#37 REVISED

CPC Planning Bulletin

CHESTER COUNTY PLANNING COMMISSION

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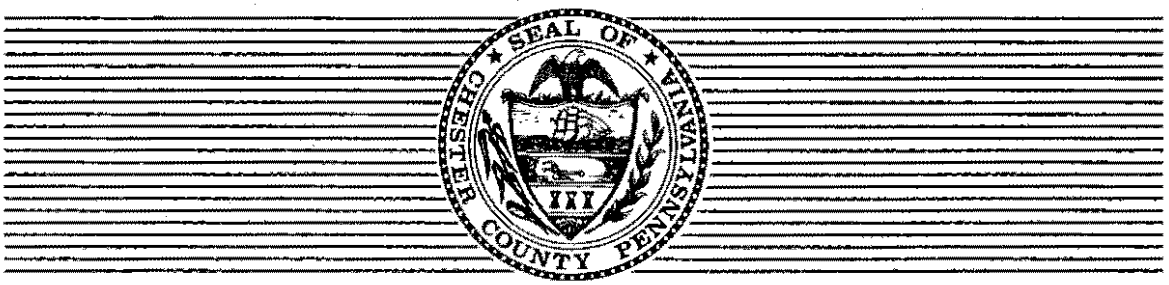
Stream Water Quality Classifications Chester County, Pennsylvania



BOARD OF COUNTY COMMISSIONERS

Karen L. Martynick, Chairman
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Introduction

Streams are natural bodies of flowing water. Despite this simple definition, streams are complex ecosystems in which biological, chemical, or physical changes may affect other characteristics (U.S. EPA, 2001a). Commencing at their headwaters, streams gather water from runoff, rain, snowmelt, or are fed by ground water. Streams hold great importance regardless of size or flow. They provide water supplies, recreation and agricultural uses, a variety of aesthetic values, and are also important wildlife habitats.

Carrying freshwater to cities and farms, streams serve as the home to wildlife and fisheries, and provide recreation and natural beauty for people throughout the land. Streams are used as sources of drinking water, for product manufacturing, and to provide habitats for animals. Common species in Chester County streams include smallmouth bass, brown trout, plains leopard frog, bog turtle, salamander, beaver, and snowy egret (Knorr and Fairchild, 1987; USDA, undated). It is for all of these reasons that we must protect and enhance Chester County streams.

Streams have always attracted and influenced the development of communities through their ability to support life and economic development. However, this relationship works both ways, with the streams being influenced by the development they sustain. Virtually everything that society does, and has done in the past, on the surface of the land has impacted the streams and ground water. Many streams have been altered through the addition of sewage, debris, and excessive sedimentation (the removal, transport, and deposition of detached particles by water). While certain systems remain healthy, very few occur today as they did in their natural historic state.

Increasing awareness of the environmental impacts our streams have undergone, and will potentially undergo, prompted the importance of protecting water quality for their biotic communities and drinking water supplies. In response to the increasing consciousness of the significance of water quality, the Federal and State governments began actively pursuing a program of stream water quality protection in the early 1970s. The County of Chester shares in the concerns for protecting water quality in our streams. Through the combined efforts of the Chester County Planning Commission's (CCPC) comprehensive plan, *Landscapes*, and the Chester County Water Resources Authority's (CCWRA) integrated water resources plan, *Watersheds*, steps are being taken to sustain both economic growth throughout the County while maintaining or improving upon the quality of it's natural waters.

The updating of *Planning Bulletin #37 Stream Water Quality Classifications of Chester County, Pennsylvania* is focused on increasing public awareness and understanding of the designated, protected uses of the streams within the County. Recent changes to federal and state programs along with efforts of the CCPC and CCWRA are discussed in an effort to encourage the continuous practice of not only protecting our streams, but also working to enhance their overall quality.

Chester County Streams

There are 21 watersheds that originate within Chester County (CCWRA, 2001); these are shown in Map 1, "Watersheds of Chester County". All 21 of these watersheds are located in the Piedmont Region, an area of gently rolling to hilly land lying between the Appalachian Mountains and the Atlantic Coastal Plain. These watersheds are the areas of land that catch rain and snow and drain or seep the water into a common marsh, stream, river, or lake. Found in a variety of shapes and sizes, watersheds are not limited by local, county, or state lines (CCWRA, 2001). Instead, the topography of the area determines the boundary of the water-

shed. Bounded by ridgelines connecting the highest elevation points surrounding a stream, the watershed collects any precipitation falling within those ridgelines, transporting it down into the stream and onward to the next watershed.

A percentage of the precipitation that falls on the land within a watershed percolates down through the surface and becomes ground water. Ground water is the water that is located underground that saturates the spaces between particles of sand, silt, and clay, ot fills the crevices or fractures in rock (CCWRA, 2001). The function of ground water is intertwined with that of surface water. Feeding water to streams, wetlands, and lakes, ground water is also recharged through streambed infiltration. In this sense, ground water is responsible for maintaining the hydrologic balance of surface streams, lakes, wetlands, and marshes (CCWRA 2001).

Landscapes

Chester County has taken a proactive approach to protecting and maintaining the natural resources of the County. In 1996 the Chester County Commissioner's adopted *Landscapes*, the Comprehensive Plan Policy Element of the Chester County Comprehensive Plan. Within *Landscapes*, the resources goal aims to sustain and enhance the natural and scenic resources for the benefit of current and future generations while also accommodating for planned growth. Supporting this goal are a number of policies relating to water, biotic, and land resources.

In order to gain support from the municipalities within the county, the CCPC entered into Memorandums of Agreement (MOA) with those supporting the goals and policies of the plan. Part of this agreement was the initiation of the Vision Partnership Program (VPP) which works to grant funding to those municipalities that are carrying forth the implementation of *Landscapes*. To further the goals of *Landscapes*, the CCPC also committed to three functional plans: the open space plan *Linking Landscapes*, the water resources plan *Watersheds*, and the transportation plan *Connecting Landscapes*.

Linking Landscapes is the plan for protecting the open space network in Chester County from the effects of sprawl. Sprawl is defined in *Landscapes* as "spreading low density, totally automobile dependent pattern of housing, shopping centers, and corporate and industrial parks that is wasteful and short-sighted." The preservation of open space is one of the most efficient forms of land stewardship, and the simple act of allowing vegetative growth along streams reduces soil bank erosion, one of the many pollutants that can degrade water quality.

The water resources plan, *Watersheds*, prepared by the CCWRA addresses the integrity of the natural waters of the county. The objectives and policies put forth in *Watersheds* accommodate existing land uses and planned growth through effective techniques that protect ground water recharge, stream baseflows, stream stability, floodplains, water quality, and aquatic living resources of streams and ground water.

Chester County's commitment to achieving water quality standards that maintain the designated stream uses remains strong. This dedication is demonstrated through the ongoing commitment of the CCPC and CCWRA to find a balance between planned development and the conservation of natural resources for current and future generations.

Regulatory Framework

The key laws that are applicable to the waters of Pennsylvania are summarized below:

Clean Water Act

The Environmental Protection Agency (U.S. EPA) is responsible for regulation of water quality at the Federal level as required by the 1972 Federal Water Pollution Control Act, which set the basic structure for regulating discharges of pollutants to waters of the United States. The Clean Water Act (CWA) is a 1977 amendment to the Federal Water Pollution Control Act of 1972, allowing for focus on reducing toxic pollutants in the environment (U.S. EPA, 1997). In 1987, the CWA was reauthorized and again focused on toxic substances, and established regulations and funding for sewage treatment plants (U.S. EPA, 1999).

The CWA focuses on improving the quality of the nation's waters by restoration and preservation. By providing a thorough structure of standards, technical tools and financial assistance it addresses the many causes of pollution and poor water quality, including municipal and industrial wastewater discharges, polluted runoff from urban and rural areas, and habitat destruction (U.S. EPA, 1997). U.S. EPA regulations require states to develop water quality standards for streams within their borders and to develop programs for preventing further degradation of present day water quality. More information on the CWA can be obtained by accessing the U.S. EPA website (www.epa.gov).

National Pollution Discharge Elimination System (NPDES) Phase I & II

Introduced in 1972, the NPDES permit program is authorized under the Clean Water Act (U.S. EPA, 2001b). The NPDES program controls water pollution by setting limits on the amount of pollutants that can be discharged from point sources. Point sources, are discrete conveyances such as pipes or man-made ditches (U.S. EPA, 2001b).

Phase I of the NPDES program was developed in 1990 to address sources of stormwater runoff that were likely to have the greatest impact on water quality. Under Phase I construction sites larger than 5 acres, certain industrial sites, and "medium" and "large" Municipal Separate Storm Sewer Systems (MS4s) located in incorporated places or counties with populations of 100,000 or more were required to obtain an NPDES permit (U.S. EPA, 2001b).

In 1999, Phase II of the NPDES permit program was published in the Federal Register. The implementation of the Phase II regulations required construction sites that were between 1-5 acres and smaller urbanized area MS4s to be permitted. In addition to expanding the NPDES program, Phase II also requires that MS4s develop 6 minimum control measures, one of which is post construction runoff. NPDES Phase II requires operators of small MS4s to have fully developed and implemented their storm water management programs by 2008 (U.S. EPA, 2001b). Further information on NPDES can be obtained from the U.S. EPA website (www.epa.gov).

Total Maximum Daily Load (TMDL) regulations

Established under the CWA, the TMDL process 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 the volume of a substance can be put in the water without violating the water quality standard, and then distribute that quantity to all the sources of the pollutant {Pennsylvania Department of Environmental Protection (DEP), 2000a)}. TMDLs can be considered a watershed budget for pollutants, representing the total amount of pollutants that can be incorporated by a stream without causing impairment or water standards to be exceeded (DEP, 2000b). Under the TMDL process, effluent discharge limits are supposed to be set which are rigorous enough to make sure the in-stream standards are met even when water levels are low.

Pennsylvania's TMDL program for nonpoint source impaired waters uses a watershed approach, focusing on implementation of corrective efforts that will restore and maintain healthy waters through a combination of federal, state, and local programs which include regulatory, non-regulatory, and voluntary efforts (DEP, 2000b). A TMDL plan is prepared to include waste load allocations for point sources, load allocations for nonpoint sources and a margin of safety. The TMDL plan focuses on remedial measures needed to meet water quality standards for these impaired waters, addressing all the pollution sources. When DEP establishes site specific effluent discharge limits as part of the TMDL process, described in 25 Pa. Code § 96, they are implemented through the existing state regulations under the NPDES permit program. Additional information on the TMDL program can be obtained at either the U.S. EPA website (www.epa.gov) or the DEP website at (www.dep.state.pa.us).

Clean Streams Act

Pennsylvania has an extensive history of water quality concern. Beginning in 1905, Pennsylvania passed the Purity of Water Act in response to outbreaks of typhoid fever (DEP, 1997). This act became the statute for prevention and elimination of wastes in Pennsylvania, resulting in the creation of the State Department of Health (DOH). The DOH was granted jurisdiction over public water supplies and pollution resulting from domestic sewage, and so began the efforts to improve the quality of Pennsylvania's streams.

In 1937, as a response to public outcry over the adverse condition of the state's waters resulting from urbanization and industrialization, the Pennsylvania legislature passed the Clean Streams Law to inhibit pollution of state waters (DEP, 1997). As per the Clean Streams Law (35 P. S. § 691.1.), waters of the Pennsylvania Commonwealth shall be construed to include "any and all rivers, streams, creeks, rivulets, impoundments, ditches, water courses, storm sewers, lakes, dammed water, ponds, springs and all other bodies or channels of conveyance of surface and underground water, or parts thereof, whether natural or artificial, within or on the boundaries of this Commonwealth."

The Clean Streams Law in 1937 created a bond system to finance public works to decrease pollution, establish a judicial enforcement system, impose penalties, regulate sewage and industrial waste discharges and those from mining operations (DEP, 1997). During the 1960s, Pennsylvania developed water quality standards for all surface waters in the state, with reviews held every three years. In 1971, Pennsylvania amended the state constitution giving all Pennsylvanians the right to clean water. The Clean Streams Law was amended in 1945, 1956, 1965, 1970 and 1976 with the 1976 amendment reflecting the requirements of the Federal Water Pollution Control Act (DEP, 1997). Further information on the Clean Streams Act can be obtained from the DEP website (www.dep.state.pa.us).

The guidelines set by the U.S. EPA in the Clean Water Act (33 U.S.C. § 1251 et seq.) required the establishment of water quality standards for all streams in Pennsylvania. In Pennsylvania this was established under the Clean Streams Law. Sections 5 and 402 of the Clean Streams Law (35 P. S. § § 691.5 and 691.402) issue the regulatory authority to 25 Pa. Code § 93–"Water Quality Standards" of the DEP rules and regulations. A copy of 25 Pa. Code § 93 can be obtained by contacting any DEP regional office, or by accessing the Pennsylvania Code website (www.pacode.com). The water uses to be protected for each river or stream, as well as specific water quality criteria necessary to protect those uses are outlined in 25 Pa. Code § 93. Under 25 Pa. Code § 93, determination of water quality standards for streams is made by the combination of the protected water use and the water quality criteria that matches that use. Table 1 under Pennsylvania Stream Designations lists the protected water uses from 25 Pa. Code § 93.

Pennsylvania Stream Designations

The waters of Pennsylvania are mapped according to their designated use, as defined in 25 Pa. Code § § 93.4a and 93.9a-93.9z, and whether they meet previously cited standards. Protected use designations are divided into categories of aquatic life, water supply, recreation and fish consumption, special protection, and other (Table 1). Each of these categories is then broken down further depending on the characteristics of the protected use (Table 1). The use designation shown in the water quality standards is the aquatic life use. These uses are Warm Water Fishes (WWF), Trout Stocking (TSF), Cold Water Fishes (CWF), and Migratory Fishes (MF) (DEP, 2001a). In addition, streams with excellent water quality may be designated High Quality Waters (HQ) or Exceptional Value Waters (EV).

Designations for the water uses of Chester County are detailed in Map 2, "Protected Use Designations for Streams in Chester County." The Protected Use Designation map illustrates the State's Special Protection and Aquatic Life Protected Use Designations. Each sub-watershed is labeled with the designation(s) of the surface waters in that sub-watershed. EV and HQ waters are also shaded and numbered with a separate key to identify the state's special protected waters located within the county. Within Chester County, 47% of the County's watersheds are designated as EV or HQ waters. These stream designations are used by the state in various regulatory programs to protect the streams and watersheds from degradation. Map 2 also presents the streams, sub-watersheds, watersheds, major basins, municipal boundaries and major roads. This map provides easy reference of where the current designated uses are found throughout Chester County. A larger version of Map 2 is available at the CCPC or the CCWRA office.

Map 2 is complimented with the addition of Map 3, "Stream Water Quality Assessments for Chester County." The Stream Water Quality Assessments map presents the results of the DEP's field assessments of stream water quality impairments as of July 2000. Map 3 illustrates which waters are attaining the state water quality standards and which are not. Streams designated as "not attaining" the state water quality standards for their Protected Use Designation are then included on the Pennsylvania's Section 303(d) list of impaired streams. This list is called the 303(d) list because of the section of CWA that makes the requirement. Once included on the 303(d) list, the state must develop and implement a TMDL for use in reducing the pollutant loadings to that stream and improving the stream conditions to restore the water quality to the corresponding standards. Map 3 also shows the watersheds, municipalities, and major roads. A larger version of Map 3 is available at the CCPC or the CCWRA office.

Since watersheds are impacted by climate changes and land use changes, it should be noted that their water quality is always changing. As a result of their varying water quality, stream classifications may also be modified. At the time of publication, these maps and the information contained within represent the most current information available. However, since water quality changes will bring about classification changes, it is the intention of the CCPC and CCWRA to update these maps periodically.

Designation & redesignation process

DEP conducts stream use designation evaluations on an ongoing basis (DEP, 2001b). Evaluations may be conducted on streams or stream segments that are found to be missing from the water quality standards or improperly classified (25 Pa. Code § 93). The assessments may be undertaken in response to a petition or on the DEP's own initiative (25 Pa. Code § 93.4d). Redesignations may also be conducted under the initiative of the DEP or at the request of the Pennsylvania Fish and Boat Commission (PFBC). In addition, any person, agency, group, organization, municipality, or industry may submit a rulemaking petition to the Environmental Quality Board (EQB) to request a stream redesignation.

As previously mentioned, all Pennsylvania waters are protected for a designated aquatic life use as well as a number of water supply and recreational uses. These waters may not be redesignated to a less restrictive use than the current designation (25 Pa. Code § 93.4). In HQ waters, the water quality can only be lowered 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 (DEP, 2001b).

Upon completion of the DEP assessment or review of a complete evaluation, and fulfillment of other requirements under 25 Pa. Code § 93.4d, DEP submits the results to the Environmental Quality Board (EQB) for proposed rulemaking. The EQB processes the petition, and following a review and comment period by the petitioner, makes a final decision on the waterbody designation.

Special protection waters

Of particular note are the stream designations for special protection waters. The stream designations for the special protection waters are Exceptional Value (EV) and High Quality (HQ) streams (DEP, 2001b), and many of Chester County's streams have obtained these designations. The regulations that outline how a water body may qualify as HQ waters states that qualification may occur by demonstration of suitable chemical or biological conditions (DEP, 1992).

Surface waters can qualify for an HQ designation if long term water quality data (a period of at least 1 year) for 12 chemical parameters exceeds levels necessary to support propagation of fish, shellfish, wildlife, and recreation on and in the water at least 99% of the time. For the biological test, a water body qualifies as HQ if, in comparison with a reference stream, the water has a macroinvertebrate community score of 83% or greater using protocol based on U.S. EPA's Rapid Bioassessment Protocol (RBP) or the water is a Class A wild trout stream designated by PFBC following public notice and comment (DEP, 2001c).

A water body qualifies for EV designation if it is already designated an HQ water and it 1) flows in a national wildlife refuge or state propagation and protection area, 2) it flows in a designated state park natural area, state forest natutal area, national natural landmark, federal or state wild river, federal wilderness area, or national recreation area, 3) it is an outstanding national, state, regional, or local resource water as defined in 25 Pa. Code § 93.1, 4) it is a surface water of exceptional recreational significance as defined in 25 Pa. Code § 93.1, 5) the water achieves a biological score of 92% or greater using modified RBP, or 6) the water is designated a wilderness trout stream by PFBC following public notice and comment (DEP, 2001c). Waters that have "exceptional ecological significance", such as wetlands and thermal springs, can also be designated as EV waters without meeting the previously stated watet quality standards.

In EV streams, discharges are required to meet highet permitting standards in an effort to maintain water quality. For HQ waters additional requirements for potential discharges are identified in 25 Pa. Code § 93.4c. Under 25 Pa. Code § 93.4c, it is required that proposed point source discharges to HQ waters show 1) that there are no economically or environmentally feasible best available land disposal and reuse technologies, 2) that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located and, 3) that the HQ water will support applicable existing and designated water uses (other than the high quality and exceptional value uses) in 25 Pa. Code § 93, Table 1.

Table 1
Protected water uses

(Source: 25 Pa. Code § 93.3)

Symbol	Protected Use
Aquatic life	
CWF	Cold Water Fishes—Maintenance or propagation, or both, of fish species including the family Salmonidae and additional flora and fauna which are indigenous to a cold water habitat.
WWF	Warm Water Fishes—Maintenance and propagation of fish species and additional flora and fauna which are indigenous to a warm water habitat.
MF	Migratory Fishes—Passage, maintenance and propagation of anadromous and catadromous fishes and other fishes which ascend to flowing waters to complete their life cycle.
TSF	Trout Stocking—Maintenance of stocked trout from February 15 to July 31 and maintenance and propagation of fish species and additional flora and fauna which are indigenous to a warm water habitat.
Water supply	
PWS	Potable Water Supply—Used by the public as defined by the Federal Safe Drinking Water Act, 42 U.S.C.A. § 300F, or by other water users that require a permit from the Department under the Pennsylvania Safe Drinking Water Act (35 P. S. § § 721.1—721.18), or the act of June 24, 1939 (P. L. 842, No. 365) (32 P. S. § § 631—641), after conventional treatment, for drinking, culinary and other domestic purposes, such as inclusion into foods, either directly or indirectly.
IWS	Industrial Water Supply—Use by industry for inclusion into nonfood products, processing and cooling.
LWS	Livestock Water Supply—Use by livestock and poultry for drinking and cleansing.
AWS	Wildlife Water Supply—Use for waterfowl habitat and for drinking and cleansing by wildlife.
IRS	Irrigation—Used to supplement precipitation for growing crops.
Recreation and fish consumption	
B	Boating—Use of the water for power boating, sail boating, canoeing and rowing for recreational purposes when surface water flow or impoundment conditions allow.
F	Fishing—Use of the water for the legal taking of fish. For recreation or consumption.
WC	Water Contact Sports—Use of the water for swimming and related activities.
E	Esthetics—Use of the water as an esthetic setting to recreational pursuits.
Special protection	
HQ	High Quality Waters—Streams or watersheds of excellent quality, based on at least 1 year of data, exceeding levels necessary to support propagation of fish, shellfish,

wildlife, and recreation in and on the water by satisfying § 93.4b(a) and requiting special water quality protection.

EV Exceptional Value Waters— Streams or watersheds of high quality which satisfy § 93.4b(b) (relating to antidegradation). These waters are outstanding national, state, regional, or local resources such as waters of designated parks and forests, waters used as sources of unfiltered potable water supplies, waters belonging to wildlife refuges or state game lands, waters designated by the Fish Commission as "Wilderness Trout Streams", and other waters of considerable ecological or recreational importance.

Other

N Navigation—Use of the water for the commercial transfer and transport of persons, animals and goods.

Stream designation criterion

There are a number of chemical, physical, and biological criterion that DEP has established for all surface waters, regardless of classification. Aluminum, alkalinity, ammonia nitrogen, bacteria, fluoride, iron, magnesium, nitrite, plus nitrate, osmotic pressure, pH, phenolics, and total dissolved solids are all quantitative measures of overall water quality regulated in 25 Pa. Code § 93.7. Protected use designations require an additional set of criteria, and add several levels of dissolved oxygen (DO) and temperature (T°C) to the list of mandated statewide standards. Criteria for chloride, color, hardness, methylene blue active substances, radioactivity, sulfate, threshold odor number, and turbidity are also listed in 25 Pa. Code § 93, and have been assigned to a few streams in the state, although no streams in Chester County have these standards designated to them. Under the regulations of 25 Pa. Code § 93, DEP also has the ability to establish safe concentration values for any pollutant not already listed in the regulations. Special criteria are provided in 25 Pa. Code § 93.8a for the regulation of toxic substances, as defined in 25 Pa. Code § 16, in all surface waters.

Table 2 demonstrates the different levels of Dissolved Oxygen (DO) for the different water designations.

Table 2
Specific Dissolved Oxygen (DO) levels and associated critical uses
(Source: 25 Pa. Code § 93.7)

Symbol	Criteria	Critical Use
DO_1	Minimum daily average 6.0 mg/l; minimum 5.0 mg/l. For lakes,ponds, and impoundments only, minimum 5.0 mg/l at any point.	CWF, HQ-WWF, HQ-TSF
DO_2	Minimum daily average 5.0 mg/l; minimum 4.0 mg/l. For the epilimnion of lakes, ponds and impoundments, minimum daily average of 5.0 mg/l, minimum 4.0 mg/l.	WWF
DO_3	For the period February 15 to July 31 of any year, minimum daily average of 6.0 mg/l, minimum 5.0 mg/l. For the remainder of the year, minimum daily average of 5.0 mg/l, minimum 4.0 mg/l. For lakes, ponds and impoundments, the criteria apply to the epilimnion.	TSF
DO_4	Minimum 7.0 mg/l.	HQ-CW

Note: The DO critical uses for EV waters are the same as those for HQ waters and are therefore not listed in Table 2.

Local Efforts

The streams of Chester County are unique and ecologically valuable resources. The natural characteristics of watersheds are frequently vulnerable to development activities that may disrupt physical and ecological relationships resulting in the degradation of streams, their habitats, and water quality. Actions at the state level alone can't fully provide for their protection and enhancement. Local government and land owner/operator activities must also consider resource protection.

Addressing land use and other topics relative to the protection of streams is essential. To do so, local officials, developers, and residents should be aware of stream quality designations in their watershed(s) and municipality. Through active involvement with their watershed(s), municipalities can work to enhance and protect them. The authority for control of land use is directly in the hands of local municipal governments. To protect their watershed(s), municipalities can use the Municipal Planning Code (MPC) along with Federal and State regulations for water resources protection. Through the opportunities within the MPC, municipalities can use good planning and zoning practices to protect and enhance the quality of their streams.

Measures that can be taken to enhance and protect our watershed(s) are:

- Support public education at all levels and encourage public responsibility for implementing watershed stewardship and good housekeeping practices on private, commercial, industrial, institutional, and public lands and roads. (CCWRA, 2001)
- Utilize municipal planning and zoning to recognize the importance of water quality by reducing unnecessary requirements for impervious cover, supporting conservation development design practices, requiring porous parking areas, requiring grass swales in place of curbs, and, among other steps, reducing the building setback requirements to allow for shorter driveways, etc. (CCWRA, 2001).

- Employ municipal planning and zoning for protection efforts of streams supporting Exceptional Value and High Quality watersheds, instream sources of community water supply, and state-designated water-based habitats to recognize their vulnerability to low stream flows and water quality impairments (CCWRA, 2001).
- Create and enhance a network of forested riparian buffers along lakes and streams to protect water bodies from erosion and pollutants, to provide ground water infiltration, to stabilize stream channels, and provide shading, food, and habitat for aquatic species (CCWRA, 2001).
- Support the preparation and implementation of watershed-based comprehensive stormwater management plans through the adoption and enforcement of ordinances resulting from Act 167 stormwater management planning (CCWRA, 2001).
- Support the implementation of NPDES Phase II permitting program to reduce point source discharges of pollution into waters of the Commonwealth to improve water quality (CCWRA, 2001).
- Utilize natural methods for the restoration and stabilization of streams to prevent problems such as in-stream erosion and sedimentation.
- Plan effectively and enforce zoning to protect floodplains, wetlands, and steep slopes because of their direct connection to streams.
- Use resources such as the National Wetlands Inventory maps and the Federal Emergency Management Agency floodplain maps as guides in the preparation of plans and ordinances.
- Regularly update Act 537 Sewage Facilities Plans that recognize and require preservation of stream quality. Support land application of treated wastewater over stream discharges everywhere practicable.

The most important areas to target are those on Map 3, "Stream Water Quality Assessments," which indicate areas that are not currently attaining their designated water quality standards. Restoration efforts should be centered in these areas to bring the streams up to their designated standards. By following the above recommendations, water quality can be restored and protected for the future.

Conclusion

The streams of Chester County are valuable for their industrial, economical, aesthetic, recreational, and ecological properties. These streams are worthy of protection and enhancement by all that enjoy them for their natural beauty, wildlife and fish sanctuaries, recreational uses, and as sources of drinking water. Because all activities that occur in a watershed affect that watershed, everyone who lives in that watershed is responsible for its protection. In watershed stewardship, there is a job for everyone. Through everyday conservation and protection efforts, individuals, municipalities, and businesses can work together to protect and enhance our streams for present and future enjoyment.

A list of organizations that can provide further information on how you can protect and enhance the streams of Chester County is included in Appendix 1. This list should be considered a starting point, since there are number of government and non-profit agencies involved in watershed restoration and protection.

Appendix 1
Sources of Additional Information

Brandywine Valley/ Red Clay Valley Association
1760 Unionville-Wawaset Road
West Chester, PA 19382
Phone (610) 793-1090
www.bva-rcva.org

Chester County Conservation District
601 Westtown Road, Suite 240
P.O. Box 2747
West Chester, PA 19380-0990
Phone (610) 696-5126
www.chesco.org/conserve.html

Chester County Health Department
601 Westtown Road, Suite 290
P.O. Box 2747
West Chester, PA 19380-0990
Phone (610) 344-6225
www.chesco.org/health.html

Chester County Planning Commission
601 Westtown Road, Suite 270
P.O. Box 2747
West Chester, PA 19380-0990
Phone (610) 344-6285
www.chesco.org/planning

Chester County Water Resources Authority
601 Westtown Road, Suite 260
P.O. Box 2747
West Chester, PA 19380-0990
Phone (610) 344-6285
www.chesco.org/water

Chester Ridley Crum Watershed Association
P.O. Box 972
Edgemont, PA 19028
Phone (610) 353-2926
www.ctic.purdue.edu/crcwa/home.html

Darby Creek Valley Association
P.O. Box 732
Drexel Hill, PA 19026
Phone (610) 789-1814

Delaware River Basin Commission
25 State Police Drive
P.O. Box 7360
West Trenton, New Jersey 08628-0360
Phone (609) 883-9500
www.state.nj.us/drbc

Department of Conservation and Natural Resources
7th Floor, Rachel Carson State Office Building
P.O. Box 8767
Harrisburg, PA 17105-8767
Phone (717) 787-2869
www.dcnr.state.pa.us

Elk Creeks Watershed Association
P.O. Box 93
Louisville, PA 19351

French Creek Project
Allegheny College Box 172
Meadville, PA 16335
Phone (814) 332-2946
merlin.alleg.edu/group/fcreek

Green Valleys Association
1368 Prizer Road
Pottstown, PA 19465
Phone (610) 469-4900
www.greenvalleys.org

Octoraro Watershed Association
389 Pine Grove Road
Nottingham, PA 19362
Phone (717) 529-2132

PA Department of Environmental Protection
South East Regional Office
Suite 6010 Lee Park
555 North Lane
Conshohocken, PA 19428-2233
Phone (610) 832-6028
www.dep.state.pa.us

PA Organization for Watersheds and Rivers
PO Box 765
25 North Front Street
Harrisburg, PA 17108-0765
Phone: (717) 234-7910
www.pawatersheds.org

Schuylkill River Keeper
P.O. Box 459
St. Peters, PA 19470
Phone (610) 469-6005

Susquehanna River Basin Commission
1721 N. Front Street
Harrisburg, PA 17102
Phone (717) 238-0423
www.srbc.net

University of Delaware Water Resources Agency
DGS Annex off Academy Street
University of Delaware
Newark, DE 19716
Phone (302) 831-4925
www.wr.udel.edu

U.S. Environmental Protection Agency
Region 3
1650 Arch Street
Philadelphia, PA 19103-2029
Phone (800) 438-2474
www.epa.gov/region03

White Clay Creek Watershed Association
P.O. Box 10
Landenberg, Pa. 19350
home.ccil.org/~wcwa/

List of Acronyms

AWS	Wildlife Water Supply
B	Boating
CCPC	Chester County Planning Commission
CCWRA	Chester County Water Resources Authority
CWA	Clean Water Act
CWF	Cold Water Fishes
DO	Dissolved Oxygen
E	Esthetics
EV	Exceptional Value
EQB	Environmental Quality Board
F	Fishing
HQ	High Quality
IWS	Industrial Water Supply
IRS	Irrigation
LWS	Livestock Water Supply
MF	Migratory Fishes
MOA	Memorandum of Agreement
MPC	Municipal Planning Code
MS4s	Municipal Separate Storm Sewer Systems
N	Navigation
NPDES	National Pollution Discharge Elimination System
DEP	Pennsylvania Department of Environmental Protection
DOH	Pennsylvania Department of Health
PFBC	Pennsylvania Fish and Boat Commission
PWS	Potable Water Supply
RBP	Rapid Bioassessment Protocol
TMDL	Total Maximum Daily Load
TSF	Trout Stocking Fishes
VPP	Visions Partnership Program
USDA	United States Department of Agriculture
U.S. EPA	United States Environmental Protection Agency
WC	Water Contact Sports
WWF	Warm Water Fishes

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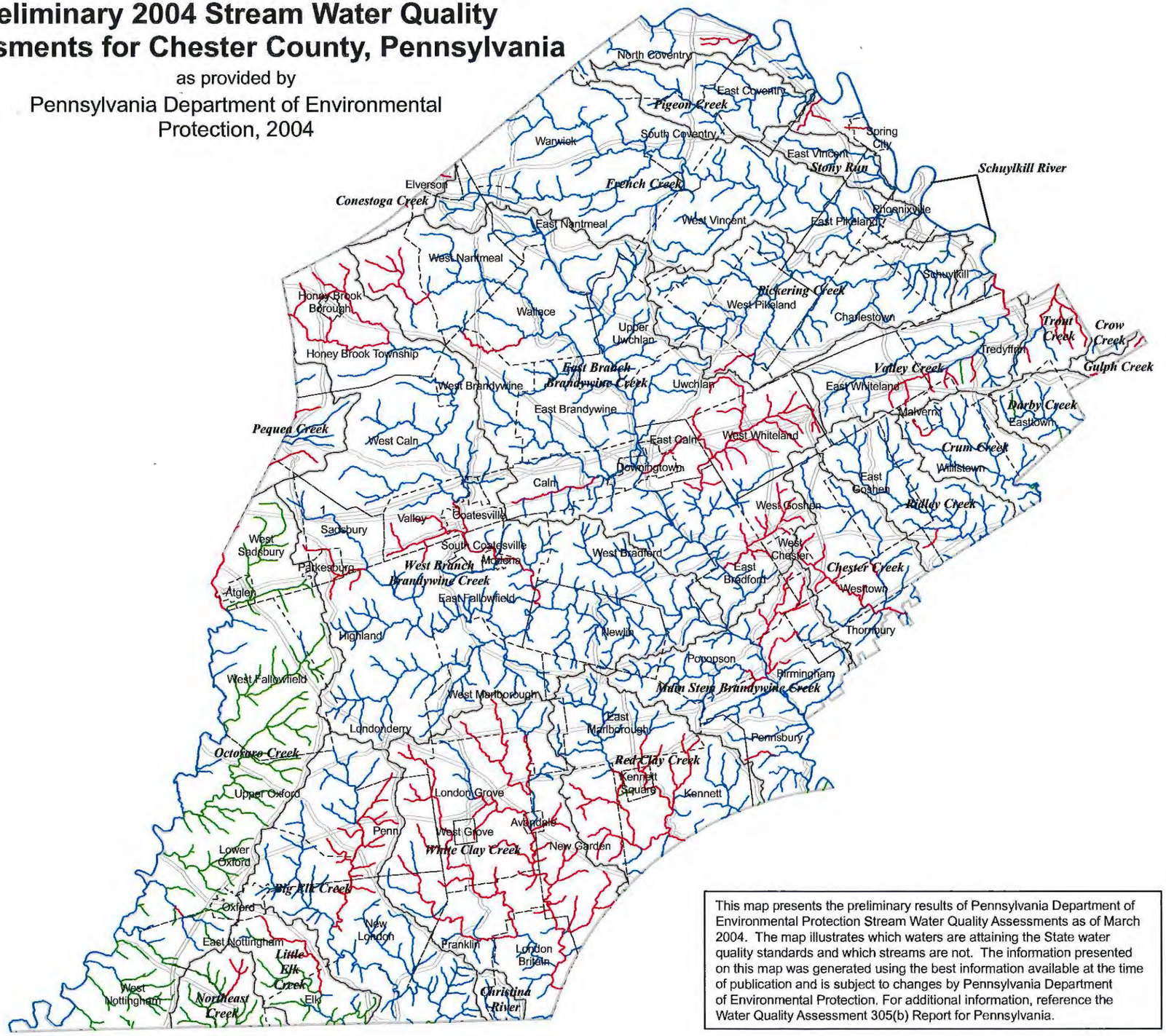
U.S. Environmental Protection Agency. 2001b. *National Pollutant Discharge Elimination System Permit Program* [Online]. Available: cfpub.epa.gov/npdes/ [2001, October].

Note: References made to the Pennsylvania Code (PA Code) are taken from the website:www.pacode.com. This website reflects the Pennsylvania Code changes effective through 31 Pa. B. 4518 (August 11, 2001).

Preliminary 2004 Stream Water Quality Assessments for Chester County, Pennsylvania

as provided by

Pennsylvania Department of Environmental Protection, 2004



This map presents the preliminary results of Pennsylvania Department of Environmental Protection Stream Water Quality Assessments as of March 2004. The map illustrates which waters are attaining the State water quality standards and which streams are not. The information presented on this map was generated using the best information available at the time of publication and is subject to changes by Pennsylvania Department of Environmental Protection. For additional information, reference the Water Quality Assessment 305(b) Report for Pennsylvania.

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PA-DEP Assessed Waters Map WRM - 17e - (8/8/2005)

Streams

- Meeting Water Quality Standards
- Water Quality Standards Not Attained
- Stream Currently Unassessed

- Watersheds
- Municipal Boundaries
- County Boundary
- Highways

Disclaimer:

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Sources:

Data Source for Stream Assessments: Pennsylvania Department of Environmental Protection - Commonwealth of Pennsylvania, 2004 Preliminary Water Quality Assessment 305(b) Report via PA-DEP Division of Water Quality Assessment and Standards (3/8/2004) and personal communication (8/8/2005).
Data Source for Watershed and Sub-Watershed Boundaries and Hydrology: Pennsylvania Department of Environmental Protection 1998.
Data Source for Municipal Boundaries: Chester County Land Records System 1999.
Data Source for Highways: Chester County Land Records System 1999.

N
W E
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2 1 0 2 4 6 8
Miles

Water Protected Use Designations For Streams in Chester County, Pennsylvania

Water Resources Map - 15 revised (12/21/2005)

Stream use designations for this map apply to the waterways shown. When there is one designation in a sub-watershed, that designation applies tothe entire basin. If there are multiple designations, the designation with a superscript (1) applies to the mainstem and land areas that drain directly to the mainstem. Other designations apply to the tributaries and their drainage basins.

Special Protection Waters

Exceptional Value Waters (EV)

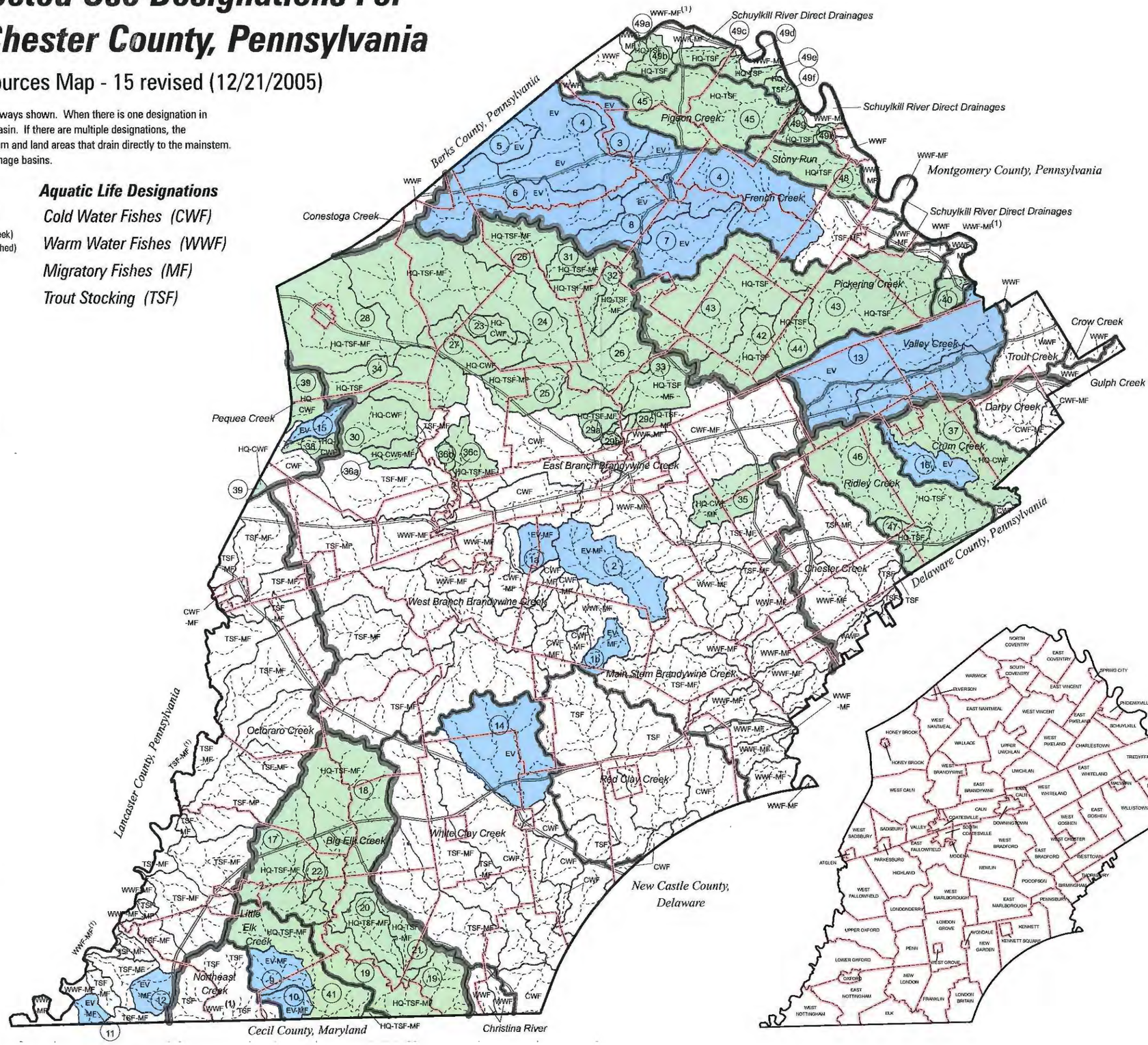
1 a-b - Unnamed Tributary to West Branch Brandywine Creek)
2 - Broad Run (West Branch Brandywine Creek watershed)
3 - Rock Run (French Creek watershed)
4 - French Creek
5 - Pine Creek (French Creek watershed)
6 - South Branch French Creek
7 - Birch Run (French Creek watershed)
8 - Beaver Run (French Creek watershed
9 - Jordan Run
10 - Barren Brook
11 - Unnamed Tributary to Octoraro Creek
12 - Black Run
13 - Valley Creek
14 - East Branch White Clay Creek (Source to Northern Border of Avondale Borough)
15 - Indian Spring Run (to SR 10)
16 - West Branch Crum Creek

High Quality Waters (HQ)

17 - West Branch Big Elk Creek
18 - East Branch Big Elk Creek
19 - Big Elk Creek
20 - Hodgson Run
21 - Ways Run
22 - McDonald Run
23 - North Branch Indian Run
24 - East Branch Brandywine Creek
25 - Culbertson Run
26 - Marsh Creek
27 - Indian Run
28 - West Branch Brandywine Creek
29 a-b - Unnamed Tributaries to East Branch Brandywine Creek (in East Brandywine Twp)
29 c - Unnamed Tributaries to East Branch Brandywine Creek (in Uwchlan Twp)
30 - Birch Run (Brandywine Creek watershed)
31 - Lyons Run
32 - Black Horse Creek
33 - Shamona Creek
34 - Two Log Run
35 - Broad Run (East Branch Brandywine Creek watershed)
36 a-c - Unnamed Tributary to West Branch Brandywine Creek
36 b-c - Unnamed Tributaries to West Branch Brandywine Creek ((in West Brandywine Twp)
37 - Crum Creek
38 - Tributary to Indian Spring Run (Source to SR 10)
39 - Pequea Creek
40 - Jug Hollow
41 - Little Elk Creek
42 - Pine Creek (Pickering Creek watershed)
43 - Pickering Creek
44 - Pigeon Run (Pickering Creek watershed)
45 - Pigeon Creek
46 - Ridley Creek
47 - Hunters Run
48 - Stony Run
49 a-h - Unnamed Tributaries to Schuylkill River (except those in Spring City and Phoenixville)

Aquatic Life Designations

Cold Water Fishes (CWF)
Warm Water Fishes (WWF)
Migratory Fishes (MF)
Trout Stocking (TSF)



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Streams
Municipal Boundaries
Chester County
Major Basins
Watersheds
Sub-Watersheds
Major Roads

2 1 0 2 4 Miles

Sources:

Commonwealth of Pennsylvania, Pennsylvania Code Title 25. Environmental Protection Chapter 93. Water Quality Standards, (www.pacode.com) (11/2005)
Stream Redesignation Evaluations Status and Draft Reports, (www.dep.state.pa.us/dep/deputate/watermgt/wqp/wqstandards/streamstatus/streamstatus.htm) (11/2005)
Personal communication with PADEP Watershed Management Operations (12/19/2005)
Data Source for Watershed Boundaries and Hydrology: Pennsylvania Department of Environmental Protection 1999.
Data Source for Municipal Boundaries: Chester County Land Records System 2005.

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March, 2002