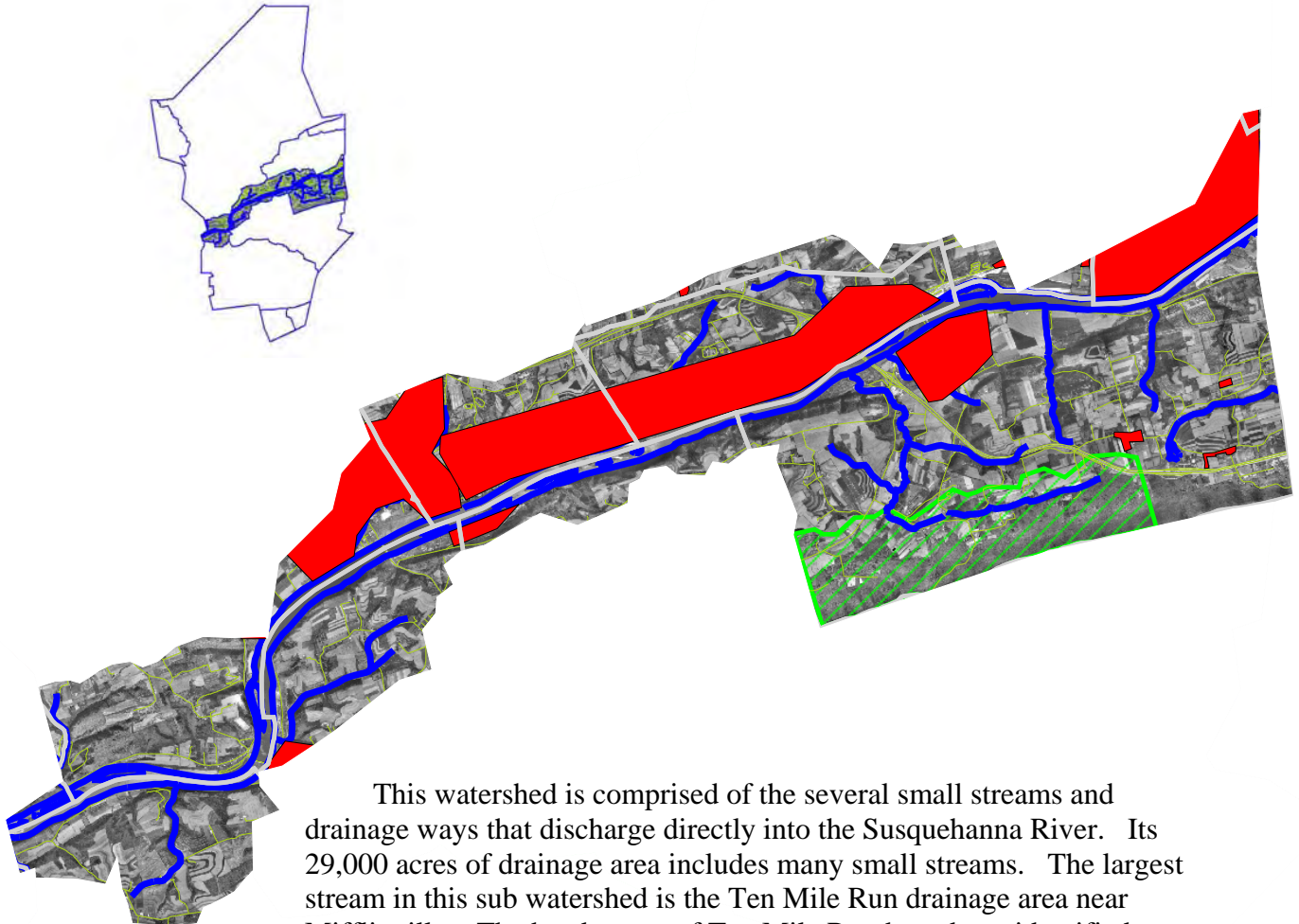







SUSQUEHANNA RIVER WATERSHED

Date: 02/03/2005



This watershed is comprised of the several small streams and drainage ways that discharge directly into the Susquehanna River. Its 29,000 acres of drainage area includes many small streams. The largest stream in this sub watershed is the Ten Mile Run drainage area near Mifflinville. The headwaters of Ten Mile Run have been identified as a High Quality Waters as classified in Chapter 93 regulations. This entire watershed is along the Route 11 corridor, which has been identified as the area with the most potential for continued development in the near future.

Legend

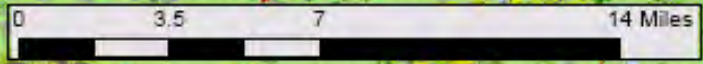
-  Streams
-  Roads
-  Municipalities
-  HQ Watershed
-  Urban/Residential Areas



Columbia Co.
Chesapeake Bay
Tributary Strategy Map
2005



- Legend**
- Municipalities
 - 0
 - Open Water
 - Low Intensity Residential
 - High Intensity Residential
 - Commercial / Industrial / Transportation
 - Bare Rock / Sand / Clay
 - Quarries / Strip Mines / Gravel Pits
 - Transitional
 - Deciduous Forest
 - Evergreen Forest
 - Mixed Forest
 - Pasture / Hay
 - Row Crops
 - Urban / Recreational Grasses
 - Woody Wetlands
 - Emergent Herbaceous Wetlands



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Problems, Progress, and Strategies

Each area was discussed and the major problems in each watershed were identified. While each watershed has unique problems and concerns, several items continued to be common between each watershed. The problems can be grouped under three major areas:

1. Agriculture Concerns
2. Urban Concerns
3. Rural Concerns

1. AGRICULTURE CONCERNS

PROBLEMS: The problems related to agriculture land use identified include-

- a. Erosion of cropland & pastureland
- b. Excessive runoff from cropland
- c. Over application of nutrients
- d. Runoff from feedlots and farmsteads
- e. Uncontrolled animal access to streams.
- f. Direct discharges to streams

PROGRESS: We partner with several government and private programs to help address these agriculture concerns-

- The USDA EQIP program provides technical and financial assistance to address problems with erosion and runoff. This program uses a ranking system that looks at many environmental concerns to qualify landowners. All identified environmental concerns must be addressed under the funding contract.
- The USDA CREP & CRP program are land retirement programs that have been used extensively in this county to take over 14,000 acres of highly erodible cropland out of production and establish a stable vegetative or woody cover on the land. This program is still available to provide buffers along streams.
- The Nutrient Management Act 38 funding program provides financial assistance to landowners for BMP's that are listed on an approved Nutrient Management Plan.
- The Chesapeake program offers financial and technical assistance to address major pollution producing problems on farms.

- The DEP streambank fencing program provides free materials and installation of streambank fences to control livestock access to streams. Watering facilities in or along the stream can also be provided through this program.
- The Chesapeake Bay Foundation provides technical assistance as well as funding for projects to protect the watershed.

While these programs provide up to three fourths or more of cost of installation of best management practices (BMP's) to address environmental problems, experience has shown that often the landowners' share of the cost still places an enormous financial burden on the operation. In addition, many of the operations that do qualify are without the ability to manage these complicated systems properly.

STRATEGY: Several recommendations are being made to address concerns that these programs do not seem able to address and to offer solutions to the problems that will not place excessive financial burdens on the landowners.

◆ CONSERVATION TILLAGE / NO-TILL

Columbia County plants over 23,000 acres of corn, 11,000 acres of soybeans, 7,000 acres of small grains, and 3,500 acres of vegetables. It is estimated that less than half of this is planted with effective conservation tillage practices.

The Conservation District's goal is to expand conservation tillage in Columbia County by 2000 acres. Many operations no-till one or more crops but do not follow this practice for all crops. Research has shown that the continued use of no-till will provide increasing benefits year after year by improving the soil structure. Often the landowner quits no-tilling just when the benefits would start increasing. The Conservation District will strive to promote no-till planting on an additional 1000 acres. In conjunction with local partners, the district will provide educational and financial aid programs to encourage farmers to no-till with increased payments for multi-year continuous no-tilling.

A cost share program is proposed to provide first time no-tillers with technical and financial assistance for no-tilling two consecutive years. Other farmers would be eligible for assistance only with a commitment to no-till the same fields for five continuous years.

◆ **NUTRIENT MANAGEMENT PLANS**

Over 300 farming operations in the county have livestock or poultry as part of the farming enterprise. Less than 10% of these farms have approved nutrient management plans and many of the approved plans do not meet current guidance related to phosphorous.

The Conservation District proposes to develop nutrient management plans for over 5000 acres through assistance provided by the Chesapeake Bay technician. In return for the assistance in development of plans, the landowner will be required to adjust all nutrient applications to meet the NMP guidelines. Installation of other BMP's would be recommended in the plan but would be optional unless required by other programs or regulations.

◆ **COVER CROPS**

Farmers in Columbia County raise over 3,500 acres of vegetables and 3,500 acres of corn silage each year. Much of this land does not receive any type of cover crop or protection over winter.

It is proposed to increase the use of cover cropping and crop residue use during critical soil loss periods during the year by providing a cost share program that encourages establishment of cover crops on 2000 acres within the next 5 years. Farmers will be provided reimbursement for the cost of the seed and planting cost. No-till or minimum tillage of the following crop will be strongly encouraged. The landowner would also need to participate in the nutrient management planning program identified above.

◆ **HOT SPOT TARGETS**

There is often one or two critical problems on a farm that everyone agrees needs to be addressed but the landowner cannot receive financial assistance for this without committing to many other less critical problems. Often this results in the problem not being addressed.

The Conservation District proposes to provide a cost share program that addresses the one or two most critical problems without having to address implementation of BMP's on the entire farm. The district technician would visit the farm and identify the one or two most critical problems on the farm. Cost sharing and technical assistance would be made available to address these problems. The landowner would be required to enter into a long-term agreement whereby he agrees to maintain the installed BMP's for an agreed length of time. The landowner would also need to participate in the nutrient management planning program identified above.

◆ **ADDRESS END ROWS – GRASS BORDERS**

DEP has identified over 90 miles of Columbia County streams on the 303d list as being impaired by agricultural siltation. NRCS and Conservation District personnel have noted that many gullies are being formed as a result of water collected in end rows in fields.

The Conservation District plans to provide a program to filter runoff from cropland and eliminate end rows on row crops by funding the establishment of grassed vegetative filters on the ends and bottom sides of fields. Maintenance of grass borders along the edges of the fields would greatly reduce the erosion that often occurs in end rows and provide a filtering of runoff from the remainder of the field.

Cost sharing would be provided for the cost of seeds and installation costs to establish permanent sod borders on the ends and lower sides of cropland. In exchange, the farmer would agree to not plant end rows. All buffers would meet PA Tech Guide requirements for buffers or filters and would be a minimum of 30 feet. Cost share would be limited to a maximum width of filter of 50 feet. Farmers would be allowed to maintain the vegetation by harvesting or mowing as desired provided a dense sod is maintained. Where needed, cutoffs would be installed to prevent concentration of runoff on

◆ **RIPARIAN BUFFERS/RESTORATION OF STREAMBANKS**

Within the county there are 24 miles of streams that have been listed as impaired on the 303.d list as a result of organic enrichment from agriculture. We would like to conduct 2 demonstration projects installing riparian forest buffers, mostly on streams presently being intensively grazed or farmed. The target area would be the Chillisquaque/Limestone Run and Fishing Creek Watersheds. Presently, unmanaged livestock access to creeks and the lack of forested buffers contribute to substantial water quality problems in the county's waterways. The district has applied for a grant with the Chesapeake Bay Foundation from the National Fish & Wildlife Foundation for funding to plant riparian forested buffers along streams impaired from intensive farming and cattle grazing. Within five years, it is our goal to plant 150 acres of forested buffers.

◆ **EDUCATIONAL OUTREACH**

Work with other agencies and groups to educate landowners on the benefits of the various BMP's and the various sources for technical and financial aid to implement them. This would be accomplished through Annual Ag Conferences, Sunset Tours, various media events, Web Page and publications.

◆ **LONG-TERM WARM SEASON GRASS PLANTINGS**

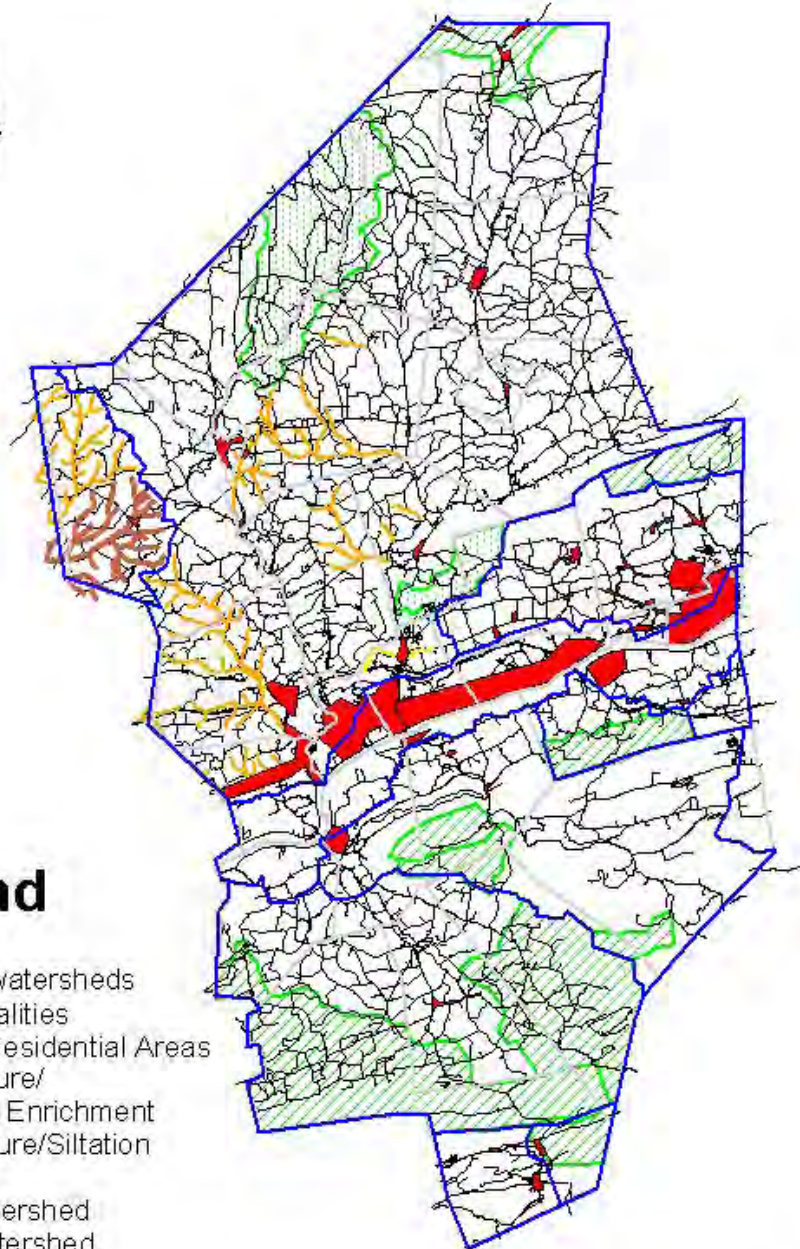
The District will promote the planting of long-term warm season grasses as a method of controlling soil erosion and nutrient pollution. Establishing warm season grasses will provide permanent cover in fields, reducing the potential for soil erosion. Also having warm season grasses established reduces the need for nutrients to be applied to these acres, therefore decreasing the potential for nutrient pollution. Recently in Columbia County grants from cooperating agencies have resulted in creating a market for warm season grasses. This trend will help promote and encourage the implementation of this type of BMP, while still making profitable use of the crop land.

◆ **REEXAMINE ALL IMPAIRED STREAM SEGMENTS**

The District will conduct a visual assessment of the current conditions of all impaired stream segments within Columbia County. Current conditions impacting these segments will be documented along with any BMPs that have been implemented since the segment was listed as impaired. This will enable the District to target the direct causes of impairment on each stream segment as well as begin the process of removing any segment that is no longer impaired from the impaired list.

AGRICULTURAL IMPAIRED STREAMS

Date: 2/3/05



Legend

-  county watersheds
-  Municipalities
-  Urban/Residential Areas
-  Agriculture/
Organic Enrichment
-  Agriculture/Siltation
-  Roads
-  EV Watershed
-  HQ Watershed

5 0 5 10 15 Miles



2. URBAN CONCERNS

PROBLEMS: The problems identified with the urban sector that contribute to the degradation of the Chesapeake Bay include:

- a. Excessive peak storm water runoff from impervious areas including roads, parking lots, roofs and sidewalks creating downstream flooding which results in many pollutants being mixed with and carried off by the flowing water.
- b. Excess nutrients and chemicals applied to lawn and play areas being leached and/or transported off with runoff and into the stream systems.
- c. Pollutants from streets and other heavy use areas mixing with runoff and entering the stream systems.
- d. Loss of stream floodplains and buffer areas.
- e. Accelerated erosion and increased storm water during the construction phases of land development.
- f. Current stormwater controls often result in extended “bank full” flow periods in streams resulting in destabilization of stream banks.
- g. Lack of ground water recharge due to the loss of pervious cover in urban areas.
- h. Urban sprawl resulting in loss of hydrological buffering areas.
- i. Inadequate wastewater treatment.

PROGRESS:

- Local zoning and subdivision regulations require controlling the peak runoff rate to avoid downstream flooding.
- State regulations exist to address the accelerated erosion and runoff occurring during construction projects but usually only the larger projects undergo a formal process assuring compliance.
- More local regulations are controlling work in floodways impacts and development
- The county planning commission is working to inform local municipalities about environmentally friendly planning.
- Improved wastewater treatment facilities

Despite these positive actions many problems still exist. The implementation of state regulations is difficult with limited staff. The local zoning and subdivision boards often do not fully understand the impact of changes to the designs have on environmental issues.

Local officials often lobby for specific regulations without fully understanding the impact on other issues. For example, road crews often like curbs inlets to minimize shoulder maintenance without realizing the impacts on water quality and infiltration that are lost without grass lines ditches.

Regulations require large lots that fueling urban sprawl and loss of land rather than promote clustering and reuse of existing areas.

STRATEGIES: The following actions are recommended to reduce 500 acres of urban sprawl concerns and implement 700 acres of erosion & sedimentation controls:

◆ **LOW IMPACT DEVELOPMENT**

Work with local and regional planning commissions and agencies to promote environmentally friendly land development including cluster housing, limiting of impervious areas, and protection of stream buffers and critical areas.

◆ **CONTINUED ENFORCEMENT OF REGULATIONS**

Continue to support compliance with environmental regulations by working with DEP to assure that environmental regulations are being considered in the planning process and implemented on the ground.

◆ **TRAINING IN PROPER STORMWATER TECHNIQUES**

Provide training to all the designers and engineers concerning proper stormwater planning and compliance with regulations. Promote the use of soft engineering type practices when feasible to control runoff quality and quantity.

◆ **CONDUCT WATERSHED STORMWATER STUDIES**

Work with local and state agencies to promote and secure funding for Act 167 stormwater planning on a watershed scale.

◆ **URBAN NUTRIENT MANAGEMENT EDUCATION**

Conduct a public awareness campaign identifying the financial and environmental concerns related to over application of chemicals and nutrients to lawns.

◆ **STORMWATER/ WATER QUALITY CONCERNS**

Develop a program to promote the routine sweeping of streets in critical areas such as areas near inlets and ditches that empty directly into streams. Work with local municipalities to provide treatment of stormwater discharges from all new construction.

◆ **REEXAMINE ALL IMPAIRED STREAM SEGMENTS**

The District will conduct a visual assessment of the current conditions of all impaired stream segments within Columbia County. Current conditions impacting these segments will be




documented along with any BMPs that have been implemented since the segment was listed as impaired. This will enable the District to target the direct causes of impairment on each stream segment as well as begin the process of removing any segment that is no longer impaired from the impaired list.

Urban - Residential Areas

Date: 02/02/2005



Legend

-  County Watersheds
-  Communities
-  Urban/Residential Areas



10 0 10 20 Miles

A horizontal scale bar with markings at 10, 0, 10, and 20 miles.

3. RURAL CONCERNS

PROBLEMS: Several concerns are related to rural areas. Included in these are:

- a. Runoff from dirt and gravel roads.
- b. Acid Mine Drainage
- c. Acid Deposition
- d. Impacts of recreational type activities on the streams and watercourses
- e. Lack of public concern and involvement in the quality of the watershed
- f. Unregulated development of sensitive areas
- g. Sediment and stormwater problems resulting from improper forestry practices.
- h. Lack of public concern and involvement in the quality of the watershed
- i. Unregulated development of sensitive areas
- j. Loss of water quality and quantity
- k. Polluted runoff from paved roads including deicing mixtures
- l. Lack of TMDL's for rural streams to be used during permitting process
- m. Thermal Pollution
- n. Stream bank/bed erosion
- o. Loss of Farmland to development
- p. Failing/poor septic systems
- q. Low flow dams

PROGRESS: to address the rural concerns

- The Dirt and Gravel Roads program administered by the Columbia County Conservation District had paid for 6.75 miles of road improvement. In addition the townships that have received funding for these roads have been educated on environmentally sensitive road maintenance.
- The Catawissa Creek Restoration Association along with partners such as Columbia CCD, Schuylkill CCD, BAMR, EPCAMR, PA DEP, US EPA, and private landowners have secured funding to treat three major acid mine discharges restoring over 40 miles of the 303(d) listed Catawissa Creek. The groups plan to treat the remaining discharges in a similar manner. In addition, a Rivers Conservation Plan for the watershed will be developed to address social as well as environmental concerns from a community perspective.
- The Fishing Creek Watershed Association along with partners such as Columbia CCD, Sullivan CCD, PA Game Commission, PA Fish & Boat Commission and PA DEP have secured funding to assess the acid deposition effects on the East Branch of Fishing Creek and to develop treatment options for this 303(d) listed area. A pilot project to land apply limestone is being tested in a small subwatershed.

- Groups such as the Columbia County Planning Commission, the Susquehanna Greenway Partnership, & PA DCNR Bureau of Recreation have made progress to provide recreational opportunities that do not negatively impact the watershed.
- The PA DCNR Bureau of Forestry, Sustainable Forestry Institute, and Susquehanna Woodland Owners Association have provided education and assistance to promote sustainable forestry. The district promotes proper logging through the Chapter 102 and Chapter 105 programs.
- The Conservation District in cooperation with watershed groups and many others have promoted an interest in watershed stewardship. Activities include watershed festivals, newsletters, articles, workshops, teacher programs, outreach to schools, Community Connections to Our Watershed program for high/middle school students, & teachers, and trainings.
- Fluvial Geomorphology has been used in the county to demonstrate a technique to control stream bank & bed erosion.
- The Farmland Preservation program is administered by the district to purchase conservation easements on prime farmland that is threatened by development. To date, 9 easements on 1,068 acres have been preserved.
- Through CREP and the Chesapeake Bay Foundation 1,000 acres of riparian buffers have been planted. These buffers will provide wildlife habitat, control streambank erosion, filter sediment & nutrients from runoff, and alleviate thermal pollution.

STRATEGIES: to address rural concerns

◆ **DIRT & GRAVEL ROADS PROGRAM**

Work with cooperating townships to use the Dirt & Gravel Roads program to improve 10 miles of roads that impact 303(d) listed waters and critical areas. Townships involved in the program will also receive training on environmentally sensitive road construction

◆ **ACID MINE DRAINAGE SYSTEMS**

Work with Catawissa Creek Restoration Association and partners to maintain and build treatment systems for the acid mine discharges effecting 24 miles of stream in the Catawissa watershed.

◆ **REMEDiate ACID DEPOSITION STREAM EFFECTS**

Work with Fishing Creek Watershed Association & partners to assess and treat the acid deposition damage in the East Branch of Fishing Creek.

◆ **TMDL DEVELOPMENT**

Participate and encourage the development of TMDL's for the county's 303(d) listed streams.

◆ **EDUCATE LOCAL OFFICIALS**

Work with local officials and offer trainings that include education on septic tanks, Chapter 102/105, planning, and maintenance.

◆ **WATERSHED GROUPS**

Facilitate the reformation of Briar Creek Watershed group. Continue involvement and support of Fishing Creek Watershed Association, Catawissa Creek Restoration Association, and Roaring Creek Valley Conservation Association.

◆ **WATERSHED ISSUE AWARENESS**

Work with established watershed groups to create watershed issue awareness and promote recreational activities that create a watershed stewardship ethic.

◆ **SUSTAINABLE FORESTRY**

Work with the PA DCNR Bureau of Forestry, Sustainable Forestry Institute, and Susquehanna Woodland Owners Association to continue to provide education and assistance to promote sustainable forestry. Continue to promote proper logging through the Chapter 102 and Chapter 105 programs.

◆ **ACT 167**

Participate in efforts to complete an Act 167 study for the county.

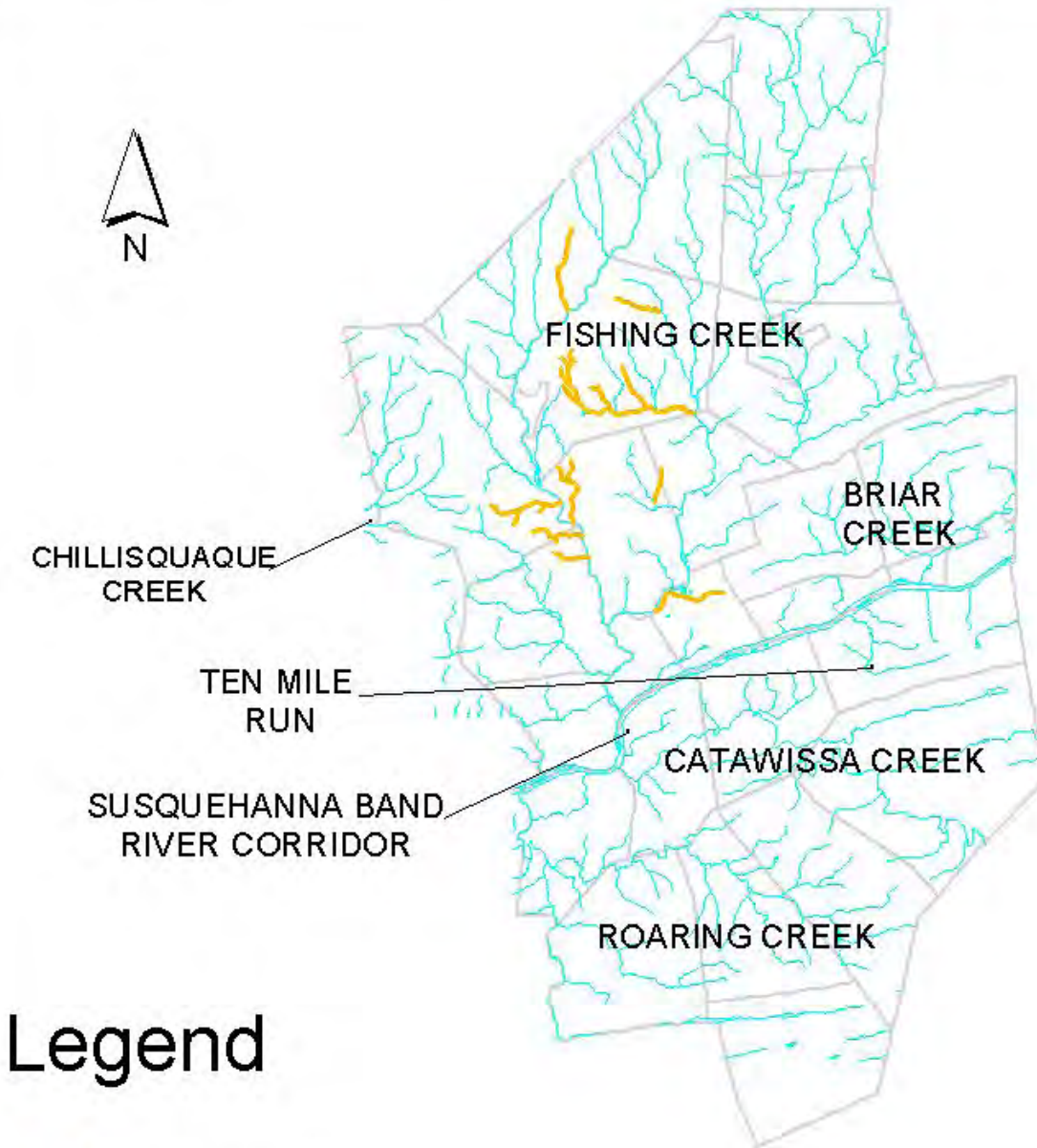
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ROAD SILT IMPACTED STREAMS

Date: 2/3/2005



Legend

-  ROAD_IMPAIRED
-  Streams
-  Municipalities

