

*Rapid Watershed Assessment
Upper Susquehanna-Lackawanna Watershed*

Rapid watershed assessments provide initial estimates of where conservation investments would best address the concerns of landowners, conservation districts, and other community organizations and stakeholders. These assessments help landowners and local leaders set priorities and determine the best actions to achieve their goals.



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Preface

The Natural Resources Conservation Service (NRCS) is initiating rapid watershed assessments in order to increase the speed and efficiency generating resource information to guide conservation implementation, as well as the speed and efficiency of putting it into the hands of local decision makers. While these rapid assessments provide less detail and analysis than full-blown studies and plans, they do provide a foundation for watershed studies or area planning. In addition, the assessments provide the benefits of NRCS locally-led planning for resource conservation and conservation program implementation in less time and at a reduced cost than more complex studies.

Rapid watershed assessments will be valuable for Farm Bill program delivery, and provide useful information for county, watershed and regional planners. These assessments provide initial estimates of where conservation investments would best address the concerns of landowners, conservation districts, and other community organizations and stakeholders. These assessments can help landowners and local leaders set priorities and determine the best actions to achieve their goals.

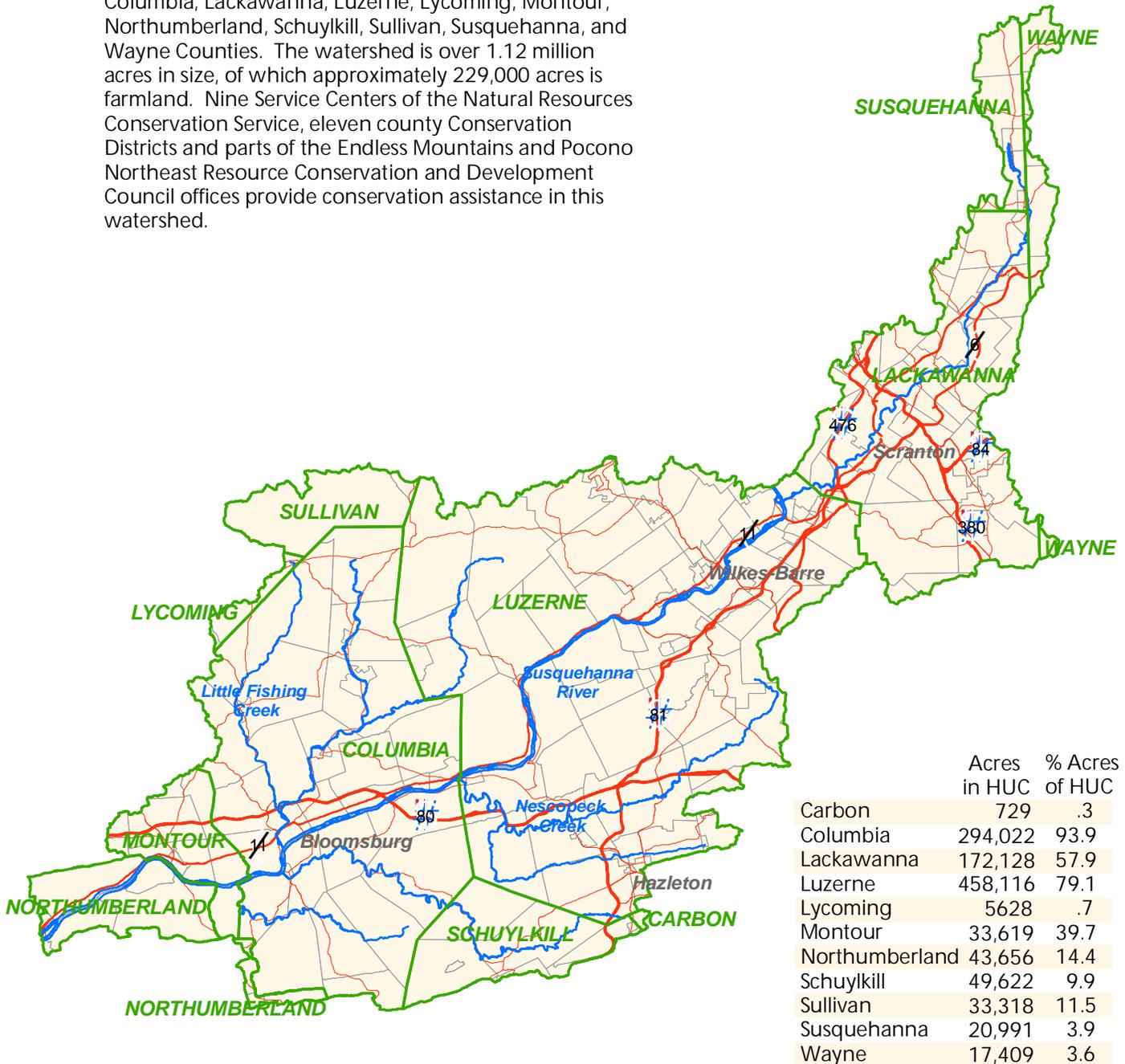
To produce the assessments, quantitative and qualitative data is collected and organized to create a watershed profile using Geographic Information System (GIS) technology. The data is analyzed to allow resource concerns and conditions to become apparent, and to generate maps and information to help people make better decisions about conservation needs and programs.

/s/ Craig R. Derickson
Pennsylvania State Conservationist



Introduction

The Upper Susquehanna-Lackawanna Watershed is located in Northeast Pennsylvania in portions of Carbon, Columbia, Lackawanna, Luzerne, Lycoming, Montour, Northumberland, Schuylkill, Sullivan, Susquehanna, and Wayne Counties. The watershed is over 1.12 million acres in size, of which approximately 229,000 acres is farmland. Nine Service Centers of the Natural Resources Conservation Service, eleven county Conservation Districts and parts of the Endless Mountains and Pocono Northeast Resource Conservation and Development Council offices provide conservation assistance in this watershed.



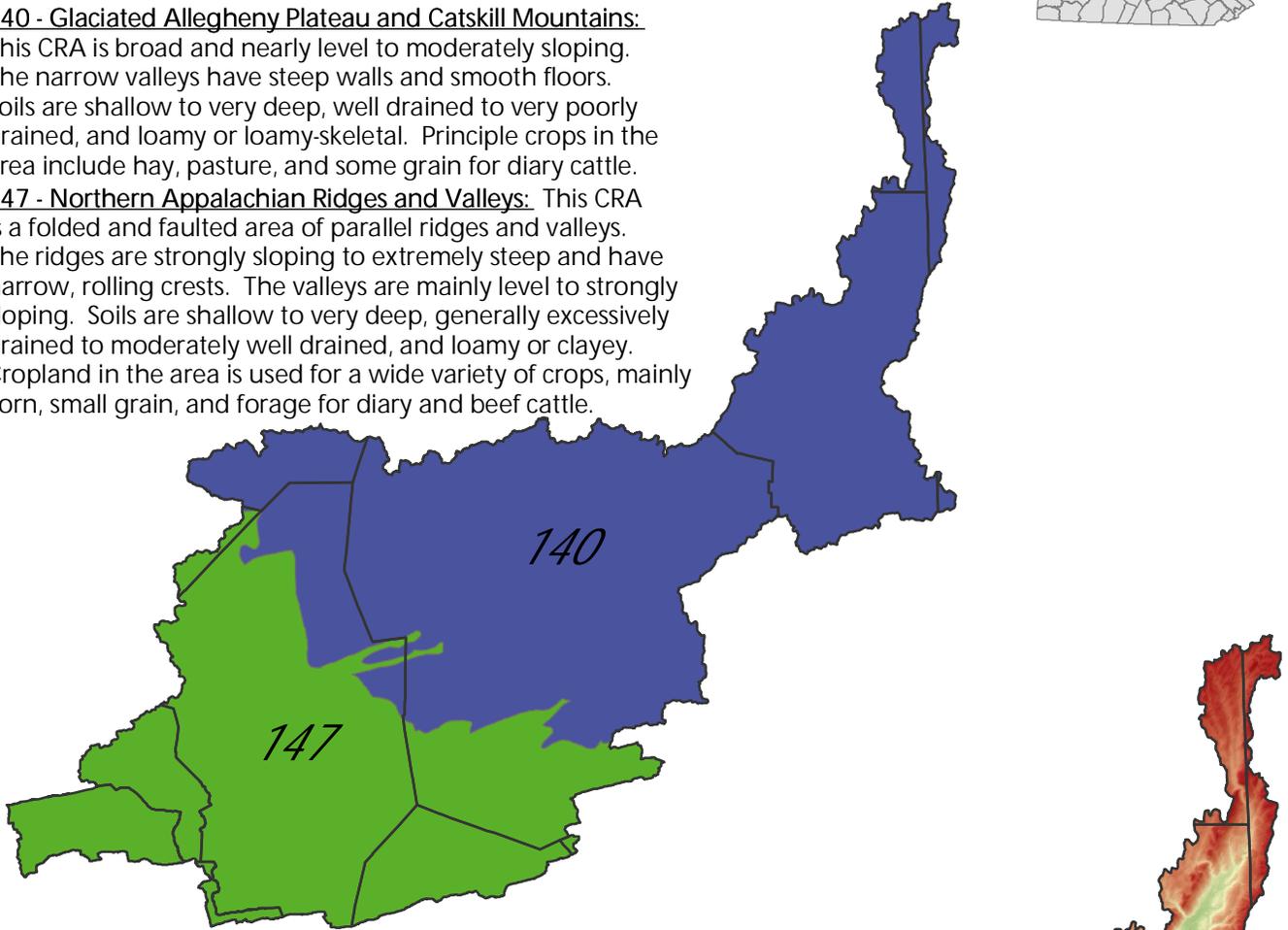


Common Resource Area (CRA) ¹

140 - Glaciated Allegheny Plateau and Catskill Mountains:

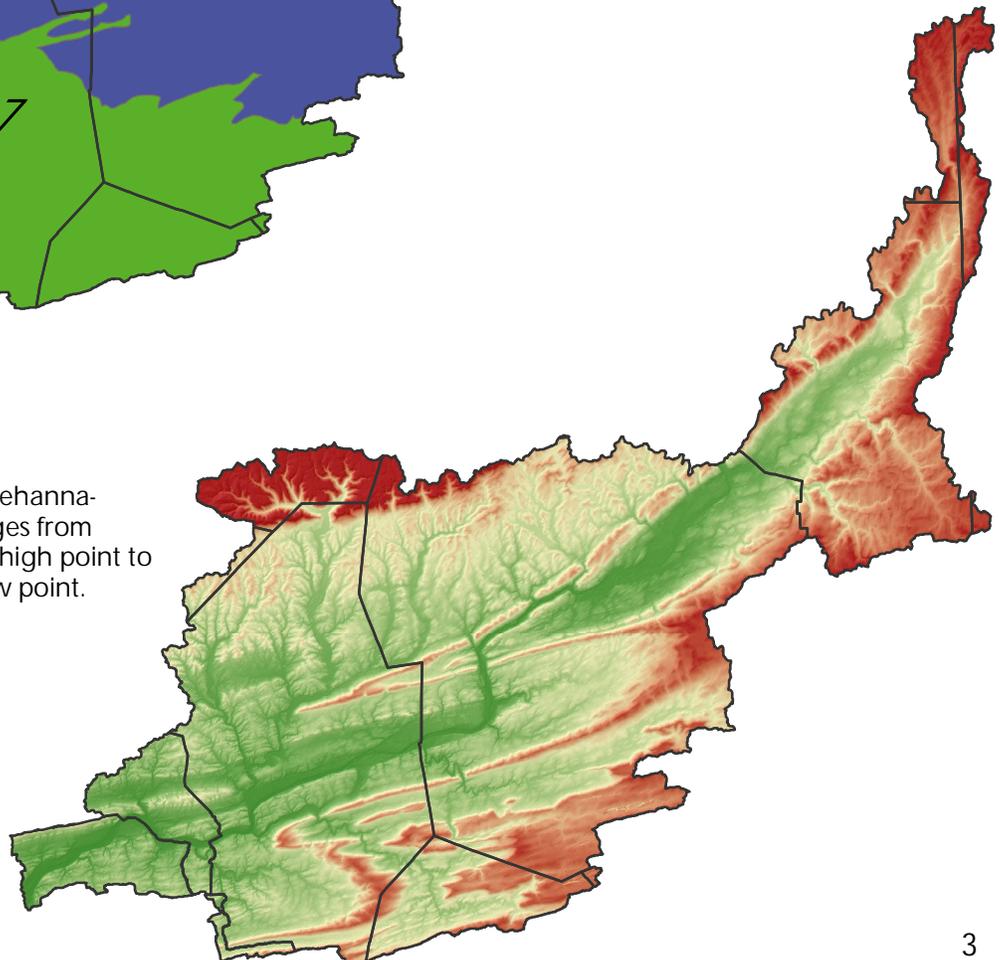
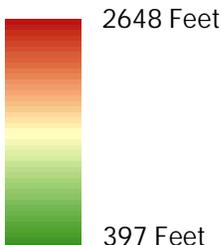
This CRA is broad and nearly level to moderately sloping. The narrow valleys have steep walls and smooth floors. Soils are shallow to very deep, well drained to very poorly drained, and loamy or loamy-skeletal. Principle crops in the area include hay, pasture, and some grain for dairy cattle.

147 - Northern Appalachian Ridges and Valleys: This CRA is a folded and faulted area of parallel ridges and valleys. The ridges are strongly sloping to extremely steep and have narrow, rolling crests. The valleys are mainly level to strongly sloping. Soils are shallow to very deep, generally excessively drained to moderately well drained, and loamy or clayey. Cropland in the area is used for a wide variety of crops, mainly corn, small grain, and forage for dairy and beef cattle.



Elevation ²

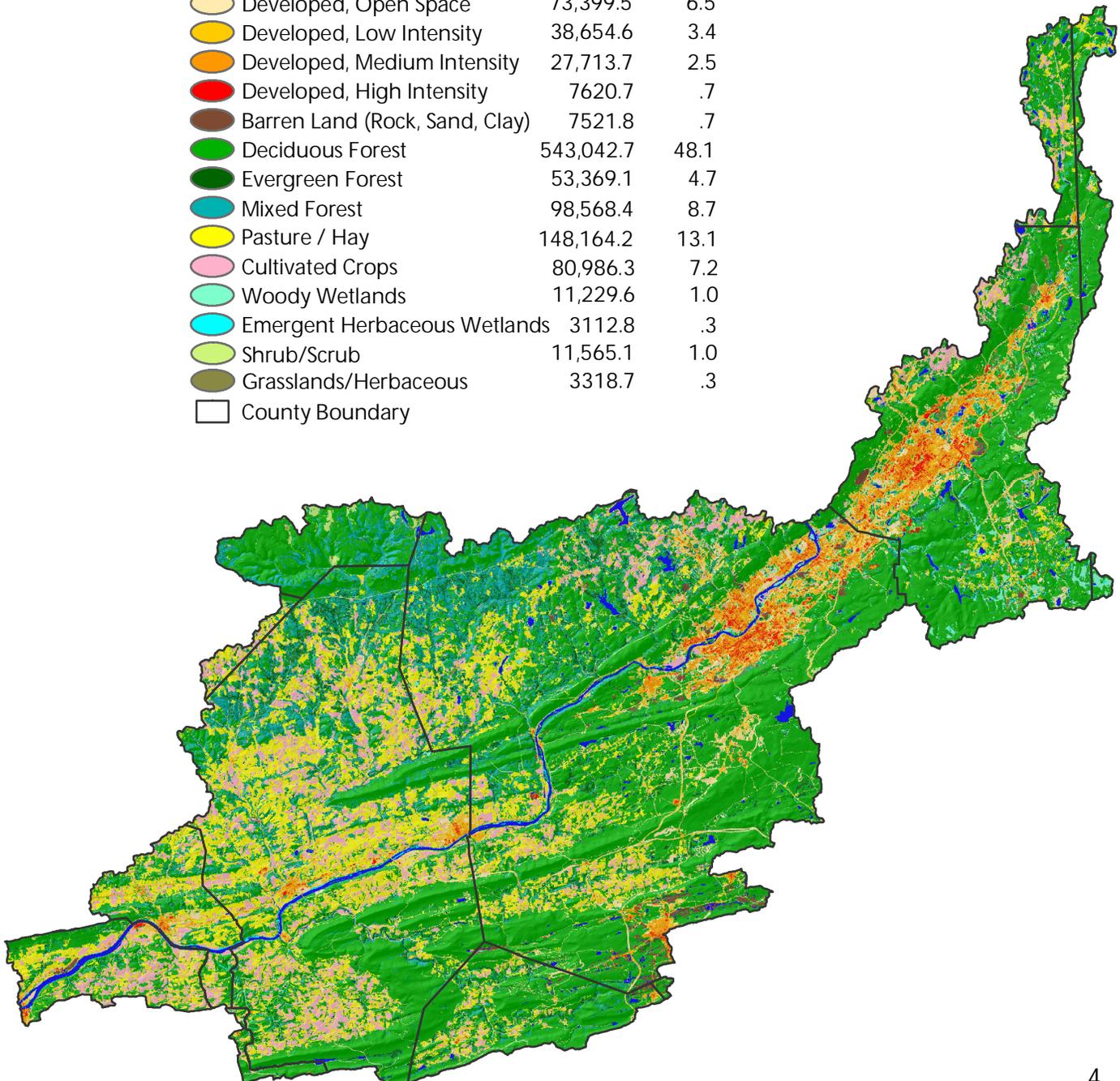
Elevation in the Upper Susquehanna-Lackawanna Watershed ranges from 2648 feet (807 meters) at it's high point to 397 feet (121 meters) at a low point.



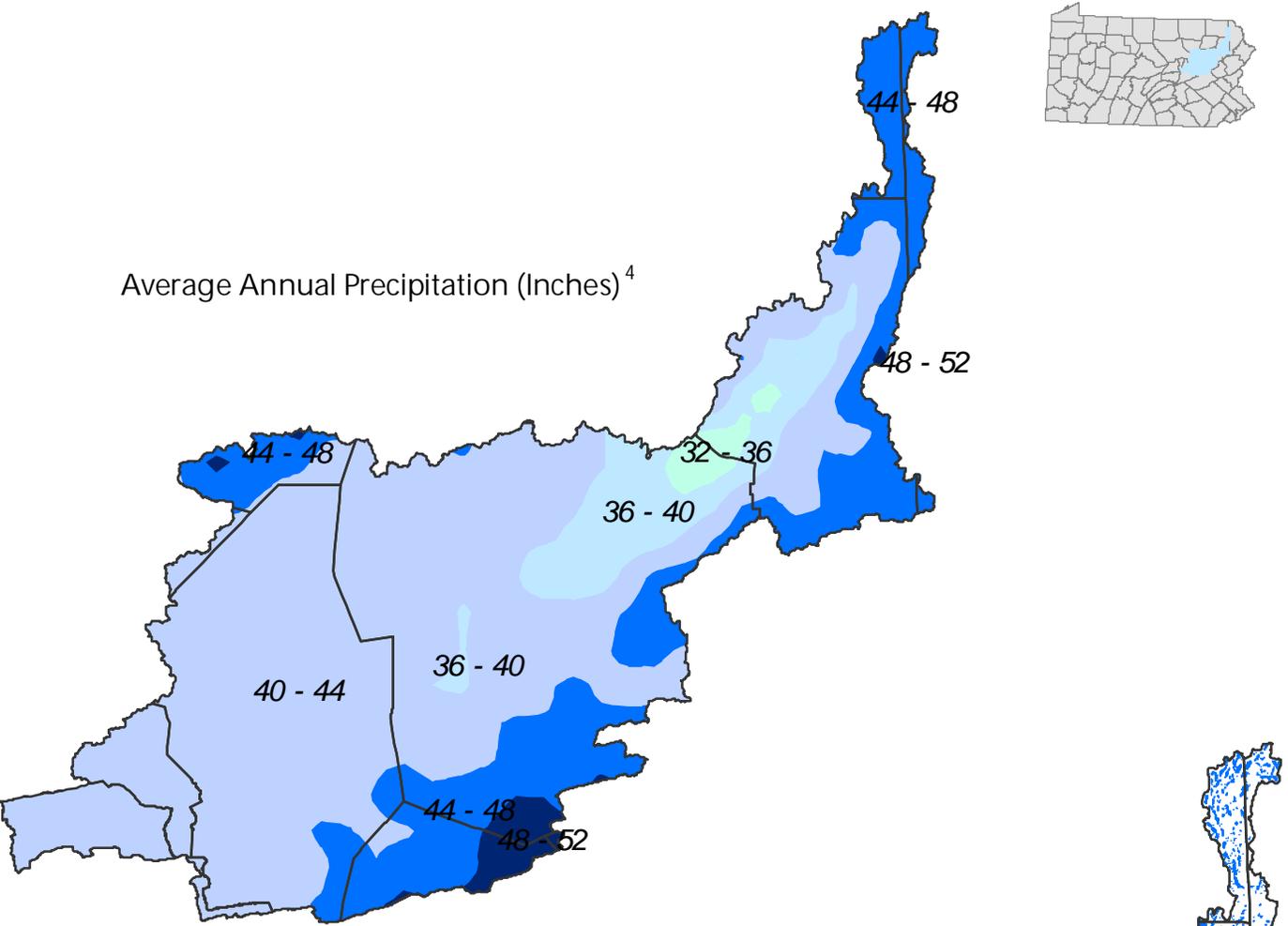


Land Use / Land Cover 2001³

	Acres	Percent
 Water	20,945.1	1.8
 Developed, Open Space	73,399.5	6.5
 Developed, Low Intensity	38,654.6	3.4
 Developed, Medium Intensity	27,713.7	2.5
 Developed, High Intensity	7,620.7	.7
 Barren Land (Rock, Sand, Clay)	7,521.8	.7
 Deciduous Forest	543,042.7	48.1
 Evergreen Forest	53,369.1	4.7
 Mixed Forest	98,568.4	8.7
 Pasture / Hay	148,164.2	13.1
 Cultivated Crops	80,986.3	7.2
 Woody Wetlands	11,229.6	1.0
 Emergent Herbaceous Wetlands	3,112.8	.3
 Shrub/Scrub	11,565.1	1.0
 Grasslands/Herbaceous	3,318.7	.3
 County Boundary		



Upper Susquehanna-Lackawanna Watershed

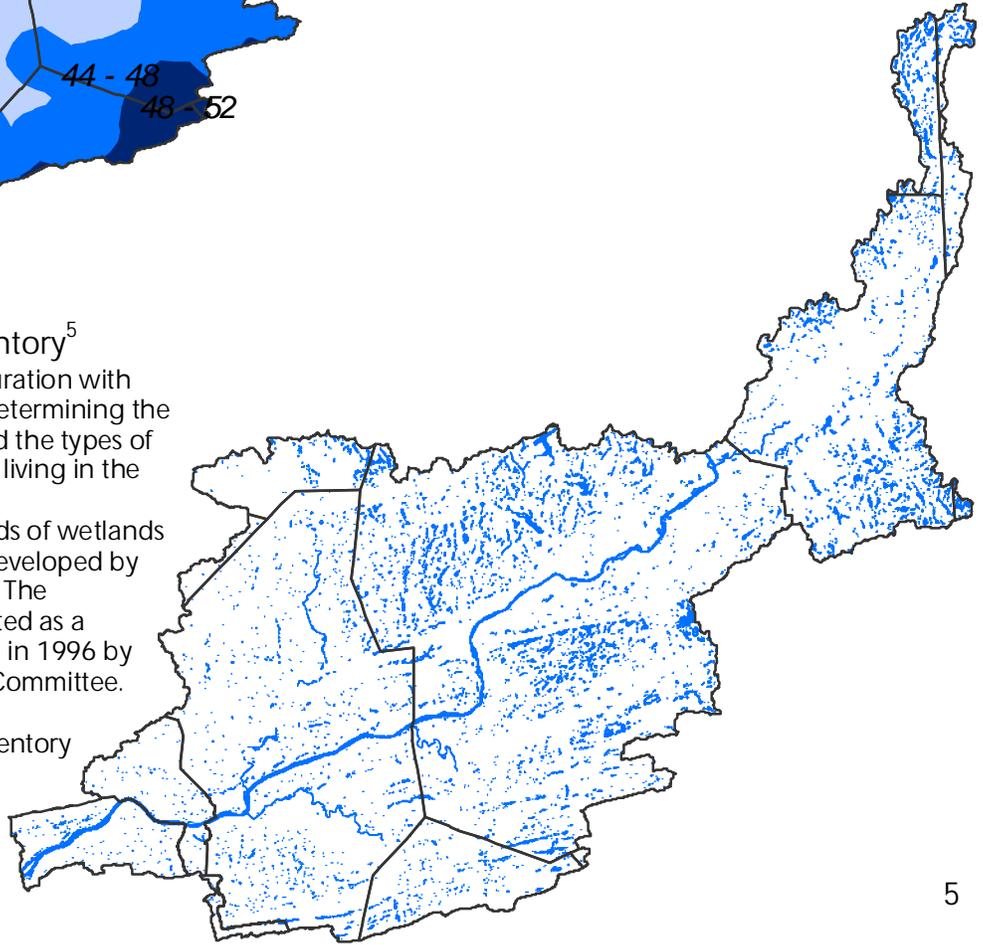


National Wetlands Inventory⁵

Wetlands are lands where saturation with water is the dominant factor determining the nature of soil development and the types of plant and animal communities living in the soil and on its surface.

NWI digital data files are records of wetlands location and classification as developed by the U.S. Fish & Wildlife Service. The classification system was adopted as a national classification standard in 1996 by the Federal Geographic Data Committee.

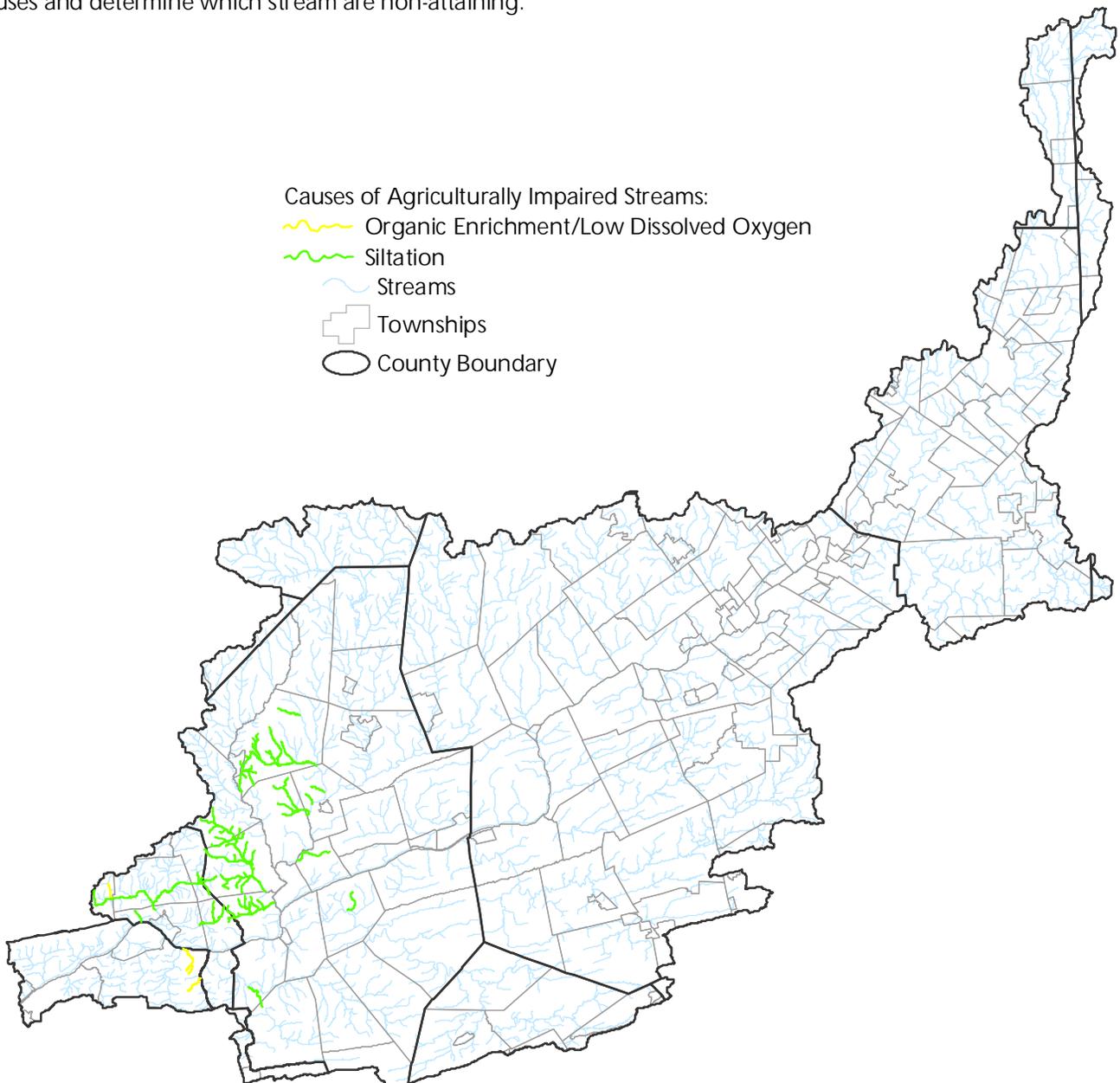
 National Wetlands Inventory





Impaired Streams ⁶

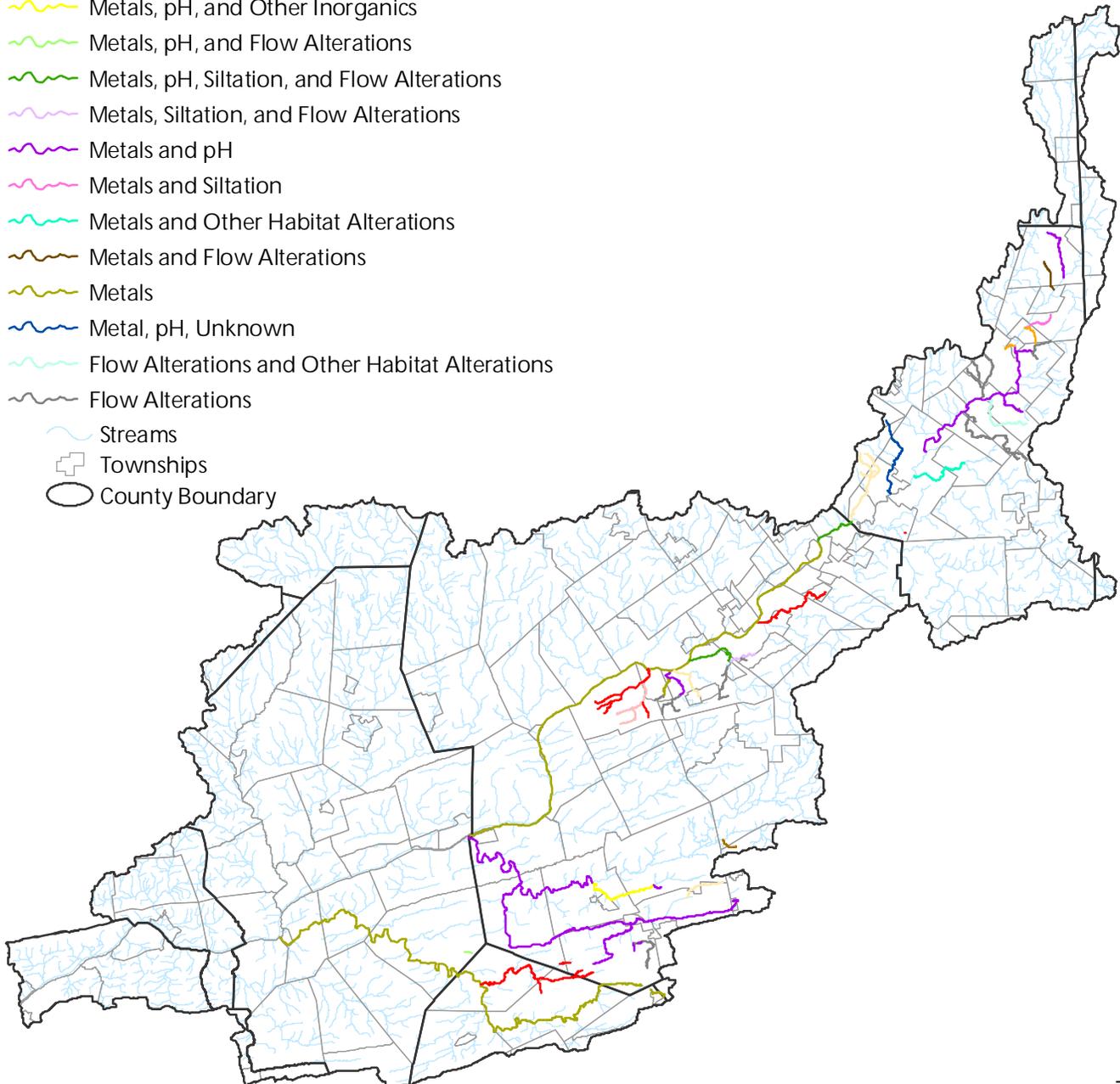
The Streams Integrated List (2006) represents stream assessments in an integrated format for the Clean Water Act Section 305(b) reporting and Section 303(d) listing. PA Department of Environmental Protection protects 4 stream water uses: aquatic life, fish consumption, potable water supply, and recreation. The 305(b) layers represents stream segments that have been evaluated for attainment of those uses and determine which stream are non-attaining.





Abandoned Mine Drainage Impaired Streams

- pH and Siltation
- pH
- Siltation and Flow Alterations
- Siltation
- Metals, pH, and Siltation
- Metals, pH, and Other Inorganics
- Metals, pH, and Flow Alterations
- Metals, pH, Siltation, and Flow Alterations
- Metals, Siltation, and Flow Alterations
- Metals and pH
- Metals and Siltation
- Metals and Other Habitat Alterations
- Metals and Flow Alterations
- Metals
- Metal, pH, Unknown
- Flow Alterations and Other Habitat Alterations
- Flow Alterations
- Streams
- Townships
- County Boundary



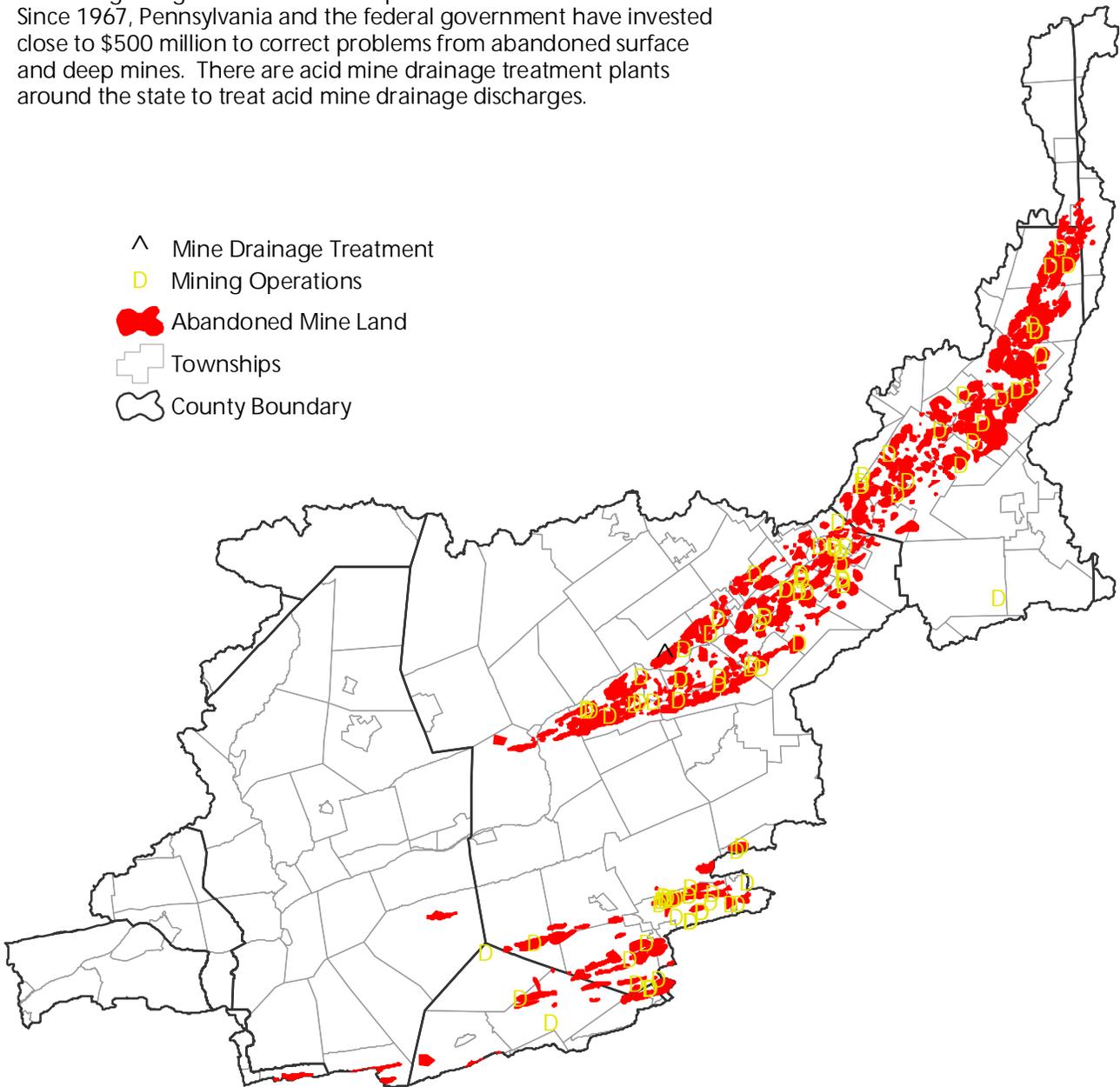


Abandoned Mine Land ⁷

Coal mining in Pennsylvania began in the mid-1700's. Pennsylvania is the fourth largest coal producer in the United States, producing over 69.5 million tons in 1995 in 878 mining operations.

The environmental legacy of hundreds of years of coal mining in PA includes over 2,400 miles of PA's 84,000 miles of streams effected by acid mine drainage from old coal mining operations. Acid mine drainage in the single largest source of water pollution in the state.

Since 1967, Pennsylvania and the federal government have invested close to \$500 million to correct problems from abandoned surface and deep mines. There are acid mine drainage treatment plants around the state to treat acid mine drainage discharges.

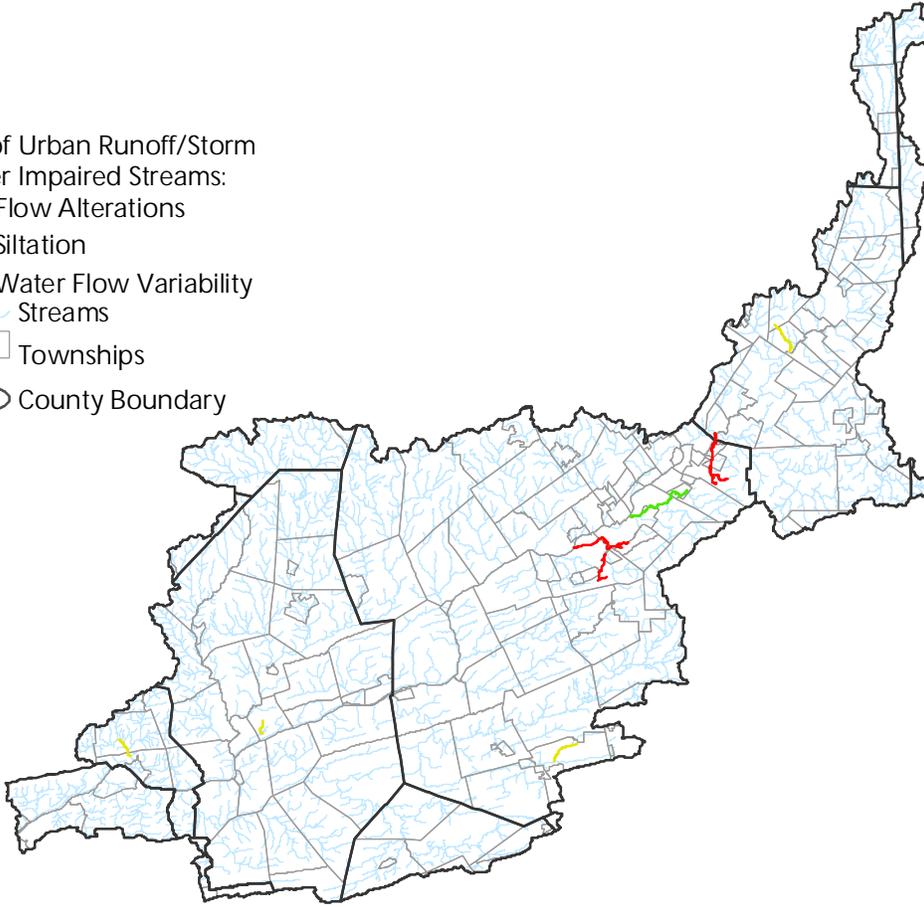


- ^ Mine Drainage Treatment
- D Mining Operations
- Abandoned Mine Land
- Townships
- County Boundary

Upper Susquehanna-Lackawanna Watershed

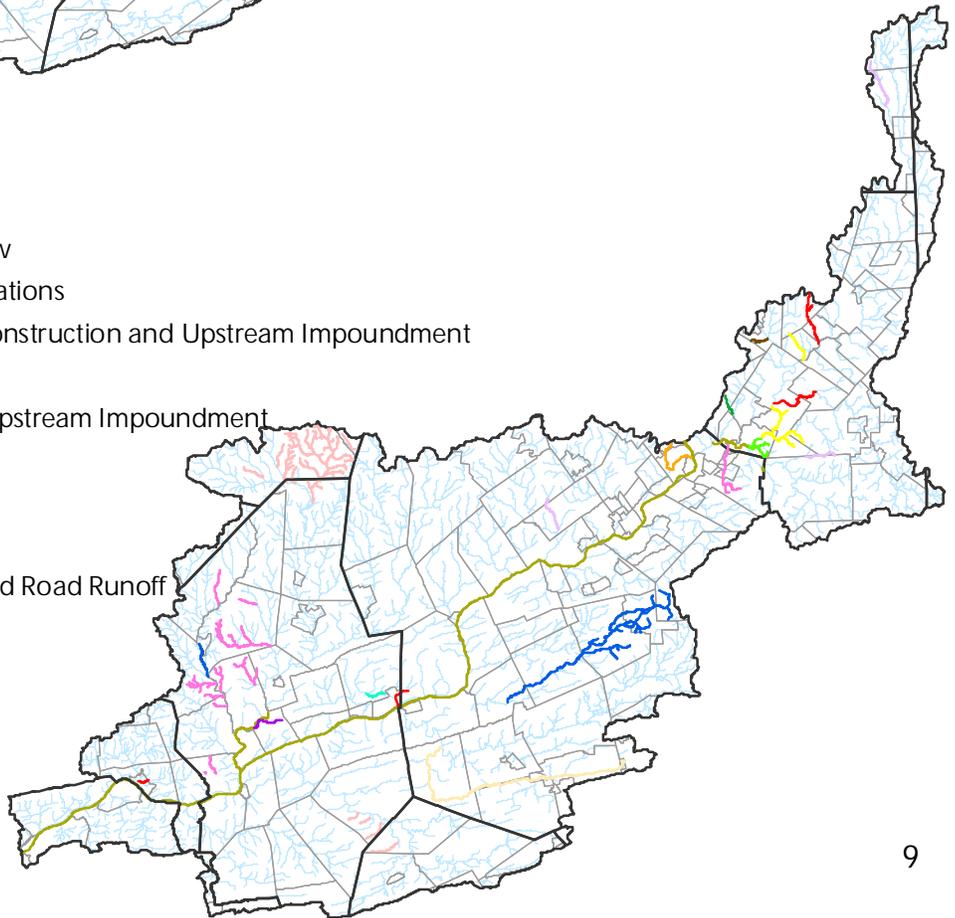
**Causes of Urban Runoff/Storm
Sewer Impaired Streams:**

- Flow Alterations
- Siltation
- Water Flow Variability
- Streams
- Townships
- County Boundary



Other Sources of Impairment:

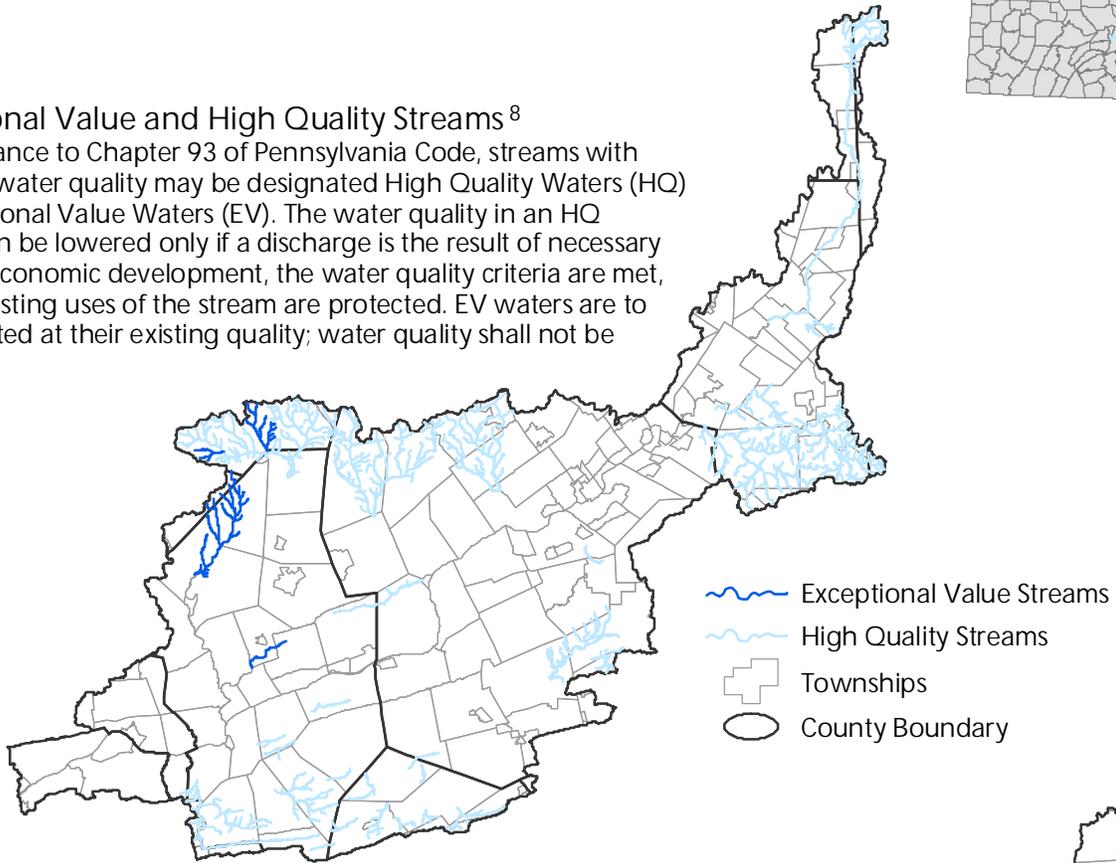
- Atmospheric Deposition
- Channelization
- Combined Sewer Overflow
- Flow Regulations/Modifications
- Highway, Road, Bridge Construction and Upstream Impoundment
- Hydromodifications
- Land Development and Upstream Impoundment
- Land Disposal
- Municipal Point Source
- Natural Causes
- Removal of Vegetation and Road Runoff
- Road Runoff
- Upstream Impoundment
- Unknown
- Streams
- Townships
- County Boundary





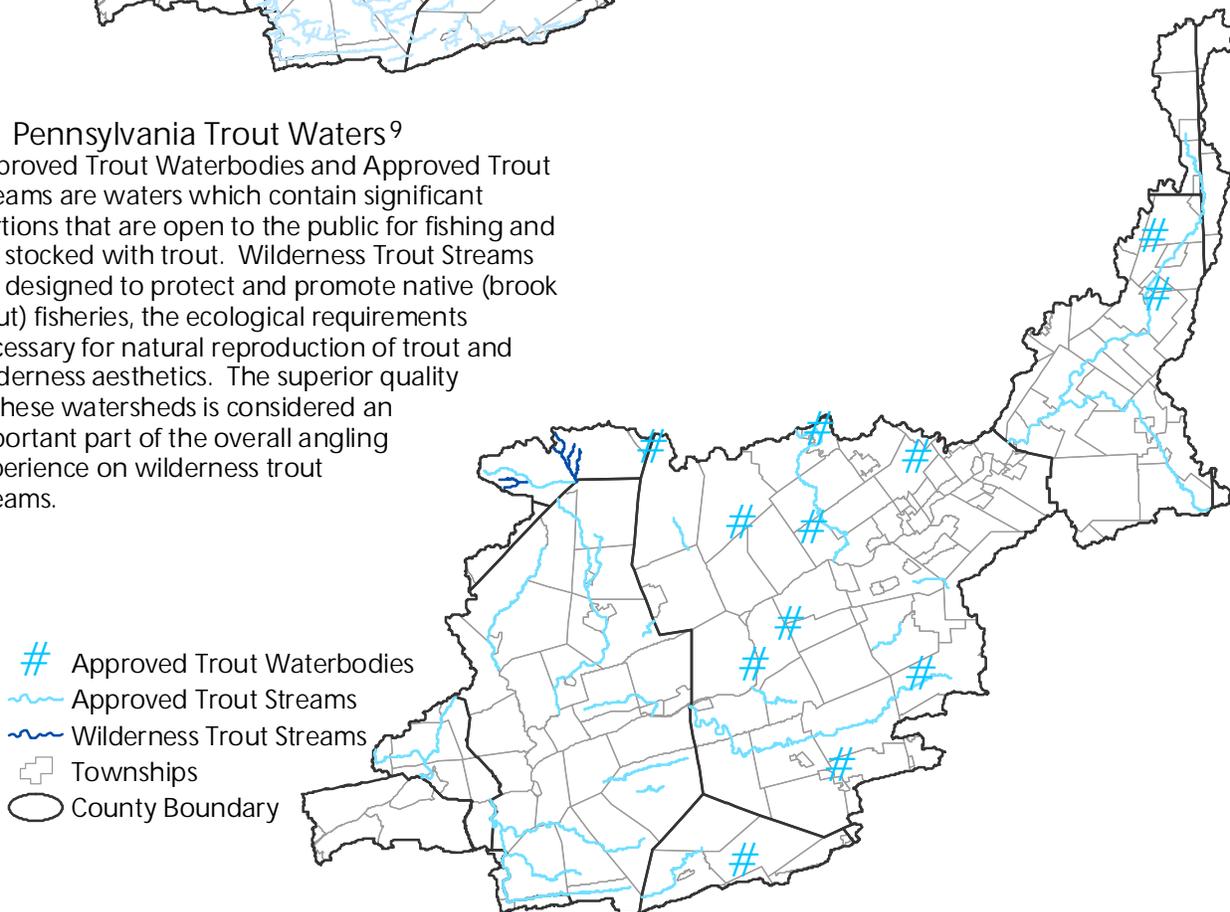
Exceptional Value and High Quality Streams⁸

In accordance to Chapter 93 of Pennsylvania Code, streams with excellent water quality may be designated High Quality Waters (HQ) or Exceptional Value Waters (EV). The water quality in an HQ stream can be lowered only if a discharge is the result of necessary social or economic development, the water quality criteria are met, and all existing uses of the stream are protected. EV waters are to be protected at their existing quality; water quality shall not be lowered.



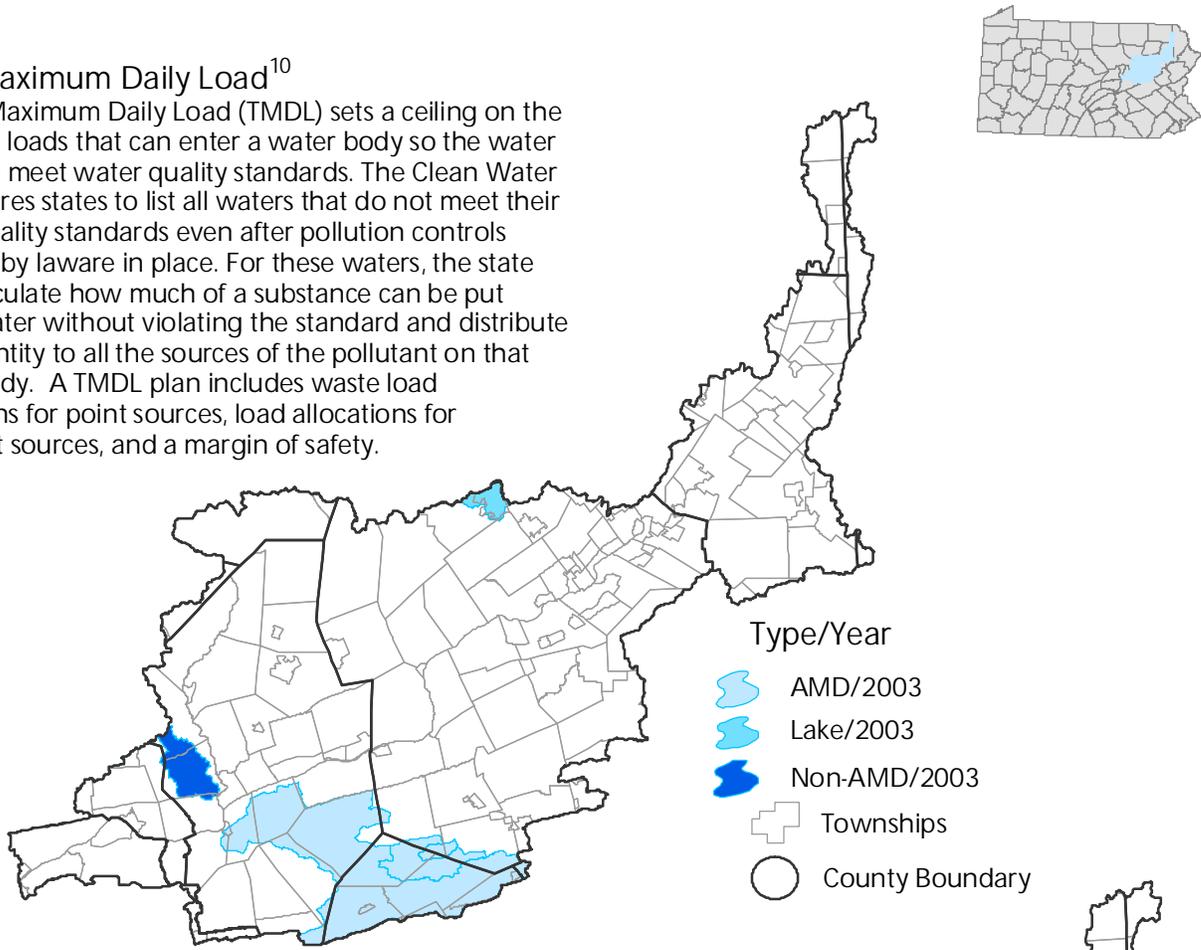
Pennsylvania Trout Waters⁹

Approved Trout Waterbodies and Approved Trout Streams are waters which contain significant portions that are open to the public for fishing and are stocked with trout. Wilderness Trout Streams are designed to protect and promote native (brook trout) fisheries, the ecological requirements necessary for natural reproduction of trout and wilderness aesthetics. The superior quality of these watersheds is considered an important part of the overall angling experience on wilderness trout streams.



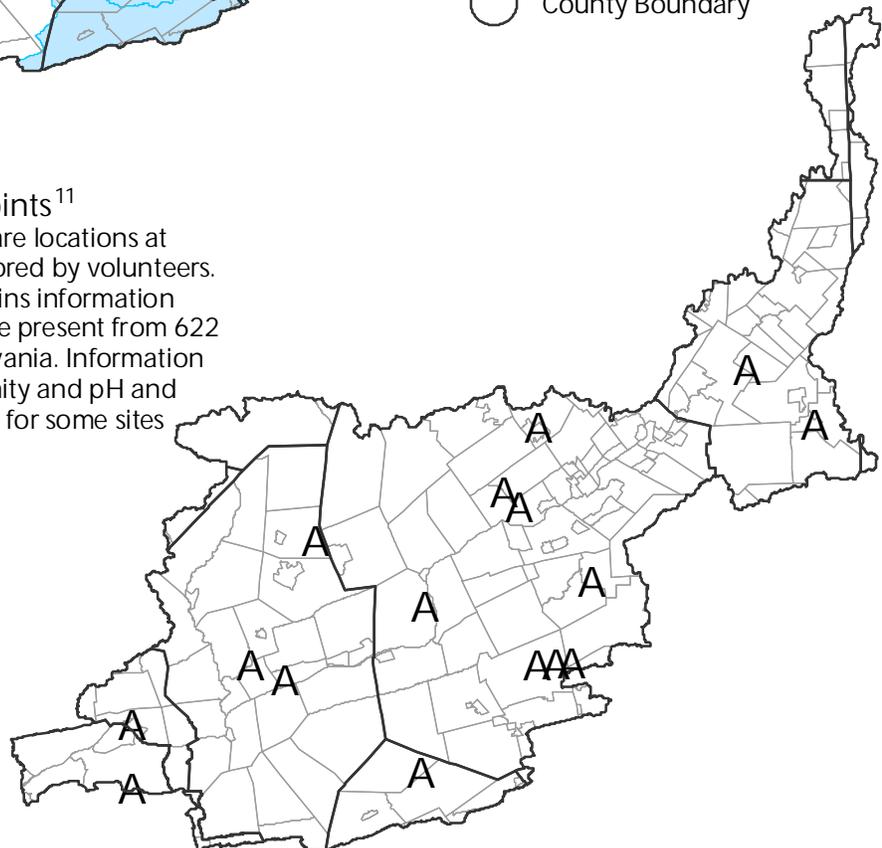
Total Maximum Daily Load¹⁰

A Total Maximum Daily Load (TMDL) sets a ceiling on the pollutant loads that can enter a water body so the water body will meet water quality standards. The Clean Water Act requires states to list all waters that do not meet their water quality standards even after pollution controls required by law are in place. For these waters, the state must calculate how much of a substance can be put in the water without violating the standard and distribute that quantity to all the sources of the pollutant on that water body. A TMDL plan includes waste load allocations for point sources, load allocations for nonpoint sources, and a margin of safety.



Water Quality Testing Points¹¹

The water quality testing points are locations at which the water quality is monitored by volunteers. A database of these points contains information on water quality from 1986 to the present from 622 testing sites throughout Pennsylvania. Information in records includes at least alkalinity and pH and includes nitrates and phosphates for some sites since 1996.





Water Resource Points¹²

A Water Resource is a DEP primary facility type related to the Water Use Planning Program. The sub-facility types related to Water Resources that are included are:

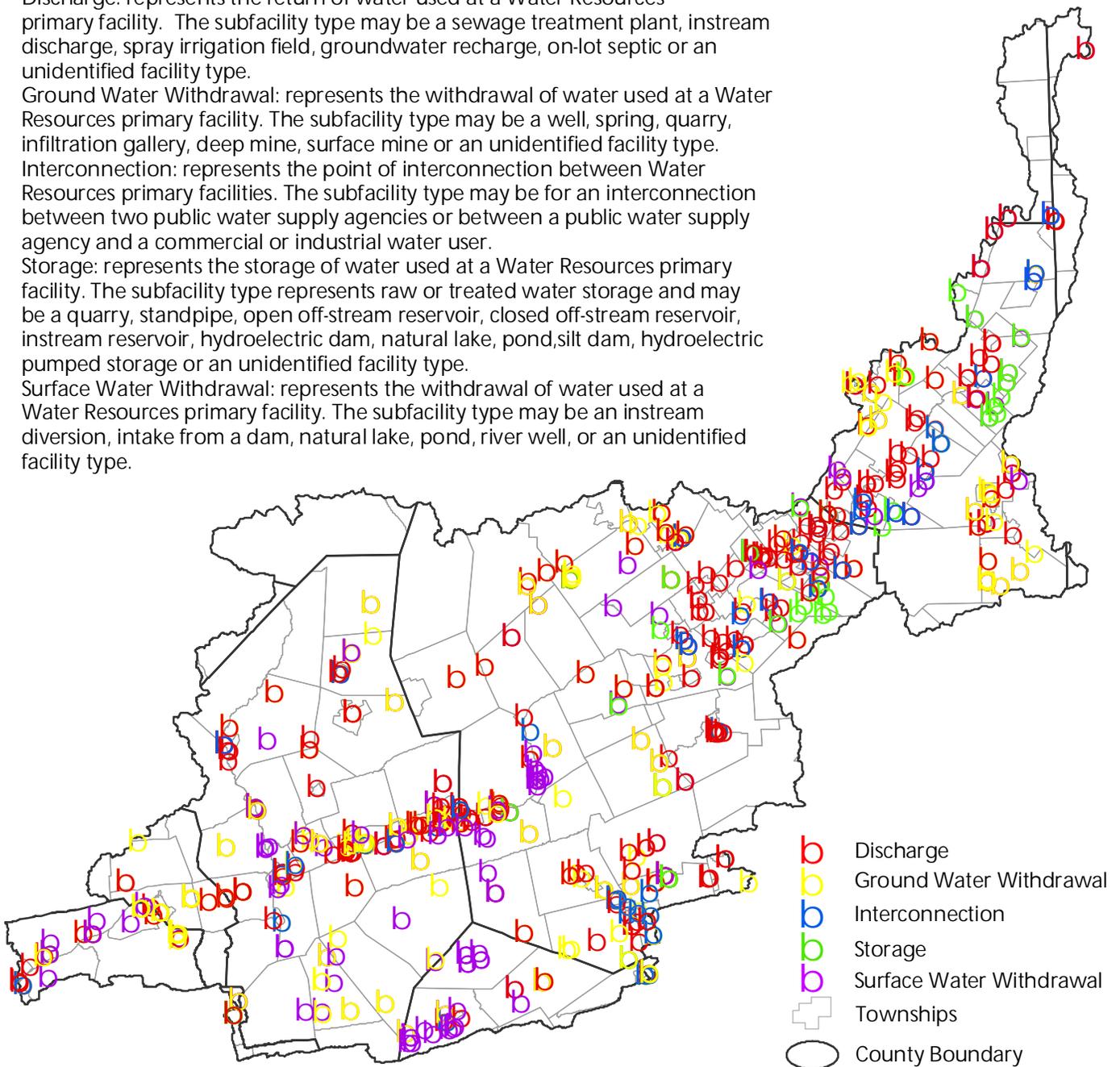
Discharge: represents the return of water used at a Water Resources primary facility. The subfacility type may be a sewage treatment plant, instream discharge, spray irrigation field, groundwater recharge, on-lot septic or an unidentified facility type.

Ground Water Withdrawal: represents the withdrawal of water used at a Water Resources primary facility. The subfacility type may be a well, spring, quarry, infiltration gallery, deep mine, surface mine or an unidentified facility type.

Interconnection: represents the point of interconnection between Water Resources primary facilities. The subfacility type may be for an interconnection between two public water supply agencies or between a public water supply agency and a commercial or industrial water user.

Storage: represents the storage of water used at a Water Resources primary facility. The subfacility type represents raw or treated water storage and may be a quarry, standpipe, open off-stream reservoir, closed off-stream reservoir, instream reservoir, hydroelectric dam, natural lake, pond, silt dam, hydroelectric pumped storage or an unidentified facility type.

Surface Water Withdrawal: represents the withdrawal of water used at a Water Resources primary facility. The subfacility type may be an instream diversion, intake from a dam, natural lake, pond, river well, or an unidentified facility type.

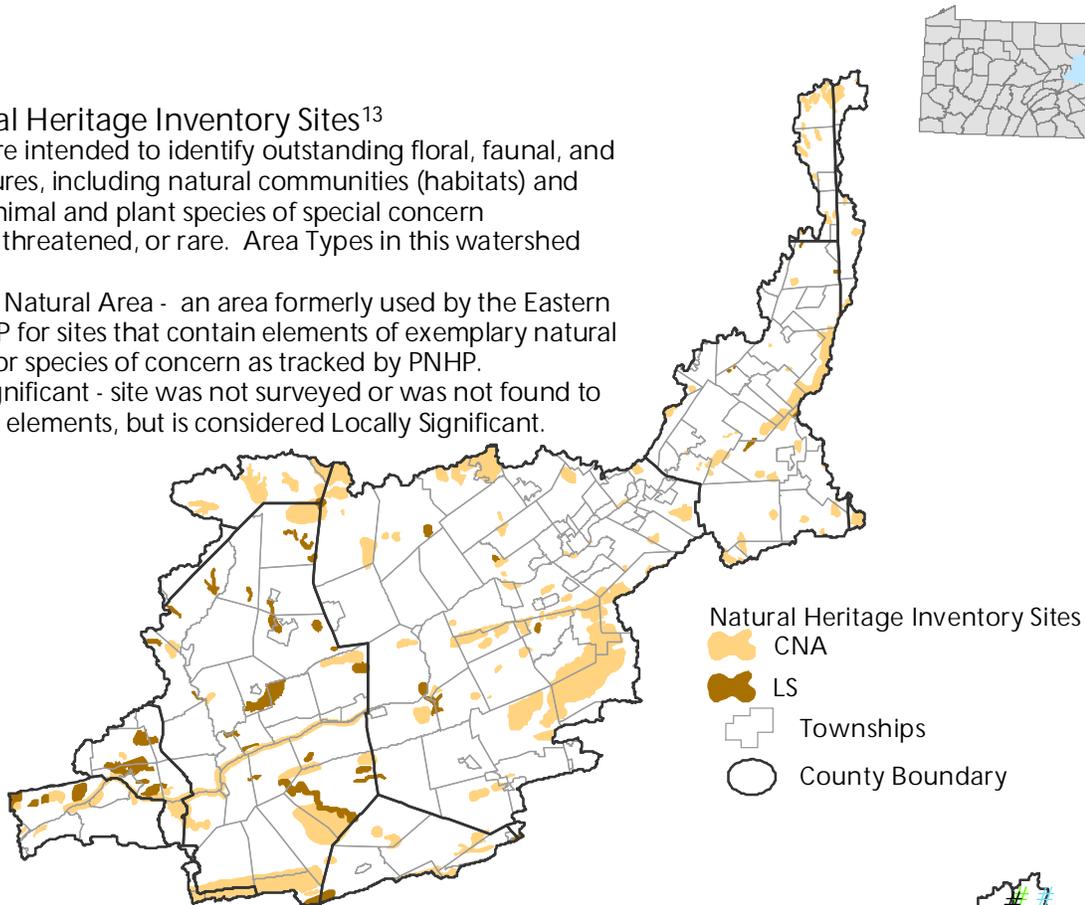


Natural Heritage Inventory Sites¹³

These areas are intended to identify outstanding floral, faunal, and geologic features, including natural communities (habitats) and locations of animal and plant species of special concern (endangered, threatened, or rare). Area Types in this watershed include:

CNA - County Natural Area - an area formerly used by the Eastern Office of PNHP for sites that contain elements of exemplary natural communities or species of concern as tracked by PNHP.

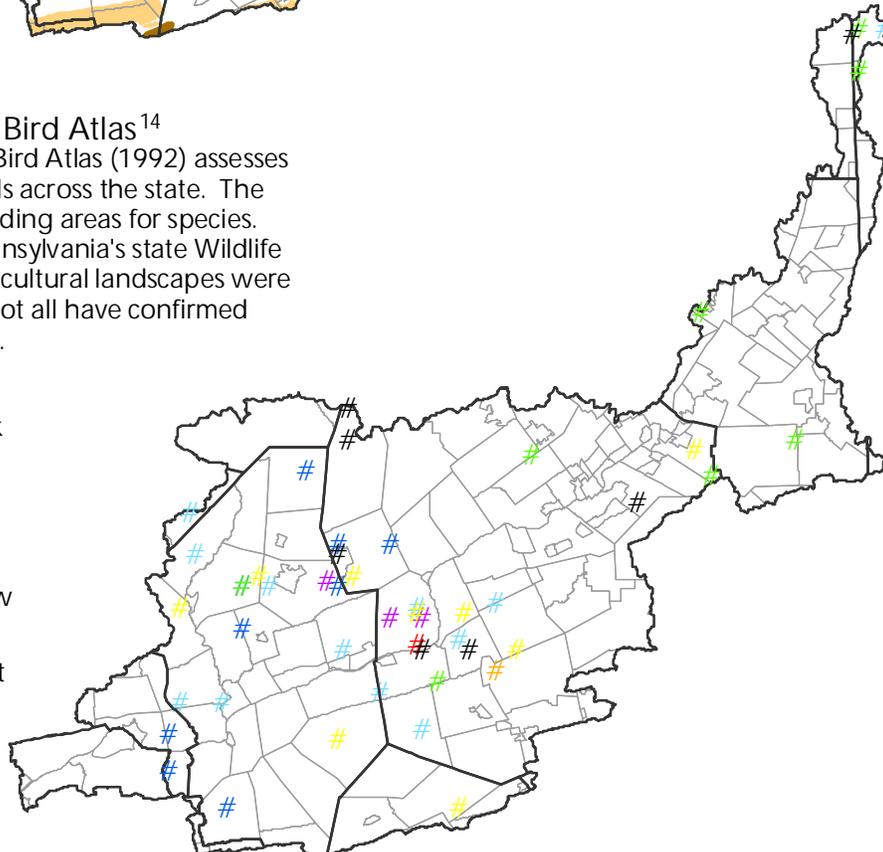
LS - Locally Significant - site was not surveyed or was not found to contain PNHP elements, but is considered Locally Significant.



Pennsylvania Breeding Bird Atlas¹⁴

The 1st Pennsylvania Breeding Bird Atlas (1992) assesses the distribution of breeding birds across the state. The areas below are confirmed breeding areas for species. Fourteen birds species from Pennsylvania's state Wildlife Action Plan associated with agricultural landscapes were focused on in this assessment, not all have confirmed breeding area in this watershed.

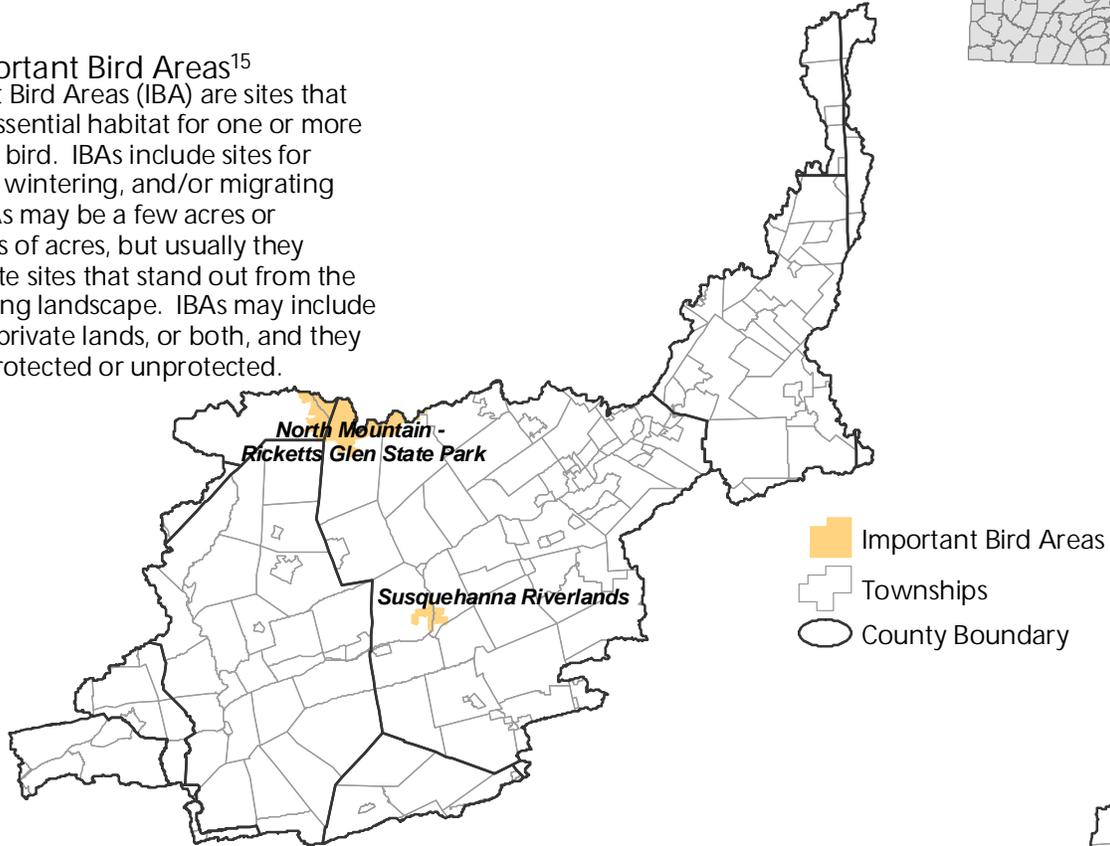
- # American Woodcock
- # Barn Owl
- # Blackbilled Cuckoo
- # Bobolink
- # Eastern Meadowlark
- # Grasshopper Sparrow
- # Northern Harrier
- # Yellow Breasted Chat
- Townships
- County Boundary





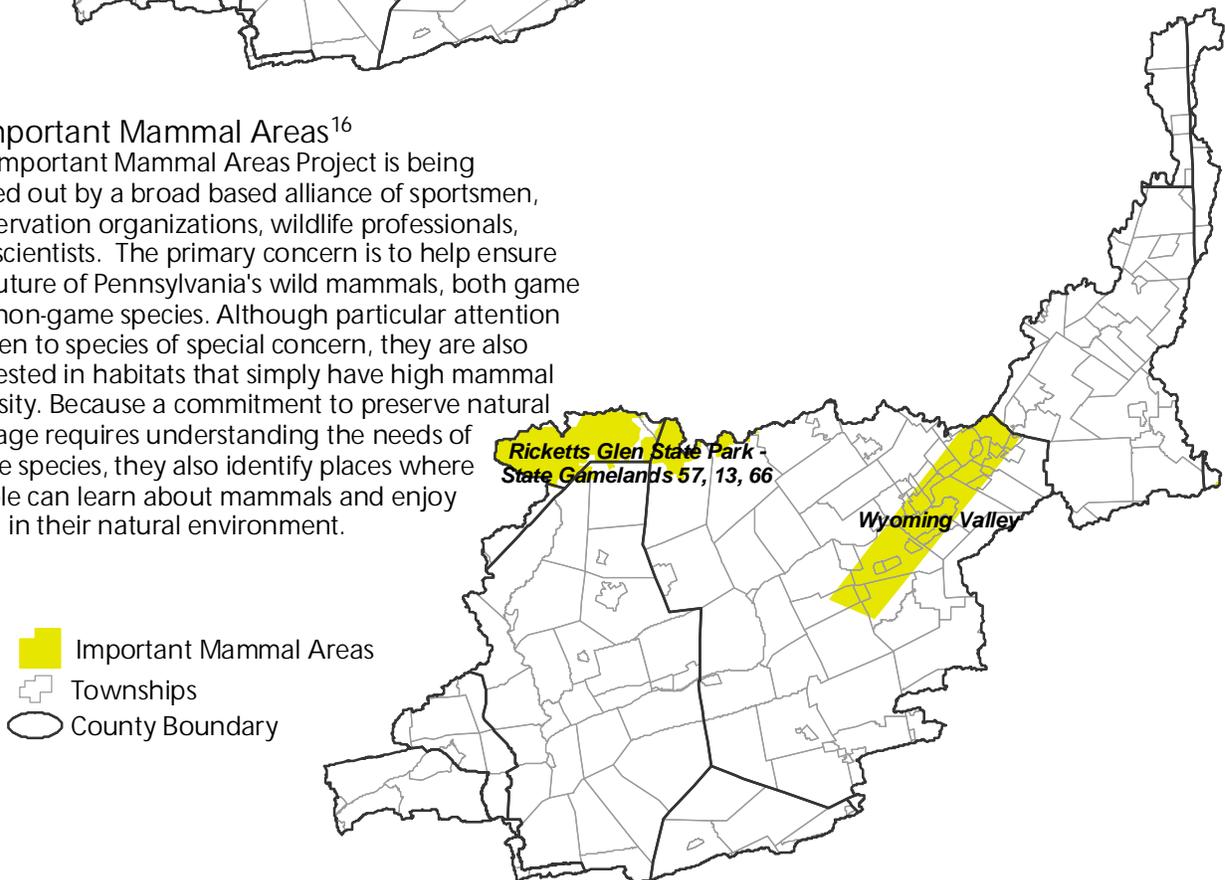
Important Bird Areas¹⁵

Important Bird Areas (IBA) are sites that provide essential habitat for one or more species of bird. IBAs include sites for breeding, wintering, and/or migrating birds. IBAs may be a few acres or thousands of acres, but usually they are discrete sites that stand out from the surrounding landscape. IBAs may include public or private lands, or both, and they may be protected or unprotected.



Important Mammal Areas¹⁶

The Important Mammal Areas Project is being carried out by a broad based alliance of sportsmen, conservation organizations, wildlife professionals, and scientists. The primary concern is to help ensure the future of Pennsylvania's wild mammals, both game and non-game species. Although particular attention is given to species of special concern, they are also interested in habitats that simply have high mammal diversity. Because a commitment to preserve natural heritage requires understanding the needs of native species, they also identify places where people can learn about mammals and enjoy them in their natural environment.



Soils¹⁷

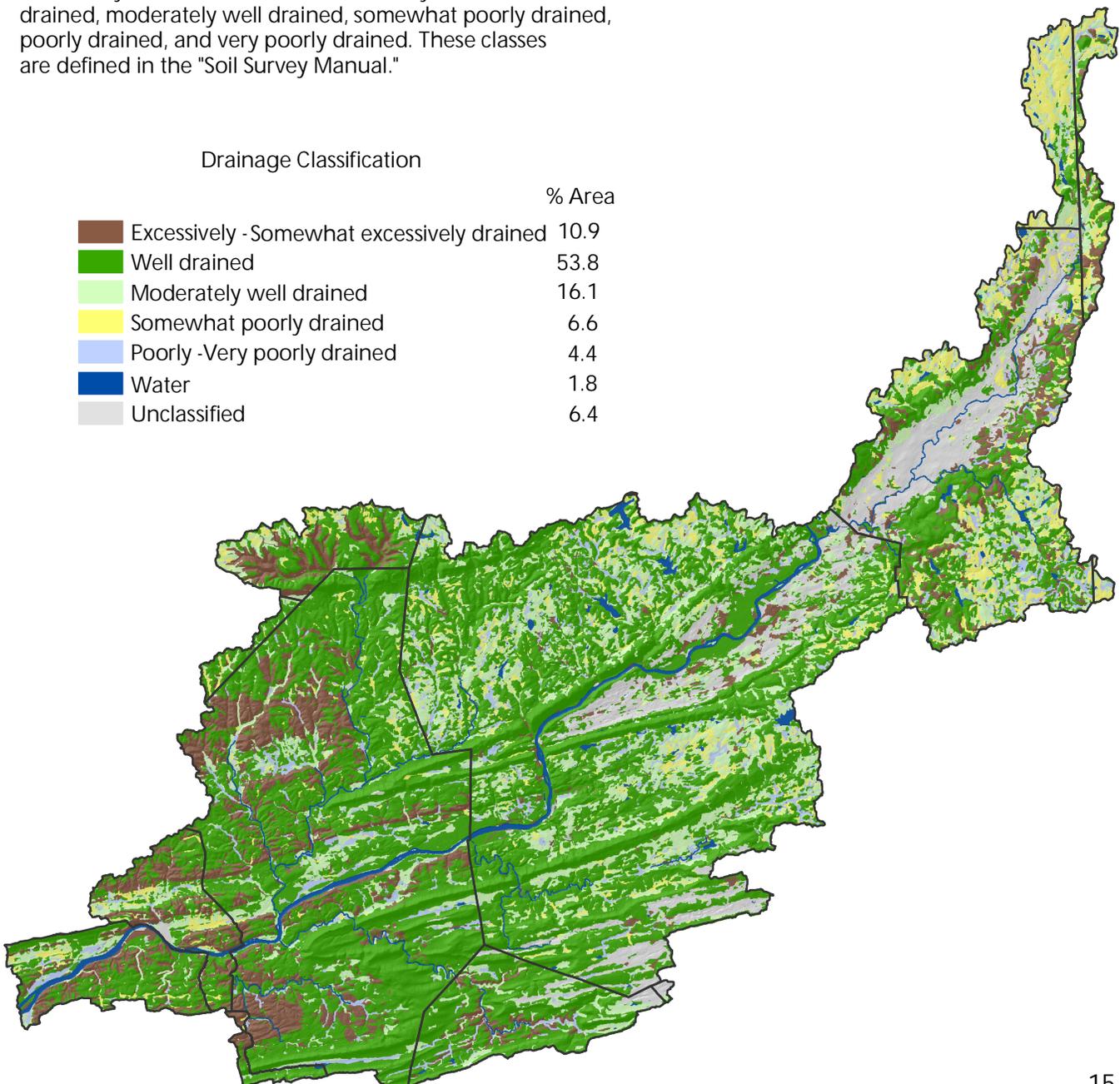


Drainage Classification

Drainage class (natural) refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized -- excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained. These classes are defined in the "Soil Survey Manual."

Drainage Classification

	% Area
 Excessively - Somewhat excessively drained	10.9
 Well drained	53.8
 Moderately well drained	16.1
 Somewhat poorly drained	6.6
 Poorly - Very poorly drained	4.4
 Water	1.8
 Unclassified	6.4



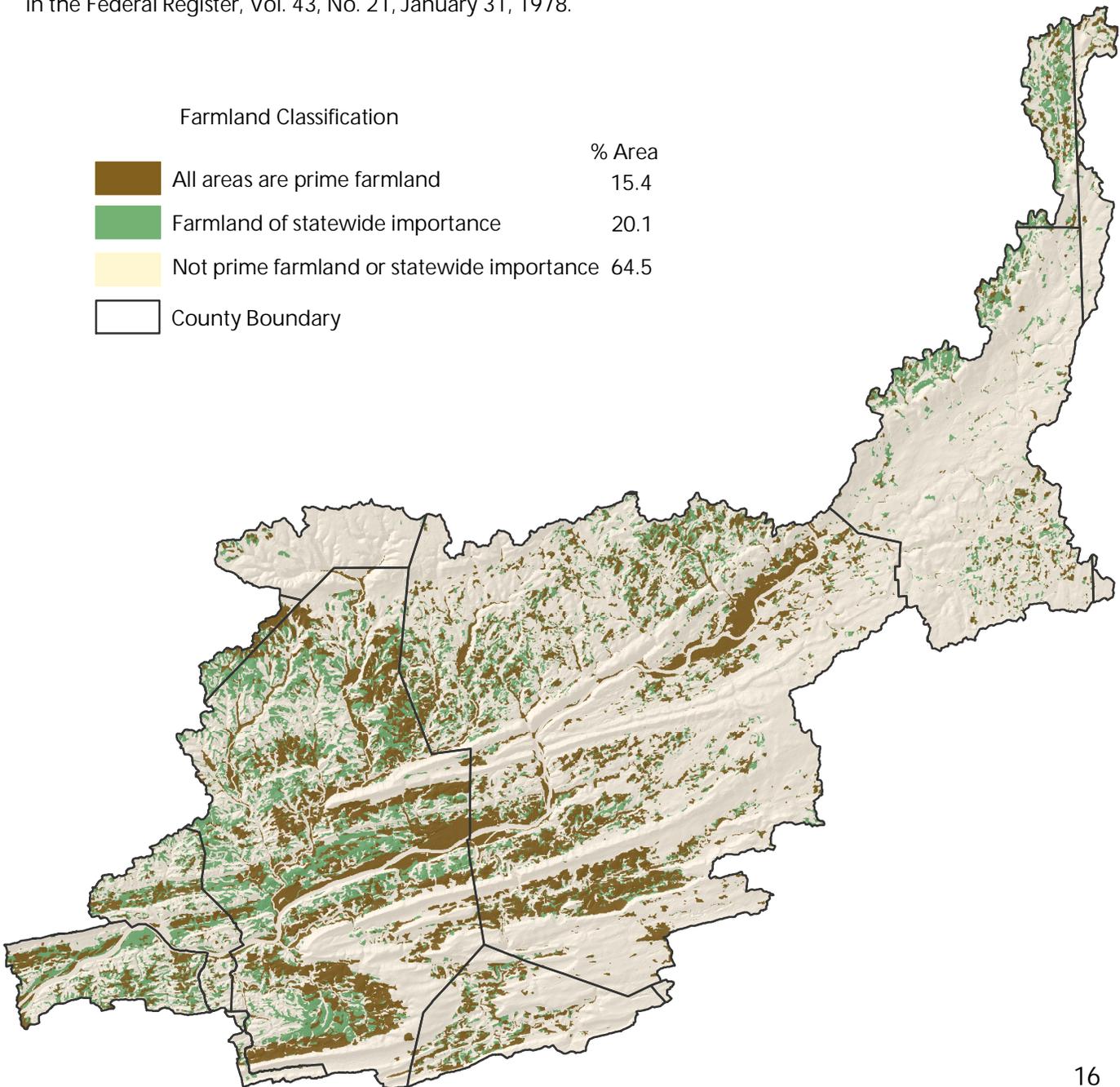


Farmland Classification

Farmland classification identifies soil map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland. Farmland classification identifies the location and extent of the most suitable land for producing food, feed, fiber, forage, and oilseed crops. NRCS policy and procedures on prime and unique farmlands are published in the Federal Register, Vol. 43, No. 21, January 31, 1978.

Farmland Classification

	% Area
 All areas are prime farmland	15.4
 Farmland of statewide importance	20.1
 Not prime farmland or statewide importance	64.5
 County Boundary	





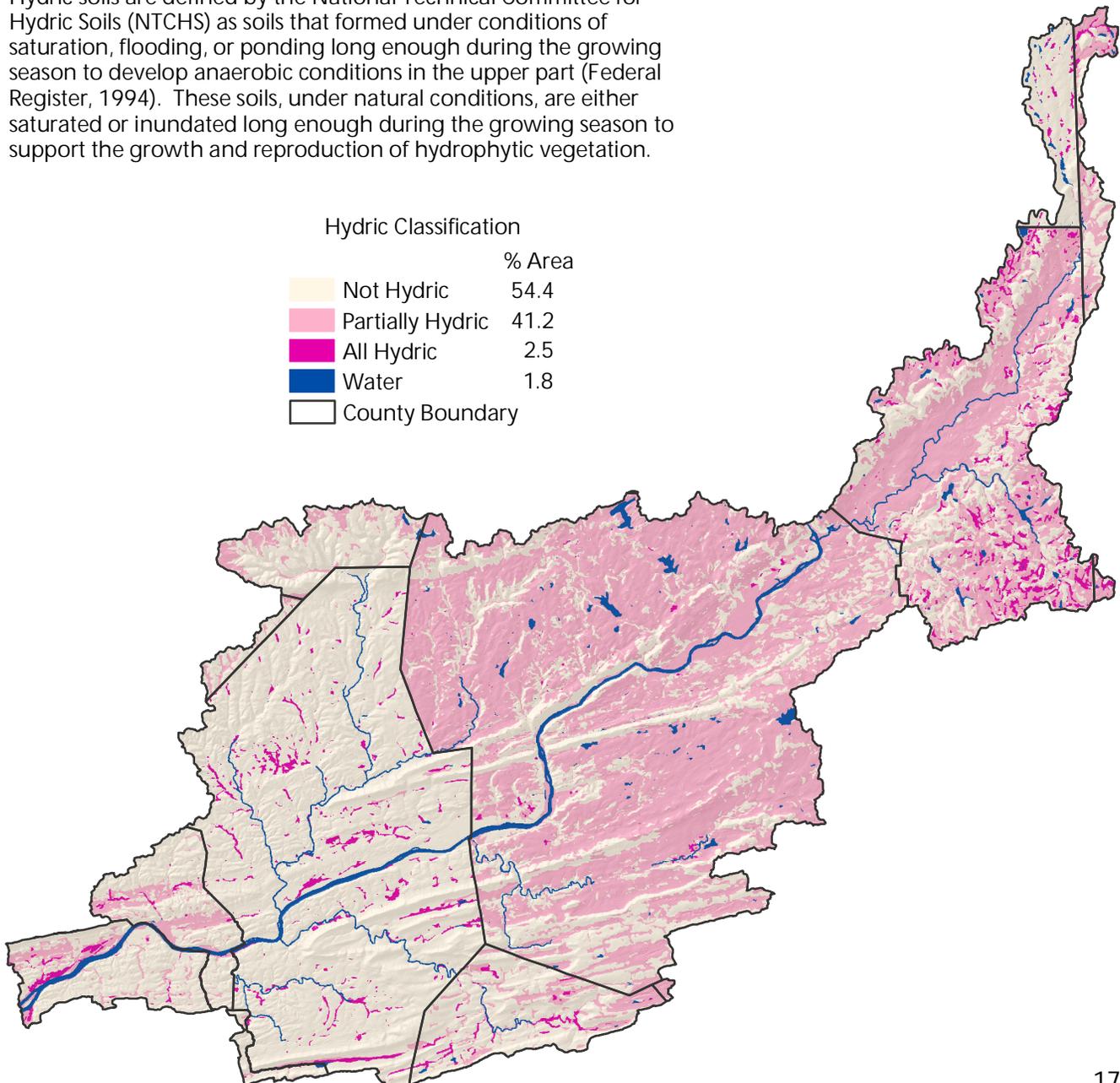
Hydric Soil Classification

This rating provides an indication of the proportion of the map unit that meets criteria for hydric soils. Map units that are dominantly made up of hydric soils may have small areas, or inclusions, of nonhydric soils in the higher positions on the landform, and map units dominantly made up of nonhydric soils may have inclusions of hydric soils in the lower positions on the landform.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

Hydric Classification

	% Area
 Not Hydric	54.4
 Partially Hydric	41.2
 All Hydric	2.5
 Water	1.8
 County Boundary	

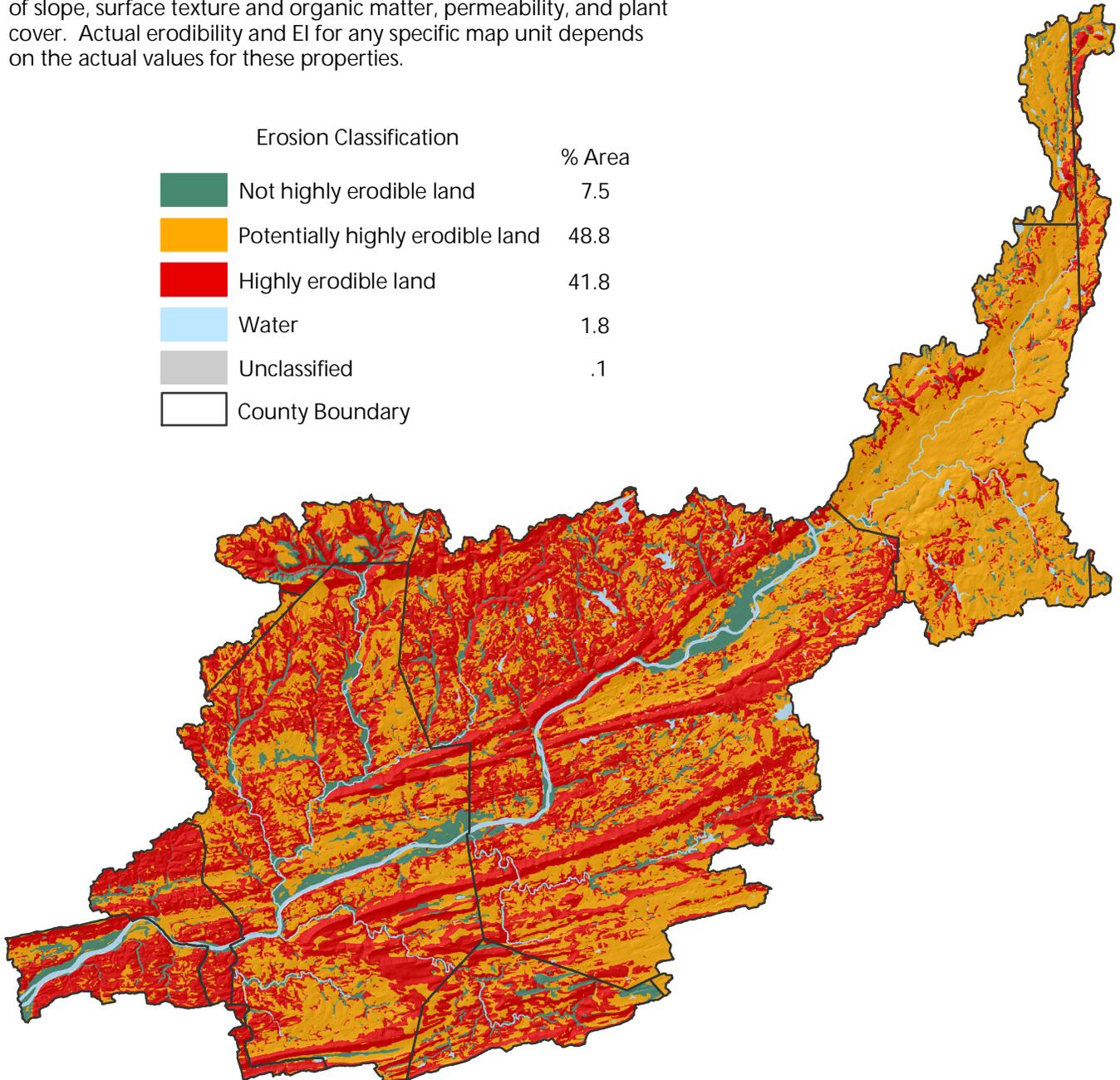




Highly Erodible Land

A soil map with an erodibility index (EI) of 8 or greater is considered to be highly erodible land (HEL). The EI for a soil map unit is determined by dividing the potential erodibility for the soil map unit by the soil loss tolerance (T) value established for the soil in the FOTG as of January 1, 1990. Potential erodibility is based on default values for rainfall amount and intensity, percent and length of slope, surface texture and organic matter, permeability, and plant cover. Actual erodibility and EI for any specific map unit depends on the actual values for these properties.

Erosion Classification	% Area
 Not highly erodible land	7.5
 Potentially highly erodible land	48.8
 Highly erodible land	41.8
 Water	1.8
 Unclassified	.1
 County Boundary	

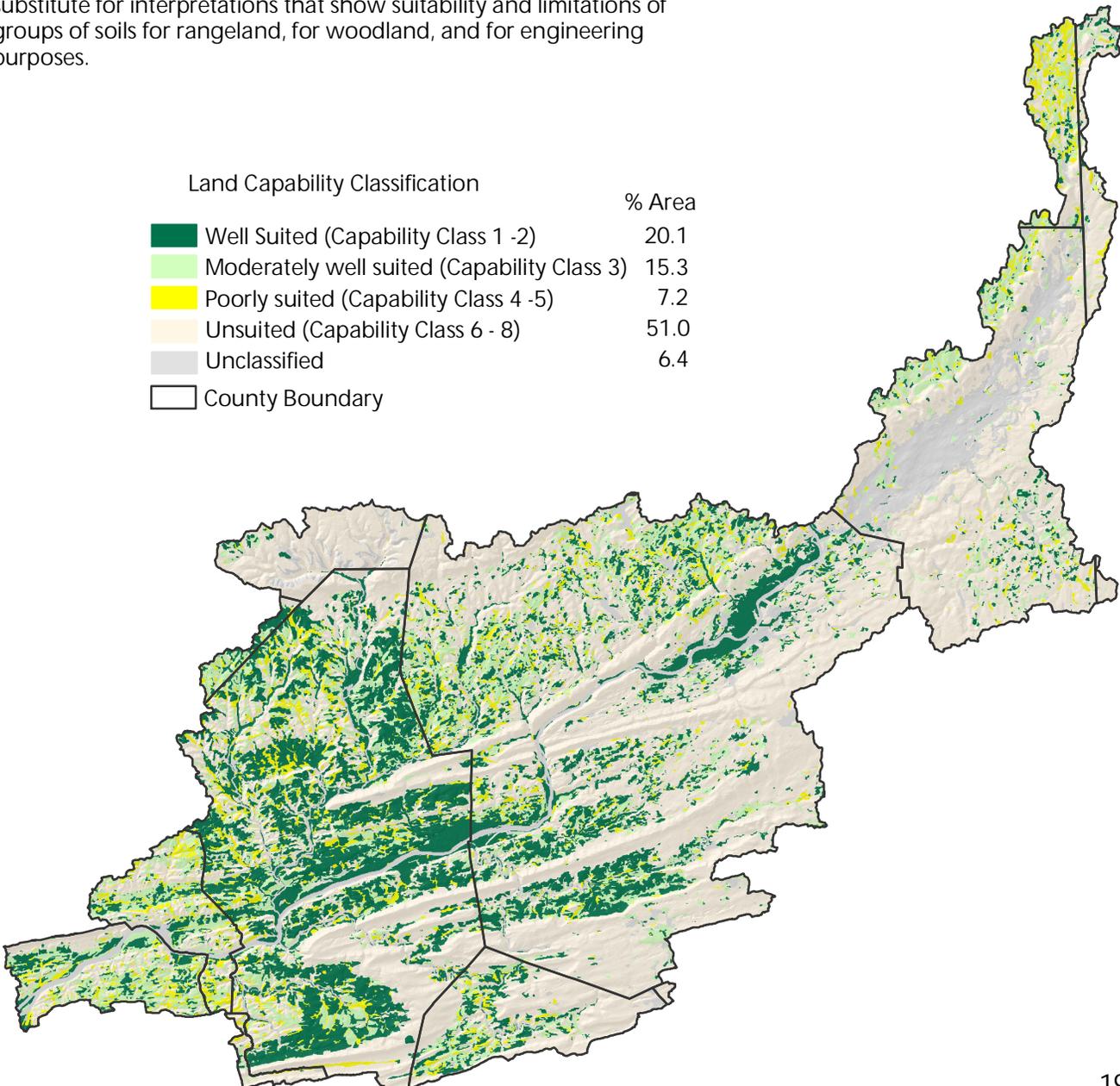


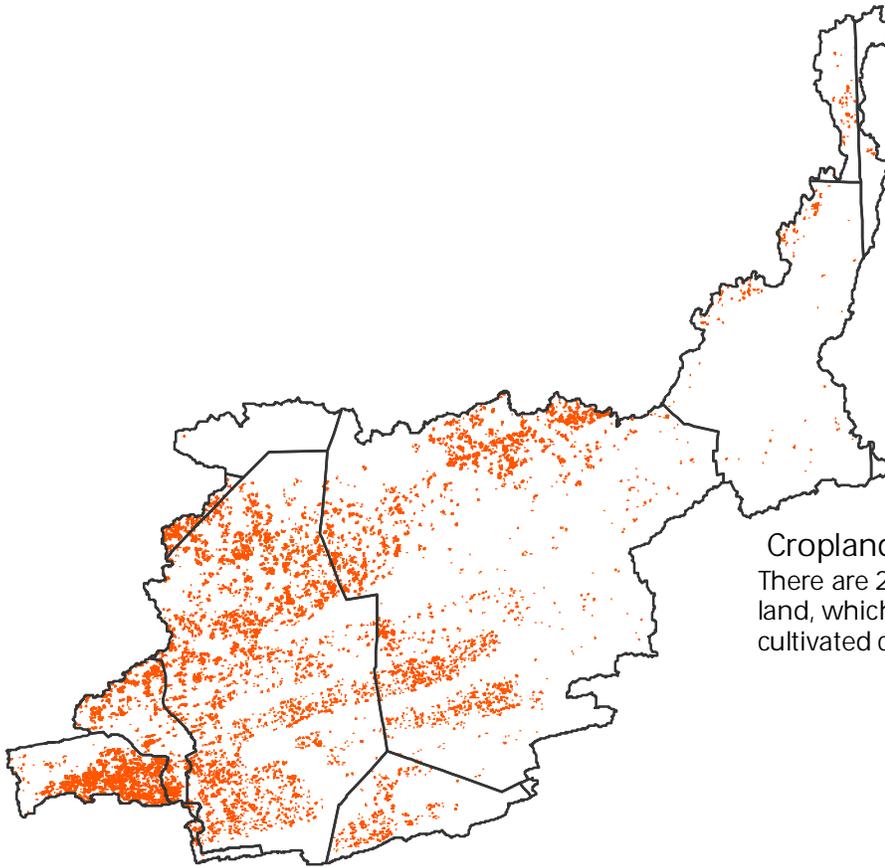


Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations that show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.

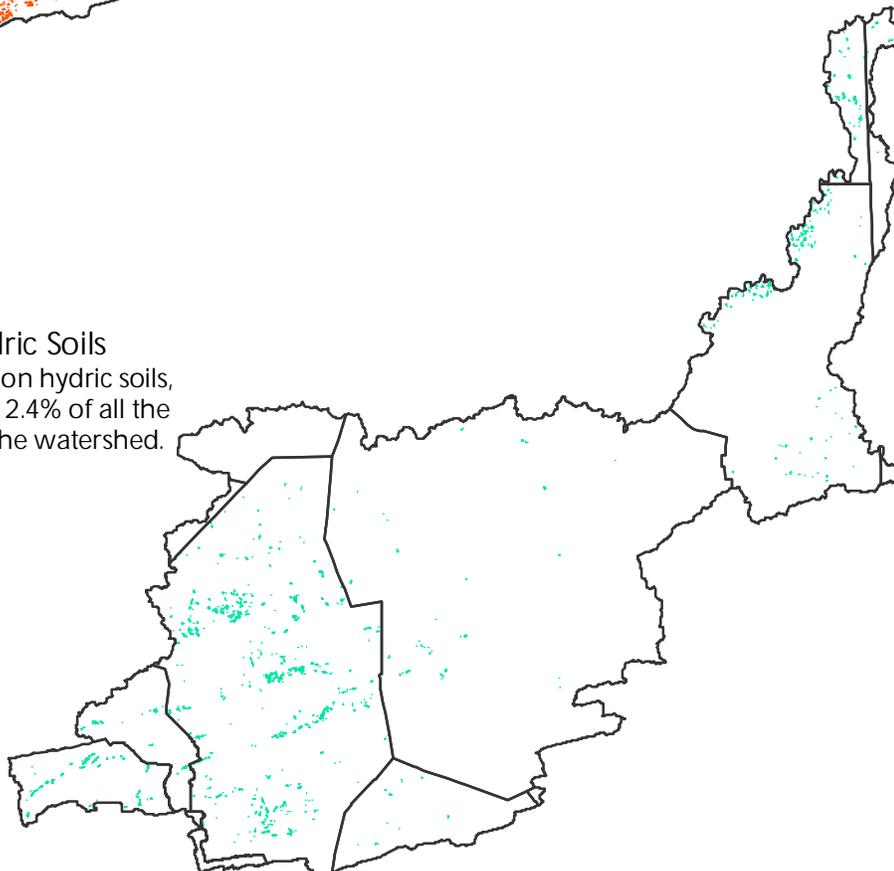
Land Capability Classification		% Area
	Well Suited (Capability Class 1 -2)	20.1
	Moderately well suited (Capability Class 3)	15.3
	Poorly suited (Capability Class 4 -5)	7.2
	Unsuited (Capability Class 6 - 8)	51.0
	Unclassified	6.4
	County Boundary	





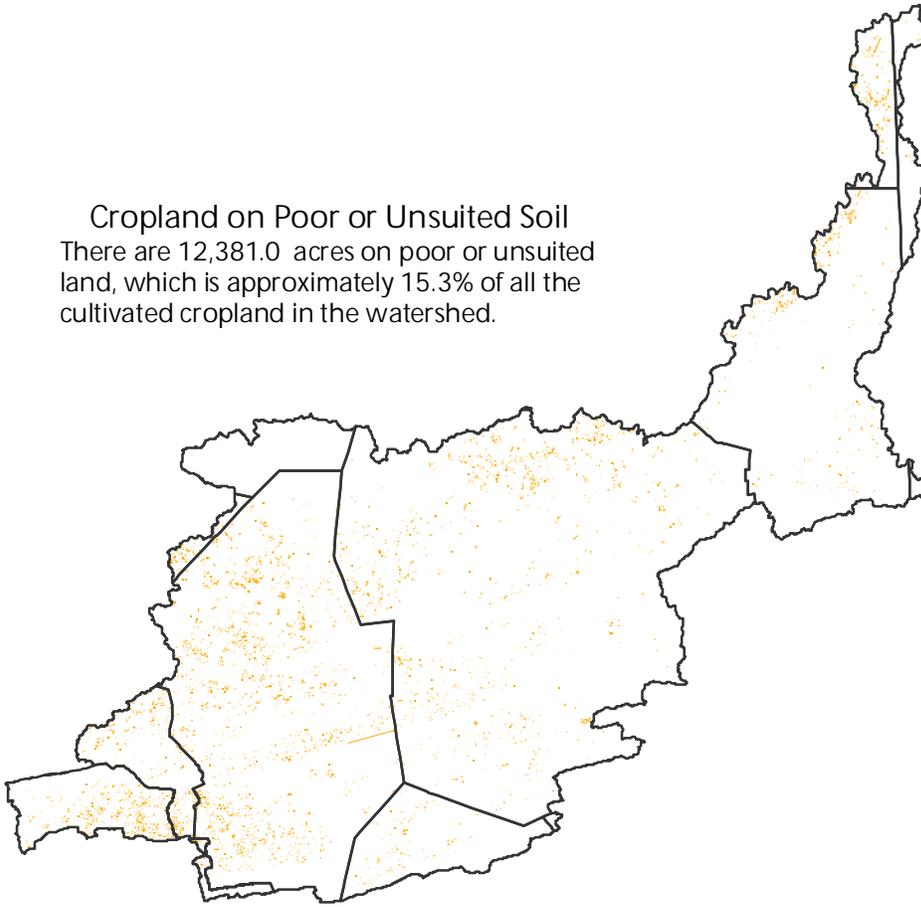
Cropland on Highly Erodible Land
There are 22,473.2 acres on highly erodible land, which is approximately 27.7% of all the cultivated cropland in the watershed.

Cropland on Hydric Soils
There are 1976.7 acres on hydric soils, which is approximately 2.4% of all the cultivated cropland in the watershed.

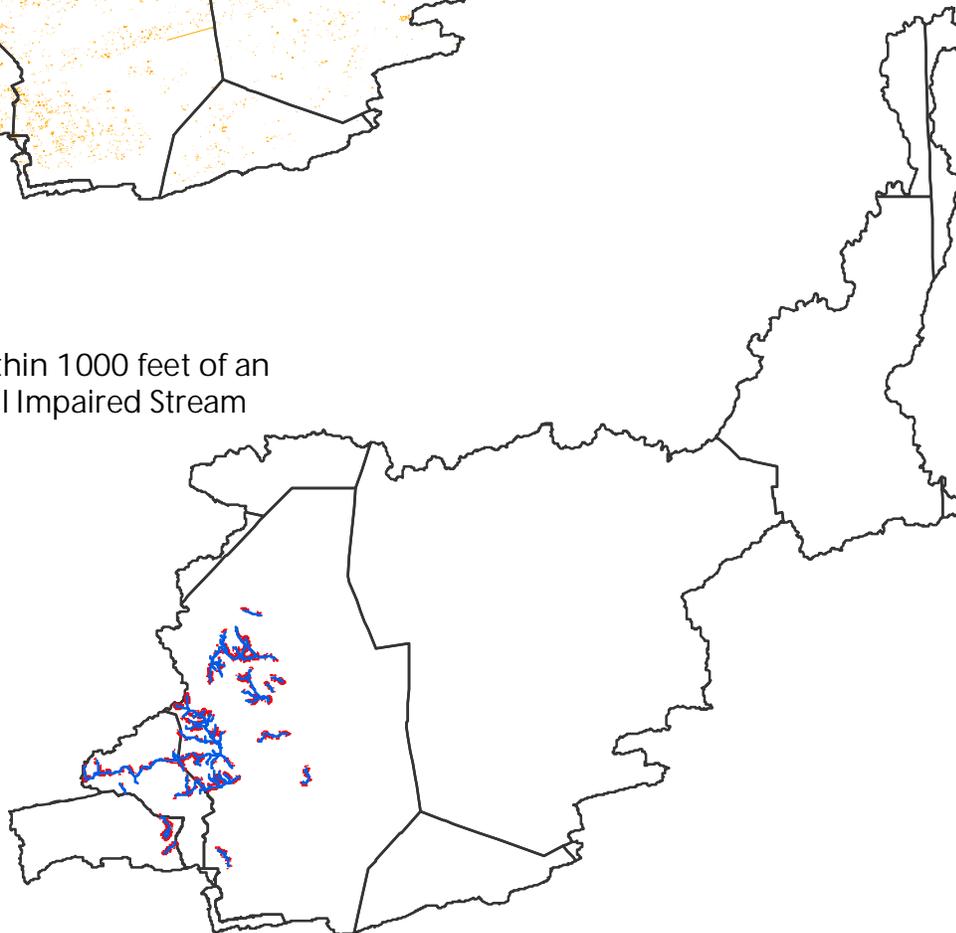




Cropland on Poor or Unsuitable Soil
There are 12,381.0 acres on poor or unsuitable land, which is approximately 15.3% of all the cultivated cropland in the watershed.



Cropland within 1000 feet of an Agricultural Impaired Stream





Resource Concerns

Major resource concerns in the area include:

- erosion
- soil wetness
- maintenance of organic matter on cropland
- soil productivity
- sedimentation

Conservation Practices

Common conservation practices for cropland:

- conservation tillage
- contour farming
- crop rotations
- residue management
- cover crops
- diversions
- grassed waterways
- nutrient management



PRS Performance Measures¹⁸

	FY99	FY00	FY01	FY02	FY03	FY04	FY05	FY06	Total
Total Conservation Systems Planned (acres)	6440	8613	10,163	11,483	9082	NA	8340	9736	63,857
Total Conservation Systems Applied (acres)	4205	4534	6727	9881	7443	NA	5581	5167	43,538
Key Conservation Treatments									
Waste Storage Facility (number)	4	11	22	5	1	2	0	5	50
Riparian Forest Buffer (acres)	26	687	58	377	422	144	151	172	2,037
Erosion Control Total Soils Saved (tons/year)	4111	3640	5396	9496	5332	NA	NA	NA	27,975
Nutrient Management (acres)	734	721	1864	2113	1915	699	280	909	9,235
Pest Management (acres)	322	1146	0	106	600	288	106	140	2,708
Prescribed Grazing (acres)	217	76	31	294	36	10	81	178	923
Tree and Shrub Establishment (acres)	214	493	13	378	235	27	17	5	1,382
Residue Management (acres)	3433	1751	3790	5300	2523	1013	2892	196	20,898
Wildlife Habitat (acres)	1089	668	2657	5470	2030	369	1616	1757	15,656
Wetlands Created, Restored, or Established	20	2	19	173	378	0	13	5	610
Acres in Conservation Programs									
Conservation Technical Assistance									
Planned	5027	5363	4309	6871	5996	NA	6684	7923	42,173
Applied	2904	2450	3855	4801	4954	NA	4498	3004	26,466
Conservation Reserve Program									
Planned	225	298	4325	3736	2501	NA	2302	1243	14,630
Applied	1027	637	2333	4561	2022	NA	1313	1878	13,771
Environmental Quality Incentive Program									
Planned	936	320	918	122	265	NA	841	916	4,318
Applied	145	35	355	93	208	NA	144	959	1,939
Farmland Protection Policy/Farm and Ranch Lands Protection Program									
Planned	0	196	109	0	0	NA	0	0	305
Applied	0	144	57	0	0	NA	0	0	201
Forestry Incentive Program									
Planned	74	5	3	0	87	NA	0	0	169
Applied	0	7	18	15	87	NA	0	0	127
Grasslands Reserve Program									
Planned				0	0	NA	0	0	0
Applied				0	0	NA	0	0	0
Grazing Lands Conservation Initiative									
Planned	0	277	451						728
Applied	0	25	240						265
Wildlife Habitat Incentive Program									
Planned	155	0	640	8	0	NA	64	101	968
Applied	5	10	41	15	31	NA	7	26	135
Wetlands Reserve Program									
Planned	545	0	48	0	0	NA	0	0	593
Applied	0	0	10	101	0	NA	0	0	111
Conservation Security Program									
Planned							21	0	21
Applied							0	0	0

NA - Reporting was unavailable by Hydrologic Unit Code



Social and Census Data ¹⁹

	Carbon	Columbia	Lackawanna	Luzerne	Lycoming	Montour	Northumberland	Schuylkill	Sullivan	Susquehanna	Wayne	Total
Farms (number)	1	830	167	433	9	121	104	83	20	44	24	1,836
Land in farms (acres)	56	115,980	19,067	57,914	1,241	15,866	17,155	10,984	3,576	7,382	4,074	253,295
Total cropland (acres)	42	94,416	12,851	31,200	726	10,980	13,531	7,756	1,956	4,088	2,048	179,594
Principal operator by primary occupation - Farming (number)	0	432	97	200	5	60	55	41	13	21	15	939
Farms by Size												
1 to 9 acres	0	46	20	47	0	5	13	8	2	1	1	143
10 to 49 acres	0	224	36	129	2	31	29	28	2	11	3	495
50 to 179 acres	1	400	86	184	4	61	41	33	9	16	11	846
180 to 499 acres	0	121	24	59	2	18	15	10	5	12	7	273
500 to 999 acres	0	25	1	10	0	5	3	3	1	2	1	51
1,000 acres or more	0	13	2	5	0	1	3	1	0	0	0	25
Livestock and Poultry												
Cattle and calves inventory (farms)	0	248	67	126	4	52	40	19	11	20	13	600
Cattle and calves inventory - Beef cows (farms)	0	142	43	76	2	16	15	9	8	11	7	329
Cattle and calves inventory - Milk cows (farms)	0	57	23	32	1	21	11	5	3	8	6	167
Hogs and pigs inventory (farms)	0	51	3	15	1	6	7	4	1	1	1	90
Sheep and lambs inventory (farms)	0	33	2	17	0	4	5	2	0	2	1	66
Layers 20 weeks old and older inventory (farms)	0	37	9	29	1	11	5	7	1	3	2	105
Broilers and other meat-type chickens sold (farms)	0	14	3	5	0	4	5	2	0	0	0	33
Crops Harvested												
Corn for grain (acres)	3	17,487	538	4,652	129	1,596	4,471	1,714	101	56	17	30,764
Corn for silage or greenchop (acres)	2	3,329	416	1,187	39	564	657	444	173	188	80	7,079
Wheat for grain, all (acres)	1	4,385	(D)	954	12	564	631	497	0	3	(D)	7,047
Oats for grain (acres)	2	2,364	34	1,421	19	372	257	305	22	7	2	4,805
Barley for grain (acres)	0	269	0	27	2	78	261	75	(D)	0	(D)	712
Soybeans for beans (acres)	1	10,748	0	1,555	47	2,293	2,998	788	0	(D)	(D)	18,430
Forage - land used for all hay and all haylage, grass silage, and greenchop (acres)	13	16,666	7,353	10,193	256	2,685	2,114	1,777	1,175	2,372	1,419	46,023
Vegetables harvested for sale (acres)	1	2,922	523	1,328	8	67	285	122	(D)	3	3	5,262
Land in orchards (acres)	0	488	106	282	5	46	48	56	(D)	6	5	1,042
Total cropland harvested (acres)	31	63,336	9,357	23,092	525	8,484	11,556	6,309	1,488	2,658	1,551	128,387
Farm Operator by Ethnicity												
White	1	1128	243	614	13	162	148	118	28	64	35	2,554
Black or African American	0	0	0	2	0	0	0	0	0	0	0	2
Asian	0	0	0	0	0	0	0	0	0	0	0	0
Hispanic	0	0	5	2	0	2	1	0	1	0	0	11
American Indian/Alaskan Native	0	2	0	2	0	0	0	0	0	0	0	4
Pacific Islander	0	0	0	0	0	0	0	0	0	0	0	0
Women	0	313	53	146	3	39	35	27	7	19	9	651

(D) - Withheld to avoid disclosing data for individual farms



Partnership Groups:

A cooperative project involving NRCS and conservation partners, including:

- State Conservation Commission
- Pennsylvania Department of Environmental Protection
- Pennsylvania Game Commission
- Pennsylvania Grazing/Forage Lands Conservation Coalition
- Pennsylvania Fish & Boat Commission



Footnotes/Bibliography

All data is provided "as is". There is no warranties, express or implied, including the warranty of fitness for a particular purpose, accompanying this document. Use for planning purpose only.

- 1. Common Resource Area**
Common Resource Area (CRA) delineation is defined as a geographical area where resource concerns, problems, or treatment needs are similar. More information can be found online at <http://soils.usda.gov/survey/geography/cra.html>
- 2. National Elevation Dataset (NED)**
The NED is a seamless mosaic of the best-available elevation data. The primary source data were the USGS 7.5-minute (30-meter or 10-meter resolution) DEM's. A hillshade grid was also created using the DEM and used to create a 3-D effect. More information on NED can be found online at <http://ned.usgs.gov/>
- 3. Land Use / Land Cover 2001**
Land Use / Land Cover map was created using the National Land Cover Dataset. The National Land Cover Dataset was compiled from Landsat satellite TM imagery with a spatial resolution of 30 meters and supplemented by various ancillary data (where available). More information can be found online at <http://landcover.usgs.gov/>
- 4. Average Annual Precipitation**
The average annual precipitation data for this map layer were produced through a partnership between NRCS and the Spatial Climate Analysis Service at Oregon State University (OSU). The average annual precipitation is from 1961 through 1990. More information can be found online at <http://www.ncgc.nrcs.usda.gov/products/datasets/climate/index.html>
- 5. National Wetlands Inventory (NWI)**
The NWI maps do not show all wetlands since the maps are derived from aerial photointerpretation with varying limitations due to scale, photo quality, inventory techniques, and other factors. More information can be found online at <http://www.fws.gov/nwi/>
- 6. Impaired Streams**
Impaired Streams were derived from Pennsylvania Department of Protection Office of Water Management, 2006 list on Non-Attaining Streams. More information can be found on DEP website at <http://www.depweb.state.pa.us/dep/site/default.asp>
- 7. Abandoned Mine Land**
Abandoned Mine Land data was received from the Office of Surface Mining. The data set shows the approximate location of Abandoned Mine Land Problem Areas containing public health, safety, and public welfare problems created by past coal mining. More information can be found online at <http://www.osmre.gov/osmaml.htm>
- 8. Exceptional Value and High Quality Streams**
Exceptional Value and High Quality Streams were taken from the Chapter 93 data layer received from Pennsylvania Department of Environmental Protection. For more information on what qualifies a stream as exceptional value or high quality or any information on Chapter 93 streams go to <http://www.pacode.com/secure/data/025/chapter93/chap93toc.html>



Footnotes/Bibliography

9. Pennsylvania Trout Waters
Pennsylvania Trout Water data is compiled by the Pennsylvania Fish and Boat Commission. This layer was created based on the 1:24000 National Hydrography Dataset (NHD) water bodies layer. More information can be found online at <http://www.fish.state.pa.us/fishpub/summary/troutwaters.html>
10. Total Maximum Daily Load (TMDL)
TMDL is the sum of the individual waste load allocations and load allocations which would not produce a violation of water quality standards. The data used is from 2003, the PA Department of Environmental Protection is currently working on updating the GIS data available. More information can be found on TMDL locations in PA at http://www.dep.state.pa.us/watermanagement_apps/tmdl/, and/or nationally at <http://www.epa.gov/owow/tmdl/>
11. Water Quality Testing Points
Water Quality Testing Points monitor water quality with emphasis on stream acidity in Pennsylvania with an associated database. The database contains more than 33,466 records on water quality from 1986 to the present from 622 testing sites throughout Pennsylvania. Information in the records includes alkalinity and Ph and includes nitrates and phosphates for some sites since 1996. The information is maintained by the Alliance for Aquatic Resource Monitoring. More information can be found online at <http://alpha.dickinson.edu/storg/allarm/allarm%20projects/database.htm>
12. Water Resource Points
A Water Resource is a DEP primary facility type related to the Water Use Planning Program. More information can be found <http://www.depweb.state.pa.us/dep/site/default.asp>
13. Natural Heritage Inventory Sites
The Natural Areas polygons were developed by the Pennsylvania Natural Heritage Program (PNHP) County Natural Heritage Inventory (CNHI) Program. Natural Areas were identified using map and air photo interpretation, aerial reconnaissance, and field surveys. More information and county reports can be found online at <http://www.naturalheritage.state.pa.us/>
14. Pennsylvania Breeding Bird Atlas
Data was taken for the 1st Pennsylvania Breeding Bird Atlas (1992). For this watershed assessment, fourteen bird species were chosen to be focused on. More information about all bird species can be obtained at <http://www.carnegiemnh.org/atlas/home.htm>
15. Important Bird Areas
The Important Bird Areas Program (IBA) is a global effort to identify and conserve areas that are vital to birds and other biodiversity. For more information nationally and/or on the state level go to <http://www.audubon.org/bird/iba/>
16. Important Mammal Areas
Important Mammal Areas Project, IMAP, the first program of it's kind, was created by the Mammal Technical Committee of the Pennsylvania Biological Survey (PaBS). For more information go online to <http://www.pawildlife.org/imap.htm>



Footnotes/Bibliography

17. Soils

Soil Survey spatial and tabular data were used for the following survey areas:

- Carbon County (PA025)
- Columbia County (PA037)
- Lackawanna County (PA069)
- Luzerne County (PA079)
- Lycoming County (PA081)
- Montour County (PA093)
- Northumberland County (PA097)
- Schuylkill County (PA107)
- Sullivan County (PA610)
- Susquehanna County (PA115)
- Wayne County (PA127)

Spatial and tabular data can be downloaded at <http://soildatamart.nrcs.usda.gov/>

18. Performance Results System (PRS)

PRS data was extracted from PRS by year, conservation system, conservation practice, and programs by hydrologic unit code. More information can be found online at the PRS homepage

<http://ias.sc.egov.usda.gov/prshome/>

19. Social and Census Data

Ag census data and ethnicity data were downloaded from the National Agricultural Statistics Service (NASS). The data was adjusted by percent of Hydrologic unit in the county. More information can be found online at http://www.nass.usda.gov/Census_of_Agriculture/index.asp