area
Public Lands Include: State Game Lands #116, State Game Lands #180, State Game Lands #209, and Upper Delaware Management Area

Bushkill Swamp – This small bog opening in the middle of a shrub swamp provides a unique habitat for a number of species found only on the sphagnum mats surrounding

glacial wetlands. A leatherleaf – bog-rosemary peatland occurs in a narrow band around the water's edge. This natural community of concern provides habitat for several plant species of concern – Mud sedge (*Carex limosa*), horned bladderwort (*Utricularia cornuta*), and slender sedge (*Carex lasiocarpa*). The black spruce (*Picea mariana*) growing on the floating sphagnum mat support a population of dwarf mistletoe (*Arceuthobium pusillum*), a plant species of concern that parasitizes black spruce, red spruce, and tamarack. Harlequin darner (*Gomphaeschna urcillata*), elfin skimmer (*Nannothemis bella*), and American emerald (*Cordulia shurtleffi*), three dragonfly species of concern, were all found in Bushkill Swamp and the surrounding wetland. Soft-leaved sedge (*Carex disperma*), a plant species of concern, was found growing on the edge of the wetland and in a smaller wetland that sits to the south of Bushkill Swamp.

The Delaware River North of Handsome Eddy is part of the Upper Delaware Management Area.
This area is mostly privately owned and provides habitat for several aquatic species of concern. Alewife floater (*Anodonta implicata*) and triangle floater (*Alasmidonta undulata*), two mussel species of concern, were found in the gravel river bottom. Green-faced clubtail (*Gomphus viridifrons*), Maine clubtail (*Ophiogomphus mainensis*), mustached clubtail (*Gomphus adelphus*), rapids clubtail (*Gomphus quadricolor*), slaty skimmer (*Libellula incesta*), and spine-crowned clubtail (*Gomphus abbreviatus*) are dragonfly species of concern found along the River. An additional species of concern, not named at the request of the agency overseeing its protection, was also found in this section of the Delaware River. Riverweed (*Podostemum ceratophyllum*) is a plant species on the PNHP Watch List that was found near the mouth of the Lackawaxen River.

Delaware River between Handsome Eddy and Dingmans Ferry north to Milford is part of the Delaware Water Gap National Recreation Area, protecting it from development and other large scale disturbances. This section of the Delaware River provides habitat for several aquatic species of concern. Alewife floater (*Anodonta implicata*), brook floater (*Alasmidonta varicosa*), and triangle floater (*Alasmidonta undulata*), three mussel species of concern, were found in the gravel river bottom. Extra-striped snaketail (*Ophiogomphus anomalus*), harpoon clubtail (*Gomphus descriptus*), rapids clubtail (*Gomphus quadricolor*), green-faced clubtail (*Gomphus viridifrons*), slaty skimmer (*Libellula incesta*), and spine-crowned clubtail (*Gomphus abbreviatus*) are dragonfly species of concern found along the River. Large flat rocks along the shoreline provide habitat for several plant species of concern – Riverine sand cherry (*Prunus pumila var. depressa*), three-toothed cinquefoil (*Potentilla tridentata*), and tufted hairgrass (*Deschampsia cespitosa*). A sedge (*Carex sprengelii*) is another plant species of concern found growing along the shoreline. Two additional species of concern, not named at the request of the agencies overseeing their protection, were also found in this section of the Delaware River.

Shohola Falls – As Shohola Creek exits Shohola Lake, it drops 70 feet, creating Shohola Falls. Over the course of a half mile, Shohola Creek drops a total of 200 feet. The waterfalls and rapids geologic feature is part of the Catskill formation and is from the Devonian Age. A small conifer – hardwood seepage swamp occurs to the east of Shohola Falls and is surrounded by a well-drained hardwood forest. This small wetland supports a population of soft-leaved sedge (*Carex disperma*), a plant species of concern. This species is found growing in the sphagnum moss that covers the tree roots and grows among the rocks.

Shohola Falls Swamp – Most of this wetland is part of State Game Lands #180 with a private inholding on the western edge of Shohola Falls Swamp. This small wetland north of Route 6 is a black spruce – tamarack peatland forest, a natural community of concern. The black spruce and tamarack overstory has a thick shrub understory with a sphagnum base.

Twin Lakes and Wetland – This lake is a residential area cut into many privately owned parcels. Most of the shoreline habitat has been disturbed by development, but a population of small beggar-ticks (*Bidens discoidea*), a plant species of concern, still occurs in several locations along the shoreline. The lake itself provides habitat for several species of concern – Floating-heart (*Nymphoides cordata*), slender water-milfoil (*Myriophyllum tenellum*), and bayonet rush (*Juncus militaris*). Small waterwort (*Elatine minima*) and floating bladderwort (*Utricularia inflata*) are two species on the PNHP Watch List that were also found during surveys on Twin Lakes. Twin Lakes is surrounded by several small wetlands, many of which are spruce dominated palustrine forests. One such wetland to the south of Twin Lakes provides habitat for a population of dwarf mistletoe (*Arceuthobium pusillum*). This plant species of concern parasitizes the black and red spruce found in this wetland. The open, sedge dominated portion of the wetland also provides habitat for Halloween pennant (*Celithemis eponina*) a dragonfly species of concern.

Westfall Township and Milford Borough Natural Heritage Areas

The Delaware River separates Westfall Township from the state of New York along its northeastern border and from the state of New Jersey along the southeastern edge. Matamoras is the easternmost point in Pennsylvania with Westfall Township and the Delaware River forming its borders. Matamoras Borough covers 0.8 square miles and Westfall Township at 31.0 square miles is Pike County's second smallest township. Eighty-eight percent of Westfall Township is forested, giving it the highest percentage of forest of any township in Pike County. The bedrock of the township is primarily sandstone, siltstone, and shale. Much of Westfall Township, along with adjacent sections of Shohola and Milford Townships, supports a large forest block of over 29,000 acres. The western portion of the township is a part of Delaware State Forest. All the streams in Westfall Township flow east into the Delaware River. The National Park Service administers two areas along the Delaware River in Westfall Township: the Upper Delaware Management Area along the northern township border and the Delaware Water Gap National Recreation Area at the southern tip of the township.

There are nine heritage areas in Westfall Township and they include:

Buckhorn Oak Barren
Delaware River between Handsome Eddy and Dingmans Ferry
Dimmick Meadow Brook Wetlands
Mashipacong Cliffs
Matamoras Cliffs
Millrift Cliffs
Millrift Flats
Old Port Jervis Road Shale Barrens
Stairway Lake Wetland
Public lands include: Delaware State Forest, National Park Service, Delaware Water Gap National Recreation Area, and Upper Delaware Management Area

Milrift Cliffs – This northeast-facing shale cliff rises over 100 vertical feet from the Delaware River. Water runs over the surface of the Milrift Cliffs and creates a unique habitat that supports a large population of roseroot stonecrop (*Sedum rosea*), a plant species of concern. Pennsylvania represents the southern end of the known range for this species, which is known from few locations in the state. This section of the Delaware River shoreline also represents a calcareous opening/cliff, a natural community of concern. An additional species of concern, not named at the request of the jurisdictional agency overseeing its protection, was also noted at this site.

Stairway Lake Wetland – This small wetland is one of many along Bush Kill and is part of the Stairway Lake Wild Area in Delaware State Forest. This part of the wetland is a hemlock palustrine forest, a natural community of concern. The hemlocks in this type of habitat grow in sphagnum with pit and mound topography. The southern portion of Stairway Lake Wetland has some openings dominated by sedges, grasses, and other herbaceous vegetation. This area provides habitat for marsh bedstraw (*Galium trifidum*), a plant species of concern. Dimmick Meadow Brook Wetlands – This small headwater wetland flows to the west of Buckhorn Oak Barren. Several locations along this narrow channel have been modified by beaver activity. These open graminoid wetlands provide habitat for marsh bedstraw (*Galium trifidum*), a plant species of concern. This species is found growing on hummocks of tussock sedge (*Carex stricta*). Halloween pennant (*Celithemis eponina*), a dragonfly species of concern, was also found in Dimmick Meadow Brook Wetlands. This dragonfly species can be found in a variety of different types of wetlands. A small wetland to the west of the stream channel is a red spruce palustrine woodland. This natural community of concern is dominated by red spruce (*Picea rubens*) with a thick shrub understory.

The Nature Conservancy Lands and Perspective

According to The Nature Conservancy, the Upper Delaware River watershed contains groundwater-influenced fens near Mount Bethel, high-quality, seasonal vernal pools scattered throughout the Greater Minsi Lake Corridor, dramatic cliffs and hardwood forests comprising the remote Long Eddy River Edges Preserve, and a rich floodplain forest of increasingly rare butternut trees on Butternut Island. This unique assemblage of cool, clean waters, interesting geology, healthy forests and extensive wetlands support abundant wildlife. Mammals including bobcat, beaver, bear and fox roam throughout this watershed that also boasts a world-class fishery abundant with trout, small mouth bass, shad and walleye. The Upper Delaware River also contains an important segment of the Atlantic flyway. Each year, more than 200 species of birds spend part of their life cycle in this region.

Great Minsi Lake Corridor

Sandwiched between the Delaware Water Gap National Recreation Area and Northampton County's park system, the Greater Minsi Lake Corridor represents a collection of forestlands and other natural areas that if preserved, would link and protect valuable wildlife habitat spanning several thousands of acres. The corridor hugs part of the Kittatinny Ridge, and lies in close proximity to the Appalachian Trail and Delaware River. Well-known for its recreational opportunities, this location also contains important ecological features, including one of the largest collections of vernal pools in Pennsylvania. The corridor spans spans about 2,000 acres between Minsi Lake County Park and the Appalachian trail in Northampton County and the top of Kittatinny Ridge (3 miles

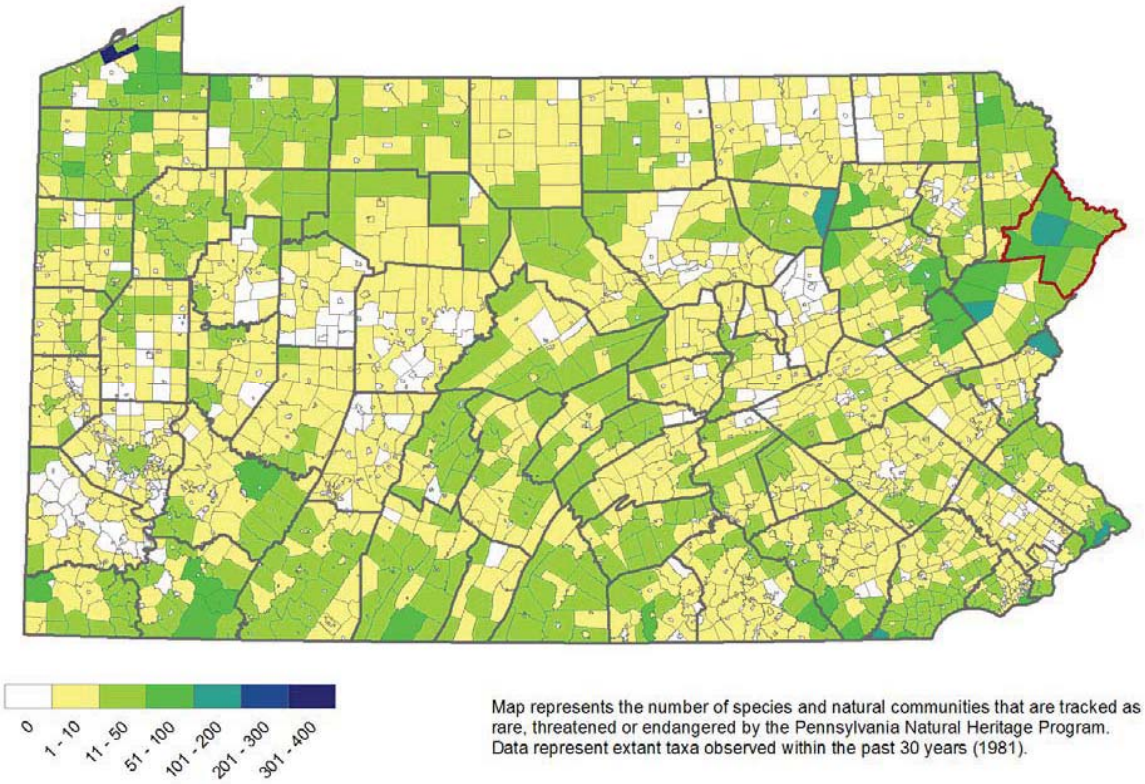
northwest of the town of Mt Bethel). See this link for a map: http://www.protectedplanet.net/sites/Minsi_Lake_Corridor_Vernal_Ponds_Conservancy_Easement_The_Nature_Conservancy)

The hundreds of vernal pools located throughout the Minsi Lake Corridor come to life during the spring, when melting snow and frequent rains fill the seasonal ponds and summon numerous species that spend part of their life cycle in these temporary wetlands. By summer, some of these "microhabitats" dry up, and can go unnoticed by casual observers and even dedicated conservationists. However their significance – no matter the season – is not lost on the species supported by them, including numerous amphibians such as marbled and spotted salamanders.

Throughout the region, scattered forests of tulip poplar, red maple, sweet birch, red and white oak, and shagbark hickory directly benefit the vernal pools. The dense woodlands shade the water, reduce evaporation and control runoff. They also provide ideal habitat for forest interior-breeding birds such as the Scarlet tanager. Since the removal of trees jeopardizes the pools, The Nature Conservancy continues to acquire land and conservation easements throughout the Minsi Lake Corridor to establish a greenway of natural areas that will ensure these and other fragile habitats remain undisturbed into the future. TNC is acquiring lands and conservation easements to establish the Greater Minsi Lake Corridor and connect it with existing protected areas, including the Delaware Gap National Recreation Area, managed by the National Park Service, and Northampton County's Minsi Lake Wilderness Area. The Nature Conservancy acquired 115 acres of high-quality vernal pool habitat in 2001, and an additional 130 acres in 2006. Northampton County acquired more than 500 acres in 2003 and 2004 (part of the Minsi Lake Corridor). The Nature Conservancy is partnering with: Northampton County, Pennsylvania Department of Conservation and Natural Resources, Upper Mount Bethel Township, National Park Service, William Penn Foundation, Wildlands Conservancy, local communities.

Threatened & Endangered Species

The proposed upgrade area is a hot spot for the Commonwealth when looking at threatened and endangered plant, animal, and insect species. Many of the species are also reliant on good water quality to survive. This map below, provided by the Pike County Natural Heritage Inventory, is telling about what the region has to offer and why Exceptional Value status is essential and deserved. See specifics of the Natural Heritage Inventories provided above and included in the Appendix.



Distribution of endangered, threatened and rare species by municipality, darker colors indicate more occurrences these species in a given municipality. (PNHP Data 2010).

Mussels of the Delaware River

The proposed upgrade area has a variety of freshwater mussels that reside in the main stem Delaware River. The dwarf wedgemussel once existed in 70 areas within 15 Atlantic slope basins from Canada to North Caroline (USFWS 1993). Today though, the dwarf wedgemussel is thought to be extirpated because of pollution, dams, and other factors from all but about 30 small areas. Here in the Delaware River, the dwarf wedge mussel still hangs on and is found in the Upper Delaware River, the Paulins Kill, and the Pequest Rivers. Fish hosts include tessellated darter (Etheostoma olmstedi), mottled sculpin (Cottus bairdi), and Johnny darter (Etheostoma nigrum) (Michael and Neves 1995).

The green floater was once found in smaller streams in quiet pools and eddies with gravel and sand bottoms (Ortmann 1919) and is one of the mussels that scientists believe is no longer found in the Delaware River today with one exception in New Jersey, where there is an individual green floater in the Stony Brook in Mercer County that may very well be the last of its kind in the entire Delaware River Basin. The host fish is unknown but some

research indicates that the green floater may not require a host fish at all to reproduce (Barfield and Watters 1998, Lellis and King 1998).

The yellow lampmussel prefers large rivers that drain more than 1,200 sq km and is found in sand/silt bottoms. The alewife may be its host fish, and in NJ it is only found in the Delaware River.

The eastern pondmussel, often associated with tidewaters, is only found in the Delaware River and a few of the Delaware's tributaries in New Jersey. Its host fish is unknown.

7. A general description of land use and development patterns in the watershed.
Land use and development patterns have a direct impact on water quality. The primary indicators for assessing land use and development patterns in this watershed include population change, population density, land use, and changing land use. These factors are significant in assessing water quality as increased population correlates with increased demand on the watersheds resources. Consequently, an increased demand for resources will determine current and future land uses.

The Delaware River Basin has undergone substantial population increases within the last decade in this already densely populated watershed. In 2000 the basin's population was estimated at 7.4 million people and is estimated to climb to 9 million people by 2030. Thus, the general trend shows moderate population growth throughout the entire Basin. Although far less densely populated than the Lower and Upper Estuary regions, the proposed upgrade area of the Middle and Upper Delaware have undergone the most significant growth with regards to percentage change in population. For example, Pike and Monroe counties of the Middle and Upper Delaware are the fastest growing counties in Pennsylvania. In fact, the growth of Pike and Monroe counties accounts for 77% of the total population increase within the entire proposed upgrade area, including Carbon, Luzerne, Wayne, and Northampton counties. As of 2000, the Lackawaxen watershed experienced a 25% increase in population in comparison to the 1990 U.S. census (DRBC State of the Delaware Basin Report, 2008). This increase can be attributed to the development trend of inroads in once sparsely populated regions such as the Lackawaxen Watershed and the Upper and Middle Delaware. Within the same decade the population of the entire proposed upgrade region increased by 63,000 people (DRBC, 2008).

The proposed upgrade regions of the Middle and Upper Delaware however, remain the least densely populated and least developed of the Basin. The average Basin density is 603 persons per square mile (p/mi^2) compared to 30-100 p/mi^2 in the upper most regions, and 204 p/mi^2 in the Upper Central region. Despite remaining the least densely populated, nearly 74,000 acres of forested watershed lands were lost to development and agricultural uses. Trends in deforestation and development threaten the highly sensitive HQ tributaries delineated in section E.1., which are under consideration in this upgrade petition for EV status. The presence of forested land and vegetated riparian buffer zones are the most important indicators for water quality. At present, the Basin remains predominately forested, having 6,263 mi^2 or 55% forest cover. Of this total, 782 acres (11%) is protected under federal or state ownership. The proposed upgrade regions of the Middle and Upper Delaware contain the majority of the forested land in the watershed that contributes to the high number of HQ under consideration in this petition. In this area, agricultural and development practices are less prevalent than in the lower regions. Due to land

development, the basin has been undergoing serious losses to its forest cover. The greatest losses have occurred within the central region, losing nearly 30 acres between 1996 and 2001. The Upper Region has lost approximately 5 acres (DRBC, figure 4.19) predominately due to increases in agriculture. Decreases in forested land due to increased land development will likely yield greater nonpoint source pollution. Further deforestation is also likely to result in greater erosion/sedimentation, eutrophication, pathogen, and hydrocarbon presence. For this reason, it is critical that these already High Quality streams receive Exceptional Value designation (DRBC, 2008).

8. Municipalities in the Proposed Area

Carbon County (1)
Kidder Township

Monroe County (13)

Barrett Township
Jim Siglin
933 Route 390
Cresco, PA 18326
570-595-2602

Delaware Water Gap Borough
P.O. Box 218
Delaware Water Gap, PA 18327
570-476-0331

Middle Smithfield Township
Scott Schaller
25 Municipal Drive
East Stroudsburg, PA 18302
570-223-8920

Paradise Township
Reda Briglia
5912 Paradise Valley Road
Cresco, PA 18326
570-595-9880

Price Township
10 Barren Road
East Stroudsburg, PA 18301
570-421-2497

Stroud Township
James Decker
1211 North Fifth Street
Stroudsburg, PA 18360
570-421-3362

Northampton County (1)
Portland Borough

Coolbaugh Township
Jospeph O' Boyle
5550 Memorial Blvd
Tobyhanna, PA 18466
570-894-8940

Jackson Township
Dave Thomas
P.O. Box 213
Route 715
S. Reeders, PA 18352
570-629-0153

Mount Pocono Borough
Dan McDavitt
303 Pocono Blvd
Mount Pocono, PA 18344
570-839-8436

Pocono Township
Harold Werkheiser
P.O. Box 197
Tannersville, PA 18372
570-629-1922 ext:212

Smithfield Township
Brian E. Barrett
1155 Red Fox Road
East Storudsburg, PA 18301-9105
570-421-6931

Stroudsburg Borough
Kim M. Diddio
700 Sarah Street
Stroudsburg, PA 18360
570- 421-5444

Tobyhanna Township
Heidi A. Pickard
105 Government Center Way
Pocono Pines, PA 18350
570-646-1212

Pike County (12)

Blooming Grove Township
Fred D. Hatton
488 Route 739
Blooming Grove, PA 18428
570-775-6461

Dingman Township
Thomas Mincer
118 Fisher Lane
Milford, PA 18337
570- 775-6461

Lackawaxen Township
Brain Stuart
P.O. Box 205
Lackawaxen, PA 18435
570-685-2550

Matamoras Borough
Richard Gassmann
PO Box 207
Matamoras, PA 18336
570-491-2771

Palmyra Township
Thomas A. Simons
115 Buehler Lane
Paupack, PA 18451
570-226-223

Shohola Township
159 Twin Lakes Road
Shohola, PA 18458
570-559-7394

Delaware Township
Thaddeus Parsell
116 Wilson Hill Road
Dingmans Ferry, PA 18328
570-828-234

Greene Township
Mary Ann Hubbard
Greentown, PA 18426
570-676-932

Lehman Township
John P. Sivick
P.O Box 4000
Bushkill, PA 18324

Milford Borough / Milford Twp
Merritt B. Quinn
111 West Catherine Street
Milford, PA 18337
570- 296-7140

Porter Township
Bill Powel
2186 Route 402
Dingmans Ferry, PA 18328
570-223-0447

Westfall Township
James Muir
Delaware River & La Barr Lane
PO Box 247
Matamoras, PA 18336
570- 491-4176

Wayne County (27)

Berlin Township
Paul Henryrd
50 Milanville Road
Beach Lake, PA 18405
570-729-8073

Bethany Boro
Nina Martin
438 Wayne Street
Bethany, PA 18431
570-253-1847

Buckingham Township
Kris Karcher
177 Travis Road
Starrucca, PA 18462
570-798-2949

Canaan Township
Lewis C. Henshawst
46 Gallik Road
Waymart, PA 18472
570-488-6608

Cherry Ridge Township
John Rickard Jr.
269 Spinner Road
Honesdale, PA 18431
570-253-5956

Clinton Township
Ronald Poska
26 Terrel Road
Waymart, PA 18472
570-785-3363

Damascus Township
Jeffrey Dexter
60 Conklin Hill Road
Damascus, PA 18415
570-729-7270

Township of Dreher
James Lee
P.O. Box 177
Newfoundland, PA 18445
570-676-4976

Dyberry Township
Edward Fritsch
44 Cabin Corner
Honesdale, PA 18431
570-253-1806

Hawley Borough
Donald Kyzer
757 Finn Swamp Road
Lakeville, PA 18438
570-226-4570

Honesdale Borough
Ed Langendoerfernd
958 Main Street
Honesdale, PA 18431
570-253-6496

Lake Township
Robert F. Peters
1270 Easton Tpk.
Lake Ariel, PA 18436
570-698-5131

Lebanon Township
Kevin Bryant
40 Ellison Road
Tyler Hill, PA 18469
570-253-3247

Lehigh Township
Protus Phillipsst
P.O. Box 651
Gouldsboro, PA 18424
570-842-6262

Manchester Township
Wilfred Stalker
3881 Hancock Highway
Equinunk, PA 18417

Mount Pleasant Township
Albert Wildensteinst
1479 Great Bend Turnpike
Pleasant Mount, PA 18453

570-224-4070

Oregon Township
Bernard Tallman
474 Fox Hill Road
Honesdale, PA 18431
570-253-6062

Paupack Township
Bruce Chandler
25 Daniels Road
Lakeville, PA 18438
570-226-2680

Prompton Borough
Dennis Millon
P.O. Box 12
Prompton, PA 18456
570-253-5781

Scott Township
David Harris
197 Sherman Road
Susquehanna PA 18847
570-461-3999

Sterling Township
Roger Swingle
P.O. Box 100
Sterling PA 18463
570-689-2911

Waymart Township
Charles Norella
PO Box 280
Waymart PA 18472
570-488-6742

570-448-2973

Palmyra Township
Peter Steffenst
219 Oak Street
Hawley, PA 18428
570-226-0373

Preston Township
Beverly Watsonst
1515 Crosstown Highway
Lakewood, PA 18439
570-448-2758

Salem Township
Merel Swingle
3 Savitz Road
Moscow, PA 18444
570-689-2705

South Canaan Township
Peter Lazorack
46 Lake Quinn Road
Waymart PA 18472
570-937-4425

Township of Texas
John McDonald
320 Shady Lane
Honesdale PA 18431
570-253-3870

Michael L. Krancer, Chair Person
Environmental Quality Board
Secretary of Environmental Protection
15th Floor, RCSOB
400 Market Street
Harrisburg, PA 17101-2301

Dear Secretary Krancer,

On behalf of the undersigned organizations and businesses residing and operating within the Delaware River Watershed and beyond, we are writing as co-petitioners in full support of the regional stream redesignation petition being submitted to the PA Department of Environmental Protection and the Environmental Quality Board that requests an upgrade or stream redesignation of the main stem Delaware River and all Pennsylvania tributaries that flow into the Upper and Middle Delaware River from their current designated use status of High Quality or lower designation to Exceptional Value (EV) status. We believe it is critical that PADEP accepts this petition for review and takes immediate actions to see this redesignation through in an expedited redesignation process to ensure this national treasure and treasure of the Commonwealth is protected.

The Delaware River and its tributary streams are deserving of this highest designation status as it meets many of the qualifiers put forth in the anti-degradation guidelines that are summarized in the submitted petition. The Upper and Middle Delaware and its tributary streams are a treasure for Pennsylvanians and other northeast residents and the region who enjoy fishing, boating, and swimming its waters. This wilderness provides the region $22 billion in economic benefits from activities like hiking, hunting, fishing, boating, and farming. It's headwaters are home to threatened and endangered species, including diverse populations of native freshwater mussels that live in the main stem and tributary streams. The Delaware River is the largest undammed River east of the Mississippi, flowing freely for 330 miles, and is home to diverse wildlife, including forty species of resident and migrating fish.

Furthermore, the Delaware River Basin provides drinking water for more than 15 million Americans - 42% of Pennsylvanian residents, 34% of New Jersey residents, 81% of Delaware residents, and 35% of New York residents rely on the River for the water they drink, cook, and bathe in. The Delaware River delivers 1,803 mgd to public water supplies. That's about 5% of the Nation's population from a relatively small watershed, only .4% of the land mass of the continental U.S. The Delaware River is one of the largest water supply basins in the mid-

Atlantic, providing more drinking water than any adjacent basin. For instance, the Susquehanna River Basin (27,500 square miles) is more than twice as large as the Delaware River Basin (12,769 square miles) yet the Susquehanna provides 6.2 million people with water, less than half of what the Delaware provides each day. That's why river historian Richard Albert recounted that the river has been dubbed —A Little Giant because of the command performance it must meet every day. The value of this water supply has recently been calculated by a University of Delaware study at $3,767,000. Looking at the many aspects of economic value that the River provides, this study concludes —The Delaware Basin contributes close to $22 billion in annual market/non-market value to the regional economy.

There are 2,271,000 jobs in Pennsylvania's portion of the Delaware River Basin and 43% of Pennsylvania's population lives in the Watershed, even though only 14% of the State is contained here. The Delaware River supports the largest freshwater port in the world. The Delaware Watershed may be relatively small but it is a great provider and is intensely used.

The Delaware River is a National Wild and Scenic River, designated by Congress for its outstanding attributes and resources, a National Estuary, and the exceptional water quality of the nontidal Delaware. The water quality of the Delaware River is so high that the entire 197-mile nontidal river is protected by a special regulatory program enacted by the Delaware River Basin Commission (DRBC) over the past two decades to prevent water quality degradation. In fact, the Delaware River is the longest stretch of anti-degradation waters in the Nation – and it is the longest undammed river east of the Mississippi. These distinctions make the Delaware an irreplaceable resource, an extraordinary natural asset, a unique and powerful provider that is deserving of the highest designation Pennsylvania has to offer – Exceptional Value status.

The Upper Delaware River and its tributary streams' current PA designated use status does not reflect its quality as one of the most pristine bodies of water in Pennsylvania, or the nation for that matter, nor does it provide adequate protections against the threat of gas drilling currently pending approval of special gas drilling regulations by the Delaware River Basin Commission. If those regulations are approved, there could be up to 64,000 wells drilled within the watershed.

Dr. Erik Silldorff, an aquatic biologist with the DRBC, testified that, "exploratory well drilling projects within the drainage area of Delaware River Basin Special Protection Waters pose a substantial risk to the water quality and ecological condition of these waterways." DRBC macroinvertebrate data, in coordination with PADEP, will be submitted as part of this upgrade petition to illustrate the diverse benthic community residing in the Delaware's tributary streams. Because of the threat gas drilling poses to the Upper and Middle Delaware River (with

36% of the Delaware underlain with Marcellus shale), American Rivers designated the Upper Delaware River the most endangered River in the Nation in 2010.

An Exceptional Value designation will not stop gas drilling or other development in the Basin. It will, however, require that the necessary steps are taken to ensure preservation of the outstanding quality of the Upper Delaware watershed. Those steps include complete antidegradation reviews for drilling permits, individual permit filing processing instead of general permit processing, and ensuring that the protected waterway is not affected by stormwater runoff and other impacts of drilling through Clean Water Act requirements.

Protecting the Delaware River and its tributary streams for all of the communities that rely on it for healthy clean water is the right thing to do and we are in support of the proposed petition being submitted to the Pennsylvania EQB to rightly designate the Upper and Middle Delaware River Region as Exceptional Value so that Pennsylvania residents and the region can continue to enjoy the beauty, drinking water, and life-giving qualities of the Delaware River.

Thank you for your consideration and your timely action on this redesignation at a critical time.

Sincerely,

0120-FM-PY0004 Rev. 3/2003

COMMONWEALTH OF PENNSYLVANIA
ENVIRONMENTAL QUALITY BOARD

PETITION FORM

I. PETITIONER INFORMATION

Name: Delaware Riverkeeper Network (in partnership with 23 additional co-petitioners)

Mailing Address: 925 Canal Street, 7th floor
Suite 3701
Bristol, PA 19007

Telephone Number: 215-369-1188 ext 110

Date: 12/8/11

II. PETITION INFORMATION

A. The petitioner requests the Environmental Quality Board to (check one of the following):

☐ Adopt a regulation

☒ Amend a regulation (Citation 25 Pa.Code 93.9a and 93.9b, and 93.9c.)

☐ Repeal a regulation (Citation _____)

Please attach suggested regulatory language if request is to adopt or amend a regulation.

B. Why is the petitioner requesting this action from the Board? (Describe problems encountered under current regulations and the changes being recommended to address the problems. State factual and legal contentions and include supporting documentation that establishes a clear justification for the requested action.)

Please see attached information

C. Describe the types of persons, businesses and organizations likely to be impacted by this proposal.

Please see attached information

D. Does the action requested in the petition concern a matter currently in litigation? If yes, please explain.

No

E. For stream redesignation petitions, the following information must be included for the petition to be considered complete. Attach supporting material as necessary.

1. A clear delineation of the watershed or stream segment to be redesignated, both in narrative form and on a map.
2. The current designated use(s) of the watershed or segment.
3. The requested designated use(s) of the watershed or segment.
4. Available technical data on instream conditions for the following: water chemistry, the aquatic community (benthic macroinvertebrates and/or fishes), or instream habitat. If such data are not included, provide a description of the data sources investigated.
5. A description of existing and proposed point and nonpoint source discharges and their impact on water quality and/or the aquatic community. The names, locations, and permit numbers of point source discharges and a description of the types and locations of nonpoint source discharges should be listed.
6. Information regarding any of the qualifiers for designation as high quality waters (HQ) or exceptional value waters (EV) in §93.4b (relating to qualifying as High Quality or Exceptional Value waters) used as a basis for the requested designation.
7. A general description of land use and development patterns in the watershed. Examples include the amount or percentage of public lands (including ownership) and the amount or percentage of various land use types (such as residential, commercial, industrial, agricultural and the like).
8. The names of all municipalities through which the watershed or segment flows, including an official contact name and address.
9. Locational information relevant to items 4-8 (except for contact names and addresses) displayed on a map or maps, if possible.

All petitions should be submitted to the
Secretary of the Department of Environmental Protection
P.O. Box 2063
Harrisburg, PA 17105-2063

Petition to Upgrade the Upper and Middle Delaware River Watershed to Exceptional Value

December 9, 2011

Submitted by: Delaware Riverkeeper Network and American Rivers in Partnership with over 20 Organizations and 150 Individual Co-Petitioners

Section B: Upgrade Background and Justification

Problems Encountered Under Current Designation

The current High Quality designation of the Upper and Middle Delaware River tributaries does not accurately depict the outstanding water quality of the Upper and Middle Delaware River Watershed, and will not adequately protect the outstanding natural resource values from new sources of degradation based in Pennsylvania. The Upper and Middle segments of the Main Stem Delaware River currently are deemed Special Protection Waters (SPW) by the Delaware River Basin (DRBC) but the Pennsylvania level of protection does not compliment this same high quality standard/designation. In addition, the tributaries feeding into the Special Protection Waters of the Delaware River do not have Exceptional Value (EV) status throughout and as a result protections of tributaries necessary to protect the mainstem are lacking. An upgrade to EV status for the Upper and Middle Delaware River Watershed would offer greater protection from any future Pennsylvania-based discharges that would adversely influence water quality and ensure the watershed's exceptional water quality is maintained and protected as outlined in the Chapter 93 anti-degradation regulations (25 Pa.Code § 93.4a(c)). This EV designation throughout the Pennsylvania portion of the watershed that feeds the Upper and Middle Delaware would also be more in line with the DRBC SPW Program and designation. This EV designation would also be in line with what New Jersey has done in recent years to ensure Category 1 (C1) protections of the tributary streams in New Jersey that flow into the main stem Delaware River SPW region. Failing to provide the designation denies these high quality waterways the protection they need to maintain their high quality as is otherwise promised by State and Federal anti-degradation laws. Development surrounding the Upper and Middle Delaware River and its tributaries is likely to increase in the near future. Consequently, a close examination of new data taken on this pristine River resource has led to the conclusion that the Upper and Middle Delaware River Watershed should be protected from degradation by the highest standard of Exceptional Value.

Threats to the Watershed

Much of the Poconos area covered by this petition is undergoing rapid development similar to Pike County (fastest growing county in PA) and Wayne County (ninth fastest growing county in PA) which are considered bedroom communities for families in metropolitan areas of New York, New Jersey, and Philadelphia seeking vacation homes in these beautiful forested and rural places. This escalation of population density indicates widespread urbanization, corresponding forest loss, and an increase in impervious surfaces. While the Poconos area is already home to many HQ and some EV watersheds, there are still watersheds covered by this petition that are left under-protected, including those that carry the HQ designation which does not provide the same highest quality protection that the requested EV designation would.

Furthermore, the Upper and Middle Delaware River and its watershed are located over a geological formation known as the Marcellus Shale – DRBC estimates 36% of the Delaware River's headwaters are underlain by the shale. In order to access the reserves of natural gas in the shale, energy companies have acquired drilling rights to large tracts of land in the watershed. The Delaware River Basin Commission (DRBC), Environmental Protection Agency, and National Park Service have variously estimated that the natural gas industry

could drill between 16,000 and 64,000 wells in the Delaware River Basin in coming years. Because of the Special Protection Waters designation of the Delaware River, DRBC has maintained a moratorium on gas drilling while gas drilling regulations are developed for the Delaware River Basin. DRBC was set to approve gas drilling regulations on November 21, 2011 which would have opened the region to gas drilling but the meeting was cancelled when the five Commissioners could not reach agreement on the vote. The science coming out on drilling also raises concerns. An Academy of Natural Sciences' preliminary study has found that even in areas where spills and large pollution events from industrial gas drilling are not evident, stream quality and diversity are declining in the intensely developed drilling areas of neighboring Pennsylvania counties. Public concern is at an all time high. With New York still working out an EIS, if drilling were to be approved in the Delaware River Basin, Pennsylvania communities would be the first to experience the gas drilling boom.

Dr. Erik Silldorff, an aquatic biologist with the DRBC, testified that, "exploratory well drilling projects within the drainage area of Delaware River Basin Special Protection Waters pose a substantial risk to the water quality and ecological condition of these waterways; this risk is expected to increase commensurately with the number of exploratory well projects. The juxtaposition of highly sensitive resources in an area that could see unprecedented industrial activity through exploratory well projects highlights the need for appropriate environmental safeguards." "Such safeguards provide a means to minimize the risks from exploratory wells, risks that could undermine the considerable efforts across the preceding decades to prevent degradation of these resources," said Dr. Sildorff. This expert testimony pinpoints the need to ensure that the Upper and Middle Delaware River Watershed is protected from degradation using the strongest possible safeguards— in this case an Exceptional Value designation. It is important to note that Dr. Silldorff had this high level of concern when merely talking about exploratory well projects, if drilling is allowed the concerns he expressed will be tremendously magnified.

Changes Recommended to Address the Problems

An EV designation will not stop residential development or natural gas development; however, the upgrade will provide stronger mechanisms to ensure the watershed is protected as these changes take place. EV designation will ensure that an antidegradation review is conducted for proposed new discharges (such as wastewater disposal or stormwater discharges) and that nondischarge alternatives for permits will be applied whenever possible. EV status will also require applicants to apply for individual permits instead of general permits in many cases, which will ensure a closer evaluation of the local conditions and incorporate appropriate site-specific considerations into the permit that will protect water quality. Furthermore, in the event that a viable nondischarge alternative is not possible, the public is made aware of, and has the opportunity to comment on, the proposed discharge in HQ/EV watersheds.

Proposed well sites must ensure that stormwater run-off during and after construction will not degrade water quality in the designated waterway. All earth disturbances, regardless of size, that may come to impact EV/HQ waterways must include an erosion and sedimentation plan and must implement "special protection" best management practices (BMPs) to minimize soil erosion and sedimentation to the receiving stream. When land is cleared and well pad sites are constructed, a plan for controlling erosion and sedimentation

will be critical to protect the River. As with construction activities associated with development, shale operators in HQ and EV watersheds must implement "Special Protection" BMPs that are not usually required in watersheds that do not have HQ or EV designation.

If a proposed development in the Upper Delaware involves disturbance or encroachment into wetlands, streams, ford crossings, or other surface water within the floodplain of an EV stream, an Encroachment Permit is required to ensure the proper level of protection and care are given to the local waterways. In addition, individual permits would be required for pipeline stream crossings, minor road crossings, and temporary road crossings. Increased truck traffic from gas drilling in the area and the need for trunk lines and other distribution pipelines from each gas pad site would lead to many of these crossings being proposed in the watershed so better regulation of these crossings will be essential.

Proposed new dams in EV watersheds require an environmental assessment review. Some gas companies are proposing new or temporary dams in order to increase water available for hydraulic fracturing. An environmental review of dams proposed to aid withdrawals will ensure that adequate flows and ecological integrity are maintained for the health of the exceptional system. Low level radioactive waste disposal facilities and hazardous waste treatment and disposal facilities cannot be sited in EV watersheds. This is critical, as Marcellus Shale exploration is known to produce radioactive wastewater that requires disposal.

The measures required in EV watersheds help protect the resource while still allowing development to take place using BMPs. These protections and anti-degradation regulations will prove to be critical to ensure this exceptional resource that serves as the drinking water supply for 15 million Americans is protected as these major landuse changes unfold.

What will EV/HQ status not do?

The elevation of the Delaware River Watershed to EV status will not stop development, but it will provide better mechanisms to ensure the watershed is protected and not degraded. EV status will not affect agricultural plowing or tilling practices or pesticide use. Regardless of the stream designation, agricultural plowing that disturbs 5,000 square feet or more of land, must be preceded by an implemented Erosion and Sediment Control Plan. Current Nutrient Management Regulations for CAOs and CAFOs remain the same for all streams, regardless of their designated use. In most cases, existing facilities, such as sewage facilities, are permitted to continue to operate under all existing applicable approvals and permits. Permits to these facilities may also be renewed without any additional requirements after EV designation. EV status does not affect winter maintenance on roads, or bridge and culvert maintenance, repair, or replacement.

Justification for the Requested Re-designation of the Upper and Middle Delaware Watershed

This petition will summarize a compendium of evidence that illustrates that the Upper and Middle Delaware River and the Pennsylvania tributaries that flow into these segments of the Delaware River are deserving of an upgrade from HQ to EV: from its current water quality conditions, demonstrated aquatic diversity, presence of endangered and threatened species, land preservation investments in the region, importance as a drinking water supply, natural and historical importance, free-flowing conditions of the main stem, diverse recreational opportunities and abundant ecotourism industry, and the existing grass-roots and governmental commitment in the region for strong protections like DRBC's Special Protection Waters designation which applies to the longest stretch of anti-degradation waters in the nation. It was critical to the co-petitioners that we gathered strong evidence that supports this petition as well as garner local and regional support. Key justification to support this petition includes the following points:

Drinking Water Supply

The Delaware River supplies water to 15.6 million people in Pennsylvania, New York, New Jersey, and Delaware and a recent University of Delaware study estimated the worth of this water supply at $3.8 billion. New York City gets at least half of its drinking water supply from the headwaters of the Delaware River in the Cannonsville, Pepacton, and Neversink Reservoirs. It is the largest unfiltered water supply in the world and New York has recognized this by investing in efforts to protect forested and rural areas of the watershed. The Delaware River is also a major source of drinking water for Philadelphia and surrounding PA areas and river towns, three million New Jersey residents and residents of Delaware. Supplying water for at least 5% of the U.S. population, maintenance of high quality water standards that ensure clean fresh drinking water, is paramount in this watershed. As a drinking water supply, the Commonwealth should afford streams flowing into this basin the highest protection available.

A clean Delaware River reduces the cost of water treatment and increases property values for homes and businesses. By protecting and restoring the River we earn tremendous economic and ecological benefits while the quality of life for residents throughout the

Delaware River watershed increases. Once damage has been done to the natural ecosystems of the Delaware River, it can be difficult and costly, if not impossible, to undo.

The Delaware River is Designated a Wild & Scenic River

Three quarters of the non-tidal Delaware River is designated a National Wild and Scenic River. One section extends 73 miles from the confluence of the River's East and West branches at Hancock, N.Y. downstream to Milrift, PA (the second is a 40-mile stretch from just south of Port Jervis, N.Y. downstream to the Delaware Water Gap near Stroudsburg, PA (both designated in 1978). Combined, these two river corridors take in 124,929 acres and make up a large part of the proposed upgrade area in this petition. The Lower Delaware Wild and Scenic Rivers Act, signed into law on November 1, 2000, added another 38.9-mile section of the main stem Delaware (and about 28 miles of selected tributaries) to the national system, linking the Delaware Water Gap and Washington Crossing, PA, just upstream of Trenton, N.J. Sections of the Maurice River in New Jersey (a Delaware Bay tributary) and the Musconetcong River in New Jersey (a Delaware River tributary), as well as the White Clay Creek in Pennsylvania and Delaware (which flows into the Christina River, a tributary to the Delaware) also have been included in the national system. According to the National Park Service's web site, the U.S. has 3.5 million miles of rivers, but only about 12,600 river miles (just over one-quarter of one percent) are included in the National Wild and Scenic Rivers System, making the Delaware River a crown jewel for the nation and the northeast. The Wild and Scenic Rivers Act states that the River must be protected in its free-flowing condition and that it must be managed for the benefit and enjoyment of present and future generations.

The Delaware River is a world class fishery

The Upper and Middle Delaware is recognized by sportsmen and fisheries biologists as one of the finest fishing rivers in the northeastern United States. The River offers a high quality fishing experience in close proximity to major metropolitan areas. According to the 1976 New York Angler Survey, the Upper Delaware is one of the five most heavily fished river areas in the state. In 1982, it was estimated that there were nearly 60,000 angler days for the river area between Hancock and Port Jervis. Since 1978, the estimated fishing days in the 27 mile reach between Hancock and Calicoon have increased by ninety percent.

In Delaware, New Jersey, New York, and Pennsylvania, the U. S. Fish and Wildlife Service (2008) estimated the annual economic value of fishing, hunting, birding and wild-life/bird watching recreation was $9.2 billion in $2006. Trip-related expenditures include food and lodging, transportation, and hunting, fishing, and wildlife watching equipment. The Delaware Basin includes 50% of Delaware's land area, 40% of New Jersey's land area, 5% of New York State's land area, 14% of Pennsylvania's land area. Prorating based on the ratio of the area of the state within the basin to total state area, estimated economic value of fishing, hunting, and wild-life associated recreation in the Delaware Basin is $1,477 million/yr in $2006 or $134 million/yr in Delaware, $574 million/yr in New Jersey, $160 million/yr in New York, and $608 million/yr in Pennsylvania (see University of Delaware's Socioeconomic Report for more details).

The annual economic value of recreational fishing to the Upper Delaware area has been estimated at nearly $5,000,000. Fisheries biologists from Pennsylvania and New York

recognize the upper segment of the River as one of the foremost trophy trout streams in the Northeast. Depending on the time of year and volume of cold water releases from tributary reservoirs, this significant trout fishery ranges between the hamlets of Hancock and Callicoon. Trout and other fish have been subjected periodically to extreme changes in flows and water temperature due to sudden changes in the release schedules of the upstream reservoirs. American eels are found throughout the corridor, sustaining one of the finest commercial eel fisheries in the world during the fall, when mature eels return to the sea to spawn.

The Upper Delaware also provides key spawning and nursery habitat for the American shad along its entire length. The Delaware is the only natural shad river in the Northeast (from Maine to West Virginia) that is sufficiently free of man-made barriers and industrial pollution to allow passage of these migratory fish to their upper reach spawning habitats. According to the NY Dept of Conservation 2009 report, up to 750,000 American shad migrate to the upper reaches annually. The most important spawning occurs above the Delaware Water Gap, with nursery areas at or downstream of spawning grounds due to the downstream dispersal of young shad. The most important nursery areas are located from Belvedere to Hancock and up into the East Branch, and centered near Tusten and Lordville. The American shad spawning period runs from mid-April through June. From Port Jervis up into the East Branch the peak of the spawning period usually occurs in June due to the slower warming waters. Populations of American shad along the Atlantic coast have been declining in recent years. Protection of exceptional spawning habitat for this species in the Delaware River is critical to its overall sustainability.

It has been reported by the Pennsylvania Fish and Boat Commission that in 1986, recreational shad fishers fishing on the Delaware River for shad spent about $1.6 million during just a 9 week fishing season; in 2007 this would be equivalent to approximately $3 million. PAFBC 2011 reports show that shad fishers are willing to spend twice as much as this ($3.2 million in 1986 dollars; $6.5 million adjusted in 2010 dollars). This is an important boost for local economies to the Delaware River with ripple effects beyond.

According to a 2011 University of Delaware Report, the annual value of fish landings in the tidal Delaware River and Bay is $25.4 million in $2000 or $34.1 million in $2010 as reported to the National Marine Fisheries Service and tabulated by the National Ocean Economics Program (2007). The most lucrative fisheries in the Delaware Estuary as blue crab ($14.4 million/yr), summer flounder ($5.3 million/yr), Atlantic menhaden ($4.3 million/yr), eastern oyster ($3.7 million/yr), striped bass ($2.3 million/yr), and American eel ($0.8 million/yr).

PAFBC Fishing Hot Spots in the Upper and Middle Delaware River
(Excerpts and data descriptions from PAFBC hotspot mapping tool online, http://fishandboat.com/hotspots.htm.) Wild trout streams in the proposed upgrade area: Devils Hole Creek, Toms Creek, Upper Delaware River, West Branch Delaware River, and Bushkill Creek

Delaware River (Wayne County)
The upper reaches of the Delaware River in Wayne County have excellent wild trout fishing and the scenery is great, especially in the fall. The West branch (PA's Eastern border) has mostly browns with some rainbows (some brookies occur in the feeder streams). The West

and East branches meet at Hancock and the river becomes big trout water with riffles, long pools and steep drop-offs. Wild trout fishing is good as far as 30 miles below Hancock. This portion of the main stem contains both wild brown trout and rainbow trout, and chances of encountering a wild rainbow trout are greater in the main stem portion of the Delaware River (view August 2003 field report for more). Wading is possible, but tricky. Fishing from shore or boats is better for those not familiar with this part of the river.

White Oak Pond (Wayne County, PA)
The Commission owns this 175-acre lake north of Prompton Lake State Park. Only electric motors are permitted.

West Branch Delaware River (Wayne County, PA)
The upper reaches of this River in Wayne County have excellent wild trout fishing and the scenery is great, especially in the fall. The West branch (PA's Eastern border) has mostly browns with some rainbows (some brookies occur in the feeder streams). The West and East branches meet at Hancock and the River becomes big trout water with riffles, long pools and steep drop-offs. Wild trout fishing is good as far as 30 miles below Hancock. This portion of the main stem contains both wild brown trout and rainbow trout, and chances of encountering a wild rainbow trout are greater in the main stem portion of the Delaware River (view August 2003 field report for more). Wading is possible, but tricky. Fishing from shore or boats is better for those not familiar with this part of the River. Delayed Harvest Artificial Lures Only regulations apply.

Lower Woods Pond (Wayne County) (manmade impoundment and current high hazard dam)
This 91-acre lake is nestled in Wayne County and is Commission-owned. Only electric motors are permitted. Lower Woods is great for bass, pickerel and panfish. Upper Woods is good if you know how to fish for deep-water trout. Upper Woods is under the Early Season Trout-Stocked Lake Program.

Upper Woods Pond (natural lake)
This 80 acre natural lake located in State Game Lands 159 in Wayne County is managed as primarily a stocked trout fishery, focusing on rainbow trout. However a 2008 survey found a small but nice large mouth bass fishery has developed in the lake, as well. Only electric motors are allowed and ice fishing is permitted.

Dyberry Creek Hotspot
Dyberry Creek can be accessed from PA 191 North out of Honesdale and is a beautiful high quality waterway with tremendous high value scenery along its banks.

Lackawaxen River
The waters from this River in Wayne and Pike Counties flow from Pleasant Mount through Hawley and eventually to the town of Lackawaxen where it empties into the Delaware River. Along the way it picks up water from Dyberry Creek, Middle Creek and Lake Wallenpaupack. It receives a fall stocking and there always seems to be a good supply of trout, even a few big holdovers. If you don't have luck on the Lackawaxen, then give Dyberry Creek a try, but make sure you consult the PFBC Summary Book for information on its special regulation area.

Delaware River at Narrowburg, NY
Most areas along this reach of river have good smallmouth bass fishing. Particularly good sections are located around Zane Grey, Narrowsburg and Smithfield.

Delaware River (Zane Grey) (Pike County, PA)
Most areas along this reach of river have good smallmouth bass fishing, Pike, muskellunge, and walleye. Particularly good sections are located around Zane Grey, Narrowsburg and Smithfield. The best walleye and musky fishing in the River is from the Lackawaxen River, Pike County down to the Commission's Access below Martin's Creek.

Lake Wallenpaupack (Pike County PA)
This 5,700 acre man-made lake is huge, but the bass fishing is good and ice fishing is great for big perch, crappies, trout and bass. There are also largemouth bass, rock bass, walleye, muskellunge, pickerel, rainbow trout, brown trout and yellow perch. Striped bass have been stocked. There's stream fishing in both the Wallenpaupack Creek and Lackawaxen River, which are stocked. Anglers should be aware of sudden water-level rises on the Lackawaxen River due to periodic releases from the hydroelectric plant. Walt's Cove at the north end and opposite of the Wilsonville Campground is a good place to focus fishing efforts.

Shohola Lake (Pike County PA)
The PA Game Commission owns this 1,100-acre lake. It is located in Pike County. Only electric motors are permitted. It's a great ice fishing destination for trophy largemouth bass and big pickerels.

Pecks Pond (Pike County PA)
This 315-acre lake is owned by DCNR and is located in Pike County. It is also a popular spot for ice fishing. It has lots of pickerel and the occasional big largemouth bass.

Promised Land Lake (Pike County PA)
The 422-acre Promised Lake and the 173-acre Lower Lake offer great opportunities for fishing. The common fish species are largemouth and smallmouth bass, pickerel, muskellunge, yellow perch, sunfish and catfish. Lower Lake is approved trout waters and is stocked with brook, brown and rainbow trout. Bait may be purchased from the seasonal boat rental on Promised Land Lake. Panfish Enhancement special regulations apply.

Lower Lake in Promised Land Lake State Park (Pike County, PA)
The 422-acre Promised Lake and the 173-acre Lower Lake offer great opportunities for fishing. The common fish species are largemouth and smallmouth bass, pickerel, muskellunge, yellow perch, sunfish and catfish. Lower Lake is approved trout waters and is stocked with brook, brown and rainbow trout. Bait may be purchased from the seasonal boat rental on Promised Land Lake. Panfish Enhancement special regulations apply.

Toms Creek (Pike County)
Toms Creek in Pike County is great for wild trout especially if you like small-stream flyfishing and nice scenery. This stream flows through the Delaware Water Gap National Recreational Area. There are plenty of brown trout and the waters seem to stay cool all year. This creek also has some nice deep pools, riffles and plenty of rocks and boulders for cover.

Bushkill Creek (Monroe County)
This creek in Monroe County flows out of the Pocono Plateau. It has lots of rocks - from boulder size to small stones, which provide plenty of trout hiding places. Fly-Fishing Only regulations. In addition to the special regulation area, anglers should try fishing the section of stream in the Delaware Water Gap National Recreation Area (Saw Creek Road downstream to its confluence with the Delaware River).

Devils Hole Creek (Monroe County)
This Class A Wild Trout stream is located in Monroe County and the heart of the "Poconos." It borders one side of State Game Lands 221.

Hidden Lake (Monroe County)
This lake is 40 acres and situated in Monroe County within the boundaries of the Delaware Water Gap National Recreational Area. It offers the following fisheries panfish, pickerel and bass, furthermore it is stocked by the PFBC both preseason and inseason (spring and late winter) with catchable trout.

Delaware River (Smithfield Beach Access)
Most areas along this River have good smallmouth bass fishing. Particularly good sections are located around Zane Grey, Narrowsburg and Smithfield. The best walleye and musky fishing in this River is from the Lackawaxen River, Pike County down to the Commission's Access below Martin's Creek.

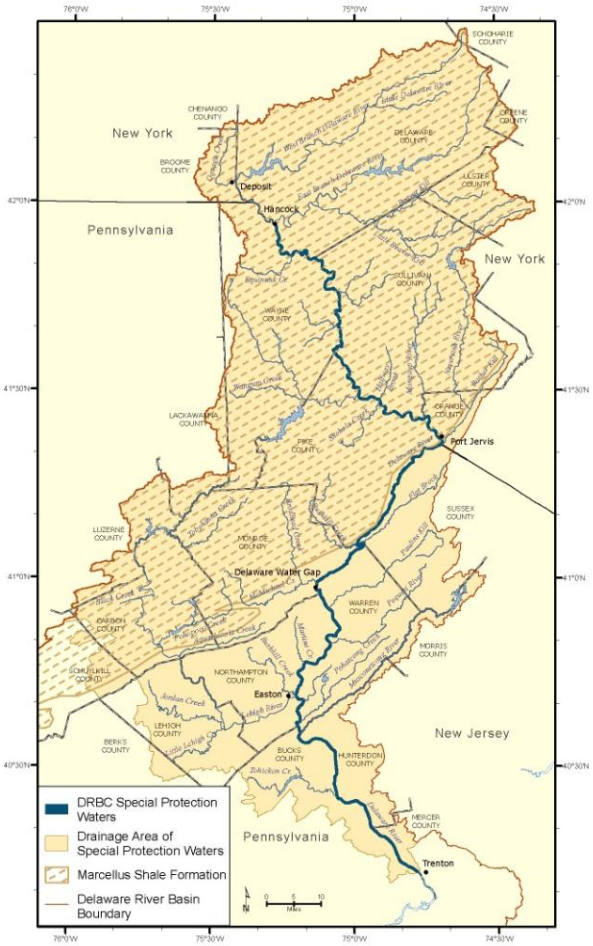
Brodhead Creek (Monroe County)
This popular stream in Monroe County is nestled between the Boroughs of Stroudsburg and East Stroudsburg surrounded by Stroud Township provides good public access to the stream. These local governments in recent years have and continue to develop greenway areas along the stream providing a host of outdoor activities for visitors. The entire section of stream from Analomink downstream of the Exit 309 Bridge on I-80 is stocked with trout and managed under Commonwealth Inland Water regulations. While the stream is stocked from from March through May, it provides angling opportunities throughout the summer, fall, and winter seasons as well. Additionally, the area from the Stroudsburg Water Company on Stokes Avenue downstream to the confluence of McMichaels Creek is also stocked during the fall season.

Special Protection Waters – Largest Protected River in the US

In September 1989, Delaware Riverkeeper Network petitioned the DRBC to designate the Upper Delaware River an Outstanding National Resources Waters due to its incredible water quality and diversity. In response, in 1992, the Delaware River Basin Commission (DRBC) designated the Upper Delaware River and its tributaries as Special Protection Waters. This area was designated in order to protect existing high water quality in areas of the Delaware River Basin deemed "to have exceptionally high scenic, recreational, ecological, and/or water supply values" from degradation by point source discharges and non-point source pollutant loadings carried by runoff. In these waters there shall be, "no measurable change in existing water quality except towards natural conditions."

The DRBC has classified as "Outstanding Basin Waters" the Upper Delaware Scenic and Recreational River (Delaware River between River Mile 330.7 and 258.4), those portions of intrastate tributaries located within the established boundary of the Upper Delaware Scenic and Recreational River Corridor, the Middle Delaware Scenic and Recreational River (Delaware River between River Miles 250.1 and 209.5), and those portions of tributaries located within the established boundary of the Delaware Water Gap National Recreation Area. The DRBC has classified as "Significant Resource Waters" the Delaware River between River Miles 258.4 (the downstream boundary of the Upper Delaware Scenic and Recreational River) and 250.1 (the upstream boundary of the Delaware Water Gap National Recreation Area).

Outstanding Basin Waters "shall be maintained at their existing water quality." This is the DRBC's Tier III, or Exceptional Value, equivalent designation. An upgraded designation by the State of Pennsylvania would allow consistent protection from the State and closer monitoring of these critically important waters. It will also help the Commonwealth ensure that water quality is met as required boundary control points used to ensure the protection of existing water quality in the main stem. The DRBC has recognized the importance of maintaining the highest water quality in the Upper Delaware River Basin with their Outstanding Basin Waters designation.



A large portion of the Special Protection Waters (SPW) in the Delaware River Basin overlies the Marcellus Shale (see map above). Recently, the Delaware River Basin Commission has

been developing regulations to increase the protection of the Upper Delaware River from the impacts of natural gas development. As part of their draft regulations, the DRBC acknowledges that a key component of the management of natural gas development will be the designation of Special Protection Waters, in order to avoid pollution and injury to the water resources in the Basin. The draft regulations note that, "An applicant for approval of a natural gas development project located in the drainage area of Special Protection Waters must comply with all SPW regulations in addition to [principles of sound watershed management discussed in Article 7.1 of the DRBC Compact]." The draft regulations also note that thousands of wells are likely to be drilled proximate to the drainage area of the Special Protection Waters. Therefore, the threat to these waters is imminent, and the State of Pennsylvania must take the greatest precautions and elevate the designation of these waters to ensure protection of this important drinking water resource.

Water Quality Data

The water quality in the Upper Delaware River Basin is extraordinary. For instance, the U.S. Environmental Protection Agency recommends the concentration of total dissolved solids to be at or below 500 mg/L. This limit is set to protect aquatic organisms from negative impacts of excessive suspended solids. However, the Delaware River and its Special Protection Waters currently maintain concentrations of dissolved solids typically between 50 mg/L and 100 mg/L, five-to-ten times below the EPA-recommended criteria.

Similarly, the concentrations of nutrients in the Upper Delaware River are low relative to recommended nutrient criteria. Many waters throughout the United States are heavily impacted by high nutrient levels and resultant water quality impairments. New York recently proposed nutrient criteria ranging from 30 to 65 μg/L for total phosphorus, and 0.7 mg/L for total nitrogen. However, water quality testing within Delaware River Basin Special Protection Waters indicate low nutrient concentrations, with median values around 20 μg/L for total phosphorus and 0.30 mg/L for total nitrogen, indicating healthy water conditions.

Ecological Diversity

The consistently high water quality in the Upper and Middle Delaware River Basin provides habitat for diverse biological communities, including numerous species of mammals, over 130 species of birds, 17 reptile species, and 14 amphibian species. Revenue coming from fish and wildlife is estimated at $1.5 billion annually. There are more than 40 resident and migratory fish species that are supported by these waters. Due to the free-flowing condition of the Delaware River (the Delaware River is the longest undammed River east of the Mississippi), migratory fish can move freely throughout the system. The Upper Delaware River and its tributaries maintain strong populations of many diminishing fish species, including American eel, American shad, alewife, and blueback herring. These species all serve commercial fisheries, so the health of the River is critically linked not only to the survival of the species, but also to the local economy.

The River also is home to abundant freshwater mussel populations. Freshwater mussel populations have been declining for decades, and they are one of North America's most endangered groups of animals. The Delaware River is a northeastern Atlantic stronghold for native mussels. Mussels are particularly successful in the Delaware River as the main

stem Delaware River is undammed and they have a symbiotic relationship with the abundant population of American eel in the river is allowed to continue and thrive. The prevalence of mussels in the river helps to maintain the historic biodiversity that has existed in the River for hundreds of years and the mussels also help maintain high water quality as they filter out nutrients. High mussel abundance and biodiversity filters the water in the River, heightening the maintenance of exceptionally clean water.

Federally endangered dwarf wedge-mussels and other T&E species

Additionally, in 2001 and 2002, William Lellis (U.S. Geological Survey) documented previously undiscovered populations of the dwarf wedgemussel (*Alasmidonta heterodon*) in the mainstem of the Upper Delaware River between Hancock, New York, and Callicoon, New York. The dwarf wedgemussel is a federally designated endangered species. This discovery expanded the range of known populations of the species within the Delaware Basin. Furthermore, one of the largest remaining populations of this particular mussel species lies within the Special Protection Waters of the Upper Delaware River Basin in the Neversink River, overtop of the Marcellus Shale formation. According to Erik Silldorff, DRBC, "A diverse and imperiled mussel fauna occupies the central area within Special Protection Waters and could be affected by any negative environmental impacts from exploratory natural gas development projects in shale formations underlying the area."

The Partnership for Delaware Estuary and Academy of Natural Science's in the summer of 2010 also documented seven healthy native mussel populations in the main stem Delaware River between Trenton, NJ and Chester, PA. "The alewife floater and tidewater mucket were previously thought to no longer exist in Pennsylvania", said Dr. Danielle Kreeger. Scientists have spent years looking for mussels in about 40 streams in southeastern Pennsylvania, Kreeger said, but have found only a single species — the common eastern elliptio — in just three waterways: Perkiomen, Brandywine and Ridley creeks. The eastern elliptio was also found in the Delaware. Two other species discovered — the pond mussel and yellow lampmussel— are considered critically imperiled, while another pair — the creeper and the eastern floater — are considered vulnerable.

The Delaware River Basin is also home to a number of other federal and state listed endangered or threatened species, including the Indiana bat, bridle shiner, bog turtle, shortnose sturgeon, loggerhead and Kemp's ridley sea turtles, and Northeastern bullrush. Pike County's 2011 Natural Heritage Diversity Index Report documented 555 existing occurrences of endangered, threatened, or rare species – ranking third out of the Commonwealth's 67 counties. Over 200 species of migratory birds have been identified within the drainage area of the Upper Delaware River Basin, including the largest wintering population of bald eagles within the Northeastern United States. Migratory birds breed in, or migrate through, the high quality riparian corridors of the Basin.

Macroinvertebrates

In 2005, the U.S. Geological Survey determined that the Delaware River is home to a healthy and diverse assemblage of over 800 species of aquatic invertebrates, including hundreds of species of insects, snails, clams, and other groups. Stroud Water Research Center conducted macroinvertebrate sampling of Raymondskill Creek and Pond Eddy in 2009, both streams are located within the proposed upgrade area. Stroud found diverse and healthy benthic populations and compared these streams with other EV streams of the Delaware Basin and found them to exceed the existing EV watersheds. DRBC has also

documented diverse and healthy populations of macroinvertebrates for both the main stem and headwater tributaries that feed it. Data included in this petition from Pike County Conservation District, Delaware Riverkeeper Network, Stroud Water Research Center, Delaware River Basin Commission, PADEP and other sources, shows high numbers of EPT species, excellent Hilsenhoff scores and overall diverse conditions for the tributaries and the main stem Delaware River in the proposed upgrade area (see Appendix and electronic files for datasets).

The ecological diversity of the Upper Delaware River can be further observed through its abundance of native aquatic plants. The Upper Delaware is host to the largest population in the region of a New York state-listed species called threadfoot or riverweed (*Podostemum ceratophyllum*). This species is also found in some of the Special Protection Water tributaries to the Upper Delaware. Threadfoot is particularly relevant because it is acutely sensitive to industrial activity, and would serve as an indicator species for the impacts of shale development in the watershed.

Land Use Statistics

The Upper and Middle Delaware River watershed areas are upwards of 80% forested and rural in nature. The Delaware River Basin covers 58 percent of the land area of New York City's watershed west of the Hudson River. Nearly 36 percent of the 13,539 square-mile Delaware River Basin is located over the Marcellus Shale formation.

New York City has spent almost $1.5 billion to protect New York City's drinking water supply. The City has used that money to purchase land to serve as a buffer for pollutants, upgrade sewage plants, and regulate human activity.

According to the U.S. Geological Survey's 2010 report on *Water Quality of the Upper Delaware Scenic and Recreational River and Tributary Streams, New York and Pennsylvania*, the percentage of agricultural land in the Upper Delaware River Basin varies from 0 to 30 percent, the percentage of forested land varies from 65 to 100 percent, and the percentage of suburbanization varies from 0 to 17 percent. Most of the agriculture in the Upper Delaware River Basin is located within the basins of four tributaries: the West Branch Delaware River, Callicoon Creek, Calkins Creek, and the Lackawaxen River. The small towns located within the watershed comprise a small proportion of the overall land use, and their impact on the watershed is minimized by the high flows coming from the headwaters and the high degree of forestland in the watershed. Ecosystem goods and services provided from the Delaware Basin on an annual basis include $6.8 billion from wetlands in the Basin, $4.8 billion from agricultural lands, and $8.6 billion from forests.

In 2007, the National Park Service identified sixty-nine vegetation associations occurring in the Delaware Water Gap National Recreational Area. The vegetation of the region is generally classified as Appalachian Oak Forest, typically dominated by white oak and northern red oak, with sugar maple, sweet birch, bitternut hickory, American beech, and tuliptree. Dry Oak – Heath Forest (4,416.7 ha.) and Dry Oak – Mixed Hardwood Forest (2,915.9 ha.) were the most dominant associations. Many environmental factors, such as geology, topography, soils, hydrology, and fire, affect the types and distribution of vegetation within Delaware Water Gap National Recreation Area.

In 2008, the National Park Service conducted vegetation classification and mapping in the Upper Delaware Scenic and Recreational River. Researchers found that the most abundant vegetation classification in the national park is Hemlock-Beech-Oak forest covering approximately 4,385.2 ha (10,836 ac) of the park area. There are 14 riparian vegetation associations, five forested, two shrubland, and seven herbaceous, collectively covering approximately 642.05 ha (1,586.5 ac) of the park. Riparian vegetation collectively accounted for 2.9% of the total coverage within the boundaries of the Upper Delaware Scenic and Recreational River.

In 2009, The Nature Conservancy did a survey of the riparian vegetation in the Upper Delaware Scenic and Recreational River and Delaware Water Gap National Recreation Area, classifying a total of 17 community types. Riparian forests were the dominant community type totaling approximately 45% of the total study area. Forested communities occurred on high to low terraces on the mainstem, tributary mouths, and on islands and bars within the channel. The two shrubland communities accounted for greater than 5% of the total riparian habitat. Both communities are subject to frequent floods, high river velocity, and ice-scour.

Strong commitment by many entities to ensure adequate protection to the Delaware River Basin from shale gas development

Because of the Delaware River's Special Protection Waters designation that encompasses a 197 mile stretch of the non-tidal Delaware River and that was put in place decades ago to protect the ecological and economic significance of the Region, DRBC has a responsibility through these designations to regulate harmful activity.

On May 19, 2009, Carol Collier, DRBC Commissioner, announced a determination notifying natural gas extraction project sponsors that they may not commence any natural gas extraction project located in shale formations within the drainage area of the Delaware River Basin Special Protection Waters without first applying for and obtaining DRBC approval. "This determination explains DRBC regulatory requirements on an interim basis and asserts commission review over all aspects of natural gas extraction projects in shale formations within the drainage area of the basin's Special Protection Waters, regardless of the amount of water withdrawn or the capacity of domestic sewage treatment facilities accepting fracking wastewater," Collier said.

In taking this action, Collier considered and determined that as a result of water withdrawals, wastewater disposal, and other activities, natural gas extraction projects in shale formations may individually or cumulatively affect the water quality of Special Protection Waters by altering their physical, biological, chemical or hydrological characteristics. This finding is in accordance with Section 2.3.5 B.18 of the DRBC's Rules of Practice and Procedure, which state that the Executive Director may specifically require review if a project is determined to have "a potential substantial water quality impact on waters classified as Special Protection Waters." The public, the city of New York, the city of Philadelphia, over twenty-five Pennsylvania legislators, and tens of thousands of other entities that live within the Delaware River Basin have overwhelmingly urged DRBC to keep a moratorium on drilling in place until the science and cumulative impact studies that would examine the full footprint of the industry if it were permitted to drill 20,000 or more gas wells in the Upper and Middle Delaware River Basin are conducted and examined.

Public comments regarding gas drilling in the Delaware River Basin have far exceeded any other DRBC matter in its history as a Commission.

In July 2011, the New Jersey legislature voted to ban hydraulic fracturing in the state. Legislators felt a ban would be necessary to protect public health and preserve natural resources, particularly in the Delaware River Basin. The Governor conditionally vetoed this Ban this fall but a 2/3 override by the legislature may occur by the end of 2011. Banning wastewater discharges of flowback water in NJ is also working through committees in the NJ legislature in 2011. NJ legislators observed incidents in Pennsylvania and expressed their concern over the need to protect their water and air supply. One of the avenues that Pennsylvania can take to increase protection of clean water in the Upper and Middle Delaware River for all users is to upgrade this region to Exceptional Value status. This would indicate a commitment to the strongest protection of water quality in the watershed on the Pennsylvania portion of the Basin.

Downstream in Philadelphia, the Philadelphia City Council unanimously passed the *Resolution on Marcellus Shale Drilling Environmental and Economic Impacts*. The resolution states that the City Council is concerned that, "Every natural gas well project inherently has the potential to endanger water resources and pollute the environment," and, "Natural gas extraction injects toxic water into the well to fracture the rock and poses a risk to our public health and the potability of our drinking water." The Council also issued a directive refusing to purchase Marcellus Shale gas because they believe that the dumping of flowback water is polluting their water supply.

Nearby, municipal bans on hydraulic fracturing have been issued in Lehman Township (Luzerne County) and Washington Township (Franklin County). Nockamixon Township (Bucks County) has passed a resolution calling for closing of the 'Halliburton loophole' in the federal Safe Drinking Water Act. Just across the border in New York, Broome County has issued a ban on hydraulic fracturing on county lands, and waste restrictions for hydraulic fracturing cuttings and flowback water. This municipal activity indicates a public concern over the potential water quality degradation that could be caused by natural gas development in the proposed upgrade area.

Protected Open Space & Recreation

In 1978, Congress recognized the exceptional value of the water of the Upper Delaware River when they designated it a National Scenic and Recreational River. The Upper Delaware National Scenic and Recreational River and Delaware Water Gap National Recreation Area have 5.4 million visitors annually that fish, boat, float, swim, camp, hike, bike, jog, bird watch, and generally enjoy the beautiful habitat that the River provides.

Many rural river towns are supported by seasonal tourist revenue. Recreation is a $730 billion annual contribution to the United States economy. In New York, New Jersey, and Pennsylvania alone, the total economic contribution of outdoor recreation exceeds $38 million annually, generating over 350 thousand jobs and adding additional economic sales and tax revenues of more than $32 million. The total economic contribution of fishing in Pennsylvania, New York, and New Jersey exceeds $3 million. Another $2.5 million is supplied from paddle-based boating. Nearly $2 million is spent on the gear to support these industries, with another $3 million generated from related travel. In addition, nearly

$750,000 is generated in state and federal taxes on all of these water recreation income streams.

The Delaware is the longest un-dammed river east of the Mississippi, extending 330 miles from the confluence of its East and West branches at Hancock, New York, to the mouth of the Delaware Bay where it meets the Atlantic Ocean. Because the Delaware is undammed, it is ideal for popular recreational activities such as canoeing and kayaking. The River is fed by 216 tributaries, the largest being the Schuylkill and Lehigh Rivers in Pennsylvania and the Musconetcong in New Jersey. Boating options throughout the watershed include canoeing, kayaking, rafting, jet skiing, motorboats, paddleboats, different types of historic riverboats, and sailing. Those who enjoy whitewater particularly enjoy the Delaware River's upper reaches. In 1986, the Upper Delaware attracted 232,000 whitewater paddlers who spent $13.3 million, adding $6.2 million to the local economy and supporting 291 jobs. The Water Gap is also a tremendous resource for whitewater paddlers. In 1986, this reach of the River was responsible for attracting 135,400 whitewater paddlers who spent $6,929,000, contributing $3,695,200 of local economic value and supporting 156 jobs. Adjusting for 3% annually, river recreation economic output along the Upper Delaware River and Delaware Water Gap is roughly $27.1 million and $14.1 million, respectively, or $41.2 million total in 2010, according to a May 2011 University of Delaware study.

A recent University of Delaware Study outlined 24 canoe liveries operating on the Delaware River main stem (mostly operating along the proposed upgrade area) and 11 additional liveries on the Lehigh, Schuylkill, and Brandywine Rivers. The total annual revenue for just canoe and kayak liveries operating in the Basin totaled $9,000,000 dollars and 225,000 river trips.

The Delaware River is known for its world class fisheries. Both commercial and recreational fishing abound on the river and help support local economies. Fish commonly found in the Delaware River include striped bass, trout, and large and smallmouth bass. Other fish present in the river include weakfish, American shad, Atlantic sturgeon, catfish, pike, bullhead, perch, walleye, and sunfish. A 1996 survey found that 31,390 anglers spent 265,970 days fishing just the New York reaches of the Delaware River. That survey also determined that in the Upper Delaware, wild trout fishing resulted in $17.69 million for local business revenue, that there was $7.25 million of spending by anglers in Delaware County, New York alone, and that about 41% of this spending remained in the local communities surrounding the tail water fisheries area. The cycling of this 41% of angler expenditures in the region ultimately results in $29.98 million in local economic activity. Research has also shown that revenues generated by anglers in this region supported 348 jobs with total wages of $3.65 million, and provided $719,350 in local taxes.

In Pennsylvania, Bucks County is distinguishing itself as an ecotourism destination. Wineries, breweries, local coffee houses, nature parks, historic hotels, museums, bed and breakfasts, and Delaware River access points all bring visitors to the area. Places like the Bowman's Hill Wildflower Preserve, 1000 acres with over 134 native plant species near New Hope, provide opportunities for day trips as well as complementing longer stays. Visitors to the area supply revenue to local businesses and keep the importance of preservation and conservation of resources at the forefront of county planning. Consequently, voters overwhelmingly approved spending $59 million towards preserving

open space throughout Bucks County in 1997. Since then, more than 15,000 acres have been protected establishing new parks, preserving agricultural land, providing natural habitat for wildlife, improving historical buildings and grounds, and rejuvenating the Delaware River waterfront. This downstream economic value is fueled by the clean river waters flowing from upstream.

Recognizing the value of recreation to communities and its dependence on clean water, beautiful and scenic vistas, and natural areas, it is important that we take the most protective action possible to preserve water quality, river corridors, and the natural areas in the watershed. Clean water increases park attendance and recreation revenue. Every type of river recreation is diminished if the health of the Delaware River diminishes. With the jobs and economy supported by recreation and ecotourism, it is vital that the Upper and Middle Delaware River Basin be protected as an Exceptional Value watershed.

Importance to Pennsylvania Fish and Boat Commission

The Pennsylvania Fish and Boat Commission (PFBC) is in the process of finalizing a Delaware River Management Plan to protect, conserve, and enhance the aquatic resources of, and provide fishing and boating opportunities on, the Delaware River. In their draft Plan, the PFBC notes the importance of maintaining the wild and scenic characteristics of the Upper Delaware River for the millions of yearly visitors from nearby metropolitan areas. PFBC mentions that advances in the treatment of municipal and industrial waste have led to improved water quality in many parts of the Delaware River Basin. However, they caution that the development of natural gas poses a new threat to the health of the ecosystem. PFBC emphasizes the importance of maintaining high water quality and managing water withdrawals to ensure the health of species throughout the Basin and an attractive healthy environment for recreation.

Pennsylvania Natural Heritage Program Priority Conservation Areas

The Pennsylvania Natural Heritage Program has classified the watersheds in Pennsylvania according to their quality of aquatic community. The Pennsylvania Aquatic Community Classification was designed to systematically identify stream community and habitat types for the freshwater mussels, macroinvertebrates, and fish that reside in Pennsylvania's streams. The main stem Upper Delaware River contains two 'Tier 1' segments, which indicates that the watershed is in the best 10% (or 90th percentile) of all stream reaches in the state. The River Basin also contains a number of Tier 1 and Tier 2 watersheds (see enclosed PNDI reports). Watersheds in-between the 80th and 90th percentiles were identified as 'Tier 2'. In order to protect these areas that data analysis has shown to have high quality habitats, high levels of biological diversity, and low levels of human disturbance, the waters of the Upper and Middle Delaware River should be elevated to Exceptional Value.

National Recognition of Watershed Importance

Recently, the America's Great Waters Coalition, an alliance of national, regional, state and local organizations working to protect, preserve, and restore our nation's Great Waters, designated the Delaware River as a Great Water of national significance. This designation recognizes the importance of the preservation of this watershed as essential to the

lifeblood of our nation, driving regional economies and shaping American's daily lives. The America's Great Waters Coalition also acknowledged a concern over the future impacts that natural gas extraction using hydraulic fracturing will have on the watershed. The Coalition calls for prompt action to ensure the health, safety, and livelihoods of the millions of Americans that depend upon the Delaware River. The Coalition notes that this waterway is beneficial not only because of its economic, social, and environmental importance, but because it is a national treasure that supports our nation's economy and provides rich resources for future generations.

Cultural History

The Delaware River holds a spiritual and cultural significance to those living within the watershed and beyond. With such a long history, the Delaware River Valley holds significant opportunities for people looking to rediscover events of the past. From the formation of the river to the first human settlement, its colonial history, the revolutionary war, and more recent accomplishments, several places of interest bring in visitors year round. Many historic sites are located along the Delaware River or one of its tributaries. Keeping the water clean as it flows past and through these sites entices people to continue visiting them. A bad smell, dirty water, or degraded streams detract from the historic presence of a site.

Native Americans from the valley continue to meet and spread their stories and history to the community. Pre-dating European settlement, Native Americans, the Lenape, inhabited the land along the Delaware River and Bay. Their "Lenapehoking" (land of the Lenape) encompassed southern Connecticut, New York, all of New Jersey, eastern Pennsylvania, and Delaware. The Lenape made canoes and used the Delaware River for both transportation and sustenance. Today, archaeologists from American University's Department of Anthropology have found more than 55,000 Lenape artifacts from 25% of what is believed to be the total site area in the Upper Delaware River Valley region. Archeological evidence of the region's native people and their settlements has been found up and down the River and its Watershed. There have even been some findings that may prove ancient cultures that pre-date the Lenape.

More recently, prehistoric Native American artifacts were found along the Delaware River in Philadelphia, at the site of the proposed Sugar House casino. Common artifacts found at Native American archaeological sites include arrowheads and other tools used during the time the Lenape inhabited the area. Museums throughout the Basin describe Lenape history and culture. The Delaware River still holds a very spiritual and cultural connection to their descendants. The
river is a link to the life and spirit cherished by the Lenape.

Henry Hudson was the first European to discover the Delaware River when he and the crew of the Dutch Half Moon entered the mouth of Delaware Bay on August 28, 1609. They quickly ran aground in the Bay, making a U-turn. The English discovered the Delaware the following year, and Dutch, Swedish, Finnish, German and other settlers from Europe followed over the next 166 years.

Today, the site where George Washington crossed the Delaware on December 25th, 1776, is one of the most heavily visited locations on the River, particularly on Christmas Day when

this event is reenacted. On the other side of the River in Trenton, NJ, there are annual reenactments of the Battle of Trenton which ensued on Christmas night, and the second Battle of Trenton that occurred seven days later. These Revolutionary War and other reenactments attract re-enactors and visitors from all over the country.

The story of the Upper Delaware is much more than just a collection of beautiful pictures. Joseph Brandt, John Roebling, and Zane Grey lend a texture to the landscape that helps tell the tale of frontier life and the rapid growth of America during the 1800's. The Upper Delaware Valley is rich in structures and sites that reflect its history and cultural development. Prehistoric archaeological sites, historic architecture, and historic engineering and industrial sites are all abundant in the Upper Delaware Valley. Portions of the D & H Canal, including the Delaware Aqueduct, were designated a National Historic Landmark in 1968. The Delaware Aqueduct is also designated a National Civil Engineering Landmark.

Delaware Canal and the Historic Roebling Bridge

The Delaware and Hudson (D & H) Canal and Gravity Railroad was a system of transportation between coal fields of northeastern Pennsylvania and markets on the Hudson River. It operated from 1828 until 1898, with enlargements after the 1840s. The Upper Delaware Scenic and Recreational River is the home of the oldest existing wire suspension bridge in the United States - the Delaware Aqueduct, or Roebling Bridge as it is now known. Begun in 1847 as one of four suspension aqueducts on the Delaware and Hudson Canal, it was designed by and built under the supervision of John A Roebling, who also engineered the Brooklyn Bridge.

Downstream, Valley Forge Park along the Schuylkill River and Pea Patch Island are other historical locations of significance that depend on the clean water of the Delaware River Basin to attract tourists and recreators throughout the year.

Maintaining the highest level of protection for the Upper and Middle Delaware River Basin is imperative so that the River and its tributaries can continue to serve as a remnant of the past culture and pristine nature for future generations.

Section C: Types of Persons, Businesses, and Organizations Likely to be Impacted by this Proposal

Most persons, businesses, and organizations in the Upper and Middle Delaware River Basin will benefit from this upgrade. First and foremost, the 15.6 million people who get their drinking water from the Delaware River Basin will feel more confident that the state is supporting the best interests of the public as permits for natural gas and other development are considered in the watershed.

For individual landowners, property values will rise due to the increased protection of their water quality and the healthy ecosystem surrounding them. In some areas of Pennsylvania, property owners have seen the value of their property drop when their water became contaminated from natural gas extraction. Ensuring the higher level of protection for the water supply will help to protect the value of properties in this area

where unconventional natural gas development has yet to be permitted. In addition, landowners will see increased protection from hazardous waste sites and other threats to their high water quality.

An Exceptional Value designation will also benefit the farmers of the region who will be able to continue production of healthy crops and livestock, which depend on clean water to contribute to the country's food supply. Many of the farmers in the watershed already have their farms in conservation easements or have implemented stream restoration projects on their property to help preserve the character of the area – Calkins Creamery and Highlands Farm, a multi-generational family farm for over 170 years, are an example of a dairy farm with grass-fed animals located along Calkins Creek that have riparian buffers established along Calkins Creek, solar powered watering operations for their cows, and established conservation easements. There are also many younger generation organic farmers, like Willow Wisp Organic Farm in Abrahamsville PA, who have come to the Delaware River Valley to grow sustainable organic food and unique businesses like Delaware Valley Ramps that forages, harvests and procures local wild foods. The Ant Hill Farm in Honesdale PA is another unique organic business that focuses on vegetables, fruits, nuts, and mushrooms. These CSA farmers took over an old dairy farm in 2007 and have begun growing vegetables in 2008 and sell their produce at the Wayne County Farmers Market which occurs every Saturday in the growing season in Honesdale, PA.

In addition, the array of recreational opportunities that are so important to the local and regional economy will be enhanced by the upgraded river status. For example, research has shown that revenues generated by wild trout anglers in this region supported 348 jobs with total wages of $3.65 million, and provided $719,350 in local taxes while generating over $17 million in local business revenue. Other research has shown that multiple towns in the New York reaches of the Upper Delaware River Watershed are benefiting from the clean water and resulting healthy fish populations found in tributary streams. Friends of the Upper Delaware have reported that the world famous Upper Delaware River is a dynamic tourism and economic engine that has not yet reached its potential. They estimate that fly-fishing in the region could generate $58 million per year in economic activity, creating new jobs with virtually no infrastructure or environmental threat, for which there is already a trained work force and where control would remain local.

In another example, clean and healthy water is essential for the survival of paddling and canoeing businesses that currently thrive in the Delaware River Watershed. The threat of pollution or contaminated water turns many families away for health and safety reasons. When it was learned that the Village of Deposit was discharging 450,000 gallons per day of chlorinated raw sewage into the Delaware River during the summer months (July-August) in 2006, it was recognized immediately as a threat to recreation along the river. The highest quality water is essential to maintain the important recreational opportunities and the revenue that they bring to the region.

The thousands of visitors each year to the Upper Delaware Scenic and Recreational River and the Delaware Water Gap National Recreation Area will feel safer playing, paddling, and enjoying the outdoors in those parks if the water is more highly protected. Stynes and Sun (2002) estimated the Delaware Water Gap National Recreation Area recorded 4,867,272 visits in 2001 that generated $106 million in sales, 7,563 direct/indirect jobs, and $100 million wages.

Any businesses which depend on clean water will directly benefit from the upgrade, including outfitters, restaurants, municipal water suppliers, medical professionals, plant nurseries, daycare facilities, real estate companies, bakeries, coffee shops, hotels, fishing guides, riverboat tours, golf courses, artists, livestock growers, wineries, farmers, and so forth. Support for this petition has been given by local businesses, including canoe liveries that paddle along the Delaware, farmers that grow food in the Upper and Middle Delaware, and outdoor outfitters.

According to the University of Delaware 2011 study, the Delaware River Basin is a jobs engine that supports over 600,000 direct and indirect jobs with $10 billion in annual wages in the coastal, farm, ecotourism, water/wastewater, recreation, and port industries. Within the Delaware Basin are 3,480,483 jobs earning $172.6 billion in annual wages including:

- Delaware (316,014 jobs, $16.5 billion wages)
- New Jersey (823,294 jobs, $38.1 billion wages)
- New York (69,858 jobs, $2.5 billion wages)
- Pennsylvania (2,271,317 jobs, $115.5 billion wages)

The Upper and Middle Delaware River area has a plethora of summer camps for children, and boyscout camps that operate in the region and rely on a clean environment for their children to enjoy and thrive. The Pocono Environmental Education Center (PEEC) based out of Dingmans Ferry, PA holds many environmental programs and has approximately 24,000 visitors a year. Just in Pike County alone, there are at least six summer camps for children to enjoy, including places like Pine Forest Camp, Camp Shohola, Camp Netimus, Camp Timber Tops, and Camp Greeley to name a few.

Many river festivals, fishing tournaments, concerts, races, historic reenactments, and other events are dependent upon a healthy clean river. For example, every year the American Canoe Association sponsors the Delaware River Sojourn, where participants spend eight days paddling and camping along the River to heighten awareness of, and appreciation for, the ecological, historical, recreational, and economic significance of the Delaware River. The Lackawaxen River is also home to annual canoe trips to highlight the beauty of this tributary stream and in 2010, the Lackawaxen was voted the River of the Year for the Commonwealth of Pennsylvania by the Department of Conservation and Natural Resources (DCNR). And any warm day during the season, hundreds of visitors and locals find cool swimming holes along the Delaware River and its tributaries to enjoy and cool off.

EV designation will not limit economic growth, natural gas or other development plans, but rather it will allow for development in a way that preserves the integrity of the watershed by requiring Best Management Practices that foster better planning and implementation of development in the watershed. There are many users within the Upper and Middle Delaware watershed that could have a cumulatively large degradation impact if they are not monitored closely and do not use best practices. All users should be held responsible for maintaining this exceptional river system in its best condition. Any immediate costs will surely be outweighed by the benefits of protecting drinking water and water-dependent jobs and agriculture for millions of people in this still clean watershed.

Section D

The current petition upgrade does not relate to any legal cases regarding EV watersheds in the Delaware River Basin.

Section E1. Clear Delineation of the watershed or stream segment to be redesignated, both in narrative form and on a map

The petitioners are requesting consideration for an upgrade of Exceptional Value (EV) designation to all Delaware River tributaries throughout the entire Middle and Upper Delaware watersheds. This designation includes all PA named and non-named tributaries feeding the main stem Delaware River and the main stem Delaware River itself. Specifically, the proposed upgrade area includes the tributaries that feed into the most southern part of the Delaware Water Gap, and extends North to the Sherman Creek tributary near the border of Pennsylvania's and New York's Wayne and Broom Counties, near the junction of Slate Route 4303 and Slate Route 4037. The watershed's area encompasses parts of Wayne, Pike, Monroe, Northampton, and Carbon counties, spanning approximately 113 miles from Stroudsburg, PA to Hancock, NY.

Major sub-watersheds within the Middle and Upper Delaware include the following tributaries in Drainage Lists A, B, and C of the 025 PA. Code. §93.9a. All tributaries within this list are classified as having a hydraulic order of two:

- **Drainage List A:** West Branch Delaware River, Shingle Hollow, Stockport Creek, Factory Creek, Equinunk Creek, Weston Brook, Little Equinunk Creek, Cooley Creek, Hollister Creek, Schoolhouse Basin Creek, Beaver Dam Creek, Calkins Creek, Peggy Run, Masthope Creek.
- **Drainage List B:** Lackawaxen River
- **Drainage List C:** Panther Creek, Shohola Creek, Twin Lakes Creek, Pond Eddy Creek, Bush Kill, Rosetown Creek, Cummins Creek, Crawford Branch, Vandermark Creek, Deep Brook, Vandermark Creek, Saw Kill Creek, Raymond Kill, Conashaugh Creek, Dry Brook, Adams Creek, Dingman's Creek, Hornbecks Creek, Toms Creek, Brodhead Creek, Cherry Creek, Caledonia Creek, Slateford Creek, Jacoby Creek, Allegheny Creek, Oughoughton Basin Creek, Martins Creek, Mud Run, Bushkill Creek.

<u>2. Current Designated Use for Watershed or Segment</u>

The tributaries within the proposed upgrade region of the Middle and Upper Delaware watersheds are designated within drainage lists A, B, and C, of the Pennsylvania Code 25, Chapter 93. These tributaries flow through Monroe, Northampton, Pike, Carbon and Wayne Counties. Below is a listing of their current designated uses (this does not include "existing use" designations but rather listings in the PA Code).

- All unnamed PA tributaries to the West Branch Delaware River including the Sherman Creek branch to Starboard Creek, are designated HQ-CWF, MF. In addition, all PA sections of Sherman and Starboard creeks and all unnamed tributaries are designated CWF, MF as outlined in Chapter 93.
- The West Branch Delaware River from the state border to its confluence with East Branch Delaware River is designated as CWF, MF. All unnamed tributaries to the West

Branch are designated HQ-CWF, MF. The tributaries of the West Branch Delaware River, Faulkner Brook, Balls Creek, and Shehawken Creek are designated HQ-CWF, MF.

- The following tributaries to the main stem Delaware River, Shingle Hollow, Stockport Creek, Factory Creek, Equinunk Creek, Weston Brook, Little Equinunk Creek, Cooley Creek, Hollister Creek, School House Creek, Beaver Dam Creek, and Calkins Creek, are all designated HQ-CWF, MF.
- All unnamed tributaries to the Delaware River extending from the PA 652 Bridge to the Lackawaxen River are designated HQ-CWF, MF. The tributaries Peggy Run and Masthope Creek within the Lackawaxen Watershed are also currently designated HQ-CWF, MF.
- The portion of the West Branch Lackawaxen River from its headwaters to Prompton Reservoir is designated HQ-CWF, MF, while the main stem from the reservoir to its confluence with Dyberry Creek is HQ-TSF. Van Auken Creek is also designated HQ-TSF. All unnamed tributaries of the West Branch Lackawaxen River from Prompton Reservoir to its confluence with Dyberry Creek are designated HQ-CWF, MF. Dyberry Creek and West Branch Dyberry Creek Tributaries to the West Branch Lackawaxen River are currently designated as HQ-CWF, MF. The East Branch of Dyberry Creek is already currently designated Exceptional Value.
- Book Brook a tributary to Dyberry Creek is already currently designated as EV, while the confluence of East Branch and West Branch Dyberry Creek is currently designated as HQ-CWF.
- Portions of the main stem Lackawaxen River such as the confluence of West Branch Lackawaxen River and Dyberry Creek are designated HQ-TSF, MF. All unnamed tributaries flowing to the Lackawaxen River in the same zone are currently designated HQ-CWF.
- The streams of Carly Brook, Middle Creek, Swamp Brook Tinkwig Creek, Decker Creek, Teddyuskung Creek, Blooming Grove Creek, Little Blooming Grove Creek, Kirkham Creek, West Falls Creek, Mill Creek, O'Donnell Creek, and Lords Creek, are all designated HQ-CWF, MF throughout their entire length. The Wallenpaupack Creek from its headwaters to Lake Wallenpaupack Dam is designated HQ-CWF, and its segment from Lake Wallenpaupack Dam to the mouth at the Lackawaxen River is designated HQ-WWF, MF.
- The following tributaries within Drainage List C are already designated as Exceptional Value (EV): Bush Kill, Roosetown Creek, Deep Brook Creek, Saw Kill Creek, Adams Creek, Toms Creek, Little Bush Kill Creek, Buck Hill Creek, Spruce Cabin Run, Mill Creek, Rattle Snake Creek, Stony Run, Poplar Run, Devils Hole, McMichael Creek, Sand Spring Run, Wolf Swamp Run, and Slateford Creek. PADEP has recently conducted surveys which have added EV streams to the Existing Uses Table but these changes are not yet reflected in Chapter 93 nor in this petition).
- All unnamed tributaries to the Delaware River, flowing from the Lackawaxen River to Tocks Island are designated as HQ-CWF, MF.
- The majority of tributaries in Drainage List C are designated as HQ-CWF, MF, they include: Panther Creek, Shohola Creek, Twin Lakes Creek, Pond Eddy Creek, Rosetown Creek, Cummins Creek, Crawford Branch, Vandermark Creek (source to Deep Brook), Vantine Brook, Raymond Kill, Conashaugh Creek, Dry Brook, Dingman's Creek, Hornbecks Creek, Bushkill (source to Saw Kill), Saw Creek, all unnamed tributaries to Bush Kill, Sand Hill Creek, Little Bush Kill, Brodhead Creek (mainstem, source to LR 45060, SR 2022 Bridge), Spruce Mountain Run, Leavitt Branch, Griscom Creek, Buck Hill

Creek, Goose Pond Run, Mill Creek, Rattlesnake Creek, Lucky Run, Pine Mountain Run, Paradise Run, Devils Hole Creek (South boundary of state game lands No. 221 to mouth, Yankee Run, Swift Water Creek, Cranberry Creek , Butz Run, Michael Creek (source to T434), McMichael Creek (T434 to Pocono Creek), Pocono Creek (main stem), Dry Sawmill Run, Scot Run, Bulgers Run, Reeders Run, Wigwam Run, Flager Run, Big Meadow Run, Marshall Creek, Cherry Creek, Greenwalk Creek, and Waltz Creek.

- The following streams in drainage list C are designated CWF, MF: Sambo Creek, Cherry Creek (LR 45010 Bridge to Mouth), Slateford Creek (T734 Bridge to Mouth), Jacoby Creek, Oughoughton Creek, East Fork Martins Creek (source to Confluence with East Fork), Brushy Meadow Creek (main stem, East Bangor Dam to mouth), Waltz Creek (source to Greenwalk Creek), Little Martins Creek, and Mud Run.
- The following streams in drainage list C are listed TSF, MF: Bush Kill (source to Saw Creek), Bush Kill, Brodhead Creek (main stem, LR 45060 [SR 2022] bridge to mouth), McMichaels Creek (basin, Pocono Creek to mouth), Martins Creek (main stem, confluence of East and West Forks to mouth).
- Shoeneck Creek is designated WWF, MF.

The information provided in the listing above was compiled using 025 PA. Code. §93.9a,b,c. and does not include "existing use" listings that may provide additional protections to some of the streams listed above that are not yet outlined in the regulations.

3. The requested designated use of the watershed or segment:

The Petitioners are requesting all tributaries within the Middle and Upper Delaware River Watersheds as well as the main stem Delaware River be designated Exceptional Value (EV). All of these tributaries flow into Delaware River Basin Commission's (DRBC's) Special Protection Waters of the Delaware River and all have the requisite high level water quality to support such designation.

E.4 Available Technical Data on Instream Conditions

Delaware River Basin and Delaware Riverkeeper Network Macroinvertebrate Data
The Delaware River Basin Commission (DRBC) and DRN collected baseline data for the tributary streams of the Upper and Middle Delaware River in 2011. As part of the planning and coordination for the redesignation petition, PADEP and DRBC collaborated on collection of macroinvertebrate data that will be used for assessment for this petition. As a result, DRBC sampled 35 stations in the Spring of 2010 for this project in Pennsylvania. DRBC worked with PADEP to select EV reference streams including East Branch Dyberry, Big Brook and Alder Marsh Brook to represent different sized reference streams in the region. A list of stream stations sampled by DRBC is compiled in the Appendices.

In addition, DRN coordinated with DRBC to fill gaps for the tributary streams and sampled 6 stations in the Spring of 2011 in the proposed upgrade area for macroinvertebrates using the same protocols used by DRBC and PADEP. In the Spring of 2010, an additional seven stations were sampled downstream of drainage areas of the Upper Delaware where exploratory gas drilling well sites were being implemented. Analysis of 2010 benthic data indicated three stations having an "excellent" water quality score (12-15 EPT taxa; Hilsenhoff scores ranged from 3.3-3.9) and four stations rated as "very good" (12-16 EPT

taxa; Hilsenhoff scores ranged from 3.75-4.14). This data is available electronically and provided on CD.

Stroud Water Research Macroinvertebrate Data

In 2008 and 2009, Stroud Water Research Center (SWRC) conducted a detailed analysis of conditions in seven Exceptional Value tributaries in the upper/middle Delaware – all of these sites were expected to be in excellent condition, and several were considered Exceptional Value reference sites (i.e., the best of the best). Streams included: Bush Kill Creek, East Branch Dyberry Creek, Sawkill Creek, Adams Creek, Toms Creek, Little Bushkill Creek, Stony Run, Pond Eddy, and Raymondskill Creek. Pond Eddy and Raymondskill Creek, at the time of sampling, were not designated EV but had the same or better macroinvertebrate quality as the other sampled streams that were EV or that were used as EV reference stations by PADEP (best of the best). SWRC provides more details and graphs of this data in their letter found in the Appendix.

Other Agency Data

Pike County Conservation District (PCCD) operates an extensive stream sampling program and monitors many of the major tributaries feeding into the Delaware River within the county – these tributaries continue to have excellent water quality and diversity that includes many EPT species. PCCD data from 1995 to 2008 includes 32 different tributaries sampled by Conservation District staff and is available electronically on the enclosed CD. In addition, 2006 – 2010 annual water quality reports compiled by PCCD are available for download at http://www.pikeconservation.org/watershed.htm. PCCD also performs visual and water chemistry assessments and data are available and summarized in the 2006-2010 annual reports.

Delaware Riverkeeper Network is coordinating with Monroe County to obtain copies of their macroinvertebrate datasets that are also available for many of the streams in their jurisdiction and that show healthy water quality conditions. This data will be forwarded onto the PADEP shortly.

PADEP Benthic Data

PADEP Biologist, Tim Daley conducted macroinvertebrate sampling of Delaware River tributaries in 2007, 2008, and 2010 in the Upper and Middle Delaware Region. Datasets were provided by Gary Walters, PADEP and are included electronically on CD for this petition

Macroinvertebrate data available from these diverse sources indicate excellent conditions that are equivalent or equal to other Exceptional Value Streams in the Delaware River Basin. And streams in the proposed upgrade region support a wide variety of macroinvertebrates that are indicative of clean water and good habitat. Dr. John Jackson, SWRC also noted, "There was some evidence that the macroinvertebrate communities in these tributaries were not identical to Exceptional Value streams in the northcentral, southeast, and southwest PA streams – some species common in the Water Gap area were not common in other areas, and vis-a-versa. We (SWRC) believe these regional differences are evidence of natural ecological variation associated with being in separate drainage basins as well as differences in climate (rainfall and temperature), hydrology, underlying geology and soils, and forest cover. It also shows that there is not much redundancy among

the limited number of stream miles throughout Pennsylvania that have received special protection associated with the Exceptional Value designation."

PA Fish and Boat Commission Data
Shad Spawning Biologist Reports
Pennsylvania Fish and Boat Commission (PFBC) sampled adult American shad at two locations in the Delaware River at Raubsville (RM 178.9) and Smithfield Beach (RM 218.0) in 2011 – both of these locations are within the proposed upgrade area of the Main Stem Delaware River. Annual spring sampling using electrofishing at Raubsville was carried out from 1997 through 2001, was re-initiated in 2010 and continues to date. For the 2011 American shad run, sampling started the last week of March (3/31/2011) and ended the second week of May (5/10/2011). Sampling was not accomplished during the second, fourth, and fifth weeks due to excessive high river flows, and logistical constraints.

A total of 66 American shad, including 33 females and 33 males, were collected, for an overall average catch-per-unit-effort (CPUE) of 20.97 shad/hour. Mean total lengths were 21.1inches TL for females and 19.5 inches TL for males. Sizes ranged from 18.8 to 23.2, and 17.2 to 21.3 inches TL for female and male American shad, respectively. Comparison of the CPUE among years suggests that the 2011 relative abundance (i.e., CPUE) was slightly lower than the 2010 run (Figure 1). The lower CPUE was unexpected, considering the strong 2005 young-of-year class, now age 6, are returning to the Delaware River as spawning adults, and a high CPUE was observed at Smithfield Beach for the 2010 and 2011 runs. Typically American shad migrate in schools up-river. The loss of sampling during the peak runtime, likely contributed to an under-estimate of American shad relative abundance at Raubsville.

The upturn in the Smithfield Beach CPUE is encouraging. Annual surveys of American shad young-of-the-year in the Delaware River by the New Jersey Division of Fish and Wildlife have suggested that sampling of 2005 and 2007 stocks indicate strong year class production. Mature American shad return to the Delaware River typically at four to five years-of-age for females and three to four years-of-age for males. Hopefully the increasing trend in relative abundance will continue in the 2012 season as the 2005 year class continues to return, and as the 2007 year class recruits to the adult spawning population (Daryl Pierce, PAFBC Biologist). In 2010, PAFBC estimated 20 plus shad fishing days on the Delaware River, indicating a recreational resource for avid fisherman. The full report is provided on CD for this petition.

The American Shad are celebrated in several cities throughout the watershed during their spring spawn including Fishtown in Philadelphia, Easton, Pennsylvania and Lambertville, New Jersey bringing in people from all over the basin. The annual Shad fishing tournament held each year following the Easton Shadfest charges a $20 entry fee, and with over 1000 competitors in 2006, the tournament raised $20,000 in proceeds. Lambertville's Shadfest has been an annual part of the community for 26 years, attracting 30,000 to 35,000 visitors during the two day event.125 The Shad population has rebounded from decades ago because of renewed efforts to maintain water quality allowing the Shad to make the spawning journey up the Delaware.

Other Delaware River Basin Datasets and Integrated Datasets
For this petition, Delaware River Basin Commission provided a series of electronic datasets of water quality data from their ongoing and targeted monitoring initiatives. They are

included on CD for DEP review. DRBC water quality reports are also provided. Data are also available through STORET. Datasets include:

- DRBC's Scenic River Monitoring Program data from 2000-2009 – (2010 dataset will be provided when available). This monitoring program is the Antidegradation water quality network for 200 miles of the non-tidal portion of Delaware River and tributaries
- Historic data available from DRBC that integrates USGS, USEPA and state agency water quality datasets into the 1980's

This water chemistry data indicate healthy conditions for the main stem Delaware River, as would be expected for this stretch of Special Protection Waters region. Low total dissolved solids and conductivity levels, healthy dissolved oxygen and temperature levels indicative of watersheds that have a high percentage of forested cover.

DRBC is also in the process of establishing water-quality objectives for nutrients in the tidal and non-tidal portions of the Delaware River and presently implementing a strategy to scientifically develop nutrient criteria for the Delaware River and its estuary. Part of that strategy is to investigate the effects of nutrient enrichment on aquatic life of the Delaware River and to gather a weight of evidence toward establishing nutrient-concentration thresholds. The USGS report on the progress of this study is provided on CD.

The Upper and Middle Delaware has many "Least Disturbed Stream" Reaches
PA's Aquatic Community Classification System catalogues and prioritizes stream life throughout the Commonwealth to help better protect streams in pristine conditions and restore those needing help. The proposed upgrade area of the Upper and Middle Delaware has a plethora of "Least Disturbed Streams" or LDS reaches that are considered high priority for conservation and protection. These high quality stream segments have little human disturbance and influences and demonstrate natural ecological function. A map of these streams are provided on CD.

Natural Heritage Areas Indicate High Diversity and High Conservation Needs
Natural areas abound throughout the proposed upgrade area highlighting glacial ponds, diverse headwater tributaries, and the presence of important plant, animal, and bird species. Hard copy of each counties' plans are provided and a description of and more detailed summary of identified high conservation areas located within the proposed upgrade area are provided in a latter section under specific qualifiers.

Freshwater Mussels Data
The Natural Capital Team at the Partnership for the Delaware Estuary has developed tools over the past two years to assist in various projects in the Delaware Estuary, including freshwater mussel restoration, climate change planning, and regional restoration planning. One case study focused on the ecosystem benefits provided by the freshwater mussel, *Ellipito complanata*. Specific ecosystem services furnished by *E. complanata* were identified and estimated based on literature values for key physiological rate functions and ecosystem process functions. These included production, clearance rate, total suspended solids removal, chlorophyll-a removal, sediment organic enrichment, sediment stabilization, macroinvertebrate habitat improvement, nutrient processing flux, and the sequestration of nitrogen and phosphorus. These metrics were related to the estimated

population biomass of *E. complanata* in the Delaware Estuary and conditions such as loadings of pollutants. Mass balance estimates suggest that even the diminished current population of mussels represents ecologically important natural capital because of the ecosystem services that are furnished, including stormwater pollutant reduction and nutrient control. Estimating the services provided by *E. complanata* and other bivalve mollusks has implications for water quality standards and total maximum daily load (TMDL) attainment strategies. Restoration of freshwater mussels such as *E. complanata* provides opportunities to enhance these services, improve water quality and habitat conditions, and build system resilience as an offset for the effects of climate change and continued watershed development. With rare native mussel assemblages being found in the Delaware River and some of its tributary streams, this natural capital needs to be protected where they still exist.

Water Chemistry Data

Delaware Riverkeeper Network has been collecting data for conductivity, TDS, chloride, and temperature on a monthly . Since February 2010, we have collected a dataset for 70 stations on tributary streams in the proposed upgrade area (N=354). For all parameters, the tributary streams sampled are in healthy conditions with ideal cool temperatures indicative of a healthy fishery (average temperatures of 14°C, and average conductivity readings of 72 µg/l and 46 ppm TDS). Even during winter rain events conductivity levels remained low. On the main stem Delaware River, DRBC 2000-2004 data indicate very healthy levels for the River and the 15 tributaries sampled for TDS (N=1028 samples). The average total dissolved solids (TDS) was 183 ppm, the median was 160 ppm, and TDS ranged from 10 ppm – 618 ppm. Visual assessments collected by DRN volunteer monitors also indicate minimum consolidation and embeddedness, indicative to good benthic habitat. This dataset is available electronically and provided on disk.

National Park Service Data

Various datasets collected by the National Park Service are provided electronically on CD.

Delaware Riverkeeper Network will continue to investigate additional data sources that become available for the proposed upgrade area and provide these sources to PADEP during the upgrade process.

5. A description of existing and proposed point and nonpoint source dischargers and their impact on water quality and/ or the aquatic community

The upgrade regions of the Middle and Upper Delaware have approximately 25 active or inactive point-discharge facilities holding NPDES permits. The majority of point dischargers are located near the southern end of the proposed upgrade area in Monroe County, surrounding the city of Stroudsburg and the Delaware Water Gap. Specifically, seven facilities are present throughout Wayne County and 18 facilities located in Monroe County. The regulatory characteristics of these dischargers are classified as, Industrial Waste, Stormwater-Industrial, and Stormwater-Municipal. The information on these facilities was collected through using Pennsylvania DEP's Emap PA system.

Facility Name	NPDES #	Nature of Discharge	County
APS Recycling INC	PAR602248	Stormwater-Industrial	Monroe
Bestway of Pa Inc. Lumber Treatment Center	PAS222202	Industrial Waste	Monroe

Blue Ridge Peat Farms	PAS322202	Stormwater-Industrial	Monroe
Bunnell Recycling CTR INC	PAS602207	Industrial Waste	Wayne
Burroughs Fuels Inc WTP	PA0063835	Industrial Waste	Monroe
Chroma Tube Plant	PA0029637	Stormwater-Industrial	Wayne
Crossroads Trave lCTR INC	PA0013676	Industrial Waste (Inactive)	Monroe
East Stroudsbourg Mun Auth	PA0020168	Industrial Waste	Monroe
Gustin Stone Supply INC	PAS212214	Industrial Waste	Wayne
Laird Tech	PA0060241	Industrial Waste	Monroe
LKQ Thru Way Auto Parts	PAR602243	Stormwater-Industrial	Monroe
Mcgraw-Edison Co	PA0013269	Industrial Waste	Monroe
Milford Boro IWTP-Backwash	PA0063848	Stormwater-Industrial	Monroe
Nolan Oil	PAG052215	Groundwater Cleanup	Monroe
Patterson Kelly Co	PA0012394	Industrial Waste	Monroe
Penna Power & Light	PA0027201	Industrial Waste	Wayne
Pleasant Mt. Hatchery PA Fish & Boat Comission	PA0044024	Stormwater-Industrial	Wayne
Rock Hill Materials CO	PAS212203	Stormwater-Industrial	Monroe
Rock Tenn Co	PA0012963	Stormwater-Industrial	Monroe
Sanofi Pasteur	PA0060071	Industrial Waste	Monroe
Sibums Auto Parts	PAS602206	Industrial Waste	Monroe
Stroudsburg Water Filtration P	PA0060992	Industrial Waste	Monroe
Texaco Refining & Marketing	PA0063452	Stormwater-Industrial	Wayne
UPS SVC Stroudsburg	PAS802213	Stormwater-Industrial	Monroe
Waste Management of Pennsylvania	PAS602207	Industrial Waste	Wayne

Nonpoint Source Dischargers in the Middle and Upper Delaware Watersheds

Nonpoint source pollution is often carried as storm water runoff from the following sources:

- Roads and parking lots (hydrocarbons, heavy metals, road salt)
- Lawns (fertilizers, pesticides, pet waste)
- Cultivated fields (soil erosion/sedimentation)
- Livestock pastures (manure, soil erosion/sedimentation)
- Stormwater management facilities (MS4)
- On-lot septic systems

The majority of nonpoint source pollution in the proposed upgrade region is likely to occur in the form of nutrient pollution (eutrophication), stemming from agricultural sites and livestock, within the middle and lower portions of the Middle Delaware. New development projects within the region, particularly within Pike and Monroe counties, have increased soil erosion and sedimentation (DRBC State of the Delaware Basin Report, 2008).

7.3 (f)(i): High Quality Qualifiers

The majority of the streams in the proposed upgrade area of the Upper and Middle Delaware River already have HQ designation. Some of the tributaries in the proposed upgrade area also have EV designation.

7.3(f)(i)(A): Water Chemistry qualifier

Section E4, the electronic appendices and disks include a plethora of water chemistry data from various agency and private sources for the proposed upgrade area, including the tributaries and the main stem Delaware River. In general, dissolved oxygen levels and temperature data show optimum conditions, even in warmer summer temperatures for the majority of tributaries sampled. Recent monthly data collected by Delaware Riverkeeper

Network at 70 stations within the proposed upgrade area (from March 2010-Present) for Total Dissolved Solids, conductivity and chlorides indicates very low conductivity readings and low chlorides, an important necessity for the diverse benthic life that flourish here. DRBC data for the main stem also shows healthy conductivity readings indicative to the forested nature of this region even in the main stem Delaware River. Please see submitted datasets on CD for more details.

7.3(f)(i)(B): Biological assessment qualifier
Macroinvertebrate data for the proposed upgrade area is available for many of the tributary streams and the main stem in the proposed upgrade area. That data is submitted with this petition with the exception of DRBC's datasets from Spring 2011 which will be submitted when available. Data indicate healthy and diverse benthic populations of macroinvertebrates present. EPT taxa are abundant and Hilsenhoff scores are good. Please see section E.4 and electronic datasets.

7.3(f)(i)(C): Class A Wild Trout Stream Qualifier
The proposed upgrade area supports populations of naturally produced trout and is considered a world class fishery by the PA Council of the Trout Unlimited.
As indicated in Section E.4, the PA Fish and Boat Commission includes "fishing hot spots" where wild trout are abundant for the following streams and the main stem Delaware River: West Branch Delaware River and Upper Delaware River, Devils Hole Creek, Toms Creek, and Bushkill Creek. PAFBC lists the following streams as Class A wild trout streams found in the following table (http://fishandboat.com/classa.pdf).

In Wayne County – Faulkner Brook (rainbow trout), Sherman Creek (brown trout), and Stiles Creek (brook trout)

Pike County is also identified as prime fishing area with Mill Brook, Bushkill Creek, Burchards Creek, Birchy Creek, and Pond Eddy Creek all having Class A trout populations for native brook trout. Sawkill Creek, Toms Creek and Pond Eddy also have Class A designations for brown trout.

In Monroe County – Mill Creek, Poplar Run, Middle Creek, Devils Hole Creek, Appenzell Creek, Aquashicola, Cranberry, Middle Branch of the Brodhead, Dotters Creek, Singer Run, and Wolf Swamp Run are all designated Class A Wild Trout.

Naturally producing wild trout populations
The proposed upgrade area also has an abundant number of streams that PAFBC cites as having naturally reproducing wild trout populations and many fisher people flock to these regions to recreate http://fishandboat.com/trout_repro.pdf . The list of streams for the Upper and Middle Delaware River region includes 10 stream segments in Monroe County.

7.3(f)(ii): EV Qualifiers.
The majority of streams in the proposed upgrade area already have HQ designation.

§ 7.3(f)(ii)(A): Location in National Wildlife Refuge or state game propagation and protection area. **NO**

§ 7.3(f)(ii)(B): Location in a State Park Natural Area, State

Forest Natural Area, National Natural Landmark, Federal or State Wild River, Federal Wilderness Area or National Recreational Area. YES
The proposed upgrade area of the Upper and Middle Delaware River includes National Natural Landmarks, State Park Natural Areas, Federal Wild & Scenic River designation, and National Recreation Areas.

Wild & Scenic Rivers Designation
As outlined in Section B, The Delaware River is a federally designated Wild & Scenic River. The wilderness river has over 290 square miles of open space and water for the community to enjoy. Three quarters of the non-tidal Delaware River is designated a National Wild and Scenic River. One section extends 73 miles from the confluence of the River's East and West branches at Hancock, N.Y. downstream to Milrift, PA; the second section is a 40-mile stretch from just south of Port Jervis, N.Y. downstream to the Delaware Water Gap near Stroudsburg, PA (both designated in 1978). Combined, these two river corridors take in 124,929 acres and make up a large part of the proposed upgrade area in this petition. The Lower Delaware Wild and Scenic Rivers Act, signed into law on November 1, 2000, added another 38.9-mile section of the main stem Delaware (and about 28 miles of selected tributaries) to the national system, linking the Delaware Water Gap and Washington Crossing, PA, just upstream of Trenton, N.J. Sections of the Maurice River in New Jersey (a Delaware Bay tributary) and the Musconetcong River in New Jersey (a Delaware River tributary), as well as the White Clay Creek in Pennsylvania and Delaware (which flows into the Christina River, a tributary to the Delaware) also have been included in the national system. According to the National Park Service's web site, the U.S. has 3.5 million miles of rivers, but only about 12,600 river miles (just over one-quarter of one percent) are included in the National Wild and Scenic Rivers System, making the Delaware River a crown jewel for the nation and the northeast. The Wild and Scenic Rivers Act states that the River must be protected in its free-flowing condition and that it must be managed for the benefit and enjoyment of present and future generations.

State Park Natural Areas in Proposed Upgrade Region

Bender and Black Bear Swamps are made up of 1,600 acres of acidic swamps, sphagnum moss, rare plants and animals located in Monroe County and are part of Tobyhanna State Park. Tobyhanna State Park is in scenic Monroe and Wayne counties in northeastern Pennsylvania. The 5,440-acre park includes the 170-acre Tobyhanna Lake. Tobyhanna is derived from an American Indian word meaning "a stream whose banks are fringed with alder."

Downstream of the proposed upgrade area there are two more state park natural areas. Delaware Canal State Park in Bucks County contains seven riverine islands (consisting of 80 acres) that are home to natural plant communities and many rare plants. Also in Bucks County, Neshaminy State Park provides 71 acres of tidal marsh habitat containing many rare plants along the shores of the Delaware River and Neshaminy Creek.

National Natural Landmarks (NNLs) in the Upper and Middle Delaware River Watershed
According to the National Park Service, there are 591 designated landmarks in the United States. The Upper and Middle Delaware River upgrade area contains three of these national treasures. Sites are designated as NNLs because they contain the best remaining

examples of specific biological and/or geological features. The natural features represented include aquatic and terrestrial ecosystems, geological processes and resultant landforms, and records of geologic history. Each site is a piece of the larger picture that is the illustration of the great diversity of our Nation's natural landscape.

The Upper and Middle Delaware River upgrade area in PA includes two National Natural Landmarks (out of a total of only 27 that are located in the state of PA). Lake Wacanac, designated in 1968, located adjacent Lake Wallenpaupack in Wayne County, PA, is one of the 27 National Natural Landmarks in Pennsylvania. This private 400-acre lake in Paupack, PA is one of the southernmost lakes of glacial origin in the northeastern United States. The site contains a mixture of northern and southern forests and a portion of relict forest.

The 185-acre privately owned Tannersville Cranberry Bog Preserve in Monroe County (Pocono Creek drainage), designated in 1974, is one of the most archetypal boreal bogs in Pennsylvania and perhaps the most southern black spruce-tamarack bog along the Eastern Seaboard, according to the National Park Service.

Located within Worthington State Forest (NJ) and draining into the Middle Delaware River is Sunfish Pond, a 188-acre spring-fed mountain lake surrounded by a hardwood forest. It is an outstanding illustration of glacial sculpture that was designated in 1970. Popular hiking trails in the forest take many hikers to this unique and favorite feature that drains into the Delaware River north of Depue Island and south of Tocks Island where a dam was proposed in the 1950's and deauthorized in 2002. This is one of only eleven National Natural Landmarks in the state of New Jersey.

State Forest Natural Areas

Delaware State Forest

The Delaware State Forest contains a total of 80,267 acres in Pike, Monroe, Northampton, and Carbon counties, however most of the forest lies in Pike County. This forest is characteristic of the Pocono region, with remote glacial lakes and bogs rich with plants, wildlife and scenic beauty. The Delaware State Forest derives its name from the Delaware River that drains the entire area. The River was named after the Delaware Indians, also known at the Lenni Lenape, a tribe of the Algonquian Nation, who inhabited its shores, valleys, and cliffs. The area is easily accessible and within a two hour drive of New York City and Philadelphia. The scenic beauty is outstanding and the area draws millions of visitors annually, according to the DCNR. A map of the forest can be downloaded at http://www.dcnr.state.pa.us/ucmprd2/groups/public/documents/document/D_000883.pdf and is provided on CD.

Lackawanna State Forest

Lackawanna State Forest is named after the Native American phrase, "a place where the river forks." The forest's more than 30,000 acres blanket more than a few of the mountains near the confluence of the Susquehanna and Lackawanna rivers, thus its moniker. This forest contains some of the most pristine headwaters of the Delaware River, and provides extensive corridors for wildlife and abundant recreational opportunities to the public. A map of the forest can be downloaded at

http://www.conservationfund.org/news/lackawanna-state-forest-pennsylvania-2010 and is provided on CD.

Delaware Water Gap National Recreation Area

The Delaware Water Gap National Recreation Area, designated September 1, 1965 includes 68,714 acres on the Pennsylvania/New Jersey border, 90 miles from Philadelphia and 64 miles from Newark. This scenic area preserves relatively unspoiled land on both the New Jersey and Pennsylvania sides of the Middle Delaware River. The river segment flows through the famous gap in the Appalachian Mountains. The park sponsors a craft village and several environmental education centers. Visitors to the park enjoy camping, hiking, bicycling, mountain climbing, swimming, canoeing, tubing, fishing, hunting, auto touring, snowmobiling, cross-country skiing, wildlife viewing, and guided tours. More than 25 miles of the Appalachian Trail traverse the Delaware Water Gap National Recreation Area. This is the only backpacking area in the park. The National Park Service recorded 4.8 million visits to the Delaware Water Gap National Recreation Area in 2007. It was the fifth most visited park in the United States that year.

Upper Delaware Scenic and Recreational River

The Upper Delaware Scenic and Recreational River was added to the Wild and Scenic Rivers System on November 10, 1978. On November 24, 1968 portions of the Delaware & Hudson Canal were designated a National Historic Landmark and the Delaware Aqueduct (Roebling Bridge) was designated a National Civil Engineering Landmark. The Upper Delaware Scenic and Recreational River encompasses 55,575 acres of which 30 acres is federal and 55,545 is non-federal. Visitation to this recreation area includes: 2005 – 251,083 visitors, 2004 – 227,695 visitors, and 2003 – 259, 116 visitors. The annual budget for 2005 was $2,836,000. This park is managed by cooperation between private landowners, municipalities, the federal and state governments through the River Management Plan is available at: http://www.nps.gov/upde/parkmgmt/planning.htm and every year progress reports are completed.

§ 7.3(f)(ii)(C): The Delaware River is an outstanding national, state, regional or local resource water. YES

See Section § 7.3(f)(ii)(B) that outlines some of the federal and state owned or managed lands. Additional points listed below for this qualifier.

Multi-state protective measures

In 2011, the Delaware River was recognized as one of "America's Great Waters" by America's Great Waters Coalition for its national significance and role in the nation's prosperity and the need for renewed commitment to protecting this lifeblood River which serves as an economic engine for the region. America's Great Waters Coalition envisions a day when America embraces its Great Waters and ensures they are healthy, valued, and productive resources for our nation. A map of the Great Waters of the Nation can be found at:http://www.nwf.org/~/media/PDFs/Water/032511Americas%20Great%20Waters%20Watershed%20Map.ashx and is included on CD.

Special Protection Waters Designation for Delaware River

197 miles of the Delaware River, including the Middle and Upper Delaware, have been designated by the multi-state Delaware River Basin Commission out of recognition for its high quality waters. The SPW program, according to the DRBC, "is designed to prevent degradation in streams and rivers considered to have exceptionally high scenic, recreational, ecological, and/or water supply values …." The SPW program focuses on both point and nonpoint sources of pollution and is intended and implemented so as to protect the high quality waters of designated SPW reaches. The creation and implementation of this program was accomplished through and with the participation of each of the four watershed states and the federal representative to the DRBC and is a prime example of how they have worked together to protect the River from degradation out of recognition of its irreplaceable values to the region and the nation.

Delaware River Water Resources Plan

The Delaware River Water Resources Plan, created in 2004, is another multi-state effort that illustrates the commitment at the state and local levels to protect the Delaware River Basin because of its importance to the welfare of the public. This Plan was developed after a resolution by the four Governors of the adjoining states was passed in September, 1999 to protect the Delaware River. The plan in its entirety is located at this link: http://www.state.nj.us/drbc/BPSept04/index.htm. Every year a progress report is provided to continue to work towards the guiding principles of protection of the Delaware River Basin.

Nature Conservancy Protected Lands with Easements

The Nature Conservancy has established a strong presence in the region to ensure the Upper Delaware River maintains its integrity. Most recently, the Conservancy began assisting the Delaware River Basin Commission with designing a system to monitor and manage water diversions in the River's tributaries that disrupt natural flooding, temperature, and flow patterns further downstream. These actions – combined with ongoing efforts to connect important habitats, influence sustainable land uses, and combat non-native vegetation – will go a long way in ensuring the Upper Delaware River continues to possess outstanding natural, recreational, historical and cultural resource values that led to its designation as one of the nation's "Wild and Scenic Rivers." The TNC has preserved more than 650 acres of forests and important vernal pools near the Delaware Water Gap, adding significantly to the protection of this impressive natural area.

Pennsylvania State Gamelands in Proposed Upgrade Region

The proposed upgrade area is home to 14 state game lands managed by the PA Game Commission encompassing more than 76,032 acres. These gamelands include:

Monroe County

- **SGL 038 –** Pennsylvania State Game land 038 is located within part of Chestnut Hill Township, Tunkhannock Township, and Pocono Township. Large sections of Sand Spring Run, Wall Swamp Run and Deep Lake, reside within the area. The game land boarders Interstate 80 and encompasses 5,477 acres.

- **SGL 127 -** Pennsylvania State Game land 127 extends into Coolbaugh and Tobyhanna Townships. Largest tracts of swamps and wetlands, including major sections of Tobyhanna Creek, Kistler Run and Bradys Lake. The game land encompasses 25,227 acres.

- **SGL 186 –** Pennsylvania State Game land 186 is located in Jackson Township between Grubers Lake, Trout Lake and Appenzel Creek. The game land is situated between Pine Road and PA Rt. 715 and encompasses 976 acres.

- **SGL 221 -** Pennsylvania State Game land 221 is located in between Coolbaugh and Paradise Townships, and boarders PA Rt. 191. The game land is comprised of 4,618 acres and includes major tracts of Rattlesnake and Mill Creeks.

Pike County

- **SGL 116 -** Pennsylvania State Game land 116 is located between Shohola and Lackawaxen Townships. The area extends 3,024 acres and is boarded by Shohola Creek and Pennsylvania Rt. 434.

- **SGL 180 –** Pennsylvania State Game land 180 encompasses 11,372 acres of land between Blooming Grove, Dingham and Shohola Townships. Interstate 84 travels through the game land and includes a large stretch of Shohola Creek.

- **SGL 183 -** Pennsylvania State Game land 183 is boardered by Pike and Wayne Countiess near Palmyra Township and the town of Hawley. The Lackawaxen River runs along the game lands' Northern Boarder and encompasses 2,778 acres.

- **SGL 209 -** Pennsylvania State Game land 209 is located in Shohola Township along the Delaware River. Pond Eddy Stream runs through the game land where it comes to its confluence with the Delaware River. The game land encompasses 4,391 acres.

- **SGL 316 -** Pennsylvania State Game land 316 is located along the Delaware River in Lackawaxen Township. The area includes stretches of Rattlesnake and Masthope Creek, as well as Coby Pond. The game land extends 2,715 acres.

Wayne County

- **SGL 070 –** Pennsylvania State Game land 070 is spread throughout Wayne and Susquehanna County. The area includes large tracts of Sherman and Hemlock Creeks.

- **SGL 159 –** Pennsylvania State Game land 159 is located in Lebanon and Manchester Township and encompasses 9,368 acres. The game land includes Adler Marsh Pond, Upper Woods Pond, and a segment of Adler Marsh Brook runs through the game land.

- **SGL 299 -** Pennsylvania State Game land 299 borders the West Branch of the Delaware River and contains large portions of the tributaries of Start Creek and Faulkner Brook. The game land encompasses 1,054 acres.

- **SGL 310** – Pennsylvania State Game land 310 boarders Lake Henry and encompasses the majority of Silkmans Swamp. The game land is located within Lake Township and spans 1,120 acres.

- **SGL 312 –** Pennsylvania State Game land 312 is located on the boarder of Wayne and Lackawanna Counties within Lehigh and Coolbaugh townships, near Tobyhanna State Park. The game land includes a major tract of the West Fork Leigh River, Lehigh Pond, and Pepperidge Swamp. The area includes 3,912 acres.

State Forestlands (see section 4.2)
Federally owned or managed lands
As indicated under Section 4.2(b), the upgrade area is part of the Delaware Water Gap National Recreation Area and the Upper Delaware Scenic River. Both of these areas combined include 142,000acres of which about 95,000 acres are federally protected.

State Parks located in the Upper and Middle Delaware River Region
Prompton State Park, Varden State Park and Conservation Area, Promised Land State Park, Jacobsburg Environmental Education Center are all located within the proposed upgrade area.

Water Management
In 2007, USGS developed a decision support framework for water management in the Upper Delaware River.

DCNR's CLI Program and Pocono CLI in the Proposed Upgrade Region
The CLI program is a prime example of municipalities, state agencies, and civic organizations, working together to implement effective strategies to protect watersheds including the Upper and Middle Delaware. In 2004 the Pennsylvania Department of Conservation and Natural Resources (DCNR) developed the "Conservation Landscape Initiative" (CLI). The mission of the Initiative is to recognize the collaborative effort between state agencies, local governments, municipalities, and nonprofit organizations, who are implementing strategies to efficiently manage, conserve, and develop important landscapes throughout Pennsylvania. The goal of this integrated approach is to make a positive economic and ecological impact in the designated region through investment in sustainability, conservation, and economic revitalization initiatives. Conservation Landscape Initiative regions are usually areas that have the following characteristics: a large presence of DCNR state owned lands; a sense of common place and identity; a landscape made ready to commit to conservation due to either threat or opportunity; a region with strong civic engagement; and a presence of strategic investments on behalf of state agencies, regional, and statewide partners, which are able to provide financial and technical support to the regions conservation, and "sustainable economic initiatives".

The proposed upgrade region of the Upper and Middle Delaware Watershed is home to the "Pocono Forest and Waters Conservation Landscape Initiative". This CLI encompasses tracts of land within Carbon, Pike, Monroe, Lackawanna, Luzerne, and Wayne counties. The region is notable for its large expanses of ecologically sensitive lands and vast recreational opportunities. The Pocono Forests and Water region for example, contains approximately 54,536 acres of state parks, 115,000 acres of state forests and several hundred miles of trails and other outdoor recreational facilities such as hunting and fishing clubs. The region also is composed of the highest concentration of wetlands within the state of Pennsylvania. Although this region contains merely 8% of the state's land area, it harbors over 20% of the state's wetlands, 4,700 miles of streams, and 74 miles of lakes and ponds.

County, municipal officials, and community members within the Pocono Forest and Water Region have identified that unchecked development and urban sprawl is one of the most significant threats to the ecological sanctity of this CLI. Therefore, the members of Pocono Forests and Waters have identified progressive planning as a necessity to preserve the natural character of the region. Other objectives of the Pocono Forests and Waters plan call for expanding resource protection initiatives to enhance the foundation of existing recreation and ecotourism opportunities. The plan also seeks to foster community development by implementing region-focused educational initiatives for municipalities and community members, expanding markets for nature based tourism, and promoting community workforce development. The Pocono Forests and Waters CLI encourages an integrated approach amongst federal, state, and local governments, as well as civic organizations to meet these objectives.

A Pocono CLI project includes (Delaware Riverkeeper Network is investigating other CLI projects in the proposed upgrade area and will provide to PADEP):

- The Bethlehem Authority was recently approved to receive a $20,000 grant from the Pocono Forest and Waters CLI to help complete a forest stewardship plan through the Forest Stewardship Council. This will benefit approximately 23,000 acres of mostly forested watershed property in Carbon and Monroe counties. The mountain reservoirs and watersheds at Wild Creek and Penn Forest, as well as the Tunkhannock Creek backup supply near Long Pond, serve as the water supply for Bethlehem's water system which serves approximately 115,000 people in Bethlehem and 10 surrounding municipalities.

Other Conservation Easement and Protection Programs

Pike County began an agricultural easement program in 2006 to begin preserving important farmland. The Pike County Agricultural Land Preservation Board works with landowners who are interested in selling the development rights to their property. The county is eligible to obtain matching funds from the state to preserve agricultural properties.

Pike County's Scenic Rural Character Preservation Program

The mission of this Pike Countyh Scenic Rural Character Program run by PCCD is, "To provide for the protection of drinking water; wildlife habitat; preservation of scenic ridges and critical open space; protection of water quality of rivers, lakes and streams; parks and recreational areas; improved county and municipal planning; and related acquisitions of real property or interests therein from willing sellers on a voluntary basis and to provide education, outreach and the provision of funds for such purposes."

This program is now in its 3rd year of accepting grant applications for funding. At this time, projects eligible for funding include:

- Municipal Planning Initiatives (Comprehensive Plans, Open Space Plans, and Ordinance Updates)
- Conservation Easements from willing sellers
- Parcel Acquisition from willing sellers

- Donated Conservation Easements

In November 2005, Pike County voters affirmed the importance of preserving and protecting the natural resources of Pike County and the County's scenic rural character, by voting "Yes" with a margin of more than 2 to 1 on the Scenic Rural Character Preservation $10 Million bond referendum placed on the ballot by the County Commissioners.

This vote was consistent with the findings of the Pike County Planning Commission's Community Survey completed in summer 2004 as part of the update of Pike County's Comprehensive Plan. Approval of the Scenic Rural Character Preservation Bond was an important step in protecting the County's natural resources, preserving sensitive natural areas and critical open space, providing parks and recreation areas and improving planning efforts at both the County and Municipal levels.

In September 2006, the Pike County Commissioners voted in favor of financing a portion of the $10 million SRCP Bond to jump start the program. Initially $1.2 million will be financed over three years. Also in Fall 2006, the Preservation Board presented a Municipal Planning Initiatives Grant Manual to the Commissioners for their review. The Commissioners approved the Manual on October 18, 2006, and it was distributed to the thirteen municipalities in the county. The Municipal Planning Initiatives Manual contains the guidelines for Pike County municipalities to access Scenic Rural Character Preservation Program funds for the purposes of "municipal planning." Grant funds under this aspect of the program are provided for municipalities to undertake the development or update of Municipal Comprehensive and/or Open Space Plans or the update of land use ordinances such as Subdivision and Land Development (SALDO), Zoning, Stormwater or Floodplain Ordinances.

Monroe County

On April 9, 2011, the Pennsylvania Land Trust Association presented Monroe County with the Government Conservation Leadership Award. The county was recognized for its "proactive land protection strategies and commitment to protecting sensitive and scenic areas and critical natural resources". Monroe County's 2020 open space program was successful in incentivizing all 20 municipalities in the county to create local multi-municipal open space plans, and other planning initiatives as well as full participation in one of six regional multi-municipal open space-planning initiatives. Overall, the county has been successful in preserving over 12,000 acres of land since 1999, and over 6,000 acres through the county's Agricultural Lands Preservation program. Monroe is the second fastest growing county in Pennsylvania after Pike County. Monroe County's 2020 Open Space Program was developed in part to initiate a community-based approach in dealing with urban sprawl issues detracting from much of their pristine rural environment.

Monroe County was also recently designated by EPA Region 3 as one of their "Green Communities." The EPA Green Communities program aims to help develop environmental stewardship at the local level by bringing together community leaders and providing information on how a given community can integrate sustainable practices to solve local problems. This program is designed to support communities that are actively seeking ways to promote the quality of their environment. Much of what propagated Monroe County adopting the 2020 Open Space Plan was EPA Region 3 partnering with Harvard University,

the Commissioners and Planning Commission, the Monroe County Conservation District, and the USDA Forest Service to develop planning and development strategies for the county.

Jackson Township
Jackson Township has just recently received a grant of $225,000 from DCNR to preserve 85 acres along Sherwood Forest Road for greenway, passive recreation, and watershed protection.

Pocono Heritage Land Trust a $258,300 grant for the acquisition of "60 acres owned by the Fairview Water Co. along Route 940 in Mount Pocono Borough for habitat and watershed protection, open space and passive recreation". These projects are part of the Pocono Forest and Waters CLI.

These initiatives show a tie between legally binding sound land use measures coupled with conservation easement programs and other methods for real estate to be protected for the long term. Delaware Riverkeeper Network is investigating other conservation easements and will provide additional data to PADEP when it becomes available.

Designated River of the Year 2011: The Delaware River
(In 2010 the Lackawaxen River was designated River of the Year)
This past January, the Pennsylvania Department of Conservation and Natural Resources (DCNR) and the Pennsylvania Organization for Watersheds and Rivers (POWR), named the Delaware River "River of the Year" for 2011. This award has been presented annually to a river in Pennsylvania since 1983; last year's winner was the Lackawaxen River, a major tributary to the Delaware.

"The Delaware River is the longest un-dammed river east of the Mississippi and is steeped in history, diverse in resources, and is vital to protect," Department of Conservation and Natural Resources Secretary John Quigley said. "Its waters serve the needs of more than 15 million people from four different states, including more than 5 million Pennsylvanians. It boasts the largest freshwater port in the world, as well as threatened and endangered species, and a thriving tourism industry."

The mission of this award is to show support for, and recognize the tremendous qualities, as well as economic and ecological services, that the rivers throughout the state provide. The award is also given to promote conservation efforts and to continue the river's functioning as a valuable resource. This year's vote was particularly significant as it was the first time a river was awarded this honor through a public vote. With over 10,000 votes casts for rivers throughout Pennsylvania, the Delaware earned 2,500 votes. As a public vote, this honor is especially meaningful because it shows a strong public consciousness on behalf of the River as a precious resource and for its continued conservation. The Delaware River Basin Commission and the Delaware Sojourn Steering Committee partnered to nominate the Delaware River.

Other partners of the 2011 Pennsylvania River of the Year and Delaware River Sojourn include environmental civil organizations as well as several municipal and county and agencies such as: The American Canoe Association, Delaware and Raritan Canal State Park, Delaware Canal State Park, Friends of the Delaware Water Gap National Recreation Area,

Monroe County Transit Authority, National Canoe Safety Patrol, the National Park Service – Delaware Water Gap National Recreation Area, the National Park Service – Upper Delaware Scenic and Recreational Rivers, Northeast Wilderness Experience, Nurture Nature Foundation, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Environment Council, Pennsylvania Organization for Watersheds and Rivers, Pike County Conservation District, Pocono Environmental Education Center, Pocono Mountains Visitors Bureau, PPL Corporation, Silver Lake Nature Center, the Lackawaxen River Conservancy, the Shawnee Inn and Golf Resort, Tidewaters Gateway Partnership, Upper Delaware Preservation Coalition, and Wayne Conservation District.

The Delaware River and Lackawaxen Sojourn

In commemoration of the 2011 River of the Year, June 18 – June 25 marked the 17th annual Delaware River Sojourn. The Delaware River Sojourn is an eight-day, 75 mile paddling trip down the Delaware from upper Wayne County to Lower Bucks County. The Sojourn combines kayaking/canoeing, with educational programs, and historical interpretations, bringing together paddlers from all levels of experience. Last year's Sojourn took place on the Lackawaxen River, a tributary to the Delaware, in conjunction with the Lackawaxen being named the 2010 Pennsylvania River of the Year. The mission of the Sojourn is to "heighten awareness of, and appreciation for, the ecological, historical, recreational, and economic significance of the Delaware River". The Sojourn has been successful in bringing hundreds of people to the River to enjoy and appreciate its value. Because the River flows through some of the most populated areas in the country, it is easily accessible to people from all over the region. By taking part in the Sojourn participants can experience first hand the importance of the River, and can better understand why the conservation of this resource is so important. Lawmakers and elected officials from local, state, and federal levels have participated in the Sojourn and come away with a better understanding of how protecting the River can benefit their constituents. The Sojourn has received heightened attention from the media as well as local river communities, which has led to the promotion of greater environmental stewardship on behalf of the watershed.

2011 Delaware River Conservation Act

On June 23, 2011, congressional and senatorial leaders from both sides of the political arena in Washington D.C. acknowledged the value of the Delaware River through the introduction of H. R. 2325, the *Delaware River Conservation Act of 2011*. The goal of the proposed legislation is to encourage and support efforts throughout the Delaware River Basin to promote and restore water quality; enhancing the quality of the habitat for the 15 million people, fish and wildlife who rely on this resource for survival. If passed, this act would establish a program known as the "Delaware River Restoration Program" under the direction on the U.S Fish and Wildlife Service. The primary focus of the program is to implement a "*coordinated approach* to sustain and enhance habitat, water quality and flood control, and improvements for fish, wildlife, and people." Public planning and community outreach and education, to increase citizen involvement, would also be a major facet to this program. To maximize success in achieving these goals, monitoring, water quality research and evaluation will also be implemented.

One of the most defining features of this legislation is the proposed competitive grant program. Under the Act's grant program, the USFWS Director in conjunction with partner organizations will provide strategic funding to support on-the-ground projects. These would include initiatives such as the restoration of wetlands, forests and streams;

revitalization of waterfronts to benefit communities by modernizing their river resources; and addressing stormwater runoff and toxic pollution issues to improve water quality, habitat, and recreational uses. A proposed allocation of $5 million dollars would be the funding request for the program. A minimum of 75% of this allocation must be directed to the grant program as well as other technical assistance projects.

Main provisions of the restoration program include: facilitating coordination between states, local governments, and conservation organizations throughout the basin; carrying out coordinated restoration activities throughout the basin including, habitat restoration and protection and sustaining and enhancing drinking water quality; enhance water management throughout the basin by implementing flood mitigation strategies; encourage environmentally sensitive land use planning; improve opportunities for public recreation; encourage the capacity for the implementation of conservation projects through basin wide community outreach and education initiatives, to promote citizen involvement; and coordinate, conduct and support research activities related to conservation and restoration initiatives.

DCNR Rivers Conservation Plans and Implementation Projects (1995-2010)
DCNR has conducted a Rivers Conservation Planning Study for the Sawkill and Van Der Mark Creeks (RCP-9-19), Brodhead Creek (RCP-5-3), Northeast Northampton Watershed (RCP-12-9), and the Lehigh & Delaware Rivers/Bushkill Creek (RCP-1995-05). There are many more Conservation Plans for the Delaware River Watershed farther south outside of the upgrade area as well.

Implementation projects have also been conducted by DCNR at 5 locations in the proposed upgrade area and include: Lehigh and Delaware River/Bushkill Creek (RCI-6-23), Brodhead Creek Invasive Plant Management (RCI 11-5), Upper Delaware Knotweed Control Project (RCI-11-15), Brodhead GIS study (RCI 13-9), and Brodhead and Cherry Creek Invasive Mgmt (RCI-13-3-506).

§ 7.3(f)(ii)(G): Surface water of exceptional ecological significance. YES

Designated Important Bird Areas (IBA)
Pike County contains three Important Bird Area (IBAs) – Promised Land State Park – Bruce Lake Natural Area, Shohola Waterfowl Management Area – SGL 180, and Upper Delaware Scenic River. Two of the IBAs extend beyond Pike County, therefore, features described below pertain to the entire IBA and are not necessarily confined to the county.

Upper Delaware Scenic River IBA
The Delaware River creates the eastern border in Pike County. This IBA crosses into Wayne County and encompasses a strip of land one mile wide on the Pennsylvania side of the River. This area contains a variety of habitat types, including riparian areas, woodlands, fields, scrub habitat, hillsides, cliff, bogs, and wetlands. This IBA is important migrating habitat for many species and is a major Bald Eagle wintering location.
This area satisfies the following IBA criteria:

- Great Blue Heron colony of approximately 25 nests
- Breeding Bald Eagle and Osprey and wintering Bald Eagle
- Breeding Northern Goshawk, breeding Pied-billed Grebe and large numbers during fall migration

- Northern bogs with characteristic vegetation and rare plants that support Canada Warbler, Whitethroated
- Sparrow, Northern Waterthrush, Alder Flycatcher, and Common Merganser.

Shohola Waterfowl Management Area (SGL 180 IBA)
This IBA is a large man-made lake on State Game Lands 180. There are two wildlife propagation areas in Shohola Lake that are closed to the public. Bald Eagles were released in the area in the 1980s and currently breed here. Standing dead trees and marshy areas provide habitat for waterfowl, wading birds, birds of prey, and shorebirds.
This area satisfies the following IBA criteria:

- Large numbers of Wood Duck, American Black Duck, Mallard, and Canada Goose occur here during spring migration, fall migration, and the breeding season.
- Bald Eagles are known to breed at this location.
- The PA Game Commission publishes an annual report of the waterfowl banding data.

Promised Lake State Park – Bruce Lake Natural Area IBA
Located along the western border of Pike County and into Monroe County, this IBA contains a man-made lake and several wetlands. Coniferous forests surround the open wetlands and provide a diverse array of habitat types that support a variety of species.
This area satisfies the following IBA criteria:

- The diverse habitats support 197 documented species of birds
- Bald Eagles are known to breed at this location, Olive-sided Flycatcher is a possible breeder that is currently considered extirpated in the breeding season.
- This area contains a variety of wetland types – emergent, submergent, shrub, and spruce/fir.
- The Pennsylvania Society for Ornithology is currently conducting a Special Areas Project. Mallards and Wood Ducks are banded in the pre-hunting season.

Designated Important Mammal Areas
Delaware State Forest Bushkill Creek Area
This IMA covers just over 96,000 acres. Most of that is part of Delaware State Forest, with some privately owned areas. Most of the land in private ownership is large landowners, such as hunting and fishing clubs, recreational camps, and resorts. Several residential subdivisions are also located within the IMA boundary.
This area satisfies the following IMA criteria:

- The IMA supports habitat specific mammals, such as river otter, snowshoe hare, northern water shrew, and porcupine, as well as wide-ranging mammals such as black bear and bobcat.
- The IMA includes a landscape scale mosaic of habitats typical of the Pocono Mountains.
- There is a confirmed viable local population of snowshoe hare that is listed as a Candidate – At Risk species. Snowshoe hares regularly occur in and near spruce bogs in the IMA.

Delaware Water Gap/Pocono Environmental Center
This IMA covers over 100,000 acres, most of which is located in southern Pike County. Parts of the Upper Delaware River corridor and Delaware Water Gap National Recreation

Area are included in this IMA. This protected area provides habitat for species affected by heavy development pressure in the area. The IMA also includes Pocono Environmental Education Center and the Pinchot Institute for Environmental Studies. More than half of the IMA is privately owned.

This area satisfies the following IMA criteria:

- There are significant populations of species with specific habitat requirements, including: Allegheny woodrat, northern river otter, and northern long-eared bat.
- The habitat is representative, rare, threatened, or unique, with over 40 miles of protected river frontage, tributary streams, cliffs, caves, and talus slopes.
- Significant colonies of little brown bat and big brown bat within the park.
- Important core populations or population segments of beaver noted along major tributaries.
- Possibly active Allegheny woodrat colony. The woodrat colony is a historic location that is part of a metapopulation extending to the south and west.
- There is a confirmed viable local population of northern river otter, northern long-eared bat, and snowshoe hare.
- Numerous sites within the Delaware Water Gap National Recreation Area and Pocono Environmental Education Center allow for the viewing of mammals in their natural habitat.
- An established educational program interprets the natural history of resident mammals and other wildlife. Pocono Environmental Education Center has conducted wildlife interpretation experiences for more than 30 years.

Pennsylvania Natural Heritage Program Data

The Upper and Middle Delaware has many "Least Disturbed Stream" Reaches

PA's Aquatic Community Classification System catalogues and prioritizes stream life throughout the Commonwealth to help better protect streams in pristine conditions and restore those needing help. The proposed upgrade area of the Upper and Middle Delaware has a plethora of "Least Disturbed Streams" or LDS reaches (see map on CD). These high quality stream segments have little human disturbance and influences and demonstrate natural ecological function.

The Upper and Middle Delaware has many Tier 1 and Tier 2 Priority Conservation Watersheds (NPDI Aquatic Classification Study for PA)

The PA Aquatic Community Classification also categorized tiers with the greatest conservation needs based on their exceptional aquatic diversity for mussels, macroinvertebrates, and fish species. To select the watersheds that were of greatest conservation value, each watershed was categorized as 'Tier 1', 'Tier 2', or 'non-priority' for each of the three variables. Tier 1 status for a particular variable indicates that the watershed is in the 90th percentile or greater for that particular variable; i.e., Tier 1 represents the best 10% of all stream reaches. Those in between the 80th-90th percentiles were identified as 'Tier 2'. Watersheds that fell below the 80th percentile for a variable did not receive a ranking for that particular variable. West Branch Dyberry Creek, Carly Brook (Lackawaxen River), and Big Brook are Tier 1 and 2 Priority Conservation Areas. Tier 2 Enhancement areas include: South Branch Calkins Creek and North Branch Calkins Creek.

Important Natural Heritage Areas

Wayne County Natural Heritage Areas

The primary purpose of the Wayne County Natural Heritage Inventory has been the mapping of the locations of the most important natural areas within Wayne County. The inventory has included not only exemplary natural communities, but also the locations of plant and animal species of concern (endangered, threatened, or rare) in Wayne County, and the locations of several areas that cannot be deemed natural but may be of significance because they harbor a diverse flora. Natural Heritage Areas include both the immediate habitat and surrounding lands important in the support of these elements and are mapped according to their sensitivity to human activities. There are many glacial bogs and lakes scattered throughout Wayne County that are considered to have statewide significance. In addition rookeries and rare plant communities are also noted in abundance. There are also many areas of local significance in Wayne County based on size, diversity of wildlife and plant life, water quality protection, and recreation potential. The Delaware River is ranked as high priority for Wintering Bald Eagle area; bird migration corridor; shad spawning grounds; rare plants; water supply; river recreation; and aesthetics.

Wayne County abounds with natural heritage areas – too extensive to include all locations in the body of this petition. We summarize the number of areas for each township in Wayne County within the proposed upgrade area below. We are also including the 1991 Heritage Area Report and it is being submitted as hard copy in the Appendices.

Below is a listing of 59 Natural Heritage Areas listed in Wayne County listed by township that are part of the proposed upgrade area.

Canaan Township (3)
Hoadley Pond
Salem Hill Barren
Aldenville Mud
Clinton Township (5)
Carr Pond
Dyberry Creek Rookery
Elk Lake
Lower Woods Pond
Miller Pond

Damascus Township (9)
Lovelace Pond
Narrowsburg Bend
West Damascus Rookery
Milanville Riverwash
South Milanville Riverwash
Carley Brook Bog
Clonkling Hill
Girdland Bog
Delaware River (SA502)

Dyberry Township (1)
Prompton Bog

Lake Township (2)

Lake Ariel
Lake Henry

Manchester Township (3)
Dripping Cliffs
Lookout Bog
Peterson Lake

Palmyra Township (1)
Hawley Bog

Paupack Township (1)
Wangum Creek Rookery

Preston Township (17)
Hiawatha Lake
Lakewood Bog
Crooked Mud Pond
Spruce Pond
Bigelow Lake
Flat Rock Bog
Howell Pond
Island Lake
Maple Grove
Mt. Ararat
Poyntelle Lake
Shehawken Lake
Holberts Pond
Sly Lake
Buckingham Boat Access
Finnegan Corners
Little Bigelow Lake

Salem Township (5)
Topps Bog
Clemo Pond
Lackawac Lake
Lake Ariel
Marsh Pond

Sterling Township (6)
Lehigh Pond
Thousand Acre Swamp
Bender Swamp
Freytown Swamp
Gas Hallow
Snag Pond

Scott Township (2)

Hancock River
Stockport Woods

Texas Township (4)
Chestnut Lake
Crockenburg Pond
Pipeline Bog
Bear Swamp

Pike County Natural Heritage Areas
Pike County abounds with natural heritage areas – too extensive to include all locations in the body of this petition. We summarize the number of areas for each township in Pike County within the proposed upgrade area below. The extensive and updated Heritage Area 274-page report (updated July 2011) is being submitted in hard copy as part of this petition and on electronic disk for reference. Both core habitat and supporting landscape maps are also included.

In summary, Pike County contains 555 extant occurrences of endangered, threatened, and rare species and natural communities, ranking third out of the Commonwealth's 67 counties. Many of these species are found in the glacial wetlands and other unique habitats in the county. Municipal breakdowns of this data are presented in the full report in Figure 10.

According to the updated Natural Heritage Inventory, Pike County is one of the top counties in terms of biodiversity within the state of Pennsylvania. Inventory scientists recommend that protection of privately-owned sites and careful management of publicly-owned sites should be a priority to protect the unique habitats and the species they support. Several globally rare species are found in the unique habitats of Pike County, many of these occurring in the glacial wetlands; therefore, upstream watershed protection is critical for the persistence of these species. A breakdown of the rare, threatened, and endangered species found in Pike County by their official state legal status is presented below (and in Table 12 of the Inventory).

State conservation status of species of concern in Pike County.

State Status	# of occurrences
PA Endangered (PE)	51
PA Threatened (PT)	119
PA Candidate (PC)	34
PA Rare (PR)	88
Tentatively Undetermined (TU)	7
No Status/Unknown Status	199
PNHP Watch List	57

There is a tremendous abundance of water-dependent species from dragonflies, to plants, to freshwater mussels that are identified in the Inventory that thrive and rely on clean water quality and that are endangered, threatened, rare, or a candidate for endangered species. Freshwater mussel populations are found throughout the main stem of the Delaware River reaches. Dragonfly species and plant species are found in areas of the main stem, and in wetlands, ponds, and glacial lakes of the region that are dependent upon

maintaining good water quality. These species are sensitive to pollution, sedimentation, and other degradation of the water quality and deserve Exceptional Value protection. Roads, residential and agricultural areas, and other breaks in the forested buffer surrounding the Delaware River allow more of these pollutants to be carried by runoff into the water without being filtered. Damming and other alteration of the natural flow of the River and its tributaries would impact the habitats that these species of concern rely upon to persist.

Exceptional Value designation for these regions will allow for the goals of the Inventory to better be achieved in protecting these diverse habitats and threatened species.

Blooming Grove Township Natural Heritage Areas

There are 26 natural heritage areas in Blooming Grove Township. The second largest of Pike County's townships, Blooming Grove covers 77.1 square miles. Seventy-seven percent of the township is forested and another 10% is covered by forested and emergent wetlands. Blooming Grove is the only township in Pike County that does not share a border with another county or state. Public lands within the township include portions of Delaware State Forest and Bruce Lake Natural Area, a small section of Promised Land State Park, Little Mud Pond Natural Area, and portions of State Game Lands #180 and 183. The headwaters for Shohola Creek begin in the western part of the township. The creek flows eastward and then north into Shohola Township on its way to the Delaware River. A portion of the border between Blooming Grove and Dingman Townships is delineated by the Shohola Marsh Dam, an 1,137 acre lake built on the Shohola Creek within State Game Lands #180. Sandstone, siltstone, mudstone, and some conglomerates make up the bedrock. The southwest corner of the township contains a large forest block over 37,500 acres in size that covers portions of three other townships as well as the northeastern corner of Monroe County.

26 Blooming Grove Township Natural Heritage Areas identified include:

Beaver Lake
Billings Creek
Billings Pond
Blooming Grove Creek
Bruce Lake
Egypt Meadow Lake
Gates Run Wetland
High Knob
Lake Giles
Lake Laura
Lake Scott
Little Mud Pond North
Long Pond Swamp
Mainses Pond
Maple Swamp
Pecks Pond
Promised Land Lake
Rock Hill Ridge
Shohola Falls West
Shohola Lake

Smiths Swamp
Spring Brook Wetland
Taylortown Swamp
Wells Road Swamp
White Birch Swamp
White Deer Lake
Delaware State Forest
Bruce lake Natural Area
Little Mud Pond Swamp Natural Area
Public land: Promised Land State Park, State Game Lands #180, State Game Lands #183

Dingman Township Contains 15 Natural Heritage Areas
Dingman Township covers 59.9 square miles. The western half of the township sustains a forest block of over 5000 acres. Sixty-nine percent of the township is forested, with another 11% made up of forested and emergent wetlands; residential areas cover 6.5 % of the landscape. According to the 2000 US census bureau, 8,788 people resided in Dingman Township; this makes it the township with the greatest population in Pike County. The eastern two-thirds of the township are drained by the Raymondskill Creek that flows into the Delaware River; the western third is drained by Rattlesnake Creek, which flows northward into Shohola Creek.

Heritage areas in Dingman Township include:
Adams Creek Ravine
Big Bear Swamp
Big Bear Swamp Wetland
Delaware River between Handsome Eddy and Dingmans Ferry
Delaware River South of Dingmans Ferry
Dingmans Falls
Dry Brook
Shale Barren
Fulmer Falls
Glenside Shale Barren
Lake Maskenozha and Wetlands
Public Lands: Delaware State Forest, Stillwater Natural Area, Delaware Water Gap National Recreation Area

Ten heritage areas in Greene Township
Greene Township has 10 natural heritage areas. Eighty percent of Greene Township is forested, plus another 6% contains forested and emergent wetlands. Less than 5% of the township is in agricultural usage, which is the highest percentage for any township in Pike County. Greene Township covers 61.9 square miles along the western side of Pike County. Publicly owned lands within the township include portions of the Pine Lake Natural Area and sections of Promised Land State Park and Delaware State Forest. A large forest block of 37,500 acres covers the
eastern third of the township as well as portions of three other townships and extends into Monroe County.

Green County Natural Heritage Areas Include:
East Branch Wallenpaupack Creek

East Mountain
Goose Pond
Lake Belle
Lake Laura
Lake Paupack
Lake Wallenpaupack
Pine Lake (designated a natural area of the State Forest)
Promised Land Lake
Route 507 Wetland
Public lands include: Delaware State Forest, Pine Lake Natural Area, Promised Land State Park

Lackawaxen Township Natural Heritage Areas
The largest of Pike County's townships, Lackawaxen Township covers 81.1 square miles at the north end of the county. The township was named after the Lackawaxen River that cuts east through the township on its way to the Delaware River. The Delaware River marks the boundary between Lackawaxen Township and New York State. Land along this boundary is part of the National Park Service's Upper Delaware Management Area. Both the Delaware and Lackawaxen Rivers have cut deeply down through the rock layers made up of sandstone, conglomerate, and siltstone. A large forest block covers much of the south-central portion of the township. **Eighty-three percent of the township is forested.** A section of the Delaware State Forest along with four State Game Lands (SGLs) occurs within the township. SGL #316 covers 2,761 acres,
while SGL #116 (3113 acres) straddles rather equally the Lackawaxen/ Shohola Township line. Only small portions of SGL #180 and SGL #183 occur in Lackawaxen Township.

19 Lackawaxen Township Natural Heritage Areas include:
Corilla Lake
Delaware River North of Handsome Eddy
Forest Lake
Fourmile Pond Wetland
Germantown Swamp
Lackawaxen River at Baoba
Lackawaxen River at Rowland
Lake Greeley
Little Teedyuskung Lake
Masthope Creek
Panther Lake
Point Peter
Spring Brook Wetland
State Game Lands #316 Slopes
Teedyuskung Lake
Tinkwig Creek Roadside
Welcome Lake
Westcolang Pond
Wolf Lake
Public Lands: Delaware State Forest, State Game Lands #116, State Game Lands #180, State Game Lands #183, State Game Lands #316

The Delaware River North of Handsome Eddy has many aquatic dependent species of concern:

Alewife floater (*Anodonta implicata*) – mussel
Triangle floater (*Alasmidonta undulata*) – mussel
Green-faced clubtail (*Gomphus viridifrons*) – dragonfly
Maine snaketail (*Ophiogomphus mainensis*) – dragonfly
Mustached clubtail (*Gomphus adelphus*) – dragonfly
Rapids clubtail (*Gomphus quadricolor*) – dragonfly
Slaty skimmer (*Libellula incesta*) – dragonfly
Spine-crowned clubtail (*Gomphus abbreviatus*) – dragonfly

Lehman Township Natural Heritage Areas

Seventy-eight percent of Lehman Township is forested and it contains 16 natural heritage areas; some portions are part of the Delaware State Forest. Lehman Township covers 50.1 square miles. Toms Creek drains the northeastern portion of the township and flows into the Delaware River while Saw Creek and Little Bush Kill flow south through the township into the Bush Kill Creek which then empties into the Delaware River. The Delaware River marks the boundary between Lehman Township and New Jersey. The Delaware Water Gap National Recreational Area, part of the National Park Service holdings, stretches along the entire length of this eastern boundary. Other publicly owned lands include portions of Delaware State Forest and State Game Lands #180. The bedrock geology of Lehman Township is predominately sandstone, siltstone, and shale. The steep forested slopes along the Delaware River open up in several locations where shale barrens occur. These steep cliffs along the river have thin soils and shale outcrops that provide habitat for a unique group of species that are adapted to these harsh conditions. Red cedar (*Juniperus virginiana*) and pitch pine (*Pinus rigida*) are found growing in some of these openings. All of these locations provide habitat for a species of concern not named at the request of the agency overseeing its protection. Bushkill Shale Cliff and Glenside Shale Barren also contain a natural community of concern. Shoemakers Barren is located along Bush Kill. This habitat is composed of a little bluestem.

16 Lehman Township Natural Heritage Areas identified include:

Bushkill Shale Cliff
Deckers Creek Ravine
Delaware River South of Dingmans Ferry
Dickinson Road Bluff
Eschbach Heights Shale Barren
First Pond
Glenside Shale Barren
Lake Maskenozha and wetlands
Little Bush Kill Swamp
Minks Pond
Second Pond
Shoemakers Barren
Stuckey Lake
Sugar Mountain Swamp
Sunset Lake Woodlands
Third Pond

Public Lands include: Delaware State Forest and Delaware Water Gap National Recreation Area

Delaware River South of Dingmans Ferry Natural Heritage Areas
The Delaware River forms the eastern border of Pike County. The River creates a variety of unique habitats, including scour areas, floodplains, steep forested slopes, and vertical cliffs. Maintaining the natural character of the River is necessary to maintain these habitats. Rivers naturally change their course over time and need to remain free-flowing systems to allow for this movement. The Delaware River has remained undammed, allowing movement of the aquatic species found here.

This entire site is part of the Delaware Water Gap National Recreation Area, protecting it from further disturbance. Many of the floodplains have been cleared for agricultural fields. The gravel river bottom provides habitat for alewife floater (*Anodonta implicata*), brook floater (*Alasmidonta varicosa*), and triangle floater (*Alasmidonta undulata*). These three mussel species of concern are found embedded in the bottoms of rivers and small streams. A population of barrens buckmoth (*Hemileuca maia*), a moth species of concern, was found on Sambo Island located at the southern end of this site in Monroe County. Riverine sand cherry (*Prunus pumila var. depressa*) was found at several locations along the shoreline of the river. Tall tick-trefoil (*Desmodium glabellum*), sedge (*Carex sprengelii*), and white heath aster (*Symphyotrichum ericoides*) are three additional plant species of concern found along the Delaware River in the southern end of this site.

Milford Township Natural Heritage Areas
The small township of Milford contains 7 Natural Heritage areas. Milford Borough is the county seat of Pike County. Milford Township, at 12.6 square miles, is Pike County's smallest township; Milford Borough occupies 0.5 square miles. Milford Township, along with adjacent sections of Shohola and Westfall Townships, supports a large forest block of over 23,000 acres. Eighty percent of the township is forested. The eastern edge of both the township and the borough are formed by the Delaware River. The Delaware Water Gap National Recreational Area, owned by the National Park Service, stretches along the entire length of this eastern boundary. Sawkill Creek flows south and east through the township and into the Delaware River on the south side of Milford Borough, while Vandermark Creek enters the Delaware River on the north side of the borough. Sandstone, siltstone, and shale make up the bedrock geology.

Milford Township Natural Heritage Areas Include:
Buckhorn Oak Barren
Delaware River between Handsome Eddy and Dingmans Ferry
Dimmick Meadow Brook Wetlands
Lily Pond Brook Headwaters
Pinchot Brook Wetlands
Pinchot Falls
Sawkill Mud Pond
Public Lands include: Delaware State Forest and Delaware Water Gap National Recreation Area

Pinchot Falls – As Sawkill Creek flows toward the Delaware River, it cuts through the rock to form Pinchot Falls. This is a waterfall and rapids, a geologic feature of concern. Standing

over 85 feet tall, the mist from the falls creates habitat on the surrounding rocks for mosses, liverworts, ferns, and a variety of other plants, forming a waterfall and plungepool natural community.

Palmyra Township Natural Heritage Areas
Palmyra Township contains eight Natural Heritage Areas. Palmyra Township occupies a 39.7 square mile area along the western side of Pike County. Sixty-six percent of the township is forested – the least amount of any township in the county and 14% is covered by water, which is the most found in any township in Pike County. Thirteen mile long Lake Wallenpaupack forms most of the northwestern border between Pike and Wayne Counties and covers approximately 5,700 acres. Sandstone, siltstone, and mudstone comprise the bedrock in most of the township along with some conglomerate in the southern portion. Publicly owned lands within the township include a section of Delaware State Forest, State Game Lands 183, and portions of the Bruce Lake Natural Area and Promised Land State Park.

Palmyra Township Natural Heritage Areas include:
Buckhorn Mountain Slopes
Decker Pond
Egypt Meadow Lake
Fairview Lake
Lackawaxen River at Baoba
Lake Wallenpaupack
Mainses Pond
Promised Land Lake
Public Lands include: Delaware State Forest, Bruce lake Natural Area, Promised Land State Park, and State Game Lands #183

Lackawaxen River at Baoba – The stretch of the Lackawaxen River at Baoba runs east of Hawley just past Glen Eyre. The river itself provides habitat for several aquatic species of concern. Riffle snaketail (*Ophiogomphus carolus*), a dragonfly species of concern, was found in this section of the river. White water-crowfoot (*Ranunculus aquatilis var. diffusus*) is an aquatic plant species of concern that grows rooted to the river bottom. Riverweed (*Podostemum ceratophyllum*), a plant species on the PNHP Watch List, was found in several locations along the Lackawaxen River. Mountain starwort (*Stellaria borealis*) and an additional species of concern, not named at the request of the agency overseeing its protection, were found along the shoreline of the Lackawaxen River.

Porter Township Natural Heritage Areas
Porter Township contains 15 natural heritage areas. According to the 2000 US census bureau, 385 people reside in Porter Township, making it the township in Pike County with the fewest residents. With respect to land area, it is one of the larger townships in Pike County measuring 60.4 square miles in size. Eighty percent of the township is forested and another 14% consists of forested and emergent wetlands. Sandstone, siltstone, and mudstone make up the bedrock geology. Along its western edge, Porter Township shares a portion of a large forest block approximately 37,500 acres that covers portions of three other townships and extends into Monroe County. Bush Kill Creek flows out of Pecks Pond in the northern end of the township and eventually empties into the Delaware River. Much of the land within the township is state owned. Public lands include the Pennel Run Natural

Area, a section of the Stillwater Natural Area, and extensive sections of Delaware State Forest.

Porter Township Natural Heritage Areas Identified Include:
Bald Hill Swamp
Beaver Run Club Pond
Big Swamp
Bushkill Road
Edgemere Road
Elbow Swamp
Lake Minisink
Little Mud Pond
Painter Swamp
Pecks Pond
Pit Road
Porters Lake
Sap Swamp
Twelvemile Pond
White Birch Swamp
Public Lands include: Delaware State Forest, Pennel Run Natural Area, and Stillwater Natural Area

Bald Hill Swamp – This wetland is located to the west of Bush Kill. Bald Hill Swamp is dominated by red spruce (*Picea rubens*). The majority of the wetland is a red spruce palustrine woodland. The ends of Bald Hill Swamp are red spruce palustrine forests. Both of these are natural communities of concern, differentiated by the amount of tree cover. The stream flowing to the east of Bald Hill Swamp provides nesting habitat for a pair of Osprey (*Pandion haliaetus*), a bird species of concern. Nearby bodies of water, such as Silver Lake and Little Mud Pond, also provide important foraging habitat.

Elbow Swamp – This wetland is dominated by red spruce (*Picea rubens*) with some black spruce (*Picea mariana*), eastern hemlock (*Tsuga canadensis*), and a thick shrub understory. The forested portion of Elbow Swamp is a red spruce – mixed hardwood palustrine forest. This natural community of concern also supports dwarf mistletoe (*Arceuthobium pusillum*), a plant species of concern. A population of arctic skipper (*Carterocephalus palaemon mandan*), a butterfly species of concern, was seen along the roadside north of Elbow Swamp. This species uses several species of grasses as its larval host plant and can also be found in graminoid wetlands.

Lake Minisink – Although the shoreline has been highly modified, the lake provides habitat for several plant species of concern. Water bulrush (*Schoenoplectus subterminalis*) and a large population of bayonet rush (*Juncus militaris*) grow along the shallow edge of Lake Minisink. Flat-leaved bladderwort (*Utricularia intermedia*) and floating-heart (*Nymphoides cordata*) both are found in the shallow edges of the lake floating on the water's surface. Small beggar-ticks (*Bidens discoidea*), a plant species of concern, was found in several locations along the shoreline. This species is able to persist in modified habitat better than many other species of concern. The shallow water along the shoreline also provides habitat for golden club (*Orontium aquaticum*), a plant species on the PNHP Watch List.

Twelvemile Pond is an acidic glacial lake, a natural community of concern. Surveys located populations of three plant species of concern. A small population of water lobelia (*Lobelia dortmanna*) grows in the shallow water along the southern edge of Twelvemile Pond, while bayonet rush (*Juncus militaris*) occurs along the northern edge of the lake. Floating-heart (*Nymphoides cordata*) is found along the entire lake edge. This species is rooted in the lake bottom, with leaves and flowers that float on the surface. An additional species of concern, not named at the request of the agency overseeing its protection, was also found at Twelvemile Pond.

White Birch Swamp – This small wetland is a hemlock – mixed hardwood palustrine forest, a natural community of concern. White Birch Swamp is dominated by red maple (*Acer rubrum*) and black gum (*Nyssa sylvatica*) and also contains eastern hemlock (*Tsuga canadensis*), red spruce (*Picea rubens*), and white pine (*Pinus strobus*).

Shohola Township Natural Heritage Areas

Shohola Township contains 10 natural heritage areas. Shohola Township measures 45.9 square miles in size. Forest makes up 85% of the landscape in Shohola Township. Shohola Creek flows to the north and east through the township and serves as a major drainage for the central portion of Pike County. Pond Eddy and Twin Lakes Creek drain the eastern two thirds of the township. All streams within the township drain into the Delaware River, which forms a natural border between Shohola Township and New York State. The National Park Service manages land along the river as part of the Upper Delaware Management Area. Sandstone, siltstone, and mudstone make up the bedrock geology. Portions of State Game Lands #116 and #180 occur at the western end of the township. State Game Lands #209, a section of Delaware State Forest, and the Buckhorn Natural Area cover much of the eastern third of Shohola Township. This eastern section of the township, along with portions of Westfall and Milford Townships, is part of a large forest block covering over 29,000 acres.

Ten Shohola Township Natural Heritage Areas identified include:
Bald Hill
Bushkill Swamp
Delaware River between Handsome Eddy and Dingmans Ferry
Delaware River North of Handsome Eddy
Shohola Falls Swamp
Shohola Falls
Shohola Lake
State Game Lands #209 Wetland
Twin Lakes and Wetland
Walker Lake
Delaware State Forest
Buckhorn Natural Area
Stairway Wild Area
Public Lands Include: State Game Lands #116, State Game Lands #180, State Game Lands #209, and Upper Delaware Management Area

Bushkill Swamp – This small bog opening in the middle of a shrub swamp provides a unique habitat for a number of species found only on the sphagnum mats surrounding

glacial wetlands. A leatherleaf – bog-rosemary peatland occurs in a narrow band around the water's edge. This natural community of concern provides habitat for several plant species of concern – Mud sedge (*Carex limosa*), horned bladderwort (*Utricularia cornuta*), and slender sedge (*Carex lasiocarpa*). The black spruce (*Picea mariana*) growing on the floating sphagnum mat support a population of dwarf mistletoe (*Arceuthobium pusillum*), a plant species of concern that parasitizes black spruce, red spruce, and tamarack. Harlequin darner (*Gomphaeschna urcillata*), elfin skimmer (*Nannothemis bella*), and American emerald (*Cordulia shurtleffi*), three dragonfly species of concern, were all found in Bushkill Swamp and the surrounding wetland. Soft-leaved sedge (*Carex disperma*), a plant species of concern, was found growing on the edge of the wetland and in a smaller wetland that sits to the south of Bushkill Swamp.

The Delaware River North of Handsome Eddy is part of the Upper Delaware Management Area.
This area is mostly privately owned and provides habitat for several aquatic species of concern. Alewife floater (*Anodonta implicata*) and triangle floater (*Alasmidonta undulata*), two mussel species of concern, were found in the gravel river bottom. Green-faced clubtail (*Gomphus viridifrons*), Maine clubtail (*Ophiogomphus mainensis*), mustached clubtail (*Gomphus adelphus*), rapids clubtail (*Gomphus quadricolor*), slaty skimmer (*Libellula incesta*), and spine-crowned clubtail (*Gomphus abbreviatus*) are dragonfly species of concern found along the River. An additional species of concern, not named at the request of the agency overseeing its protection, was also found in this section of the Delaware River. Riverweed (*Podostemum ceratophyllum*) is a plant species on the PNHP Watch List that was found near the mouth of the Lackawaxen River.

Delaware River between Handsome Eddy and Dingmans Ferry north to Milford is part of the Delaware Water Gap National Recreation Area, protecting it from development and other large scale disturbances. This section of the Delaware River provides habitat for several aquatic species of concern. Alewife floater (*Anodonta implicata*), brook floater (*Alasmidonta varicosa*), and triangle floater (*Alasmidonta undulata*), three mussel species of concern, were found in the gravel river bottom. Extra-striped snaketail (*Ophiogomphus anomalus*), harpoon clubtail (*Gomphus descriptus*), rapids clubtail (*Gomphus quadricolor*), green-faced clubtail (*Gomphus viridifrons*), slaty skimmer (*Libellula incesta*), and spine-crowned clubtail (*Gomphus abbreviatus*) are dragonfly species of concern found along the River. Large flat rocks along the shoreline provide habitat for several plant species of concern – Riverine sand cherry (*Prunus pumila var. depressa*), three-toothed cinquefoil (*Potentilla tridentata*), and tufted hairgrass (*Deschampsia cespitosa*). A sedge (*Carex sprengelii*) is another plant species of concern found growing along the shoreline. Two additional species of concern, not named at the request of the agencies overseeing their protection, were also found in this section of the Delaware River.

Shohola Falls – As Shohola Creek exits Shohola Lake, it drops 70 feet, creating Shohola Falls. Over the course of a half mile, Shohola Creek drops a total of 200 feet. The waterfalls and rapids geologic feature is part of the Catskill formation and is from the Devonian Age. A small conifer – hardwood seepage swamp occurs to the east of Shohola Falls and is surrounded by a well-drained hardwood forest. This small wetland supports a population of soft-leaved sedge (*Carex disperma*), a plant species of concern. This species is found growing in the sphagnum moss that covers the tree roots and grows among the rocks.

Shohola Falls Swamp – Most of this wetland is part of State Game Lands #180 with a private inholding on the western edge of Shohola Falls Swamp. This small wetland north of Route 6 is a black spruce – tamarack peatland forest, a natural community of concern. The black spruce and tamarack overstory has a thick shrub understory with a sphagnum base.

Twin Lakes and Wetland – This lake is a residential area cut into many privately owned parcels. Most of the shoreline habitat has been disturbed by development, but a population of small beggar-ticks (*Bidens discoidea*), a plant species of concern, still occurs in several locations along the shoreline. The lake itself provides habitat for several species of concern – Floating-heart (*Nymphoides cordata*), slender water-milfoil (*Myriophyllum tenellum*), and bayonet rush (*Juncus militaris*). Small waterwort (*Elatine minima*) and floating bladderwort (*Utricularia inflata*) are two species on the PNHP Watch List that were also found during surveys on Twin Lakes. Twin Lakes is surrounded by several small wetlands, many of which are spruce dominated palustrine forests. One such wetland to the south of Twin Lakes provides habitat for a population of dwarf mistletoe (*Arceuthobium pusillum*). This plant species of concern parasitizes the black and red spruce found in this wetland. The open, sedge dominated portion of the wetland also provides habitat for Halloween pennant (*Celithemis eponina*) a dragonfly species of concern.

Westfall Township and Milford Borough Natural Heritage Areas

The Delaware River separates Westfall Township from the state of New York along its northeastern border and from the state of New Jersey along the southeastern edge. Matamoras is the easternmost point in Pennsylvania with Westfall Township and the Delaware River forming its borders. Matamoras Borough covers 0.8 square miles and Westfall Township at 31.0 square miles is Pike County's second smallest township. Eighty-eight percent of Westfall Township is forested, giving it the highest percentage of forest of any township in Pike County. The bedrock of the township is primarily sandstone, siltstone, and shale. Much of Westfall Township, along with adjacent sections of Shohola and Milford Townships, supports a large forest block of over 29,000 acres. The western portion of the township is a part of Delaware State Forest. All the streams in Westfall Township flow east into the Delaware River. The National Park Service administers two areas along the Delaware River in Westfall Township: the Upper Delaware Management Area along the northern township border and the Delaware Water Gap National Recreation Area at the southern tip of the township.

There are nine heritage areas in Westfall Township and they include:

Buckhorn Oak Barren
Delaware River between Handsome Eddy and Dingmans Ferry
Dimmick Meadow Brook Wetlands
Mashipacong Cliffs
Matamoras Cliffs
Millrift Cliffs
Millrift Flats
Old Port Jervis Road Shale Barrens
Stairway Lake Wetland
Public lands include: Delaware State Forest, National Park Service, Delaware Water Gap National Recreation Area, and Upper Delaware Management Area

Milrift Cliffs – This northeast-facing shale cliff rises over 100 vertical feet from the Delaware River. Water runs over the surface of the Milrift Cliffs and creates a unique habitat that supports a large population of roseroot stonecrop (*Sedum rosea*), a plant species of concern. Pennsylvania represents the southern end of the known range for this species, which is known from few locations in the state. This section of the Delaware River shoreline also represents a calcareous opening/cliff, a natural community of concern. An additional species of concern, not named at the request of the jurisdictional agency overseeing its protection, was also noted at this site.

Stairway Lake Wetland – This small wetland is one of many along Bush Kill and is part of the Stairway Lake Wild Area in Delaware State Forest. This part of the wetland is a hemlock palustrine forest, a natural community of concern. The hemlocks in this type of habitat grow in sphagnum with pit and mound topography. The southern portion of Stairway Lake Wetland has some openings dominated by sedges, grasses, and other herbaceous vegetation. This area provides habitat for marsh bedstraw (*Galium trifidum*), a plant species of concern. Dimmick Meadow Brook Wetlands – This small headwater wetland flows to the west of Buckhorn Oak Barren. Several locations along this narrow channel have been modified by beaver activity. These open graminoid wetlands provide habitat for marsh bedstraw (*Galium trifidum*), a plant species of concern. This species is found growing on hummocks of tussock sedge (*Carex stricta*). Halloween pennant (*Celithemis eponina*), a dragonfly species of concern, was also found in Dimmick Meadow Brook Wetlands. This dragonfly species can be found in a variety of different types of wetlands. A small wetland to the west of the stream channel is a red spruce palustrine woodland. This natural community of concern is dominated by red spruce (*Picea rubens*) with a thick shrub understory.

The Nature Conservancy Lands and Perspective

According to The Nature Conservancy, the Upper Delaware River watershed contains groundwater-influenced fens near Mount Bethel, high-quality, seasonal vernal pools scattered throughout the Greater Minsi Lake Corridor, dramatic cliffs and hardwood forests comprising the remote Long Eddy River Edges Preserve, and a rich floodplain forest of increasingly rare butternut trees on Butternut Island. This unique assemblage of cool, clean waters, interesting geology, healthy forests and extensive wetlands support abundant wildlife. Mammals including bobcat, beaver, bear and fox roam throughout this watershed that also boasts a world-class fishery abundant with trout, small mouth bass, shad and walleye. The Upper Delaware River also contains an important segment of the Atlantic flyway. Each year, more than 200 species of birds spend part of their life cycle in this region.

Great Minsi Lake Corridor

Sandwiched between the Delaware Water Gap National Recreation Area and Northampton County's park system, the Greater Minsi Lake Corridor represents a collection of forestlands and other natural areas that if preserved, would link and protect valuable wildlife habitat spanning several thousands of acres. The corridor hugs part of the Kittatinny Ridge, and lies in close proximity to the Appalachian Trail and Delaware River. Well-known for its recreational opportunities, this location also contains important ecological features, including one of the largest collections of vernal pools in Pennsylvania. The corridor spans spans about 2,000 acres between Minsi Lake County Park and the Appalachian trail in Northampton County and the top of Kittatinny Ridge (3 miles

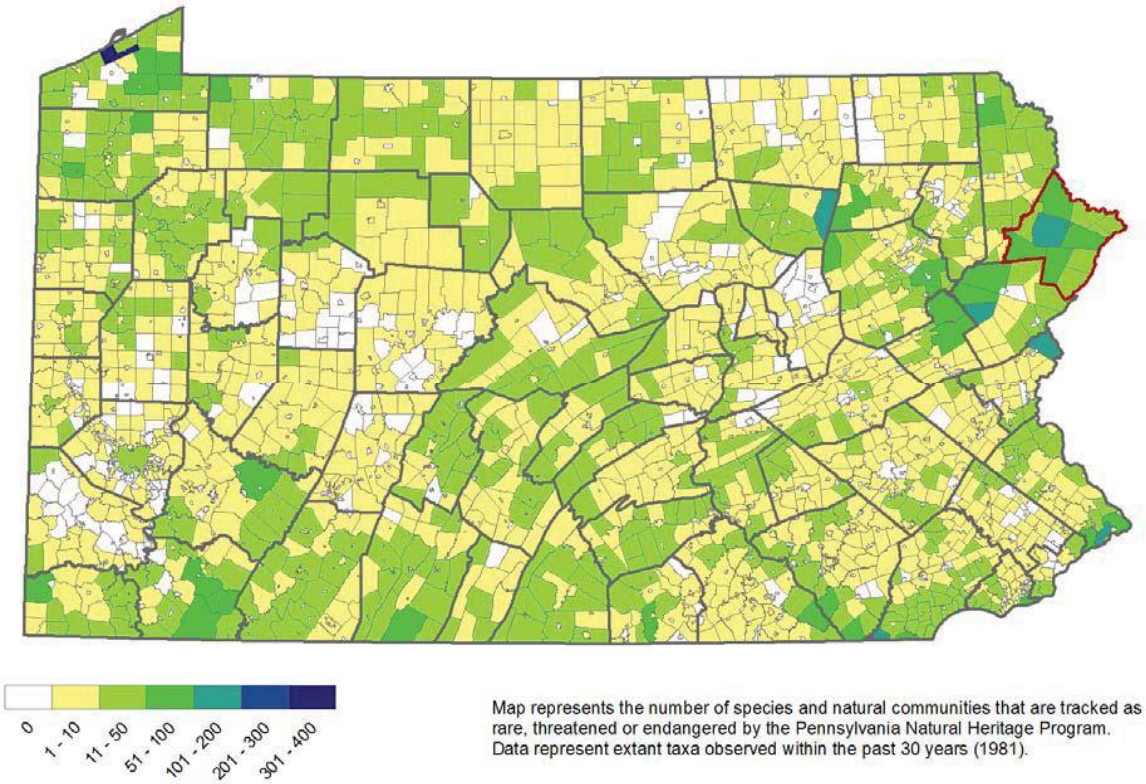
northwest of the town of Mt Bethel). See this link for a map: http://www.protectedplanet.net/sites/Minsi_Lake_Corridor_Vernal_Ponds_Conservancy_Easement_The_Nature_Conservancy)

The hundreds of vernal pools located throughout the Minsi Lake Corridor come to life during the spring, when melting snow and frequent rains fill the seasonal ponds and summon numerous species that spend part of their life cycle in these temporary wetlands. By summer, some of these "microhabitats" dry up, and can go unnoticed by casual observers and even dedicated conservationists. However their significance – no matter the season – is not lost on the species supported by them, including numerous amphibians such as marbled and spotted salamanders.

Throughout the region, scattered forests of tulip poplar, red maple, sweet birch, red and white oak, and shagbark hickory directly benefit the vernal pools. The dense woodlands shade the water, reduce evaporation and control runoff. They also provide ideal habitat for forest interior-breeding birds such as the Scarlet tanager. Since the removal of trees jeopardizes the pools, The Nature Conservancy continues to acquire land and conservation easements throughout the Minsi Lake Corridor to establish a greenway of natural areas that will ensure these and other fragile habitats remain undisturbed into the future. TNC is acquiring lands and conservation easements to establish the Greater Minsi Lake Corridor and connect it with existing protected areas, including the Delaware Gap National Recreation Area, managed by the National Park Service, and Northampton County's Minsi Lake Wilderness Area. The Nature Conservancy acquired 115 acres of high-quality vernal pool habitat in 2001, and an additional 130 acres in 2006. Northampton County acquired more than 500 acres in 2003 and 2004 (part of the Minsi Lake Corridor). The Nature Conservancy is partnering with: Northampton County, Pennsylvania Department of Conservation and Natural Resources, Upper Mount Bethel Township, National Park Service, William Penn Foundation, Wildlands Conservancy, local communities.

Threatened & Endangered Species

The proposed upgrade area is a hot spot for the Commonwealth when looking at threatened and endangered plant, animal, and insect species. Many of the species are also reliant on good water quality to survive. This map below, provided by the Pike County Natural Heritage Inventory, is telling about what the region has to offer and why Exceptional Value status is essential and deserved. See specifics of the Natural Heritage Inventories provided above and included in the Appendix.



Distribution of endangered, threatened and rare species by municipality, darker colors indicate more occurrences these species in a given municipality. (PNHP Data 2010).

Mussels of the Delaware River

The proposed upgrade area has a variety of freshwater mussels that reside in the main stem Delaware River. The dwarf wedgemussel once existed in 70 areas within 15 Atlantic slope basins from Canada to North Caroline (USFWS 1993). Today though, the dwarf wedgemussel is thought to be extirpated because of pollution, dams, and other factors from all but about 30 small areas. Here in the Delaware River, the dwarf wedge mussel still hangs on and is found in the Upper Delaware River, the Paulins Kill, and the Pequest Rivers. Fish hosts include tessellated darter (Etheostoma olmstedi), mottled sculpin (Cottus bairdi), and Johnny darter (Etheostoma nigrum) (Michael and Neves 1995).

The green floater was once found in smaller streams in quiet pools and eddies with gravel and sand bottoms (Ortmann 1919) and is one of the mussels that scientists believe is no longer found in the Delaware River today with one exception in New Jersey, where there is an individual green floater in the Stony Brook in Mercer County that may very well be the last of its kind in the entire Delaware River Basin. The host fish is unknown but some

research indicates that the green floater may not require a host fish at all to reproduce (Barfield and Watters 1998, Lellis and King 1998).

The yellow lampmussel prefers large rivers that drain more than 1,200 sq km and is found in sand/silt bottoms. The alewife may be its host fish, and in NJ it is only found in the Delaware River.

The eastern pondmussel, often associated with tidewaters, is only found in the Delaware River and a few of the Delaware's tributaries in New Jersey. Its host fish is unknown.

7. A general description of land use and development patterns in the watershed.
Land use and development patterns have a direct impact on water quality. The primary indicators for assessing land use and development patterns in this watershed include population change, population density, land use, and changing land use. These factors are significant in assessing water quality as increased population correlates with increased demand on the watersheds resources. Consequently, an increased demand for resources will determine current and future land uses.

The Delaware River Basin has undergone substantial population increases within the last decade in this already densely populated watershed. In 2000 the basin's population was estimated at 7.4 million people and is estimated to climb to 9 million people by 2030. Thus, the general trend shows moderate population growth throughout the entire Basin. Although far less densely populated than the Lower and Upper Estuary regions, the proposed upgrade area of the Middle and Upper Delaware have undergone the most significant growth with regards to percentage change in population. For example, Pike and Monroe counties of the Middle and Upper Delaware are the fastest growing counties in Pennsylvania. In fact, the growth of Pike and Monroe counties accounts for 77% of the total population increase within the entire proposed upgrade area, including Carbon, Luzerne, Wayne, and Northampton counties. As of 2000, the Lackawaxen watershed experienced a 25% increase in population in comparison to the 1990 U.S. census (DRBC State of the Delaware Basin Report, 2008). This increase can be attributed to the development trend of inroads in once sparsely populated regions such as the Lackawaxen Watershed and the Upper and Middle Delaware. Within the same decade the population of the entire proposed upgrade region increased by 63,000 people (DRBC, 2008).

The proposed upgrade regions of the Middle and Upper Delaware however, remain the least densely populated and least developed of the Basin. The average Basin density is 603 persons per square mile (p/mi^2) compared to 30-100 p/mi^2 in the upper most regions, and 204 p/mi^2 in the Upper Central region. Despite remaining the least densely populated, nearly 74,000 acres of forested watershed lands were lost to development and agricultural uses. Trends in deforestation and development threaten the highly sensitive HQ tributaries delineated in section E.1., which are under consideration in this upgrade petition for EV status. The presence of forested land and vegetated riparian buffer zones are the most important indicators for water quality. At present, the Basin remains predominately forested, having 6,263 mi^2 or 55% forest cover. Of this total, 782 acres (11%) is protected under federal or state ownership. The proposed upgrade regions of the Middle and Upper Delaware contain the majority of the forested land in the watershed that contributes to the high number of HQ under consideration in this petition. In this area, agricultural and development practices are less prevalent than in the lower regions. Due to land

development, the basin has been undergoing serious losses to its forest cover. The greatest losses have occurred within the central region, losing nearly 30 acres between 1996 and 2001. The Upper Region has lost approximately 5 acres (DRBC, figure 4.19) predominately due to increases in agriculture. Decreases in forested land due to increased land development will likely yield greater nonpoint source pollution. Further deforestation is also likely to result in greater erosion/sedimentation, eutrophication, pathogen, and hydrocarbon presence. For this reason, it is critical that these already High Quality streams receive Exceptional Value designation (DRBC, 2008).

8. Municipalities in the Proposed Area

Carbon County (1)
Kidder Township

Monroe County (13)

Barrett Township
Jim Siglin
933 Route 390
Cresco, PA 18326
570-595-2602

Delaware Water Gap Borough
P.O. Box 218
Delaware Water Gap, PA 18327
570-476-0331

Middle Smithfield Township
Scott Schaller
25 Municipal Drive
East Stroudsburg, PA 18302
570-223-8920

Paradise Township
Reda Briglia
5912 Paradise Valley Road
Cresco, PA 18326
570-595-9880

Price Township
10 Barren Road
East Stroudsburg, PA 18301
570-421-2497

Stroud Township
James Decker
1211 North Fifth Street
Stroudsburg, PA 18360
570-421-3362

Northampton County (1)
Portland Borough

Coolbaugh Township
Jospeph O' Boyle
5550 Memorial Blvd
Tobyhanna, PA 18466
570-894-8940

Jackson Township
Dave Thomas
P.O. Box 213
Route 715
S. Reeders, PA 18352
570-629-0153

Mount Pocono Borough
Dan McDavitt
303 Pocono Blvd
Mount Pocono, PA 18344
570-839-8436

Pocono Township
Harold Werkheiser
P.O. Box 197
Tannersville, PA 18372
570-629-1922 ext:212

Smithfield Township
Brian E. Barrett
1155 Red Fox Road
East Storudsburg, PA 18301-9105
570-421-6931

Stroudsburg Borough
Kim M. Diddio
700 Sarah Street
Stroudsburg, PA 18360
570- 421-5444

Tobyhanna Township
Heidi A. Pickard
105 Government Center Way
Pocono Pines, PA 18350
570-646-1212

Pike County (12)

Blooming Grove Township
Fred D. Hatton
488 Route 739
Blooming Grove, PA 18428
570-775-6461

Dingman Township
Thomas Mincer
118 Fisher Lane
Milford, PA 18337
570- 775-6461

Lackawaxen Township
Brain Stuart
P.O. Box 205
Lackawaxen, PA 18435
570-685-2550

Matamoras Borough
Richard Gassmann
PO Box 207
Matamoras, PA 18336
570-491-2771

Palmyra Township
Thomas A. Simons
115 Buehler Lane
Paupack, PA 18451
570-226-223

Shohola Township
159 Twin Lakes Road
Shohola, PA 18458
570-559-7394

Delaware Township
Thaddeus Parsell
116 Wilson Hill Road
Dingmans Ferry, PA 18328
570-828-234

Greene Township
Mary Ann Hubbard
Greentown, PA 18426
570-676-932

Lehman Township
John P. Sivick
P.O Box 4000
Bushkill, PA 18324

Milford Borough / Milford Twp
Merritt B. Quinn
111 West Catherine Street
Milford, PA 18337
570- 296-7140

Porter Township
Bill Powel
2186 Route 402
Dingmans Ferry, PA 18328
570-223-0447

Westfall Township
James Muir
Delaware River & La Barr Lane
PO Box 247
Matamoras, PA 18336
570- 491-4176

Wayne County (27)

Berlin Township
Paul Henryrd
50 Milanville Road
Beach Lake, PA 18405
570-729-8073

Bethany Boro
Nina Martin
438 Wayne Street
Bethany, PA 18431
570-253-1847

Buckingham Township
Kris Karcher
177 Travis Road
Starrucca, PA 18462
570-798-2949

Canaan Township
Lewis C. Henshawst
46 Gallik Road
Waymart, PA 18472
570-488-6608

Cherry Ridge Township
John Rickard Jr.
269 Spinner Road
Honesdale, PA 18431
570-253-5956

Clinton Township
Ronald Poska
26 Terrel Road
Waymart, PA 18472
570-785-3363

Damascus Township
Jeffrey Dexter
60 Conklin Hill Road
Damascus, PA 18415
570-729-7270

Township of Dreher
James Lee
P.O. Box 177
Newfoundland, PA 18445
570-676-4976

Dyberry Township
Edward Fritsch
44 Cabin Corner
Honesdale, PA 18431
570-253-1806

Hawley Borough
Donald Kyzer
757 Finn Swamp Road
Lakeville, PA 18438
570-226-4570

Honesdale Borough
Ed Langendoerfernd
958 Main Street
Honesdale, PA 18431
570-253-6496

Lake Township
Robert F. Peters
1270 Easton Tpk.
Lake Ariel, PA 18436
570-698-5131

Lebanon Township
Kevin Bryant
40 Ellison Road
Tyler Hill, PA 18469
570-253-3247

Lehigh Township
Protus Phillipsst
P.O. Box 651
Gouldsboro, PA 18424
570-842-6262

Manchester Township
Wilfred Stalker
3881 Hancock Highway
Equinunk, PA 18417

Mount Pleasant Township
Albert Wildensteinst
1479 Great Bend Turnpike
Pleasant Mount, PA 18453

570-224-4070

Oregon Township
Bernard Tallman
474 Fox Hill Road
Honesdale, PA 18431
570-253-6062

Paupack Township
Bruce Chandler
25 Daniels Road
Lakeville, PA 18438
570-226-2680

Prompton Borough
Dennis Millon
P.O. Box 12
Prompton, PA 18456
570-253-5781

Scott Township
David Harris
197 Sherman Road
Susquehanna PA 18847
570-461-3999

Sterling Township
Roger Swingle
P.O. Box 100
Sterling PA 18463
570-689-2911

Waymart Township
Charles Norella
PO Box 280
Waymart PA 18472
570-488-6742

570-448-2973

Palmyra Township
Peter Steffenst
219 Oak Street
Hawley, PA 18428
570-226-0373

Preston Township
Beverly Watsonst
1515 Crosstown Highway
Lakewood, PA 18439
570-448-2758

Salem Township
Merel Swingle
3 Savitz Road
Moscow, PA 18444
570-689-2705

South Canaan Township
Peter Lazorack
46 Lake Quinn Road
Waymart PA 18472
570-937-4425

Township of Texas
John McDonald
320 Shady Lane
Honesdale PA 18431
570-253-3870