

APPENDIX A

MONOCACY CREEK WATER QUALITY DATA

MAIN AND EAST BRANCHES

EXPLANATION OF WATER QUALITY PARAMETERS

TEMPERATURE

Background: Temperature is a key determinant of what species can survive in a particular environment. Although temperature preferences vary widely among species, they do have one commonality. All species are negatively impacted by rapid fluctuations in temperature.

Sources of Abnormal Readings: Discharges of coolant and waste waters from industrial or utility plants, runoff from heated surfaces such as pavement and roofs, and lack of stream cover to provide shading are among the top sources of thermal pollution.

Standards: Life and the reproductive necessities for trout are the target standards for water temperature. Growth is impaired in an adult brook trout at temperatures above 66°F or about 19°C. Death of brook trout will occur at temperatures above 75°F or about 24°C. DEP Water Quality Standards dictate a temperature no greater than 66°F for a high quality, cold water fishery (HQCWF). There should also be no fluctuation greater than 2°F in a one-hour period.

pH

Background: pH is based on a scale from 0 to 14. On this scale, 0 is the most acidic value, and 14 is the most alkaline value. Seven would be neutral. A change of one pH unit represents a 10-fold change in acidity or alkalinity. Type of bedrock and other natural conditions may affect pH readings. For instance, streams underlain by limestone may reach a pH as high as 9. In addition, abundance of algae may cause pH to become more acidic after sundown, then increase after dawn due to changes in carbon dioxide concentrations. However abnormal pH values may be indicative of pollution.

Sources of Abnormal Readings: Sources of abnormal readings include acid mine drainage, industrial effluent, acid rain, sewage lagoons, and livestock containment areas. Sources of alkaline conditions include concrete plants, water treatment plants, and raw sewage.

Standards: pH levels between 6.5 and 8.2 are optimal for most aquatic organisms. The DEP Water Quality Standard for pH is between 6 and 9.

DISSOLVED OXYGEN (DO)

Background: Dissolved oxygen is absorbed from the atmosphere and its concentration is related to the temperature and density of the water. Cold water can hold more oxygen than warm water. Therefore low values can sometimes be attributed to shallow, poorly shaded water, which can cause warming and decrease the amount of oxygen the water can hold. Plant life also influences dissolved oxygen content. Plant life may cause a diurnal fluctuation in DO levels.

During the day, while plants are undergoing photosynthesis, they emit oxygen to the stream. However, the DO level will drop at night while the plants are not producing oxygen but fish and other aquatic life are still consuming it. The result is a drop in DO at night, reaching a minimum just before dawn, then rising to a peak by late afternoon. Thus, plant life may have a dramatic impact on DO levels.

Sources of Abnormal Readings: In areas of dense algae growth, DO levels are likely to drop significantly at night or increase excessively during the day. Low readings may also be indicative of pollutants, such as inadequately treated sewage, introduced to the water supply that consume the available oxygen so that it is not available to aquatic life. Bacteria are capable of consuming large quantities of oxygen during the decomposition of organic material. High DO levels may occur where turbulent conditions increase the natural aeration of the stream.

Standards: Trout require a dissolved oxygen (DO) level of at least 7 mg/L for unimpaired production, which is the minimum Water Quality Standard set by the DEP for a high quality, cold water fishery (HQCWF) such as the Monocacy Creek.

SPECIFIC CONDUCTANCE/TOTAL DISSOLVED SOLIDS (TDS)

Background: The specific conductance of a stream measures the quantity of ions in the water, or the ability of the water to conduct an electrical current.

Conductivity is typically measured in micromhos units, which is equivalent to microsiemens. Geologic formations have significant impact on the specific conductance of a stream. Streams flowing through carbonate bedrocks often yield high conductivity. Specific conductance values typically have a direct relationship to TDS, which is the concentration of dissolved materials, such as salts, found in the water.

Sources of Abnormal Readings: A specific conductance or TDS value falling outside the normal range for a site may be caused by almost any pollutant. Point source discharges as well as storm water runoff may be contributors to excessive readings. Basically these testing parameters serve as a check to make sure pollutants are not being overlooked that are not part of the regular sampling routine.

ALKALINITY

Background: Alkalinity measures the ability of a stream to resist changes in pH. This property is often referred to as the buffering capacity of a stream. Buffering capacity is important because it allows a stream to assimilate acidic pollution or contamination. Like specific conductance, alkalinity is greatly determined by the type of underlying bedrock and also the soil type through which the water flows.

Source of Abnormal Readings: Alkalinity values in excess of what bedrock types indicate as normal may be a result of sewage, livestock wastes, and/or the production of concrete. Very low readings may be due to heavy rains or other acidic contamination. Abrupt changes in alkalinity may signify pollution.

Standards: Alkalinity levels between 100 and 200 mg/l provide ideal buffering within a stream. Endurable pH levels may be maintained at this level of alkalinity, and aquatic life may be protected from acidic shock. This occurs when there is a sudden decrease in pH that aquatic life cannot rapidly adapt to for survival.

NITRATE

Background: Nitrogen exists in several forms in the aquatic environment. Nitrate is the most completely oxidized state of nitrogen commonly found in water, and is the most readily available state utilized for plant growth. Since nitrate plays a key role in stimulating plant growth, it is heavily used as a nutrient component of fertilizer. High nitrate levels in streams cause excessive plant and algae growth and promote a deteriorating process called eutrophication.

Sources of Abnormal Readings: Fertilizer runoff resulting from improper application, human and animal wastes from failing septic systems and livestock confinement areas, and decomposing organic matter are all causes for elevated nitrate readings.

Standards: Unpolluted waters will normally have a nitrate level less than 1 mg/L. The DEP Water Quality Standard for nitrate is 10 mg/L. At higher concentrations water is unsafe to drink due to the possible presence of altered forms of nitrite, which may cause serious illness to both man and wildlife.

ORTHO-PHOSPHATE

Background: Ortho-phosphate is just one form of phosphorus found in natural waters. This is the tested form of phosphate because it is the form of phosphate used in fertilizer and applied to agricultural fields and residential lawns. Other forms of phosphorus found in natural waters that have not been tested include polyphosphates, and organically bound phosphates. Phosphates naturally found in water are derived from decomposing organic material and leaching of phosphorus rich bedrock. Like nitrates, phosphates negatively impact water by causing accelerated rates of eutrophication.

Sources of Abnormal Readings: Fertilizer runoff; human and animal waste from failing septic systems, sewage treatment plants, and livestock confinement areas; mass quantities of decomposing organic matter; industrial effluent; and detergent wastewater are all possible sources of elevated phosphate levels. Detergent wastewaters are responsible for approximately half of the phosphates polluting natural waters.

Standards: Phosphate levels below 0.03 mg/l are generally considered to be unpolluted. Levels between 0.03 and 0.1 mg/l are sufficient to stimulate plant growth. The critical level for avoiding accelerated eutrophication is 0.1 mg/L. Levels above 0.1 mg/l are considered problem areas. There has not been a standard set for safe drinking water because humans can tolerate extremely high levels before it even takes affect on the digestive system.

HARDNESS

Background: Total hardness tests usually measure the calcium and magnesium carbonate concentration in a water sample. These are the major components of hardness, which is the amount of dissolved minerals in water. Minerals are dissolved from bedrock and soil as water passes through them. The calcium component of hardness is very important to aquatic life as it is used for the cell walls of plants and the shells and bones of aquatic organisms. However, high levels of hardness can cause precipitation and deposition of calcium carbonate on the stream bottom, which disrupts normal stream activity. Water with high hardness may also cause plumbing problems. Hard water also aids buffering capacity as heavy metals and other toxic compounds may be more detrimental in soft water than in hard water.

Sources of Abnormal Readings: High hardness values are often associated with limestone formations.

Standards: Optimal values of hardness for aquatic life range from 100 to 200 mg/L. At levels above 250 mg/L, calcium carbonate will begin to precipitate. Hardness values should be slightly higher than alkalinity values. If there is a major difference between the two values, chloride and sulfate ions may be present.

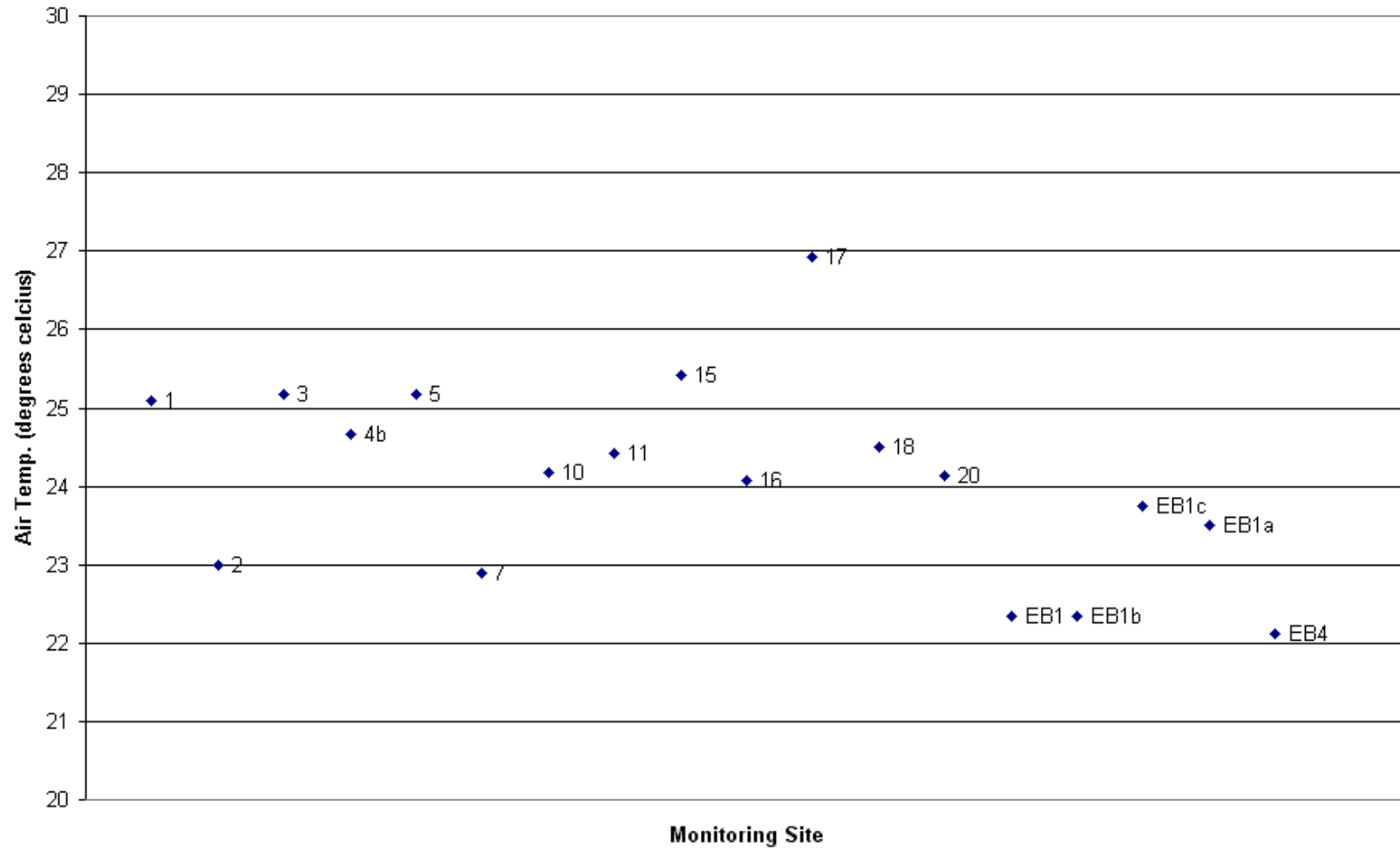
SULFUR

Background: Sulfur is commonly found as a component of sedimentary and igneous rocks in the form of metallic sulfides. Sulfides are oxidized upon contact with aerated water, producing sulfate ions in solution. The combustion of fuel and ore smelting processes are major anthropocentric causes of sulfate found in natural waters. Sulfides may also be present in soils that are oxidized through natural processes or organic waste treatment. Sulfate also occurs in evaporite sediments such as anhydrite and gypsum.

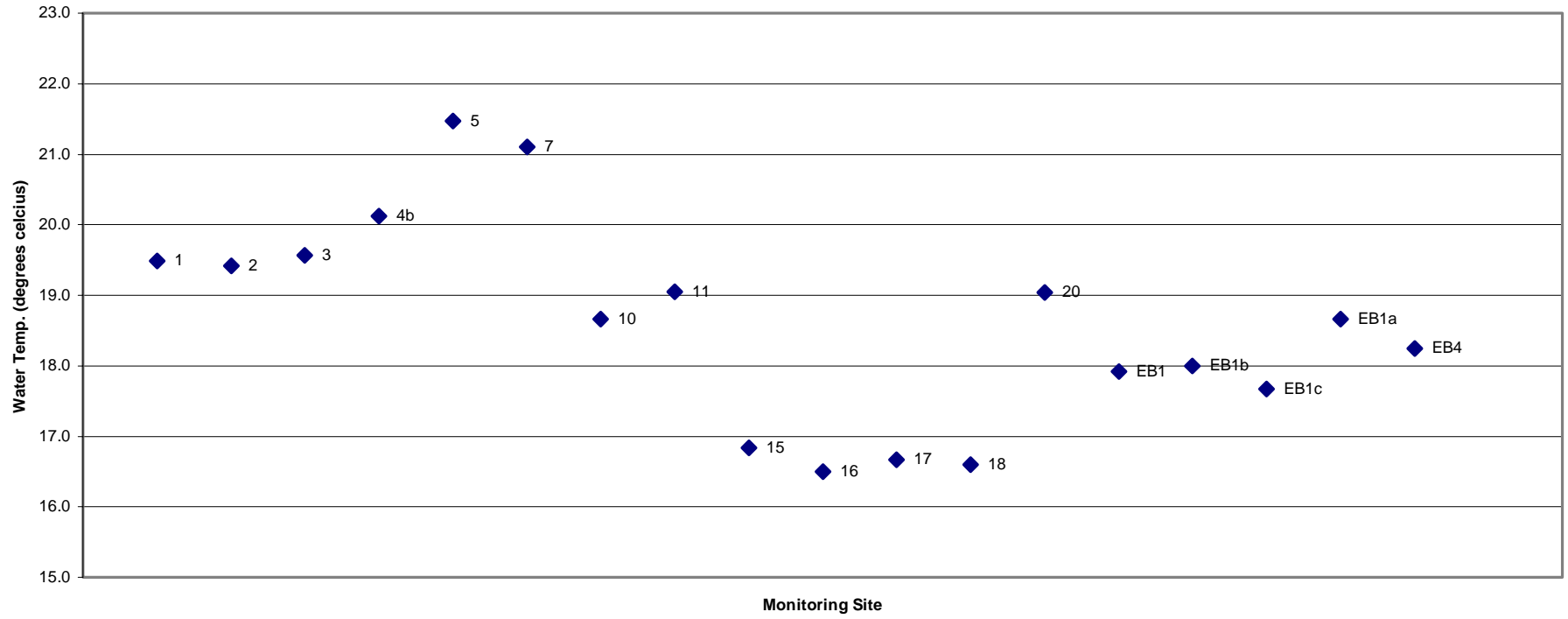
Sources of Abnormal Readings: Excessively high sulfate readings are often associated with mine drainage. The oxidation of minerals such as pyrite is the main culprit. High sulfate as well as chloride concentrations may be found in residual runoff from irrigated areas due to water that was lost through evapotranspiration.

Standards: The drinking water standard for sulfate is 250 mg/L. Beyond this point, sulfate levels may cause illness in humans.

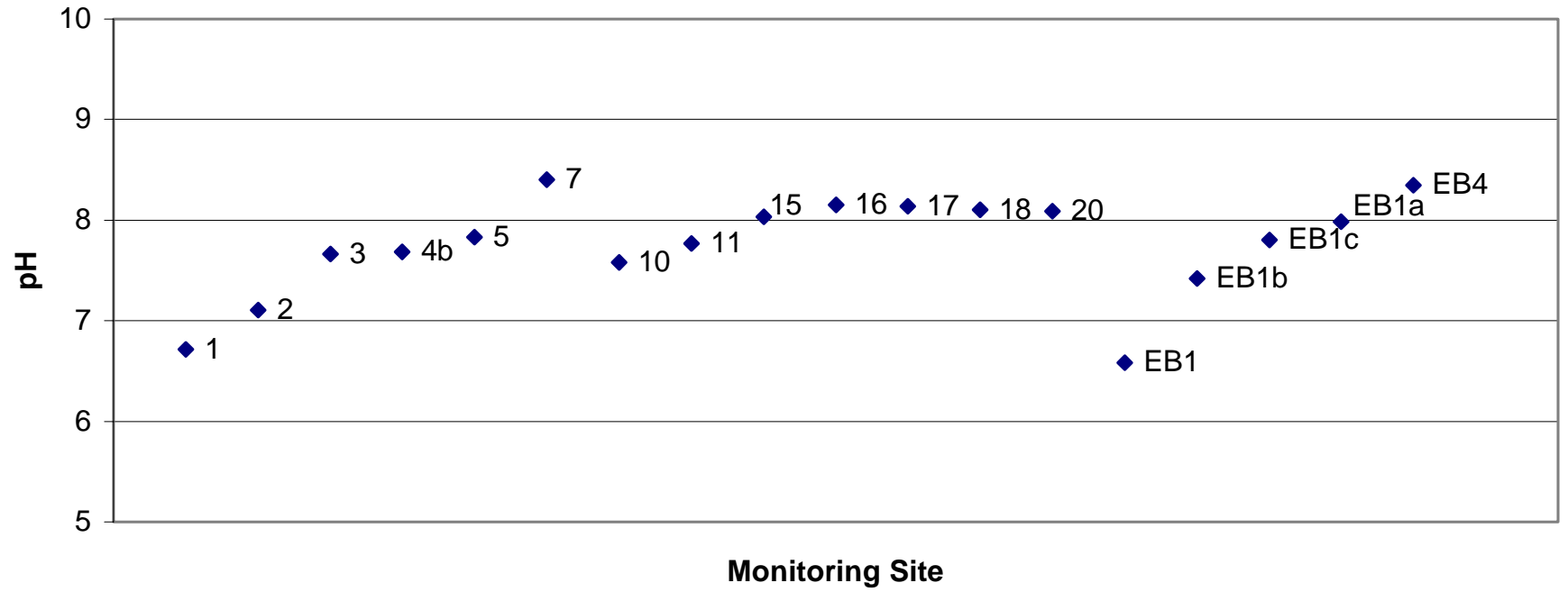
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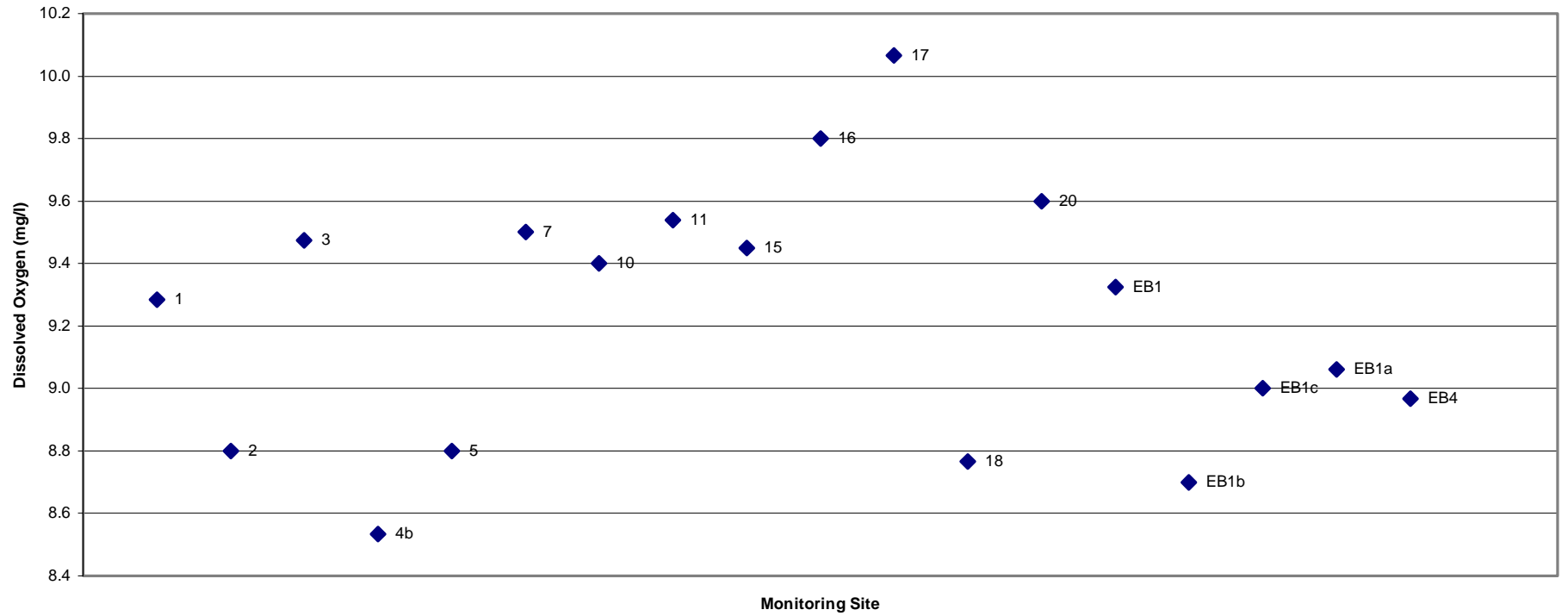
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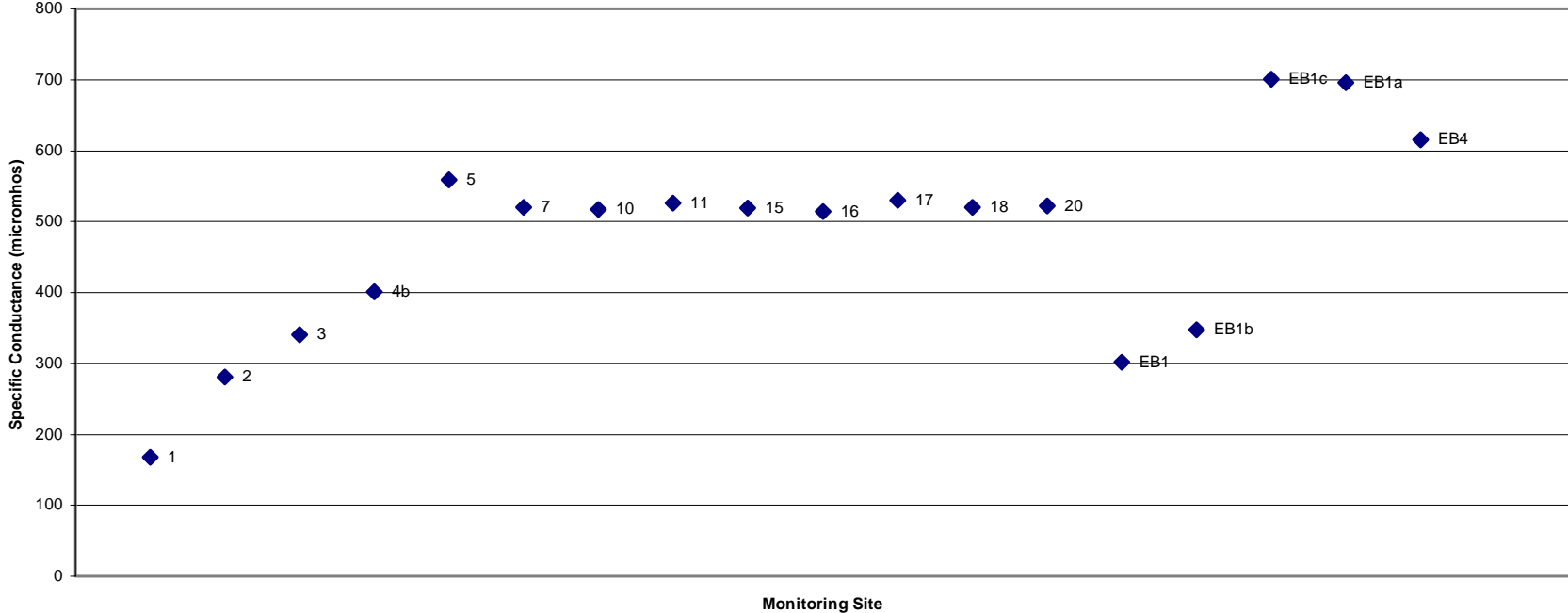
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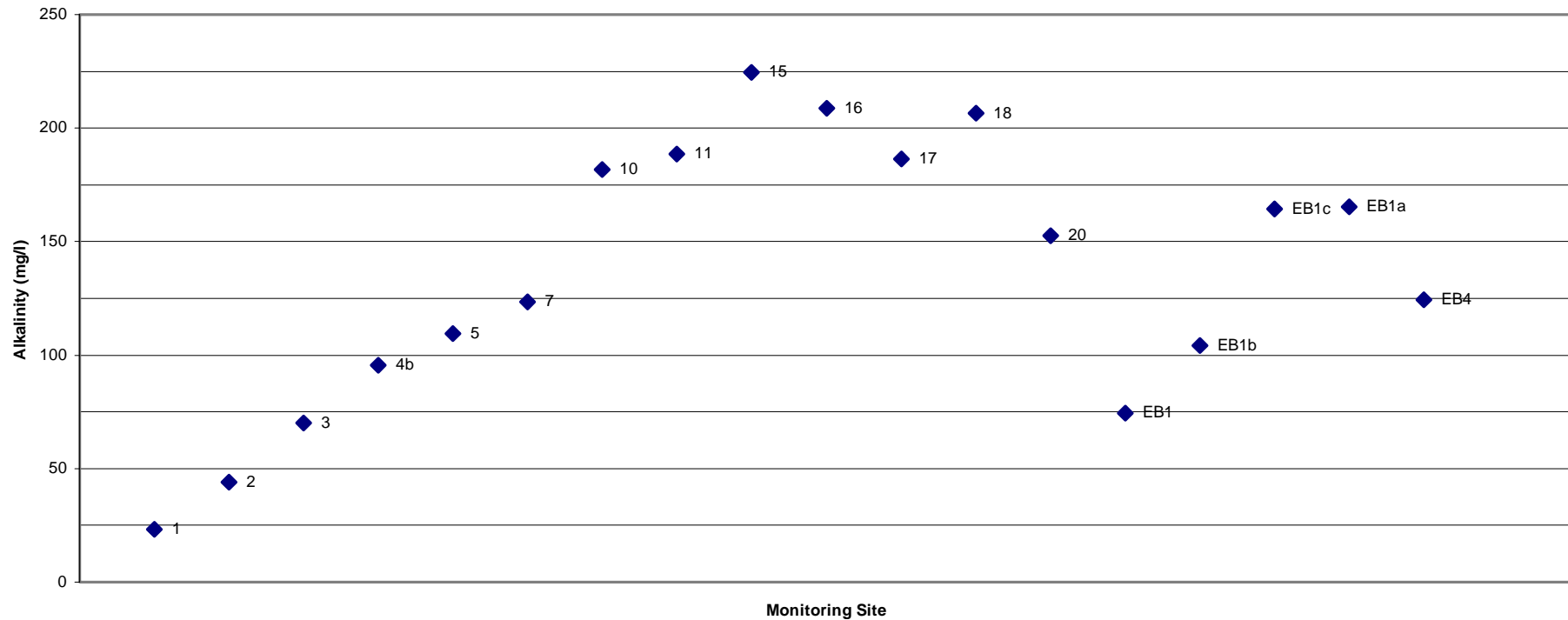
Monocacy Creek- Summer 1997



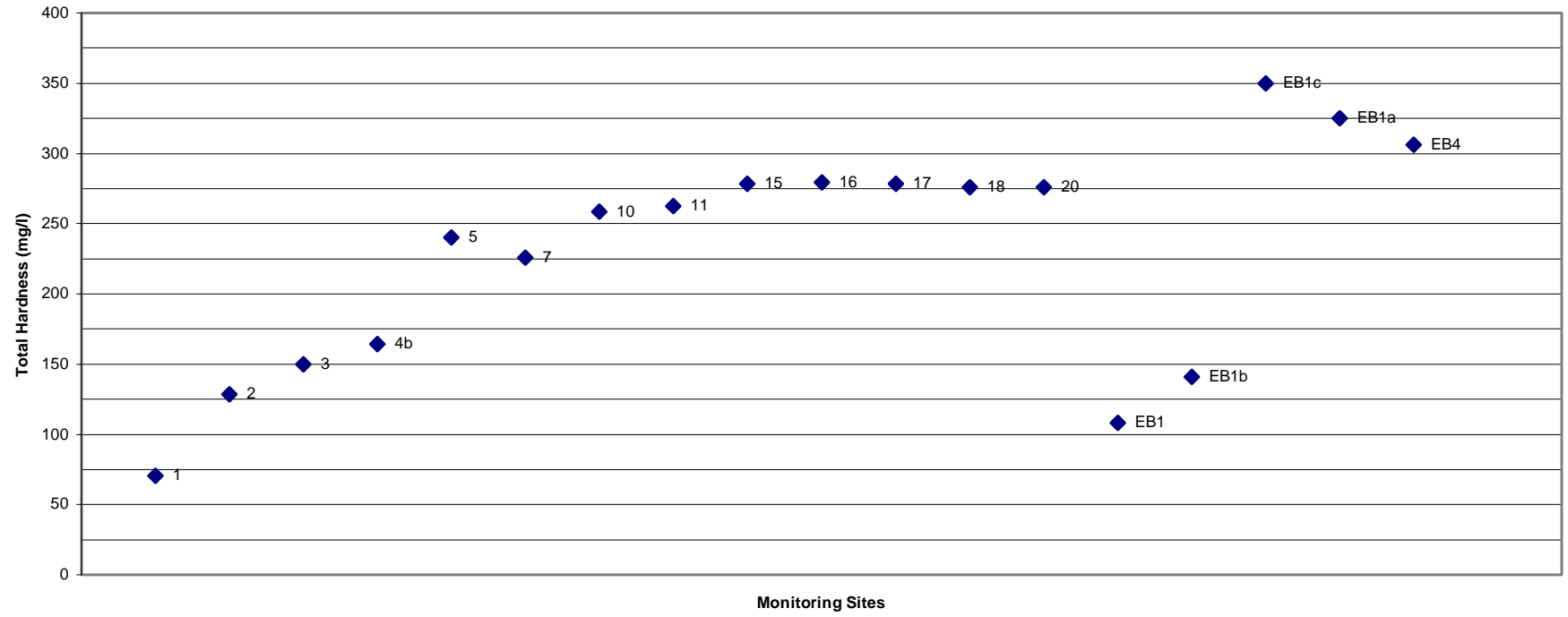
Monocacy Creek- Summer 1997



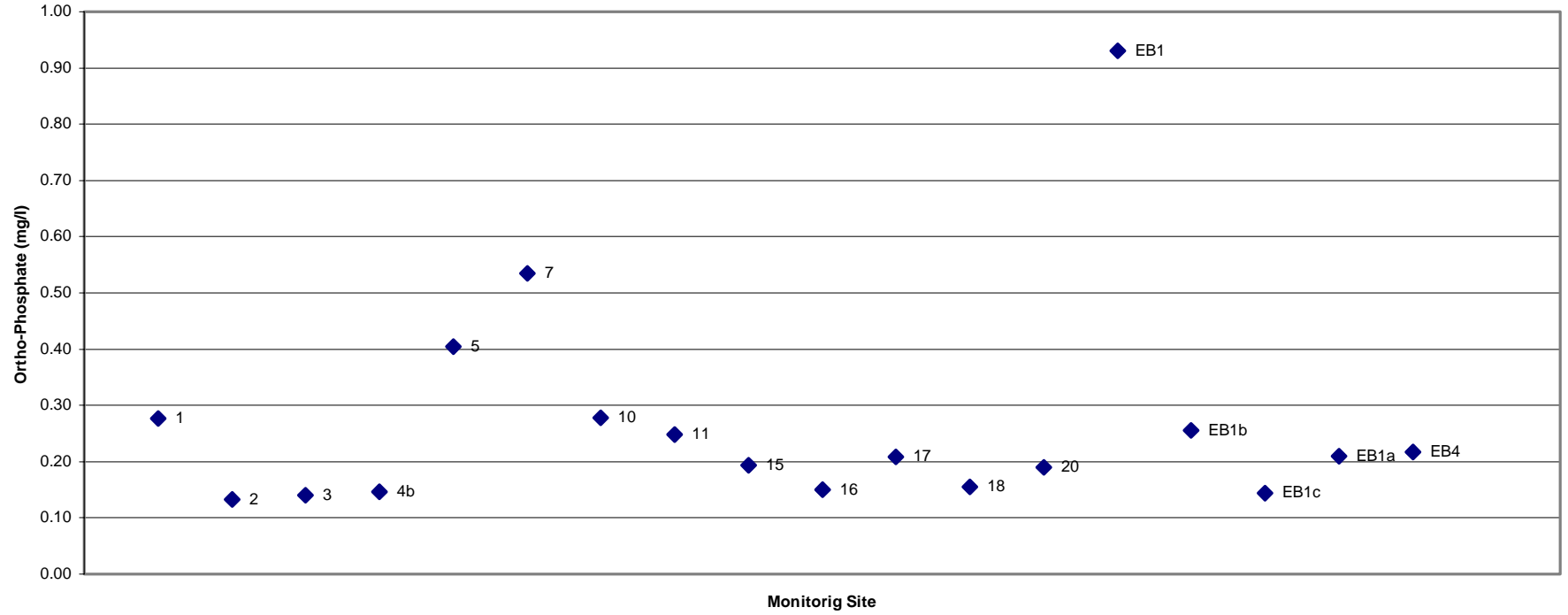
Monocacy Creek- Summer 1997



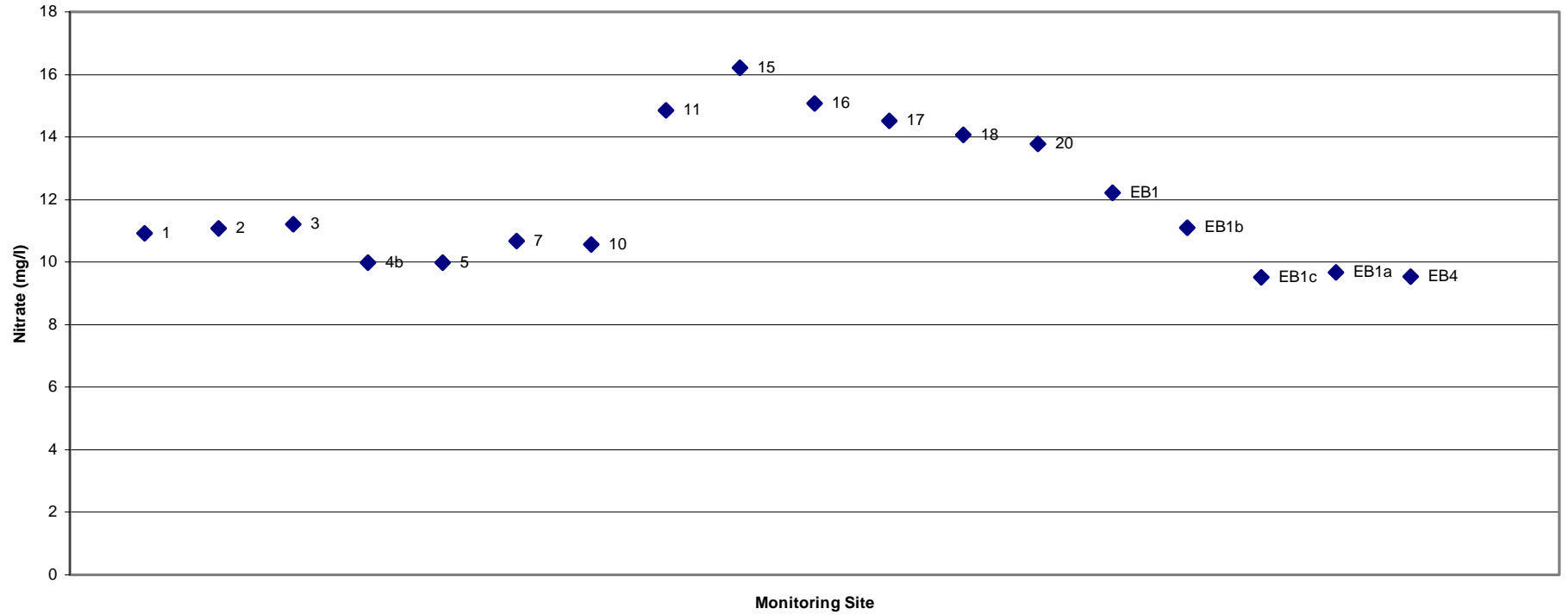
Monocacy Creek- Summer 1997



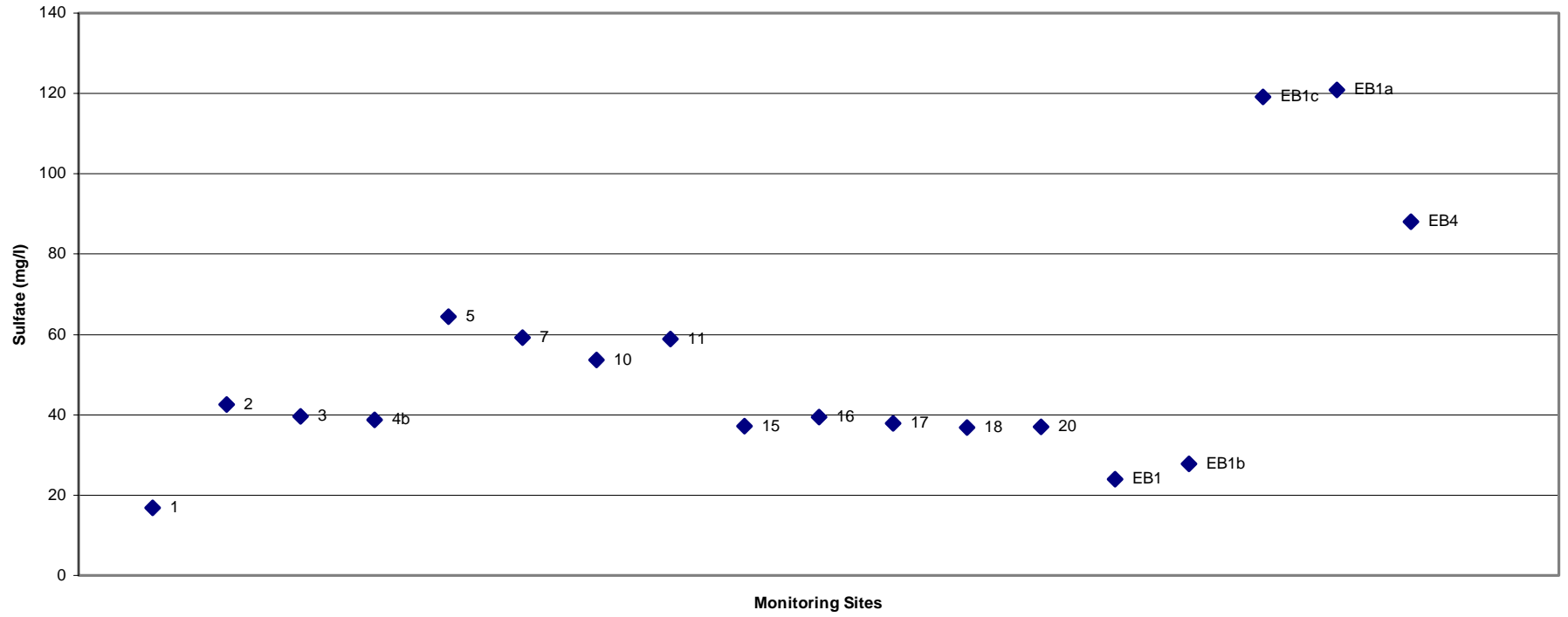
Monocacy Creek- Summer 1997



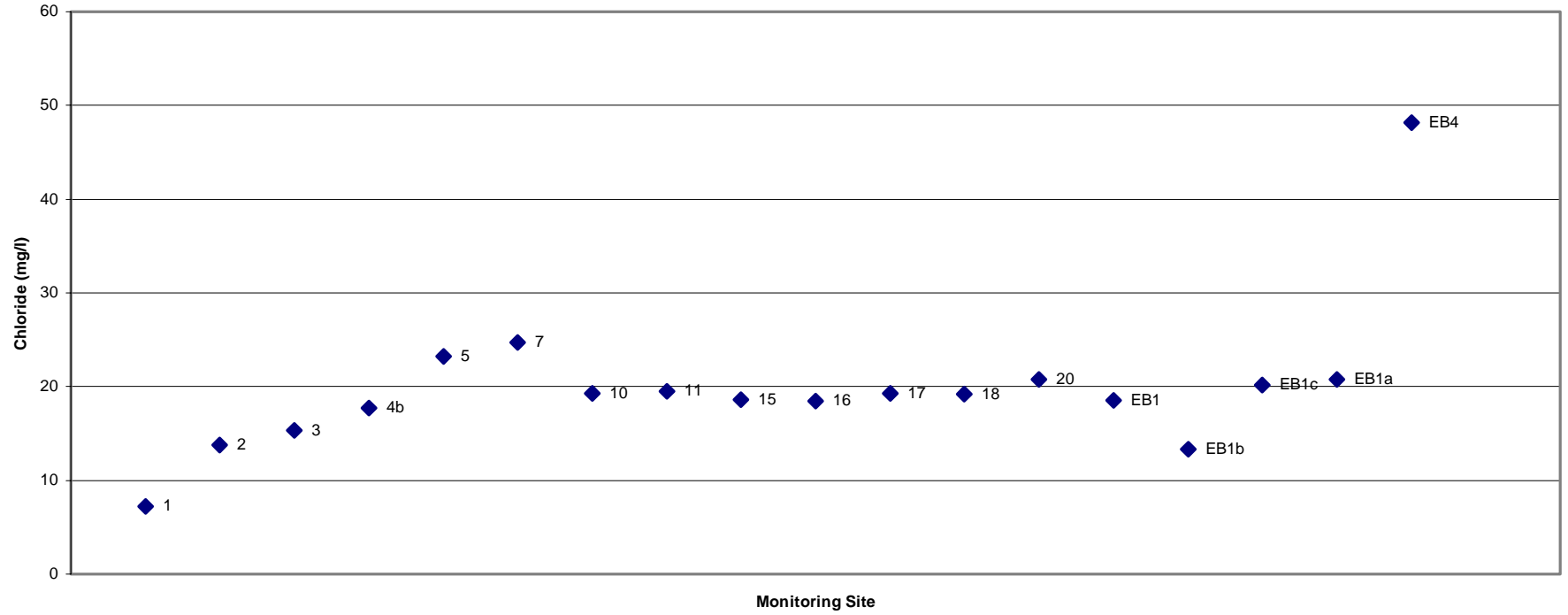
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Monocacy Creek- Summer 1997



Monocacy Creek- Summer 1997



APPENDIX B

MONOCACY CREEK PROJECT

MONOCACY CREEK PROJECT IMPLEMENTATION SCHEDULE 1999-2003			
<u>Project Description</u>	<u>Potential Project Partners</u>	<u>Grant Application Year</u>	<u>Grant Project Year</u>
1. Establishment of streamside vegetation at Maple Grove Farms	MCWA, Wildlands Conservancy, CAC, Boy Scouts		1999
2. Develop Streamside Property Owner Management Guide	Wildlands Conservancy, LVPC, MCWA	1999	2000
3. Restoration of area flowing under Rt. 512 bridge in Hanover Township (includes stabilization of threatened willow tree, installation of brush and log deflectors, educational signing, stabilization of bank upstream from bridge, and planting of native species).	Wildlands Conservancy, Trout Unlimited, Boy Souts, Hanover Township, City of Bethlehem, PFBC, private property owners	1999	2000
4. Educational Lecture Series	Wildlands Conservancy	1999	2000
5. Habitat and corridor improvements through Monocacy Nature Center (includes trail maintenance and/or relocation, boulder placement, multilog and brush deflectors, removal of invasive species, and planting of native species).	MCWA, CAC, Audobon Society, Sierra Club, Trout Unlimited, Boy Scouts, Northampton County Parks, PFBC	2000	2001
6. Streambank fencing of property along Georgetown Road adjacent to park (includes constructing cattle crossing, fencing streambank, installing habitat improvement devices, and establishing streamside vegetation).	Wildlands Conservancy, PFBC, Game Commission, MCWA, private property owner	2000	2001
7. Feasibility study of trail development (to assess potential for creating a connective system trails throughout the watershed).	LVPC, Norhtampton County Parks, municipalities, Rails to Trails, Audobon Society	2000	2001
8. Develop an on-going water quality and ecological monitoring program.	EASI, MCWA, Wildlands Conservancy	2001	2002
9. Removal or breaching of dams throughout the watershed.	DEP, Army Corps of Engineers, Wildlands Conservancy, MCWA, CAC, municipalities	2001	2002
10. St. Anne's Shrine area restoration work (includes streambank stabilization and habitat improvement with biologists and multilogs and riparian buffer establishment).	MCWA, CAC, Wildlands Conservancy, Boy Scouts, Trout Unlimited, PFBC	2002	2003
11. Riparian buffer establishment and streambank fencing as need and desire is recognized by property owners	Wildlands Conservancy, property owners, PFBC Game Commission	1999-2002	2000-2003
<u>MCWA- Monocacy Creek Watershed Association</u>	<u>POSSIBLE GRANT SOURCES</u>		
LVPC- Lehigh Valley Planning Commission	DEP-WRAP (Watershed Restoration & Assistance Program)		
EASI- Environmental Alliance for Senior Involvement	DCNR- Keystone Acquisition & Development Grant Programs:		
CAC- Citizens' Action Committee	Keystone Community Grant Program		
DEP- Department of Environmental Protection	Keystone Rails-to-Trails Program		
DCNR- Department of Conservation and Natural Resources	Keystone Rivers Conservation Grant Program		
PFBC- PA Fish & Boat Commission	William Penn Foundation		
	Canaan Valley Institute		

APPENDIX C

BEST MANAGEMENT PRACTICES FOR STREAMS AND STORMWATER

BEST MANAGEMENT PRACTICES FOR GENERAL STREAM CARE

- DON'T remove native vegetation growing adjacent to the streams.
WHY: Trees and shrubs shade the stream (trout require cool waters for survival), and provide leaf litter which forms the base of the aquatic food web.
- DO plant native trees and shrubs along unvegetated areas of the stream bank.
WHY: The root systems of woody vegetation stabilize streambanks and prevents erosion.
- DON'T mow your lawn right up to the stream, allow at least 5-10 feet of buffer along the stream.
WHY: An unmowed, naturally vegetated streambank buffer helps prevent erosion and filters out lawn chemicals which are damaging to stream life.
- DO limit your use of lawn chemicals such as fertilizers, pesticides, and herbicides.
WHY: These chemicals easily find their way into the stream and can kill stream life including vegetation, insects, fish, and birds.
- DON'T throw your grass clippings (or any other refuse) into the stream.
WHY: Grass clippings in the stream will cause water quality problems and will suffocate fish and other aquatic organisms.
- DO restrict livestock from streamside areas.
WHY: Trampled banks release sediment into the streams and fecal bacteria from animal wastes can cause serious water quality and health problems.
- DON'T dump used oil, antifreeze, etc. into storm drains.
WHY: These dangerous chemicals enter the streams directly through storm drains.
- DO leave wetlands in a naturally vegetated, undisturbed condition.
WHY: Wetlands act as reservoirs and reduce flood damage, provide removal of pollutants from stormwater runoff before it reaches the stream, and provide unique passive recreational opportunities.
- DON'T remove stable, naturally occurring, instream debris, such as fallen logs.
WHY: Instream debris holds rock fragments and organic particles for processing by aquatic animal life and provides cover and cooling shade for fish and other organisms.
- DON'T create recreational paths within 25 feet of the streambank.
WHY: Paths result in soil compaction, destruction of root systems, and the eventual death of vegetation. Streambanks rely on a strong, healthy root system for cohesion and structural integrity. A stabilized streambank minimizes collapse of land areas and undercutting of structures by erosion.
- DO urge your local municipality to manage streamside parks in a more natural way.

WHY: Many governing bodies believe that well-manicured parks are the only kind that are acceptable to residents. They need to hear a different opinion. In addition, mowing and manicuring requires large amounts of time, effort, and taxpayer money.

STORM WATER QUALITY MANAGEMENT AND FLOOD CONTROL

- Ensure the proper maintenance and operation of existing retention and detention basins, as they are frequently clogged and not working efficiently.
- Keep development to a minimum and avoid developing the floodplain whenever possible. This will limit the amount of impervious surfaces that prevent infiltration and storage of floodwaters.
- Natural vegetation should be permitted to grow on floodplains whenever possible. Plants uptake water and their root systems make soil more porous for percolation of precipitation.
- When development is necessary, incorporate porous surfaces as much as possible. For example, a type of porous asphalt has been created that can be used for driveways and parking lots. Such materials should be used whenever possible rather than traditional concrete or asphalt, which prevent percolation of precipitation and cause increased runoff. Porous asphalt application should be combined with construction of underground recharge beds in order to maximize the benefits of this technique.
- Line roadways, parking lots, and other developed areas with trees. The canopy would intercept throughfall during precipitation events and lessen the degree of flooding. This practice would also aid in reducing thermal pollution by providing shade for roadways, thus keeping down the temperature of runoff entering the stream.
- Storm water runoff should be converted to sheet flow over a porous medium or channeled to an infiltration structure, such as a seepage pit or trench, that directs runoff into the ground rather than directly to the stream. Directing water through or over a porous medium that is naturally vegetated would not only increase infiltration, but also filter out pollutants and cool the water before it enters the creek. This process would greatly reduce non-point source pollution and thermal pollution typically caused by storm water runoff. If natural areas are not available for storm water management purposes, infiltration structures are recommended.
- Closed depressions often associated with karst topography should not be filled. These depressions serve as groundwater recharge basins, where storm water collects naturally or where it may be directed to reduce peak discharges in streams and roadway flooding.
- Implementation of storm water quality methods such as two-stage biofilter ponds is also recommended.

APPENDIX D

**FUNDING AND TECHNICAL ASSISTANCE PROGRAMS FOR
RESTORATION
AND CONSERVATION**

STREAMBANK FENCING

3 PROGRAMS MAKE FENCING EASIER AND MORE AFFORDABLE

I. U.S. Fish and Wildlife Streambank Fencing Project

- ❑ U. S. Fish and Wildlife will provide wooden fence posts and two strands of wire
- ❑ Farmer must install fencing
- ❑ Streambank corridor must include a 15-foot buffer on each side of the stream

II. Ducks Unlimited

- ❑ Ducks Unlimited will hire a fencing company to install fencing
- ❑ Farmer does not need to do any work with the installation
- ❑ Fencing includes wooden fence posts and up to two strands of wire
- ❑ Streambank corridor must include a 15-foot buffer on each side of the stream
- ❑ Farmer can earn credits toward other BMPs for giving more than a 30-foot buffer
- ❑ Ducks Unlimited will provide trees and shrubs for the buffer, if so desired
- ❑ Completely private funding

III. Conservation Reserve Program

- ❑ CRP will provide 50% cost-share and 40% incentive payment for the installation of streambank fencing
- ❑ Fencing must be double-strand electric
- ❑ Streambank corridor must include a 35-foot buffer on each side of the stream
- ❑ Farmer will receive annual payment for loss of pasture and an annual maintenance payment
- ❑ Cost-share can include crossings and/or alternative water source for animals
- ❑ Cost-share for installation of trees and shrubs

⇒ *These programs can partner with each other to provide optimum incentive for streambank fencing.*

⇒ *For more information, contact the Natural Resources Conservation Service at (610) 759-9570.*

PA NUTRIENT MANAGEMENT PROGRAM

FUNDING AVAILABLE TO PRODUCERS FOR NUTRIENT MANAGEMENT

Plan Development Incentive Program

Provides 75% cost-share for the development of a Nutrient Management Plan
Cost-share available for plans written by farmers or commercial specialists

Nutrient Management Plan Implementation Grant Program

Provides grants that will cost-share up to 80% or \$75,000 towards the installation of any Best Management Practices (BMPs) listed in an approved Nutrient Management Plan
Some BMPs include rain spouting, barnyard heavy-use protection, diversions, waterways, barnyard curbing and manure storage (contact the NRCS for a more detailed list)
Applicant must show a financial distress in order to be eligible for a grant
Applicant must be an agricultural operation in existence on or before October 1, 1997
Can be partnered with other programs

AgiLink

Provides low-interest loans to implement BMPs that are part of an approved Nutrient Management Plan
Can be partnered with other programs

⇒ *These programs can partner with each other to provide maximum financial assistance.*

⇒ *For more information, contact Natural Resources Conservation Service at (610) 759-9570, ext. 104.*

**SOURCES OF INFORMATION PERTAINING TO FARMLAND
AND OPEN SPACE PRESERVATION**

Wildlands Conservancy

Land Preservation Program
3701 Orchid Place
Emmaus, Pa. 18049-1637
610-965-4397

Bureau of Farmland Protection

Room 404
Agriculture Building
2301 North Cameron Street
Harrisburg, Pa. 17110-9408
717-783-3167

Land Trust Alliance

1319 F Street NW, Suite 501
Washington, DC 20004-1106
202-638-4725

**UNITED STATES DEPARTMENT OF AGRICULTURE (USDA)
CONSERVATION PROGRAMS**

While there are a variety of USDA programs available to assist people with their conservation needs, the following primary financial assistance programs are the principal programs available. Citizens and groups are encouraged to contact the State Offices of the appropriate agency for more specific information about each program.

Lehigh County USDA Service Center

2211 Mack Boulevard
Allentown, PA 18104
Phone (610) 791-9810,
Extension 2: Farm Service Agency
Extension 3: Natural Resource Conservation Service

Lehigh-Northampton County Conservation District

1068 Bushkill Center Road
Nazareth, Pa. 18064
Phone (610) 759-9570, extension 104

Conservation Technical Assistance (CTA)

Contact: USDA, Natural Resources Conservation Service

The purpose of the program is to assist land-users, communities, units of state and local government, and other federal agencies in planning and implementing conservation systems. The purpose of the conservation systems are to reduce erosion, improve soil and water quality, improve and conserve wetlands, enhance fish and wildlife habitat, improve air quality, improve pasture and range condition, reduce upstream flooding, and improve woodlands.

Objectives of the program are to:

- Assist individual land users, communities, conservation districts, and other units of State and local government and Federal agencies to meet their goals for resource stewardship and assist individuals to comply with State and local requirements. NRCS assistance to individuals is provided through conservation districts in accordance with the memorandum of understanding signed by the Secretary of Agriculture, the governor of the state, and the conservation district. Assistance is provided to land users voluntarily applying conservation and to those who must comply with local or State laws and regulations.
- Assist agricultural producers to comply with the highly erodible land (HEL) and wetland (Swampbuster) provisions of the 1985 Food Security Act as amended by the Food, Agriculture, Conservation and Trade Act of 1990 (16 U.S.C. 3801 et. seq.) and the Federal Agriculture Improvement and Reform Act of 1996 and wetlands requirements of Section 404 of the Clean Water Act. NRCS makes HEL and wetland determinations and helps land users develop and implement conservation plans to comply with the law.
- Provide technical assistance to participants in USDA cost-share and conservation incentive programs. (Assistance is funded on a reimbursable basis from the CCC.)

- Collect, analyze, interpret, display, and disseminate information about the condition and trends of the Nation's soil and other natural resources so that people can make good decisions about resource use and about public policies for resource conservation.
- Develop effective science-based technologies for natural resource assessment, management, and conservation.

CONSERVATION FARM OPTION (CFO)

Contact: USDA, Farm Service Agency or Natural Resources Conservation Service

The Conservation Farm Option is a pilot program for producers of wheat, feed grains, cotton, and rice. The program's purposes include conservation of soil, water, and related resources, water quality protection and improvement, wetland restoration, protection and creation, wildlife habitat development and protection, or other similar conservation purposes. Eligibility is limited to owners and producers who have contract acreage enrolled in the Agricultural Market Transition Act program, i.e. production flexibility contracts. The CFO is a voluntary program. Participants are required to develop and implement a conservation farm plan. The plan becomes part of the CFO contract which covers a ten year period. CFO is not restricted as to what measures may be included in the conservation plan, so long as they provide environmental benefits. During the contract period the owner or producer (1.) receives annual payments for implementing the CFO contract and (2.) agrees to forgo payments under the Conservation Reserve Program, the Wetlands Reserve Program, and the Environmental Quality Incentives Program in exchange for one consolidated payment.

CONSERVATION OF PRIVATE GRAZING LAND INITIATIVE (CPGL)

Contact: USDA, Natural Resources Conservation Service

The Conservation of Private Grazing Land initiative will ensure that technical, educational, and related assistance is provided to those who own private grazing lands. It is not a cost share program. This technical assistance will offer opportunities for: better grazing land management; protecting soil from erosive wind and water; using more energy-efficient ways to produce food and fiber; conserving water; providing habitat for wildlife; sustaining forage and grazing plants; using plants to sequester greenhouse gases and increase soil organic matter; and using grazing lands as a source of biomass energy and raw materials for industrial products.

CONSERVATION PLANT MATERIAL CENTERS

Contact: USDA, Natural Resources Conservation Service

The purpose of the program is to provide native plants that can help solve natural resource problems. Beneficial uses for which plant material may be developed include biomass production, carbon sequestration, erosion reduction, wetland restoration, water quality improvement, streambank and riparian area protection, coastal dune stabilization, and other special conservation treatment needs. Scientists at the Plant Materials Centers seek out plants that show promise for meeting an identified conservation need and test their performance. After species are proven, they are released to the private sector for commercial production. The work at the 26

centers is carried out cooperatively with state and Federal agencies, commercial businesses, and seed and nursery associations.

CONSERVATION RESERVE PROGRAM (CRP)

Contact: USDA, Farm Service Agency

The Conservation Reserve Program reduces soil erosion, protects the Nation's ability to produce food and fiber, reduces sedimentation in streams and lakes, improves water quality, establishes wildlife habitat, and enhances forest and wetland resources. It encourages farmers to convert highly erodible cropland or other environmentally sensitive acreage to vegetative cover, such as tame or native grasses, wildlife plantings, trees, filterstrips, or riparian buffers. Farmers receive an annual rental payment for the term of the multi-year contract. Cost sharing is provided to establish the vegetative cover practices.

ENVIRONMENTAL QUALITY INCENTIVES PROGRAM (EQIP)

Contact: USDA, Natural Resources Conservation Service

The Environmental Quality Incentives Program provides technical, educational, and financial assistance to eligible farmers and ranchers to address soil, water, and related natural resource concerns on their lands in an environmentally beneficial and cost-effective manner. The program provides assistance to farmers and ranchers in complying with Federal, State, and tribal environmental laws, and encourages environmental enhancement. The program is funded through the Commodity Credit Corporation. The purposes of the program are achieved through the implementation of a conservation plan that includes structural, vegetative, and land management practices on eligible land. Five- to ten-year contracts are made with eligible producers. Cost-share payments may be made to implement one or more eligible structural or vegetative practices, such as animal waste management facilities, terraces, filter strips, tree planting, and permanent wildlife habitat. Incentive payments can be made to implement one or more land management practices, such as nutrient management, pest management, and grazing land management.

Fifty percent of the funding available for the program will be targeted at natural resource concerns relating to livestock production. The program is carried-out primarily in priority areas that may be watersheds, regions, or multi-state areas, and for significant statewide natural resource concerns that are outside of geographic priority areas.

SOIL SURVEY PROGRAMS

Contact: USDA, Natural Resources Conservation Service

The National Cooperative Soil Survey Program (NCSS) is a partnership led by NRCS of Federal land management agencies, state agricultural experiment stations and state and local units of government that provide soil survey information necessary for understanding, managing, conserving and sustaining the nation's limited soil resources.

Soil surveys provide an orderly, on-the-ground, scientific inventory of soil resources that includes maps showing the locations and extent of soils, data about the physical and chemical properties of those soils, and information derived from that data about potentialities and problems of use on each kind of soil in sufficient detail to meet all reasonable needs for farmers, agricultural technicians, community planners, engineers, and scientists in planning and transferring the findings of research and experience to specific land areas. Soil surveys provide the basic information needed to manage soil sustainably. They also provide information needed to protect water quality, wetlands, and wildlife habitat. Soil surveys are the basis for predicting the behavior of a soil under alternative uses, its potential erosion hazard, potential for ground water contamination, suitability and productivity for cultivated crops, trees, and grasses. Soil surveys are important to planners, engineers, zoning commissions, tax commissioners, homeowners, developers, as well as agricultural producers. Soil surveys also provide a basis to help predict the effect of global climate change on worldwide agricultural production and other land-dependent processes. The NRCS Soil Survey Division through its World Soil Resources Staff helps gather and interpret soil information for global use.

NRCS provides the soil surveys for the privately owned lands of the nation and, through its National Soil Survey Center, provides scientific expertise to enable the NCSS to develop and maintain a uniform system for mapping and assessing soil resources so that soil information from different locations can be shared, regardless of which agency collects it. NRCS provides most of the training in soil survey to Federal agencies and assists other Federal agencies with their soil inventories on a reimbursable basis. NRCS is also responsible for developing the standards and mechanisms for providing digital soil information for the national spatial data infrastructure required by Executive Order 12906.

FARMLAND PROTECTION PROGRAM (FPP)

Contact: USDA, Natural Resources Conservation Service

The Farmland Protection Program provides funds to help purchase development rights to keep productive farmland in agricultural uses. Working through existing programs, USDA joins with State, tribal, or local governments to acquire conservation easements or other interests from landowners. USDA provides up to 50 percent of the fair market easement value. To qualify, farmland must: be part of a pending offer from a State, tribe, or local farmland protection program; be privately owned; have a conservation plan; be large enough to sustain agricultural production; be accessible to markets for what the land produces; have adequate infrastructure and agricultural support services; and have surrounding parcels of land that can support long-term agricultural production. Depending on funding availability, proposals must be submitted by the government entities to the appropriate NRCS State Office during the application window.

EMERGENCY WATERSHED PROTECTION (EWP)

Contact: USDA, Natural Resources Conservation Service

The purpose of the Emergency Watershed Protection program is to undertake emergency measures, including the purchase of flood plain easements, for runoff retardation and soil erosion prevention to safeguard lives and property from floods, drought, and the products of erosion on

any watershed whenever fire, flood or any other natural occurrence is causing or has caused a sudden impairment of the watershed.

It is not necessary for a national emergency to be declared for an area to be eligible for assistance. Program objective is to assist sponsors and individuals in implementing emergency measures to relieve imminent hazards to life and property created by a natural disaster. Activities include providing financial and technical assistance to remove debris from streams, protect destabilized streambanks, establish cover on critically eroding lands, repairing conservation practices, and the purchase of flood plain easements. The program is designed for installation of recovery measures.

FLOOD RISK REDUCTION PROGRAM (FRR)

Contact: USDA, Farm Service Agency

The Flood Risk Reduction Program was established to allow farmers who voluntarily enter into contracts to receive payments on lands with high flood potential. In return, participants agree to forego certain USDA program benefits. These contract payments provide incentives to move farming operations from frequently flooded land.

FORESTRY INCENTIVES PROGRAM (FIP)

Contact: USDA, Natural Resources Conservation Service

The Forestry Incentives Program (FIP) supports good forest management practices on privately owned, non-industrial forestlands nationwide. FIP is designed to benefit the environment while meeting future demands for wood products. Eligible practices are tree planting, timber stand improvement, site preparation for natural regeneration, and other related activities. FIP is available in counties designated by a Forest Service survey of eligible private timber acreage.

Watershed Surveys and Planning

Contact: USDA, Natural Resources Conservation Service

The Watershed and Flood Prevention Act, P.L. 83-566, August 4, 1954, (16 U.S.C. 1001-1008) authorized this program. Prior to fiscal year 1996, small watershed planning activities and the cooperative river basin surveys and investigations authorized by Section 6 of the Act were operated as separate programs. The 1996 appropriations act combined the activities into a single program entitled the Watershed Surveys and Planning program. Activities under both programs are continuing under this authority.

The purpose of the program is to assist Federal, State, and local agencies and tribal governments to protect watersheds from damage caused by erosion, floodwater, and sediment and to conserve and develop water and land resources. Resource concerns addressed by the program include water quality, opportunities for water conservation, wetland and water storage capacity, agricultural drought problems, rural development, municipal and industrial water needs, upstream flood damages, and water needs for fish, wildlife, and forest-based industries.

Types of surveys and plans include watershed plans, river basin surveys and studies, flood hazard analyses, and flood plain management assistance. The focus of these plans is to identify solutions that use land treatment and nonstructural measures to solve resource problems.

RESOURCE CONSERVATION & DEVELOPMENT PROGRAM (RC&D)

Contact: USDA, Natural Resources Conservation Service

The purpose of the Resource Conservation and Development (RC&D) program is to accelerate the conservation, development and utilization of natural resources, improve the general level of economic activity, and to enhance the environment and standard of living in authorized RC&D areas. It improves the capability of State, tribal and local units of government and local nonprofit organizations in rural areas to plan, develop and carry out programs for resource conservation and development. The program also establishes or improves coordination systems in rural areas. Current program objectives focus on improvement of quality of life achieved through natural resources conservation and community development which leads to sustainable communities, prudent use (development), and the management and conservation of natural resources. Authorized RC&D areas are locally sponsored areas designated by the Secretary of Agriculture for RC&D technical and financial assistance program funds. NRCS can provide grants for land conservation, water management, community development, and environmental needs in authorized RC&D areas.

STEWARDSHIP INCENTIVES PROGRAM (SIP)

Contact: USDA, Forest Service

The Stewardship Incentive Program provides technical and financial assistance to encourage non-industrial private forest landowners to keep their lands and natural resources productive and healthy. Qualifying land includes rural lands with existing tree cover or land suitable for growing trees and which is owned by a private individual, group, association, corporation, Indian tribe, or other legal private entity. Eligible landowners must have an approved Forest Stewardship Plan and own 1,000 or fewer acres of qualifying land. Authorizations may be obtained for exceptions of up to 5,000 acres.

WATERSHEDS OPERATIONS --SMALL WATERSHED PROGRAM AND FLOOD PREVENTION PROGRAM (WF 08 OR FP 03)

Contact: USDA, Natural Resources Conservation Service

The Small Watershed Program works through local government sponsors and helps participants solve natural resource and related economic problems on a watershed basis. Projects include watershed protection, flood prevention, erosion and sediment control, water supply, water quality, fish and wildlife habitat enhancement, wetlands creation and restoration, and public recreation in watersheds of 250,000 or fewer acres. Both technical and financial assistance are available.

WETLANDS RESERVE PROGRAM (WRP)

Contact: USDA, Natural Resources Conservation Service

The **Wetlands Reserve Program** is a voluntary program to restore wetlands. Participating landowners can establish conservation easements of either permanent or 30-year duration, or can enter into restoration cost-share agreements where no easement is involved. In exchange for establishing a permanent easement, the landowner receives payment up to the agricultural value of the land and 100 percent of the restoration costs for restoring the wetlands. The 30-year easement payment is 75 percent of what would be provided for a permanent easement on the same site and 75 percent of the restoration cost. The voluntary agreements are for a minimum 10-year duration and provide for 75 percent of the cost of restoring the involved wetlands. Easements and restoration cost-share agreements establish wetland protection and restoration as the primary land use for the duration of the easement or agreement. In all instances, landowners continue to control access to their land.

WILDLIFE HABITAT INCENTIVES PROGRAM (WHIP)

Contact: USDA, Natural Resources Conservation Service

The **Wildlife Habitat Incentives Program** provides financial incentives to develop habitat for fish and wildlife on private lands. Participants agree to implement a wildlife habitat development plan and USDA agrees to provide cost-share assistance for the initial implementation of wildlife habitat development practices. USDA and program participants enter into a cost-share agreement for wildlife habitat development. This agreement generally lasts a minimum of 10 years from the date that the contract is signed.

Note: More information about these programs is available from staff at the State Office of NRCS and FSA as appropriate.