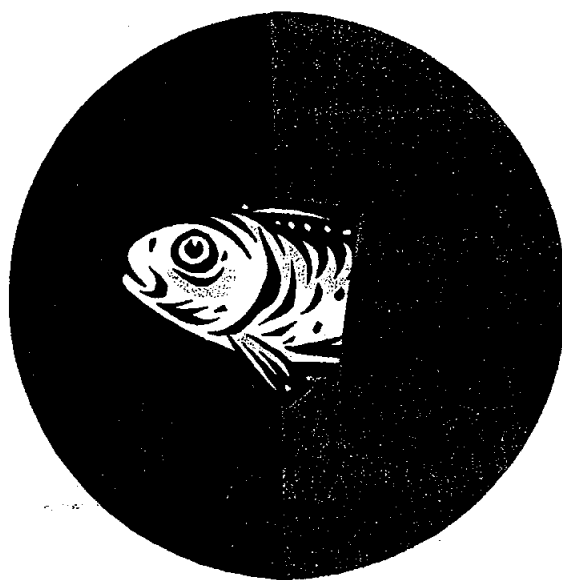


**MILLCREEK**



**WATERSHED PLAN**

**MILL CREEK  
CLARION & JEFFERSON COUNTIES  
PENNSYLVANIA**

**WATERSHED PLAN  
AND  
ENVIRONMENTAL ASSESSMENT**

**UNITED STATES DEPARTMENT OF AGRICULTURE  
NATURAL RESOURCES CONSERVATION SERVICE  
HARRISBURG, PENNSYLVANIA**

**IN COOPERATION WITH**

**CLARION COUNTY COMMISSIONERS  
JEFFERSON COUNTY COMMISSIONERS  
CLARION CONSERVATION DISTRICT  
JEFFERSON CONSERVATION DISTRICT  
MILL CREEK COALITION**

**MARCH, 1999**

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# **WATERSHED PLAN and ENVIRONMENTAL ASSESSMENT**

## **MILL CREEK**

### **CLARION and JEFFERSON COUNTIES, PENNSYLVANIA**

#### **ABSTRACT:**

The Mill Creek Watershed Plan and Environmental Assessment describes a plan for treating mine drainage discharges to improve water quality and restore aquatic habitat. The project area is located in Clarion and Jefferson Counties, Pennsylvania. The Mill Creek project area drains into the Clarion River, a tributary to the Allegheny River in the Ohio River Basin. Alternative plans developed included No Action and the Recommended Plan. Other alternatives were also considered. The recommended plan is to construct 58 passive mine water treatment systems in the Mill Creek watershed. Economic benefits will exceed the costs. Sponsors will incur about fifty-two percent (52%) of the total project cost of \$ 7,277,000. The project will improve water quality and restore or enhance aquatic habitat in 32.8 miles of Mill Creek. Other project benefits include the elimination of safety hazards associated with stripmine highwalls and water filled pits, reduced road maintenance costs, increased property values, enhanced aesthetics, improved recreation potentials, diversified wildlife habitats, technology transfer, and enhancement of environmental education opportunities. There are no significant adverse environmental impacts from this project. The document is intended to fulfill requirements of the National Environmental Policy Act (NEPA) of 1960, as amended.

#### **FOR ADDITIONAL INFORMATION CONTACT:**

Janet L. Oertly  
State Conservationist  
USDA,  
Natural Resources Conservation Service  
Suite 340, One Credit Union Place  
Harrisburg, Pennsylvania 17110-2993

**COMMENTS:** Send comments on this proposed action to the address listed above. Comments must be received by December 31, 1998.

#### **PREPARED BY:**

United States Department of Agriculture  
Natural Resources Conservation Service  
Harrisburg, Pennsylvania

In Cooperation with

|                                |                                 |
|--------------------------------|---------------------------------|
| Clarion County Commissioners   | Clarion Conservation District   |
| Jefferson County Commissioners | Jefferson Conservation District |
| Mill Creek Coalition           |                                 |

**MILL CREEK  
WATERSHED AGREEMENT**

Between the

**The Clarion County Commissioners  
and  
The Jefferson County Commissioners  
and  
The Clarion Conservation District  
and  
The Jefferson Conservation District  
and  
The Mill Creek Coalition  
(Referred to herein as Sponsors)**

and the

**United States Department of Agriculture  
Natural Resources Conservation Service  
(Referred to herein as NRCS)**

Whereas, application has heretofore been made to the Secretary of Agriculture by the Sponsors for assistance in preparing a plan for works of improvement for the Mill Creek watershed, Commonwealth of Pennsylvania, under the authority of the Watershed Protection and Flood Prevention Act (16 U.S.C. 1001-1008); and

Whereas, the responsibility for administration of the Watershed Protection and Flood Prevention Act (PL 83-566), as amended, has been assigned by the Secretary of Agriculture to NRCS; and

Whereas, there has been developed through the cooperative efforts of the Sponsors and NRCS a plan for works of improvement for the Mill Creek watershed, Commonwealth of Pennsylvania, hereinafter referred to as the Watershed Plan and Environmental Assessment, which plan is annexed to and made a part of this agreement;

Now, therefore, in view of the foregoing considerations, the Secretary of Agriculture, through NRCS, and the Sponsors hereby agree on this plan and that the works of improvement for this project will be installed, operated, and maintained in accordance with the terms, conditions, and stipulations provided for in this Watershed Plan and Environmental Assessment, including the following:

1. The Sponsors will acquire, with other than PL 83-566 funds, such land rights as will be needed in connection with the works of improvement. (Total Estimated cost \$217,000.) The estimated cost for Clarion County is \$135,000, and Jefferson County's estimated cost is \$82,000.

The Sponsors agree that all land acquired or improved with PL 83-566 financial or credit assistance will not be sold or otherwise disposed of for the evaluated life of the project except to a public agency which will continue to maintain and operate the development in accordance with the Operation and Maintenance Agreement.

2. The Sponsors hereby agree that they will comply with all of the policies and procedures of the Uniform Relocation Assistance and Real Property Acquisition Policies Act (42 U.S.C. 4601 et seq. as implemented by 7 CFR, Part 21) when acquiring real property interests for this federally-assisted project. If the Sponsors are legally unable to comply with the real property acquisition requirements of the Act, they agree that, before any federal financial assistance is furnished, they will provide a statement to that effect, supported by an opinion of the chief legal officer of the state containing a full discussion of the facts and law involved. This statement may be accepted as constituting compliance. In any event, the Sponsors agree that they will reimburse owners for necessary expenses as specified in 7 CFR, Part 21, 1006 (c) and 21.1007.

The cost of relocation payments in connection with the displacements under the Uniform Act will be shared by the Sponsors and NRCS as follows:

|                        | <u>Sponsors</u><br>(percent) | <u>NRCS</u><br>(percent) | <u>Estimated Relocation<br/>Payment Costs</u><br>(dollars) |
|------------------------|------------------------------|--------------------------|--|
| Relocation<br>Payments | 52%                          | 48%                      | \$0 <sup>1</sup>   |

3. The Sponsors will acquire or provide assurance that landowners or water users have acquired such water rights pursuant to state law as may be needed in the installation and operation of the works of improvement.
4. The Sponsors will obtain all necessary federal, state, and local permits required by law, ordinance, or regulation for installation of the works of improvement and will operate the facilities according to any conditions required by the permits.

<sup>1</sup> Investigation of the watershed project area indicates that no displacements will be involved under present conditions. However, in the event that displacement becomes necessary at a later date, the cost of relocation assistance and payments will be cost shared in accordance with the percentages shown.

5. The percentages of construction costs to be paid by the Sponsors and by the NRCS are as follows:

| <u>Works of<br/>Improvements</u> | <u>Sponsors</u><br>(percent) | <u>NRCS</u><br>(percent) | <u>Estimated<br/>Construction<br/>Costs</u><br>(dollars) |
|----------------------------------|------------------------------|--------------------------|--|
| All Treatment Sites              | 50% or<br>more               | up to 50%                | <u>\$5,982,000</u>                                       |

**NOTE:** The percentage of construction cost that the Sponsors pay may vary by site, as long as they bear fifty percent (50%) of the total construction cost. Effort will be made to keep the percentages as close to 50/50 as possible, as continued funding can not be guaranteed by either party.

6. The Sponsors and NRCS will bear the costs of engineering services that each incurs, estimated to be \$300,000 each. The sponsors estimated engineering costs in Clarion County are \$218,000, and in Jefferson County they are \$82,000
7. The Sponsors and NRCS will bear the costs of project administration, that each incurs estimated to be \$239,000 each. The sponsors costs for Clarion County are estimated at \$174,000 and for Jefferson County \$65,000.
8. The Sponsors will be responsible for the operation, maintenance, and replacement of the works of improvement by actually performing the work or arranging for such work, in accordance with agreements to be entered into before issuing invitations to bid for construction work regardless of the agency actually performing the work. The estimated **Operation and Maintenance** costs are \$48,000 per year. For Clarion County the costs are estimated at \$31,000 and for Jefferson County \$17,000.
9. The Sponsors will encourage landowners and operators to operate and maintain land treatment measures for the protection and improvement of the watershed.
10. The costs shown in this plan are preliminary estimates. Final costs to be borne by the parties hereto, will be the actual costs incurred in the installation of works of improvement.
11. This agreement is not a fund-obligating document. Financial and other assistance to be furnished by NRCS or the sponsors in carrying out the plan is contingent upon the fulfillment of applicable laws and regulations and the availability of appropriations for this purpose.



12. A separate agreement will be entered into between NRCS and Sponsors before either party initiates work involving funds of the other party. Such agreement will set forth in detail the financial and working arrangements and other conditions that are applicable to the specific works of improvement
13. This plan may be amended or revised only by mutual agreement of the parties hereto, except that NRCS may deauthorize or terminate funding at any time it determines that the Sponsors have failed to comply with the conditions of this agreement. In this case, NRCS shall promptly notify the Sponsors in writing of the determination and the reasons for the deauthorization of the project funding, together with the effective date. Payments made to the Sponsors or recoveries by NRCS shall be in accord with the legal rights and liabilities of the parties when project funding has been deauthorized. An amendment to incorporate changes affecting a specific measure may be made by mutual agreement between NRCS and the Sponsor(s) having specific responsibilities for the measure involved.
14. No member of or delegate to Congress, or resident commissioner, shall be admitted to any benefit that may arise therefrom; but this provision shall not be construed to extend to this agreement if made with a corporation for its general benefit.
15. The program conducted will be in compliance with the nondiscrimination provisions as contained in Titles VI and VII of the Civil Rights Act of 1964, as amended, the Civil Rights Restoration Act of 1987 (Public Law 100-259) and other nondiscrimination statutes, namely, Section 504 of the Rehabilitation Act of 1973, Title IX of the Education Amendments of 1972, the Age Discrimination Act of 1975, and in accordance with the regulations of the Secretary of Agriculture (7 CFR 15, Subparts A& B), which provide that no person in the United States shall, on the grounds of race, color, national origin, age, sex, religion, marital status, or handicap be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity receiving Federal financial assistance from the Department of Agriculture or any agency thereof.
16. Certification Regarding Drug-Free Workplace Requirements (7 CFR 3017, Subpart F).

By signing this watershed agreement, the Sponsors are providing the certification set out below. If it is later determined that the Sponsors knowingly rendered a false certification, or otherwise violated the requirements of the Drug-Free Workplace Act, the NRCS, in addition to any other remedies available to the Federal Government, may take action authorized under the Drug-Free Workplace Act.

Controlled substance means a controlled substance in Schedules I through V of the Controlled Substance Act (21 U.S.C. 812) and as further defined by regulation (21 CFR 1308.11 through 1308.15);

Conviction means a finding of (including a plea of nolo contendere) or imposition of sentence, or both, by any judicial body charged with the responsibility to determine violations of the Federal or State criminal drug statutes;

Criminal drug statute means a Federal or non-Federal criminal statute involving the manufacturing, distribution, dispensing, use, or possession of any controlled substance;

Employee means the employee of a grantee directly engaged in the performance of work under a grant, including: (1) all direct charge employees; (2) all indirect charge employees unless their impact or involvement is insignificant to the performance of the grant; and, (3) temporary personnel and consultants who are directly engaged in the performance of work under the grant and who are on the grantee's payroll. This definition does not include workers not on the payroll of the grantee (e.g. volunteers, even if used to meet a matching requirements; consultants or independent contractors not on the grantees payroll; or employees of subrecipients or subcontractors in covered workplaces).

**Certification:**

A. The sponsors certify that they will provide or they will continue to provide a drug-free work place by:

- (1) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the grantee's workplace and specifying the actions that will be taken against employees for violation of such prohibition;
- (2) Establishing an ongoing drug-free awareness program to inform employees about --
  - (a) The danger of drug abuse in the workplace;
  - (b) The grantee's policy of maintaining a drug-free workplace;
  - (c) Any available drug counseling, rehabilitation, and employee assistance programs; and
  - (d) The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace.

- (3) Making it a requirement that each employee to be engaged in performance of the grant be given a copy of the statement required by paragraph (1);
  - (4) Notifying the employee in the statement required by paragraph (1) that, as a condition of employment under the grant, the employee will --
    - (a) Abide by the terms of the statement; and
    - (b) Notify the employer in writing of his or her conviction for a violation of a criminal drug statute occurring in the work place no later than five calendar days after such conviction;
  - (5) Notifying the NRCS in writing, within ten calendar days after receiving notice under paragraph (4) (b) from an employee or otherwise receiving actual notice of such conviction. Employers of convicted employees must provide notice, including position title, to every grant officer or other designee on whose grant activity the convicted employee was working, unless the federal agency has designated a central point for the receipt of such notices. Notice shall include the identification number(s) of each affected grant;
  - (6) Taking one of the following actions, within 30 calendar days of receiving notice under paragraph (4) (b), with respect to any employee who is so convicted.
    - (a) Taking appropriate personnel action against such an employee, up to and including termination, consistent with the requirements of the Rehabilitation Act of 1973, as amended; or
    - (b) Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a federal, state, or local health, law enforcement or other appropriate agency.
  - (7) Making a good faith effort to continue to maintain a drug-free workplace through implementation of paragraphs (1), (2), (3), (4), (5), and (6).
- B. The Sponsors may provide a list of the site(s) for the performance of work done in connection with a specific project or other agreement.
- C. Agencies shall keep the original of all disclosure reports in the official files of the agency.
17. Certification Regarding Lobbying (7 CFR 3018) (applicable if this agreement exceeds \$100,000).

(1) The Sponsors certify to the best of their knowledge and belief, that:

(a) No federal appropriated funds have been paid or will be paid, by or on behalf of the Sponsors, to any person for influencing or attempting to influence an officer or employee of an agency, Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any federal contract, the making of any federal grant, the making of any federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any federal contract, grant, loan, or cooperative agreement.

(b) If any funds other than federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form - LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(c) The Sponsors shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

(2) This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,00 for each such failure.

18. Certification Regarding Debarment, Suspension, an Other Responsibility Matters-Primary Covered Transactions (7 CFR 3017).

(1) The Sponsors certify to the best of their knowledge and belief, that they and their principals:

(a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any federal department or agency.

- (b) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (federal, state, or local) transaction or contract under a public transaction or contract under a public transaction; violation of federal or state antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
  - (c) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (federal, state, or local) with commission of any of the offenses enumerated in paragraph (1) (b) of this certification; and
  - (d) Have not within a three-year period preceding this application/proposal had one or more public transactions (federal, state, or local) terminated for cause or default.
- (2) Where the primary Sponsors are unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this agreement.

## SIGNATURE SHEET

### PL 83-566 WATERSHED AGREEMENT MILL CREEK, PENNSYLVANIA

The signing of this PL 83-566 Watershed Agreement by an authorized representative of the Sponsors indicates that the Sponsors have reviewed the Mill Creek (PL 83-566) Plan for water quality improvement and concur with the intent and contents of the Plan.

The signing of this agreement was authorized by a resolution of the governing body of the Clarion County Commissioners adopted at a meeting held on March 8, 1999.

Clarion County Commissioners  
Commissioners Office  
Clarion County Court House  
Clarion, Pa 16214

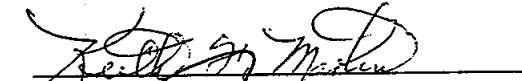
COUNTY OF CLARION  
BOARD OF COMMISSIONERS


ATTEST:



(SEAL)

  
Sally Minich, Chairman

  
Keith Martin

  
David Wagner

## SIGNATURE SHEET

### PL 83-566 WATERSHED AGREEMENT MILL CREEK, PENNSYLVANIA

The signing of this PL 83-566 Watershed Agreement by an authorized representative of the Sponsors indicates that the Sponsors have reviewed the Mill Creek (PL 83-566) Plan for water quality improvement and concur with the intent and contents of the Plan.

The signing of this agreement was authorized by a resolution of the governing body of the Jefferson County Commissioners adopted at a meeting held on February 23, 1999.

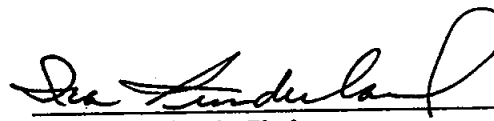
Jefferson County Commissioners  
Jefferson Place  
Brookville, PA 15825

COUNTY OF JEFFERSON  
BOARD OF COMMISSIONERS

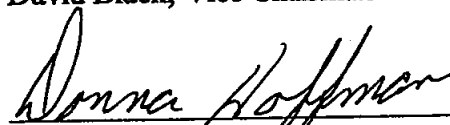
ATTEST:



(SEAL)

  
Ira Sunderland, Chairman

David Black, Vice Chairman

  
Donna Hoffman

## SIGNATURE SHEET

### PL 83-566 WATERSHED AGREEMENT MILL CREEK, PENNSYLVANIA

The signing of this PL 83-566 Watershed Agreement by an authorized representative of the Sponsors indicates that the Sponsors have reviewed the Mill Creek Plan for water quality improvement and concur with the intent and contents of the Plan.

The signing of this agreement was authorized by a resolution of the governing body of the Clarion Conservation District adopted at a meeting held on Feb. 16, 1999.

Clarion Conservation District  
RR#3 Box 265  
Clarion, PA 16214

By: Walt L. L.

Title: District Chairman

Date: 3/4/99



## SIGNATURE SHEET

### PL 83-566 WATERSHED AGREEMENT MILL CREEK, PENNSYLVANIA

The signing of this PL 83-566 Watershed Agreement by an authorized representative of the Sponsors indicates that the Sponsors have reviewed the Mill Creek (PL 83-566) Plan for water quality improvement and concur with the intent and contents of the Plan.

The signing of this agreement was authorized by a resolution of the governing body of the Jefferson Conservation District adopted at a meeting held on 3/4/99.

Jefferson Conservation District  
180 Main Street  
Brookville, PA 15825

By: 

Title: District Chairman

Date: 3/4/99

## SIGNATURE SHEET

### PL 83-566 WATERSHED AGREEMENT MILL CREEK, PENNSYLVANIA

The signing of this PL 83-566 Watershed Agreement by an authorized representative of the Sponsors indicates that the Sponsors have reviewed the Mill Creek (PL 83-566) Plan for water quality improvement and concur with the intent and contents of the Plan.

The signing of this agreement was authorized by a resolution of the governing body by the Mill Creek Coalition adopted at a meeting held on March 10, 1999.

Mill Creek Coalition  
Biology Department  
Clarion University of Pennsylvania  
Clarion, PA 16214

By: Peter Dalby  
Title: President

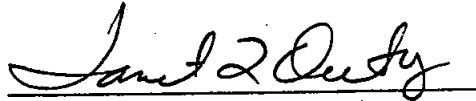
Date: 10 March 1999

## SIGNATURE SHEET

### PL 83-566 WATERSHED AGREEMENT MILL CREEK, PENNSYLVANIA

United States Department of Agriculture  
Natural Resources Conservation Service

Approved by:



JANET L. OERTLY  
STATE CONSERVATIONIST

Date:

3/11/99

## **1 - EXECUTIVE SUMMARY**

The Natural Resources Conservation Service (NRCS) began work on the Mill Creek project in the mid eighties in cooperation with the Mill Creek Coalition.

The purpose of this project will be to improve water quality and aquatic habitat in Little Mill Creek, Mill Creek, Jones Run, Douglass Run and Whites Run. The water quality in these streams will be improved by decreasing concentrations of acid, iron, aluminum and manganese. Health and safety hazards associated with stripmine highwalls and water filled pits will be removed in the process of treating acid mine drainage. The project will also enhance stream aesthetics by removing unsightly metal precipitates from the stream bottoms. Landscape aesthetics will be improved by the revegetation of barren and eroding abandoned strip mines.

This Watershed Plan and Environmental Assessment (Plan-EA) identifies problems, objectives and alternatives; evaluates the effects of the alternatives, and recommends solutions to the identified problems.

The sites have a combination of problems that will be corrected. They include deep mine discharges that have large flows of mine drainage, smaller flows of nonpoint mine seepage, and discharges from abandoned gas wells. Hazardous stripmine highwalls, and water filled pits are hazards associated with the mine drainage. There are also poorly vegetated abandoned stripmines that contribute sediment and acidity to the watershed streams.

The sites are located in the Mill Creek watershed in the eastern portion of Clarion and western portion of Jefferson Counties, Pennsylvania. All sites are within 5 miles of Interstate 80 near exits 11 and 12, Strattanville and Corsica, Pennsylvania. The Mill Creek project area is within 80 miles of Pittsburgh, population 2.25 million, and within 88 miles of Johnstown, 120 miles of Erie and 138 miles of Cleveland Ohio. The 1995 population in Clarion County was 42,388 and Jefferson County was 46,620.

Treatment will be accomplished through the construction of Successive Alkalinity Producing Systems (SAPS), anoxic limestone drains, aerobic wetlands, limestone waterways and settling ponds. These systems will neutralize acidity, and enhance precipitation of iron, aluminum and manganese. Sizing of the treatment systems will be done by analyzing water samples and measuring flow at the major mine drainage sites that have been identified in the watershed. Approximately 300 acres of abandoned mine land will be treated with agricultural limestone to neutralize acidity in the spoil and promote vegetative cover. Critically eroding areas will be stabilized with suitable vegetation. The addition of agricultural lime will also increase alkalinity levels in the receiving streams and improve water quality that will result in enhanced aquatic habitat. Riparian forest buffers will be maintained to protect water quality and aquatic habitat.

Diversions and waterways will be used to manage surface water flows around and through the sites. All disturbed areas will be limed, fertilized, seeded and mulched. Erosion and sediment control practices will be used during construction.

Total estimated costs for all 58 sites are as listed below:

|                    | <b>PL 83-566</b>    |                           |                           |
|--------------------|---------------------|---------------------------|---------------------------|
|                    | <u><b>Funds</b></u> | <u><b>Other Funds</b></u> | <u><b>Total Costs</b></u> |
| Construction       | \$2,991,000         | \$2,991,000               | \$5,982,000               |
| Engineering        | \$ 300,000          | \$ 300,000                | \$ 600,000                |
| Project Admin.     | \$ 239,000          | \$ 239,000                | \$ 478,000                |
| Land Rights        | \$ 0                | \$ 217,000                | \$ 217,000                |
| <b>Total Costs</b> | <b>\$3,530,000</b>  | <b>\$3,747,000</b>        | <b>\$7,277,000</b>        |

It is not expected that there will be any housing relocation costs. Operation and maintenance (O&M) costs are estimated at \$48,000 for all sites annually. For Clarion County the O&M cost is estimated at \$31,000 per year and \$17,000 per year for Jefferson County.

The social and ecological benefits of this project will improve public health and safety by eliminating stripmine highwalls, water filled pits and will improve water quality with regards to aquatic life in Little Mill Creek, Mill Creek, Jones Run, Douglass Run and Whites Run. Visual and aesthetic benefits will be realized removing unsightly iron staining from stream bottoms and by vegetating eroding mine spoil with suitable vegetation. Some specific social and ecological benefits include the enhancement of 20.5 acres of existing impaired wetland. Restoration of 27.1 miles of coldwater fishery, enhancement of 5.7 miles of existing coldwater fishery, for a total of 32.8 miles of continuous coldwater fishery. There will also be increased water contact recreation.

The Total Average Annual Benefits are \$814,000. This compares with the Total Average Annual Costs of \$566,000. The calculated benefit to cost ratio is 1.4:1.

Other economic benefits such as the improved aesthetics, increased land values, increased and improved wetland wildlife habitat, and improved upland wildlife habitat were not determined due to the difficulty in quantifying them. However, the social, ecological, and economic benefits of the project clearly exceed costs.

**2 - SUMMARY OF THE  
MILL CREEK  
WATERSHED PLAN and ENVIRONMENTAL ASSESSMENT**

**PROJECT NAME:** Mill Creek    **County:** Clarion and Jefferson Counties    **State:** PA

**SPONSORS:** Clarion County Commissioners  
Jefferson County Commissioners  
Clarion Conservation District  
Jefferson Conservation District  
Mill Creek Coalition

**DESCRIPTION OF THE RECOMMENDED PLAN:**

The recommended plan will control seepage and deep mine drainage from mine drainage discharge points at 58 locations. Successive Alkalinity Producing Systems (SAPS), anoxic limestone drains, aerobic wetlands, limestone waterways, settling ponds, addition of lime to abandoned mine land and revegetation will be used to improve water quality. Safety hazards that include stripmine highwalls and water filled pits will be removed in the process of treating mine drainage. The project will enhance stream aesthetics by removing unsightly iron staining from streams. Landscape aesthetics will be improved by the revegetation of barren and eroding abandoned strip mines. The plan will also reduce road maintenance costs, increase property values, improve recreation potentials and provide environmental education opportunities.

**RESOURCE INFORMATION:**

|                              |        |
|------------------------------|--------|
| Size of watershed (acres)    | 35,800 |
| Cropland (acres)             | 5,000  |
| Pastureland (acres)          | 3,450  |
| Woodland (acres)             | 19,900 |
| Unclaimed Mined Land (acres) | 4,050  |
| Reclaimed Mined Land (acres) | 1,800  |
| Residential & Roads (acres)  | 1,600  |

Land ownership-Private 80.3(%) State - Local 18.7(%)

Important farmland (16,400 acres)

Wetlands (1,143 acres) (USDA-SCS, Clarion and Jefferson County Soil Surveys)

**PROJECT BENEFICIARY PROFILE<sup>1</sup>**

|                   |                                     |
|-------------------|-------------------------------------|
| Population        | 9,800                               |
| Low Income        | 211 households below poverty level  |
| Unemployment      | 7.9 %                               |
| Per Capita Income | \$9,127 (National Average \$21,170) |
| Property Values   | \$57,300 (State Median \$69,100)    |

<sup>1</sup> Based on 1990 data from the Census Bureau

**Minority Populations:** Minority Population information for the watershed area is not available. In Clarion and Jefferson Counties these minority populations are present; Blacks -119, American Indians - 16, Asians - 179, Hispanic - 28, and others - 13.

**Cultural Resources:** The Bureau for Historic Preservation (State Historic Preservation Office, SHPO) has reviewed the Mill Creek Plan-EA (ER# 96-2789-042-A). One site (site 53) was recommended for a phase 1 pedestrian archaeological study.

**PROBLEM IDENTIFICATION:**

1. Mine drainage from abandoned mines and abandoned gas wells are degrading the quality and quantity of aquatic habitat in 32.8 miles of Mill Creek and it's tributaries.
2. Stripmine highwalls and water filled pits create health and safety hazards
3. Visual quality and aesthetics in Mill Creek and its tributaries are adversely affected by iron staining of the stream bottom. Barren and poorly vegetated, abandoned strip mines also adversely impact aesthetics.

**SPONSORS OBJECTIVES:** Return Mill Creek, Little Mill Creek, Jones Run, Douglass Run, and Whites Run to productive aesthetically pleasing streams that support a cold water fishery.

**ALTERNATIVE PLANS CONSIDERED:** No Action  
Recommended Plan

**PROJECT PURPOSE:** Aquatic biology restoration through water quality improvement.

**PRINCIPAL PROJECT MEASURES:** Successive Alkalinity Producing Systems (SAPS), anoxic limestone drains (ALD), aerobic wetlands, settling ponds, surface water controls, surface addition of agricultural lime, seeding and access roads.

**PROJECT COSTS<sup>1</sup>:**

| <u>PL 83-566 Funds</u> | <u>Other Funds</u> | <u>Total Costs</u> |
|------------------------|--------------------|--------------------|
| \$3,530,000 (48%)      | \$3,747,000 (52%)  | \$7,277,000 (100%) |

Total Average Annual Costs \$566,000

**PROJECT BENEFITS<sup>2</sup>: ECONOMIC**      Average Annual Benefits are \$814,000.  
Net Economic Benefit:      \$248,000

<sup>1</sup> 1997 Price Base

<sup>2</sup> 1997 Price Base, amortized over 25 years at 7.125% discount rate

**OTHER BENEFITS:** In addition to these benefits from improved trout fishery, the project will improve aesthetics, reduce public health and safety hazards, reduce road maintenance costs, and enhance general recreation. It also improves wildlife habitat for geese, wood ducks, turkey, mallard, and small game as well as enhancing property values. The project improves water quality for other users downstream.

**ENVIRONMENTAL VALUES CHANGED: (+) indicates positive change  
(-) indicates adverse change**

|                                  |  |
|----------------------------------|--|
| Water Quality-                   | (+) mine drainage contaminants (acid, iron, aluminum, manganese) will be controlled, resulting in 32.8 stream miles improved.  |
| Flood Plain-                     | No effect.   |
| Wetland (acres)-                 | (+) About 20.5 acres of existing, impaired (non-jurisdictional) wetland will be enhanced to increase removal of acid, iron, aluminum, and manganese. An additional 21 acres of wetlands will be constructed.   |
| Aquatic Habitat (miles)-         | (+) 11.8 miles of Mill Creek, 11.5 miles of Little Mill Creek, 3.5 miles of Jones Run, 4.0 miles of Douglass Run, and 2 miles of Whites Run will be restored or enhanced to support high quality cold water aquatic life, including trout.   |
| Threatened & Endangered Species- | No effect - none known in area.  |
| Wildlife Habitat -               | (+) The cover types affected by the project are cropland, grassland, wetland, woodland, and mine land. Changes in acreage of these cover types will occur. The following changes will take place: Woodland -211 acres, Mined land -35 acres, Grassland +152 acres, Wetland +21 acres, Water +71 acres. These changes will create 36 wood duck habitat units, 104 Canada goose habitat units, and 111 Wild turkey habitat units. One habitat unit equals one acre of optimum habitat. |
| Erosion and Sediment -           | (+) 300 acres of poorly vegetated abandoned mine land will be vegetated. Erosion will be reduced by 2100 tons per year and sediment will be reduced by 1260 tons per year  |
| Flood Prevention-                | No effect.   |



|  |  |
|--|--|
| <b>Important Farmland-</b>               | (-) 96 acres of important farmland will be converted to wetland, grassland and open water.   |
| <b>Recreation-</b>                       | (+) Increase of 11.8 miles of sport fishery in Mill Creek, 11.5 miles in Little Mill Creek, 3.5 miles in Jones Run, 4.0 miles in Douglass Run and 2 miles in Whites Run.<br>(+) Increase water contact activities. |
| <b>Municipal &amp; Industrial Water-</b> | No effect.   |
| <b>Civil Rights-</b>                     | (+) All people, including economically disadvantaged groups, minorities, women and persons with disabilities will be positively benefited by the project.  |
| <b>Visual Resources-</b>                 | (+) There will be an enhancement of the visual and aesthetic resources in the watershed.   |
| <b>Land Use Changes-</b>                 | (+) Woodland acreage will be reduced by 211 acres, Grassland will be increased by 152 acres, Wetland will be increased by 21 acres and mined land will be reduced by 35 acres                                      |
| <b>Information and Education-</b>        | (+) The constructed treatment wetlands will enhance educational opportunities for local residents, local school districts and Clarion University of Pennsylvania.  |
| <b>MITIGATION:</b>                       | None required.   |
| <b>MAJOR CONCLUSIONS:</b>                | A feasible project can be installed.   |
| <b>AREAS OF CONTROVERSY:</b>             | None.  |
| <b>ISSUES TO BE RESOLVED:</b>            | None   |

### **3 - INTRODUCTION**

The Watershed Plan and Environmental Assessment (Plan-EA) for Mill Creek has been combined into a single document. The document identifies the problems in the project area, describes plan formulation, discloses the expected impacts, and provides the basis for authorizing federal assistance for implementation. The purpose of the Plan-EA is aquatic biology restoration and water quality improvement through the establishment of successive alkalinity producing systems, (SAPS), anoxic limestone drains, wetlands, limestone waterways, and settling ponds. Approximately 300 acres of abandoned mine land will be treated with agricultural limestone to neutralize acid and promote permanent vegetative cover. Riparian forest buffers will be maintained to protect water quality and aquatic habitat. The project will also reduce hazards caused by stripmine highwalls and water filled pits. Other project benefits include reduced road maintenance, increased property values, enhanced aesthetics, and enhanced educational opportunities.

The sponsoring local organizations are:

**Clarion County Commissioners**

**Jefferson County Commissioners**

**Clarion Conservation District**

**Jefferson Conservation District**

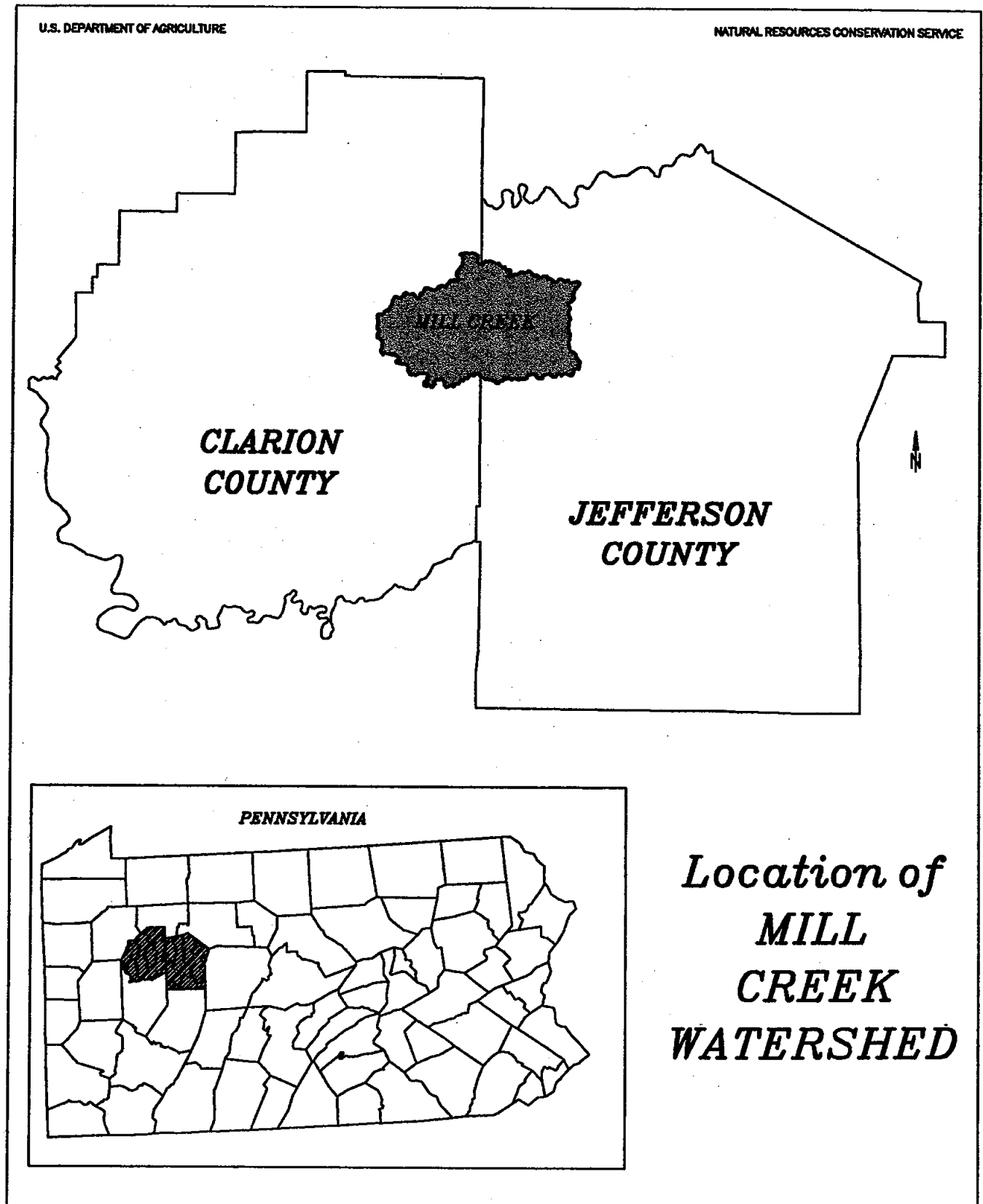
**Mill Creek Coalition**

The U. S. Department of Agriculture's Natural Resources Conservation Service (NRCS) and the Pennsylvania Department of Environmental Protection, Bureau of Abandoned Mine Reclamation provided assistance to the sponsors in the development of this plan. Many other federal, state and local agencies and organizations also assisted in plan development as described later in this report.

The information provided in this report was obtained from various agencies, organizations and published reports. Other information was derived using a variety of analytical procedures. The procedures used are summarized in the Investigations and Analysis Report included in the appendices at the end of this document.

The plan was prepared under authority of the Watershed Protection and Flood Prevention Act, Public Law 83-566, as amended (16-USC-1001-1008) and in accordance with Section 102-(2) (c) of the National Environmental Policy Act of 1969 (NEPA), Public Law 91-190, as amended (42-USC-4321 et seq.). Responsibility for compliance with NEPA rests with NRCS.

**Figure 1**



#### **4 - PROJECT SETTING**

The Mill Creek Watershed constitutes a portion of the headwaters of the Ohio River Drainage Area. Of more importance locally however, this headwater stream is nearly void of aquatic life. Previous mining endeavors as early as the late 1800's for coal and fire clay have rendered the water highly acidic, laden with toxic metals, and created substantial "dead zones" in Mill Creek and its tributaries. The watershed appears on the *State's High Priority List of Degraded Watersheds*, as published in April 6 1997, being part of watershed 17B, a tributary of the Clarion River, which is a tributary of the Allegheny River.

Several federal, state and local government agencies including the USDA, Natural Resources Conservation Service, Pennsylvania Department of Environmental Protection, Bureau of Abandoned Mine Reclamation, Bureau of Mining and Reclamation, Bureau of Oil and Gas, along with the Clarion Conservation District, the Jefferson Conservation District have come together to mutually work toward remediating the natural resource problems in the watershed.

The Mill Creek Coalition has been the local forum for bringing together these agencies with local groups interested in enhancing and preserving the local natural resources. The local groups that have provided extensive assistance in this watershed planning effort include the:

- Alliance for Wetlands and Wildlife
- Conservation District, Clarion County
- Conservation District, Jefferson County
- Federation of Sportsmen, Clarion County
- Federation of Sportsmen, Jefferson County
- Iron Furnace Chapter of Trout Unlimited
- Magic Forest of West-Central Pennsylvania
- Mill Creek Chapter National Wild Turkey Federation
- League of Women Voters of Clarion County
- Seneca Rocks Audubon Society
- Damariscotta

Federal, state and local legislators have also taken an active interest in the initiatives undertaken by the coalition.

#### **Location and Size**

Mill Creek Watershed is located in the east central portion of the Clarion River basin occupying portions of Clarion and Mill Creek Townships in Clarion County and Eldred and Union Townships in Jefferson County, Pennsylvania. The watershed lies approximately two miles east of the Borough of Clarion and two miles northwest of the Borough of Brookville.

Mill Creek flows in a westerly direction for approximately 21 miles to its confluence with the Clarion River. The creek drains an area of 56 square miles (35,800 acres). The watershed attains an average width of 6.0 miles (north – south) and an approximate length of 12 miles (east – west). The maximum relief attained is 800 feet ranging from an elevation of 1880 at Songer Hill at the northeast boundary of the watershed to elevation 1080 at the Piney Reservoir. The average gradient is 38 feet per mile.

State Route 38 follows the eastern edge of the watershed, which is bisected, southwest to northeast by State Route 949. U.S. Route 322 and Interstate 80 bound the southern edge of the watershed. Physiographically, the watershed is located in the Pittsburgh Plateau Section of the Appalachian Plateau Province. Topography ranges from steep hillsides and valleys in the west to broad hilltop plateaus in the east and moderately sloped rolling hills in between.

### **Soils**

The soil survey for Clarion County, Pennsylvania (Soil Survey Series 1955), lists three general soil associations within the watershed. These associations are: Cavode-Armagh-Gilpin, Clymer-Cookport-Dekalb and Dekalb. The soil survey for Jefferson County, Pennsylvania (Soil Survey Series 1960), maps the area Cavode-Brinkerton-Armagh, Cookport-Hartsell-Dekalb, Gilpin-Montevallo-Ernest and Gilpin-Wellston-Ernest.

The Clarion County Cavode-Armagh-Gilpin Association and the Jefferson County Cavode-Brinkerton-Armagh are both dominated by Cavode and Armagh with Gilpin and Brinkerton also common. The Cavode soils have somewhat poor natural drainage and the Armagh have poor natural drainage. Both are underlain by clay shales and both occupy upland flats and gentle slopes. The Gilpin soils are well drained upland soils that developed on mixed acid material weathered from shale and sandstone. They occur mostly on slopes. The Brinkerton soils are moderately deep to deep and are poorly drained or somewhat poorly drained. They occur in close association with Armagh soils and are found on broad flats in the uplands, gently rounded ridges and at the bottoms of slopes. The other members of this general soils area are members of the Lickdale, Wharton and Wellston series. The Lickdale soils are very poorly drained and the Wharton soils are moderately well drained with tight subsoil that overlays blocky clay shale. The Wellston soils are well drained and are underlain by sandstone or shale bedrock.

The Clarion Clymer-Cookport-Dekalb and the Jefferson County Cookport-Hartsell-Dekalb Associations consists mainly of soils of the Cookport, Dekalb, Clymer and Hartsells series. Most of the area is on ridges and slopes throughout the watershed. The soils are underlain chiefly by sandstone, and many of them are sandy or generally coarse textured. The sloping and steep areas of this association are Dekalb series, shallow to moderately deep, sandy and stoney. The main soils on the uplands are moderately deep and deep and moderately well drained or well drained Cookport and Clymer soils. The Hartsells soils are deep, well drained, occurring mainly on the tops of plateaus. Also on the uplands are smaller areas of Nolo soils, which have poor natural drainage.

The Gilpin-Montevallo-Ernest and Gilpin-Wellston-Ernest Associations are dominated by Gilpin and Ernest Soils. The shallow to moderately deep, ell drained Gilpin soils occur on the tops of rolling plateaus along with Montevallo and Wellston soils. The Montevallo soils are shallow and well drained while the Wellston soils are deep and well drained. The Ernest soils are deep and moderately well drained to somewhat poorly drained. They were formed in colluvium and are on the lower slopes and benches. The steep hillsides from the mouth of the Mill Creek well into the headwater area are mapped as the Dekalb Association in Clarion County. This general soils area is dominated by Dekalb soils which are mostly stoney or channery loams or sandy loams. The entire area is forested.

## **Geology**

The Mill Creek Watershed is underlain by 12,000 feet of sedimentary rocks dating back 540 million years to early Cambrian times. A vast inland sea occupied the region at that time. During this period of time, the present rocks were laid down as sediments. These sediments varied with changing conditions so that a succession of shale, limestone, sandstone, coal and clay beds gradually accumulated and subsided. This cycle continued for many eras and has resulted in the rocks presently exposed in the watershed.

About 200 million years ago there are a general uplift of the area with a gentle folding of the sedimentary rocks. The area has been above sea level since and has been subjected to the erosional processes of weathering and stream action.

The lower valley of Mill Creek near the mouth is steep sided and narrow while the upper reaches are broader and wider. The Shenango sandstone of the lower Pocono Group outcrops in the stream valleys of Mill Creek near its mouth as well as at the mouths of several of the western tributaries to Mill Creek. The Mauch Chunk Formation and Burgoon sandstone have been entirely removed by erosion or were never deposited in this area, creating a disconformity between the Shenango member and the overlying Pittsville rocks. Coals and clays in the watershed usually occur in beds less than five feet thick. The sandstones and shales in the watershed are quite variable with some beds reaching thickness of 50 feet or more. The broad, hilltop cap rocks of the watershed consist of shale, sandstone, coal and clay of the Allegheny Formation.

The Allegheny group includes all rock between the top of the Upper Freeport coal seam to the base of the clay beneath the Brookville coal. The Allegheny group has divided into three formation: Freeport, Kittanning and Clarion. The Upper Freeport coal, Lower Freeport coal to the base of the Freeport sandstone is not readily found in the watershed.

About 110 feet below the Upper Freeport coal, the Upper Kittanning coal occurs. This seam is thin and non-persistent, rarely reaching a foot in thickness. Below 50 feet of shales in interbedded sandstone is the Middle Kittanning coal, which is variable in thickness and persistence. There are a few places, which this seam reaches workable thickness. Approximately 70 feet below, the first regularly occurring coal of the watershed is found the Lower Kittanning. The Lower Kittanning coal, ranging from 2 - 3.5 feet, has been mined throughout the watershed, especially in the western end. This coal is underlain by a high quality fire clay, which is mined in association with the coal.

The Clarion formation extends from the base of the Kittanning Formation to the base of the Brookville underclay. This formation contains the rest of the mineable coals in the watershed. The principal mineral resources of the formation are: Vanport limestone, Upper Clarion coal, lower Clarion coal and Brookville coal. The Vanport limestone, a persistent bed in western Pennsylvania, has been rarely observed in the Mill Creek watershed. It is spotty in occurrence and covered by a thin layer of iron ore.

The absence of the Vanport limestone has major implications relative to the acid mine drainage conditions of the watershed. The groundwater aquifers usually associated with the Vanport limestone are alkaline. Where present, they tend to buffer the acid mine drainage. Since Mill Creek Watershed contains very little limestone, natural renovation of acid mine drainage is minimal.

The Upper Clarion coal is quite persistent but averages only 8 to 20 inches thick and mined only in association with the Lower Clarion coal. The interval to the Lower Clarion coal ranges from a few feet to 20 feet, usually being plastic clay, clay shale and black shale. The Lower Clarion coal ranges from 2 to 7 and is consistently 5 to 6 feet in Clarion Township, Clarion County. It has been extensively mined in the watershed. The Lower Clarion coal frequently contains a large quantity of iron pyrite and is split by lenses or pyritic shale. Both Clarion coals are sulphurous and high in ash content.

The interval between the Lower Clarion coal and the Brookville coal is approximately 50 feet of fine-grained sandstone frequently cross-bedded and often replaced by a sandy shale. The Brookville coal is generally quite poorly developed in the watershed. It has a high sulfur and ash content and contains thick partings of shale and pyrite. Relatively little mining has occurred in the Brookville coal due to the poor quality. Probability of future mining of the Brookville seam is low.

The Pottsville group is generally 150 to 200 feet thick in this area. The uppermost member is generally massive Homewood sandstone 20 to 80 feet thick. Underlying the Homewood sandstone is the extremely variable Mercer shale and coal. The lower part of the Pottsville Group is occupied by the Connoquenessing sandstone. The base of the Pottsville is not distinguishable in this area, as the underlying Mauch Chunk formation and Burgoon sandstone are absent. The Shenango sandstone of the Pocono Group outcrops in the deep valley of Mill Creek.

#### Climate

The climate is characterized as humid. It is typified by invasions of subtropical air masses in the summer and polar air masses in the winter. The temperature extremes are minus 30 degrees and 98 degrees Fahrenheit. Average annual precipitation is 44 inches per year.

## **Water Resources**

Mill Creek is the principal drainage way in the watershed. At its outlet, Mill Creek enters the Clarion River, which is a major tributary of the Allegheny River, which in turn is the major contributor to flow where the Ohio River starts in Pittsburgh. The watershed is located within the Water Resources Council / USDA-Natural Resources Conservation Service Hydrologic Unit Number 0501000-070-240. Mill Creek outlets 11.1 miles up river from the Penelec GPU hydroelectric dam on the Clarion River. The dam forms a reservoir that is 16.4 miles long. The reservoir is used for power generation, recreation and Clarion Borough water supply. During power generation, the reservoir can fluctuate 15 feet.

The Pennsylvania Code, Title 25. Environmental Protection, DEP, Chapter 93. Water Quality Standards, list 15 stream segments for Mill Creek including main stem. In addition to the statewide protected uses (i.e., warm water fishes, water supply, recreation aesthetics), cold Water Fishes is the given protected use for three of these stream segments. The majority of the segments, 10, including the entire main stem are High Quality Waters; Cold Water Fishery protected uses. There is one Exceptional Value Waters segment, Pendleton Run. The Clarion River from its mouth to confluence of Mill Creek has a Cold Water Fishery protected use.

The Commonwealth of Pennsylvania, 1994 Water Quality Assessment, 305(b) Report, shows 162.9 miles of the Clarion River degraded and not supporting designated uses. The Non Point Source (NPS) problem is identified as acid mine drainage from resource extraction, (coal). Mill Creek and its tributaries do not support their designated use.

The 305(b) Report also recognizes "Abandoned mine drainage as the single biggest source of surface water degradation (partial and nonsupport of designated uses) in Pennsylvania." High priority is given to correcting AMD NPS problems.

The streams most severely impacted by mine drainage in the Mill Creek basin are Mill Creek from approximately Route 949 downstream to the Clarion River (11.8 miles), all of Little Mill Creek (11.5 miles), all of Jones Run (3.5 miles), all of Douglass Run (4.5 miles) and all of Whites Run (2 miles). Approximately 5.7 miles of the 11.8 miles of Mill Creek that is degraded is now supporting a limited trout fishery due to AMD remediation work already completed by the Mill Creek Coalition.

## **Socioeconomics**

This area is economically, socially and environmentally disadvantaged due in large part to past mining activity and the declining coal mining industry. The major industry now in the area is farming, logging and lumbering, tourism and recreation, prefabricated housing, glass manufacturing and education (Clarion State University).

Clarion and Jefferson counties have 88,958 persons who would benefit from the project. Approximately 9,878 persons live in the watershed of which 52 are on farms and 9,826 are rural non-farm.



Both counties together have 854 farms with 39 of them in the watershed. Of the 39 farms, 11 have farming as the only source of income and 28 have income from off farm employment.

There are 211 households in the watershed that have income below the poverty level. Unemployment is 7.9% which is 25% more than the national average of 6.3%. Per capita income is \$9,127 which is 43% of the national average of \$21,170 and median home value is \$57,300 which is 83% of state median home value of \$69,100.

### **Minority Populations**

Clarion County has 119 Blacks, 16 American Indians, 179 Asians, 28 persons of Hispanic background, and 13 classified as others. This includes 2439 persons that live in college dormitories. Jefferson County has 33 Blacks, 71 American Indians, 20 Asians, 68 persons of Hispanic background, and 33 classified as others. Of the total population in both counties 5% are under five and 11% are over 65 years of age.

## **5 - PROBLEMS AND OPPORTUNITIES**

Three problems have been identified in the Mill Creek project area:

1. Mine drainage from abandoned coal mines and gas wells is degrading the quality and quantity of aquatic habitat in 32.8 miles of Mill Creek and its tributaries.
2. Stripmine highwalls and water filled pits are health and safety hazards.
3. Visual quality and aesthetics on Mill Creek and its tributaries are adversely affected by iron staining of the stream bottom and the land surface.

### **IMPAIRED WATER QUALITY**

#### **MILL CREEK**

All mine water discharges along Mill Creek outlet through abandoned mine openings, stripmines or where the hydraulic pressure forces the acid drainage to the surface creating large unvegetated seep areas. These unvegetated areas are very unsightly and are in sharp contrast with surrounding visual resources.

Water quality and quantity samples have been obtained for 75 discharge points at 58 proposed treatment areas. These data were obtained from various sources. The majority of the information was obtained from these sources: Clarion University of Pennsylvania, Department of Environmental Protection, Bureau of Mining and Reclamation, Bureau of Abandoned Mine Reclamation, U.S. Army, Corp of Engineers and Damariscotta, ecological and environmental consultants. Damariscotta was retained by NRCS to summarize existing water quality and quantity data. The water quality and quantity is summarized by sub-watershed in Table A. The site names are the local "given names" that are recognized by the local sponsors.

The following chemical parameters were tested: pH, acidity, alkalinity, sulfate, total iron, ferrous iron, manganese, and aluminum. Levels of acidity, aluminum, iron and flow are shown on Figures 2, 3, 4 and 5.

These quantities of acidity, iron, and aluminum substantially exceeded habitat thresholds as evidenced by the lack of aquatic life in significant reaches of Mill Creek. (See Project Map, Appendix D).

The project map (Appendix D) shows the location of five macroinvertebrate and fish biomonitoring (bm) stations. Table B shows the fish sampling data, and Figures 6 and 7 summarize the macroinvertebrate data. Station 1 on Mill Creek is located above the AMD affected areas. Station 2 and particularly 3 on Mill Creek have been moderately affected by AMD; station 3 is located below the confluence of Mill Creek with severely AMD affected Little Mill Creek and Douglass/Jones Run. On Little Mill Creek, Station 4 is located in the moderately unaffected headwaters of Little Mill Creek, whereas, Station 5 is located in an AMD portion of the stream.

The total number of taxa and the total number of individuals of invertebrates have been documented for the five sampling stations on the watershed for the period 1991-1994. U.S. Environmental Protection Agency (EPA) methods for rapid bioassessment were used to collect the invertebrate samples. The total number of taxa for affected AMD stations and unaffected stations are shown in figure 6. Identified primarily to genera, unaffected stations on Mill Creek (Station 1) and Little Mill Creek (Station 4) have 3-4 times more genera than AMD affected stations. Similarly, shown in Figure 7, the total number of aquatic invertebrates is about 3-4 times more in the unaffected stations.

As documented, the invertebrate community at the AMD unaffected stations is relatively rich in diversity and abundance. The fauna is dominated by acid intolerant groups, such as mayflies, stoneflies and caddisflies (order Ephemoptera, Pleicoptera, and Tricoptera respectively). These three groups are often referred to as the EPT group and are typical of clean waters with high levels of dissolved oxygen.

Biomonitoring stations 2, 3, and 5 are depauperate both in diversity and abundance of fauna. The mayflies stoneflies and caddisflies which are so abundant at stations 1 and 4 are completely absent at these AMD impacted areas. Instead, the fauna at these points are dominated by a very few acid tolerant taxa, primarily the fly orders (Diptera) with chironomids (midges) being the most abundant.

The fish information (Table B) for the headwaters site (Station 1) on Mill Creek shows a somewhat depauperate but viable community consisting of five species: native brook trout, mottled sculpin, white suckers, blacknose dace and creek chubs. These species are also found at Station 2, a station downstream from a coal company's active treatment system of a moderately severe but well treated AMD source. In contrast, Station 3 and the remaining 6 miles of Mill Creek lack fish altogether due to severe AMD contribution of Little Mill Creek and Jones/Douglass Run. On Little Mill Creek, only a severe depauperate fish community consisting of viable populations of mottled sculpins, creek chubs and blacknose dace exist in the headwaters. Several hundred yards beyond Station 4, no fish are found in the remainder of Little Mill Creek. By comparison, comparable streams in Clarion County not affected by AMD contain up to about a dozen species in generally higher population densities.

**TABLE A**  
**SITE LOCATION DATA**  
(see Project Map, Appendix D for locations<sup>1</sup>)  
**MILL CREEK WATERSHED, CLARION AND JEFFERSON COUNTIES, PENNSYLVANIA**

| MAP<br>NUMBER | STREAM<br>NAME | TOPO<br>QUAD  | SITE<br>NAME        | LATITUDE | LONGITUDE | DISCHARGE        |                   |    |                          | ACIDITY<br>Mg/L | IRON<br>Mg/L | ALUMINUM |      |
|---------------|----------------|---------------|---------------------|----------|-----------|------------------|-------------------|----|--------------------------|-----------------|--------------|----------|------|
|               |                |               |                     |          |           | FLOW RATE<br>GPM | TEMPERATURE<br>°C | PH | CONDUCTIVITY<br>µmhos/cm |                 |              | Mg/L     | Mg/L |
| 44            | DOUGLASS       | STRATTANVILLE | ASHCROFT ROAD       | 41-12-16 | 79-15-4   | 10               |                   |    | 0                        | 0               | 1            | 2        | 2    |
| 45            | DOUGLASS       | STRATTANVILLE | ASHCROFT DOWNSTREAM | 41-12-22 | 79-15-14  | 5                |                   |    | 700                      | 700             | 1            | 2        | 2    |
| 46            | DOUGLASS       | STRATTANVILLE | ASHCROFT UPSTREAM   | 41-12-15 | 79-15-5   | 15               |                   |    | 80                       | 80              | 1            | 4        | 4    |
| 47            | DOUGLASS       | CORSICA       | POWERLINE           | 41-12-17 | 79-14-56  | 15               |                   |    | 125                      | 125             | 22           | 8        | 8    |
| 48            | DOUGLASS       | STRATTANVILLE | 322 DITCH PIPE      | 41-11-9  | 79-15-35  | 15               |                   |    | 125                      | 125             | 22           | 8        | 8    |
| 49            | DOUGLASS       | STRATTANVILLE | 322 ROAD PIPE       | 41-11-06 | 79-15-21  | 10               |                   |    | 110                      | 110             | 15           | 5        | 5    |
| 50            | DOUGLASS       | STRATTANVILLE | ECM-051             | 41-10-52 | 79-15-44  | 100              |                   |    | 360                      | 360             | 10           | 38       | 38   |
| 51            | DOUGLASS       | STRATTANVILLE | ECM-053             | 41-11-03 | 79-15-47  | 40               |                   |    | 270                      | 270             | 3            | 22       | 22   |
| 52            | DOUGLASS       | STRATTANVILLE | ECM-054             | 41-11-07 | 79-15-37  | 20               |                   |    | 170                      | 170             | 1            | 8        | 8    |
| 56            | DOUGLASS       | STRATTANVILLE | DOUGLASS-PGC        | 41-12-38 | 79-5-33   | 250              |                   |    | 3.4                      | 3.4             | 2.1          | 5.3      | 5.3  |
| 25            | JONES          | STRATTANVILLE | PGC-JONES           | 41-12-14 | 79-16-8   | 10               |                   |    | 94                       | 94              | 60           | 0        | 0    |
| 25A           | JONES          | STRATTANVILLE | PGC-JONES           | 41-12-14 | 79-16-5   | 5                |                   |    | 68                       | 68              | 1            | 12       | 12   |
| 26            | JONES          | STRATTANVILLE | PGC-DILLEY WEST     | 41-12-19 | 79-16-11  | 50               |                   |    | 350                      | 350             | 75           | 10       | 10   |
| 26A           | JONES          | STRATTANVILLE | PGC-DILLEY EAST     | 41-12-19 | 79-16-10  | 50               |                   |    | 325                      | 325             | 75           | 12       | 12   |
| 26A L         | JONES          | STRATTANVILLE | JONES GORGE #1      | 41-12-28 | 79-16-10  | 10               |                   |    | 380                      | 380             | 70           | 16       | 16   |
| 26C L         | JONES          | STRATTANVILLE | JONES GORGE #3      | 41-12-32 | 79-16-4   | 5                |                   |    | 340                      | 340             | 65           | 12       | 12   |
| 26D L         | JONES          | STRATTANVILLE | JONES GORGE #4      | 41-12-36 | 79-15-50  | 50               |                   |    | 410                      | 410             | 150          | 2        | 2    |
| 26G L         | JONES          | STRATTANVILLE | JONES GORGE #7      | 41-12-45 | 79-15-34  | 20               |                   |    | 320                      | 320             | 70           | 10       | 10   |
| 26H L         | JONES          | STRATTANVILLE | JONES GORGE #6      | 41-12-47 | 79-15-33  | 50               |                   |    | 340                      | 340             | 60           | 12       | 12   |
| R 26B         | JONES          | STRATTANVILLE | JONES GORGE #2      | 41-12-30 | 79-16-5   | 5                |                   |    | 310                      | 310             | 60           | 10       | 10   |
| R 26E         | JONES          | STRATTANVILLE | JONES GORGE #5      | 41-12-38 | 79-15-40  | 10               |                   |    | 470                      | 470             | 190          | 2        | 2    |

<sup>1</sup> At sites where map number contains a letter designation, the letter signifies another discharge point at that site.

SITE LOCATION DATA  
(see Project Map, Appendix D for locations<sup>1</sup>)  
MILL CREEK WATERSHED, CLARION AND JEFFERSON COUNTIES, PENNSYLVANIA

| MAP<br>NUMBER | STREAM<br>NAME | TOPO<br>QUAD  | SITE<br>NAME         | LATITUDE | LONGITUDE | DISCHARGE |         |      |          |
|---------------|----------------|---------------|----------------------|----------|-----------|-----------|---------|------|----------|
|               |                |               |                      |          |           | FLOW RATE | ACIDITY | IRON | ALUMINUM |
|               |                |               |                      |          |           | Gpm       | Mg/L    | Mg/L | Mg/L     |
| R 26F         | JONES          | STRATTANVILLE | JONES GORGE #6       | 41-12-41 | 79-15-33  | 35        | 210     | 35   | 7        |
| R 26I         | JONES          | STRATTANVILLE | JONES GORGE #9       | 41-12-49 | 79-15-33  | 10        | 120     | 45   | 2        |
| 27            | JONES          | STRATTANVILLE | BENNETT              | 41-11-50 | 79-16-35  | 50        | 182     | 1    | 26       |
| 28            | JONES          | STRATTANVILLE | SEIGSWORTH           | 41-11-49 | 79-16-49  | 100       | 52      | 1    | 7        |
| 29            | JONES          | STRATTANVILLE | MCCANNICH #1         | 41-12-14 | 79-16-28  | 20        | 15      | 0    | 2        |
| 30            | JONES          | STRATTANVILLE | D.S. TWP FILL        | 41-12-16 | 79-16-28  | 3         | 30      | 2    | 4        |
| 31            | JONES          | STRATTANVILLE | U.S. TWP FILL        | 41-12-19 | 79-16-37  | 30        | 90      | 35   | 3        |
| 32            | JONES          | STRATTANVILLE | CULVERT - HAEERLE    | 41-12-26 | 79-16-43  | 50        | 816     | 135  | 54       |
| 33            | JONES          | STRATTANVILLE | BELL-MAPLE GROVE RD  | 41-12-16 | 79-17-5   | 40        | 120     | 3    | 16       |
| 34            | JONES          | STRATTANVILLE | BELL-MAPLE GROVE (W) | 41-12-12 | 79-17-34  | 50        | 176     | 3    | 22       |
| 35            | JONES          | STRATTANVILLE | BELL-DOLBY FLATS     | 41-12-12 | 79-17-34  | 15        | 140     | 1    | 18       |
| 36            | JONES          | STRATTANVILLE | DILLEY-GREENHOUSE    | 41-12-27 | 79-16-26  | 10        | 420     | 26   | 35       |
| LAND LIMING   | JONES          | STRATTANVILLE | LAND LIMING          |          |           |           |         |      |          |
| 1             | LITTLE MILL    | CORSICA       | SHOFESTAL            | 41-11-21 | 79-13-31  | 50        | 350     | 45   | 40       |
| 2             | LITTLE MILL    | CORSICA       | MARKLE               | 41-12-02 | 79-13-23  | 50        | 360     | 175  | 1        |
| 3             | LITTLE MILL    | CORSICA       | SMITH                | 41-12-09 | 79-13-42  | 40        | 120     | 20   | 3        |
| 4             | LITTLE MILL    | CORSICA       | ORCUTT-SMAIL (R)     | 41-12-54 | 79-11-16  | 60        | 900     | 500  | 5        |
| 4A            | LITTLE MILL    | CORSICA       | ORCUTT-SMAIL (L)     | 41-12-58 | 79-11-14  | 40        | 500     | 200  | 1        |
| 6             | LITTLE MILL    | CORSICA       | BEAGLE               | 41-12-19 | 79-9-44   | 15        | 280     | 110  | 10       |
| 7             | LITTLE MILL    | CORSICA       | MORROW               | 41-12-06 | 79-09-28  | 20        | 40      | 5    | 1        |
| 8             | LITTLE MILL    | CORSICA       | DOUG                 | 41-12-06 | 79-09-30  | 80        | 200     | 25   | 5        |

<sup>1</sup> At sites where map number contains a letter designation, the letter signifies a discharge point at that site.

**SITE LOCATION DATA**  
(see Project Map, Appendix D for locations<sup>1</sup>)  
**MILL CREEK WATERSHED, CLARION AND JEFFERSON COUNTIES, PENNSYLVANIA**

| MAP<br>NUMBER | STREAM<br>NAME | TOPO<br>QUAD | SITE<br>NAME          | LATITUDE | LONGITUDE | DISCHARGE        |                  |                  |                  | ACIDITY<br>Mg/L | IRON<br>Mg/L | ALUMINUM<br>Mg/L |
|---------------|----------------|--------------|-----------------------|----------|-----------|------------------|------------------|------------------|------------------|-----------------|--------------|------------------|
|               |                |              |                       |          |           | FLOW RATE<br>GPM | FLOW RATE<br>GPM | FLOW RATE<br>GPM | FLOW RATE<br>GPM |                 |              |                  |
| 9             | LITTLE MILL    | CORSICA      | PETE'S WELL           | 41-12-14 | 79-10-10  | 15               |                  |                  |                  | 40              | 3            | 2                |
| 10            | LITTLE MILL    | CORSICA      | FILSON #4             | 41-12-21 | 79-9-59   | 10               |                  |                  |                  | 300             | 15           | 20               |
| 11            | LITTLE MILL    | CORSICA      | PETE'S HOUSE          | 41-12-14 | 79-10-28  | 5                |                  |                  |                  | 0               | 130          | 1                |
| 12            | LITTLE MILL    | CORSICA      | FILSON #7             | 41-12-17 | 79-10-21  | 80               |                  |                  |                  | 270             | 141          | 0                |
| 13            | LITTLE MILL    | CORSICA      | SIMPSON #1            | 41-11-18 | 79-11-5   | 25               |                  |                  |                  | 116             | 53           | 1                |
| 14            | LITTLE MILL    | CORSICA      | ROSEVILLE DRIFT       | 41-11-18 | 79-8-53   | 15               |                  |                  |                  | 146             | 1            | 8                |
| 15            | LITTLE MILL    | CORSICA      | DAIVA                 | 41-11-18 | 79-10-36  | 15               |                  |                  |                  | 120             | 32           | 1                |
| 16            | LITTLE MILL    | CORSICA      | BEIDEL-DITTY          | 41-12-1  | 79-11-34  | 40               |                  |                  |                  | 36              | 4            | 1                |
| 17            | LITTLE MILL    | CORSICA      | BEIDEL-GLENN(GASLINE) | 41-11-58 | 79-12-30  | 50               |                  |                  |                  | 60              | 1            | 3                |
| 18            | LITTLE MILL    | CORSICA      | STUB SIMPSON          | 41-11-7  | 79-12-16  | 5                |                  |                  |                  | 110             | 1            | 4                |
| 19            | LITTLE MILL    | CORSICA      | GLENN-INTERCHANGE #1  | 41-11-16 | 79-11-58  | 40               |                  |                  |                  | 30              | 9            | 1                |
| 19A           | LITTLE MILL    | CORSICA      | GLENN-INTERCHANGE #2  | 41-11-16 | 79-12-02  | 20               |                  |                  |                  | 25              | 8            | 1                |
| 19B           | LITTLE MILL    | CORSICA      | GLENN-INTERCHANGE #3  | 41-11-24 | 79-12-22  | 40               |                  |                  |                  | 225             | 5            | 1                |
| 53            | LITTLE MILL    | CORSICA      | BROWN-ZERBE           | 41-11-52 | 79-13-54  | 53               |                  |                  |                  | 62              | 1            | 4                |
| 54            | LITTLE MILL    | CORSICA      | STAHLMAN              | 41-11-54 | 79-13-04  | 107              |                  |                  |                  | 62              | 9            | 4                |
| 54A           | LITTLE MILL    | CORSICA      | STAHLMAN              | 41-11-53 | 79-13-03  | 42               |                  |                  |                  | 58              | 1            | 6                |
| 55            | LITTLE MILL    | CORSICA      | STAHLMAN #2           | 41-12-09 | 79-12-42  | 30               |                  |                  |                  | 118             | 1            | 3                |
| 58            | LITTLE MILL    | CORSICA      | JEH                   | 40-11-13 | 79-11-39  | 16               |                  |                  |                  | 0               | 6            | 0                |
| 5             | MILL           | CORSICA      | HOWE BRIDGE           | 41-13-42 | 79-11-00  | 35               |                  |                  |                  | 500             | 275          | 1                |
| 20            | MILL           | CORSICA      | LOVE-BLAIR RD.        | 41-13-32 | 79-10-7   | 15               |                  |                  |                  | 0               | 2            | 0                |
| 21            | MILL           | CORSICA      | C&K SCHNEPP RD. #1    | 41-13-6  | 79-9-28   | 50               |                  |                  |                  | 200             | 50           | 3                |

<sup>1</sup> At sites where map number contains a letter designation, the letter signifies a discharge point at that site.

# SITE LOCATION DATA

(see Project Map, Appendix D for locations<sup>1</sup>)

## MILL CREEK WATERSHED, CLARION AND JEFFERSON COUNTIES, PENNSYLVANIA

| MAP<br>NUMBER | STREAM<br>NAME | TOPO<br>QUAD  | SITE<br>NAME        | LATITUDE | LONGITUDE | DISCHARGE        |                 |              |                  |
|---------------|----------------|---------------|---------------------|----------|-----------|------------------|-----------------|--------------|------------------|
|               |                |               |                     |          |           | FLOW RATE<br>GPM | ACIDITY<br>Mg/L | IRON<br>Mg/L | ALUMINUM<br>Mg/L |
| 22            | MILL           | CORSICA       | C&K SCHNEPP RD. #2  | 41-12-49 | 79-8-58   | 30               | 44              | 6            | 1                |
| 23            | MILL           | CORSICA       | C&K KUNSELMAN       | 41-14-51 | 79-8-32   | 100              | 90              | 7            | 4                |
| 40            | MILL           | STRATTANVILLE | PGC-TURKEY HOLLOW   | 41-13-50 | 79-18-7   | 25               | 4               | 8            | 1                |
| 41            | MILL           | STRATTANVILLE | PGC-WAYNES BEACH    | 41-14-10 | 79-18-32  | 5                | 6               | 12           | 1                |
| 42            | MILL           | STRATTANVILLE | DON ELDER           | 41-14-41 | 79-16-36  | 10               | 0               | 4            | 1                |
| 43            | MILL           | STRATTANVILLE | VOSBURG             | 41-12-59 | 79-16-58  | 30               | 900             | 300          | 30               |
| 57            | MILL           | CORSICA       | W&M LOVE            | 40-13-18 | 79-09-07  | 6                | 0               | 13           | 0                |
| 57A           | MILL           | CORSICA       | W&M LOVE            | 40-13-17 | 79-09-07  | 9                | 0               | 13           | 0                |
| 24            | WHITES         | STRATTANVILLE | GLACIAL             | 41-13-7  | 79-18-51  | 150              | 1050            | 450          | 8                |
| 37            | WHITES         | STRATTANVILLE | PGC#1-WHITES        | 41-13-0  | 79-18-44  | 15               | 180             | 1            | 30               |
| 38            | WHITES         | STRATTANVILLE | PGC#2-WHITES        | 41-13-11 | 79-18-37  | 20               | 30              | 1            | 3                |
| 39            | WHITES         | STRATTANVILLE | POKEY'S 100 YD WALK | 41-13-30 | 79-18-46  | 30               | 0               | 11           | 1                |

<sup>1</sup> At sites where map number contains a letter designation, the letter signifies a discharge point at that site.

**TABLE B - FISH ASSEMBLAGE DATA**  
**Mill Creek 1991-1994**  
 (Number caught per 100 m stream reach)

1991

| Sample Station | Creek Chub | Blacknose Dace | Mottled Sculpin | White Sucker | Johnny Darter | Brook Trout | Other Species | Total |
|----------------|------------|----------------|-----------------|--------------|---------------|-------------|---------------|-------|
| BM#1           | 2          | 2              | 2               | 2            | 0             | 2           | 0             | 10    |
| BM#2           | 5          | 2              | 2               | 2            | 2             | 2           | 0             | 15    |
| BM#3           | 2          | 7              | 0               | 2            | 2             | 0           | 0             | 13    |
| BM#4a          | 8          | 2              | 0               | 2            | 2             | 0           | 0             | 14    |
| BM#4b          | 8          | 0              | 0               | 3            | 0             | 0           | 2             | 13    |

1992

| Sample Station | Creek Chub | Blacknose Dace | Mottled Sculpin | White Sucker | Johnny Darter | Brook Trout | Other Species | Total |
|----------------|------------|----------------|-----------------|--------------|---------------|-------------|---------------|-------|
| BM#1           | 2          | 20             | 1               | 2            | 0             | 7           | 0             | 32    |
| BM#2           | 14         | 27             | 0               | 1            | 0             | 32          | 1             | 75    |
| BM#3           | 2          | 8              | 1               | 0            | 2             | 2           | 0             | 15    |
| BM#4a          | 3          | 9              | 0               | 1            | 1             | 0           | 0             | 14    |
| BM#4b          | 1          | 5              | 0               | 1            | 1             | 1           | 0             | 9     |
| BM#5           | 56         | 32             | 0               | 3            | 0             | 3           | 0             | 94    |

1993

| Sample Station | Creek Chub | Blacknose Dace | Mottled Sculpin | White Sucker | Johnny Darter | Brook Trout | Other Species | Total |
|----------------|------------|----------------|-----------------|--------------|---------------|-------------|---------------|-------|
| BM#1           | 22         | 47             | 14              | 2            | 0             | 24          | 0             | 109   |
| BM#2           | 45         | 81             | 7               | 8            | 0             | 42          | 0             | 183   |
| BM#3           | 1          | 23             | 0               | 0            | 1             | 1           | 0             | 26    |
| BM#4a          | 3          | 8              | 1               | 0            | 0             | 1           | 0             | 13    |
| BM#4b          | 9          | 41             | 7               | 2            | 2             | 8           | 0             | 69    |
| BM#5           | 72         | 189            | 2               | 13           | 0             | 1           | 0             | 277   |

1994

| Sample Station | Creek Chub | Blacknose Dace | Mottled Sculpin | White Sucker | Johnny Darter | Brook Trout | Other Species | Total |
|----------------|------------|----------------|-----------------|--------------|---------------|-------------|---------------|-------|
| BM#1           | 15         | 18             | 22              | 6            | 0             | 6           | 0             | 67    |
| BM#2           | 47         | 76             | 28              | 18           | 0             | 29          | 0             | 198   |
| BM#3           | 2          | 92             | 0               | 2            | 12            | 5           | 1             | 124   |
| BM#4a          | 11         | 16             | 0               | 2            | 4             | 1           | 0             | 34    |
| BM#4b          | 23         | 24             | 5               | 1            | 2             | 1           | 0             | 56    |
| BM#5           | 19         | 38             | 7               | 0            | 0             | 4           | 0             | 68    |



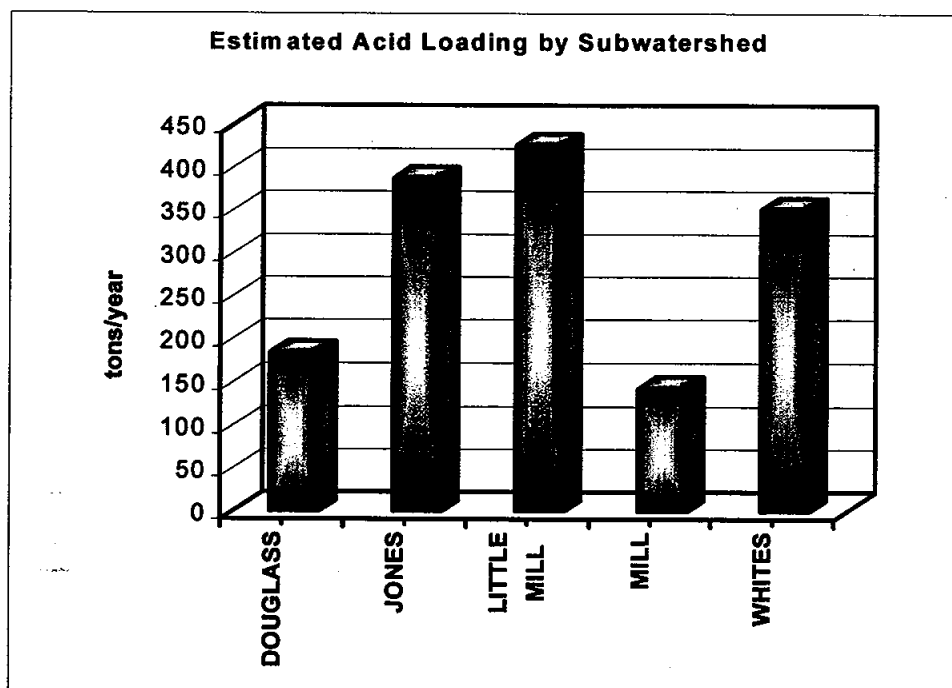


FIGURE 2

FIGURE 3

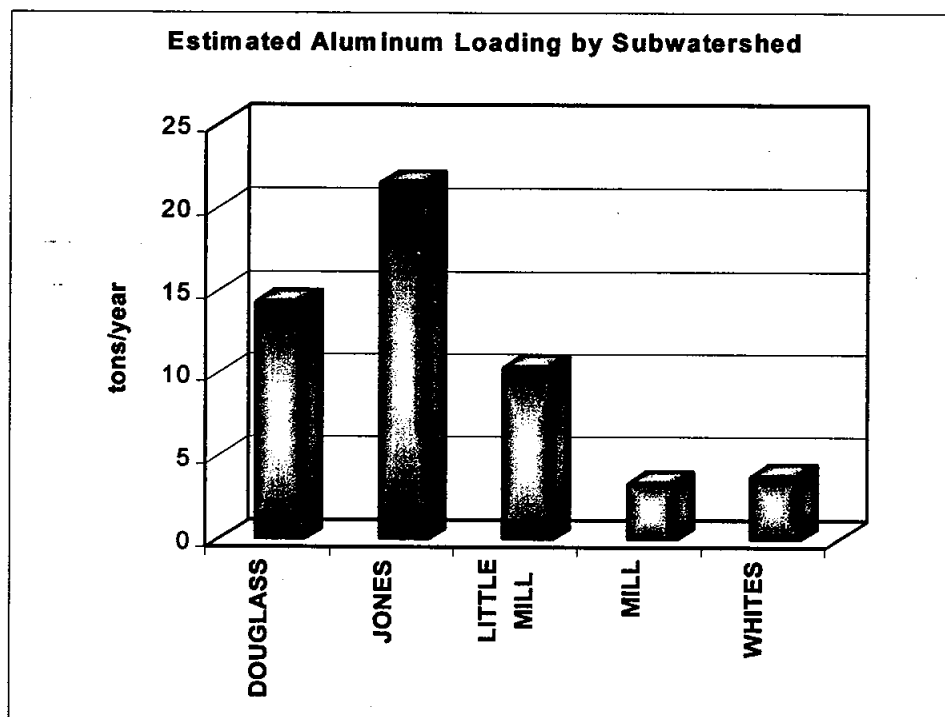


FIGURE 4

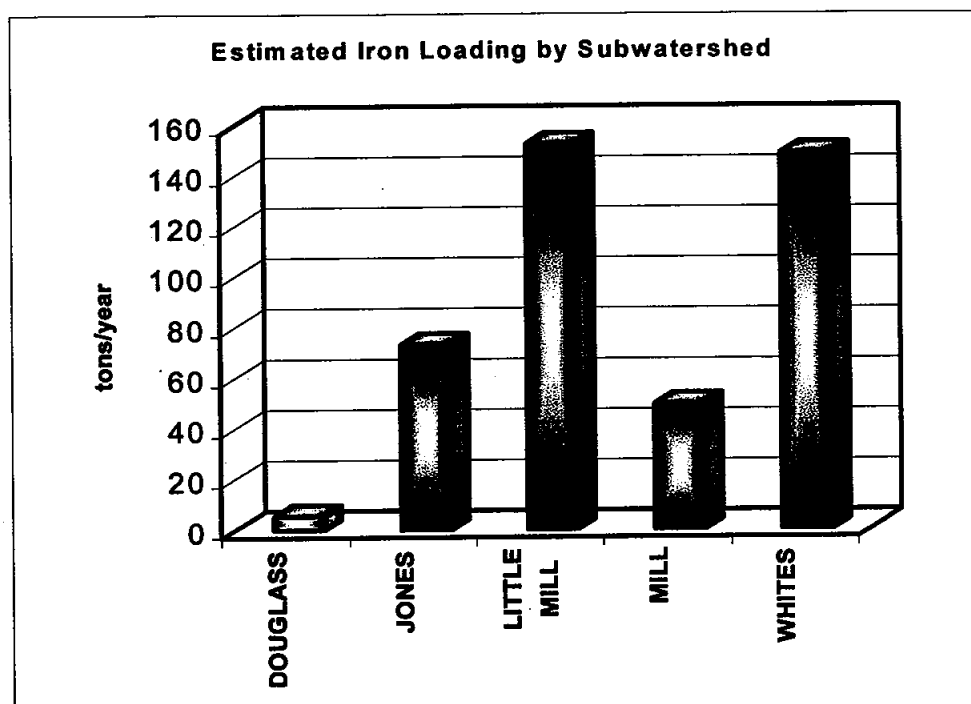
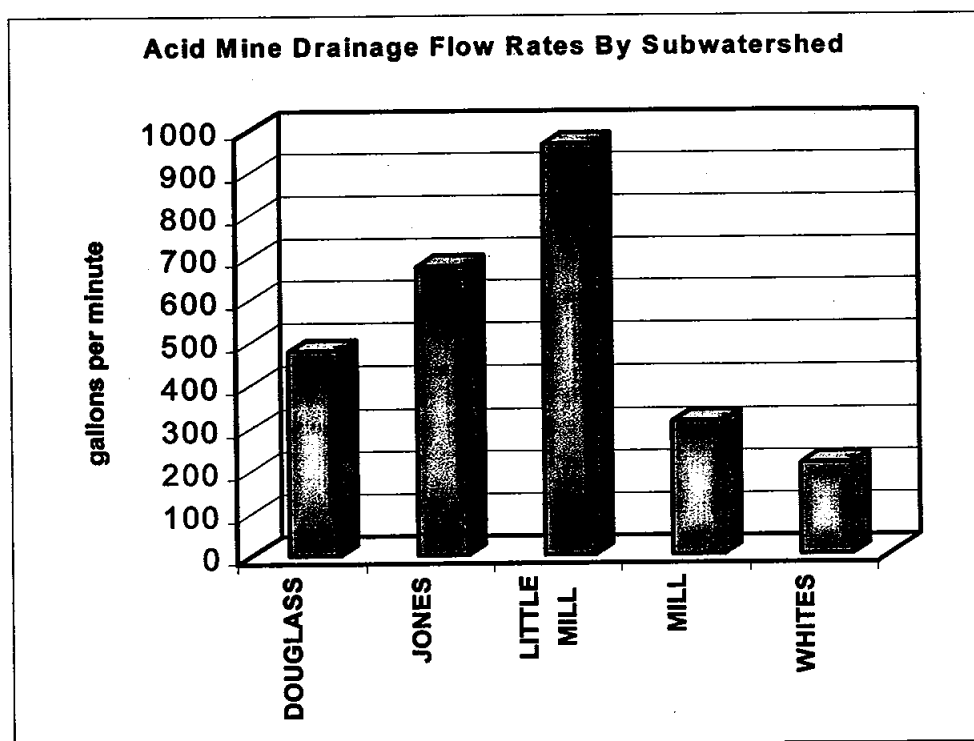
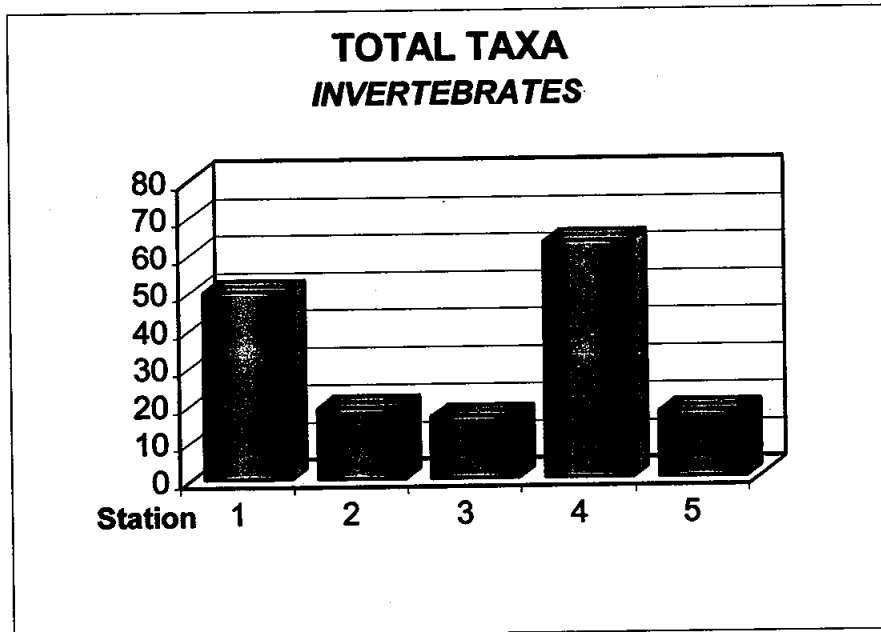


FIGURE 5

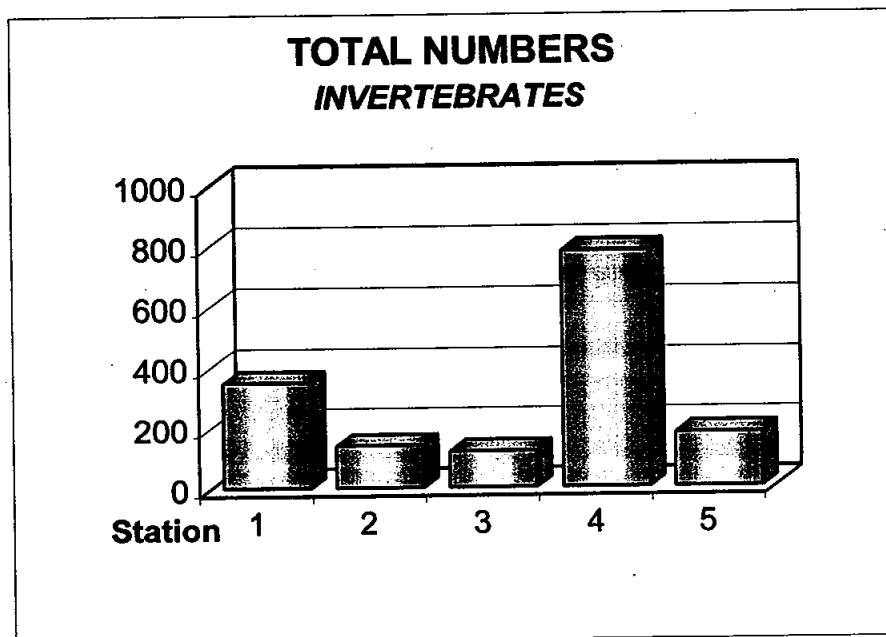


Positive impacts would occur to aquatic habitat in Mill Creek and its tributaries, with a reduction in metals and acidity concentrations and an increase in pH. Habitat improvement would occur as a result of reduced metals precipitate accumulation and less cementing of the stream bottom. Improvement in water quality and habitat would enlarge and enhance the macro-invertebrate community, allowing for the restoration of a fishery.

**Figure 6**



**Figure 7**



As part of a comprehensive watershed plan, other water quality problems have been identified. There is sediment generated from abandoned mine land. The reduction in aquatic habitat, due to sediment caused by abandoned mine land, is difficult to determine due to the overwhelming impacts of the discharges. The benthic studies completed on Mill Creek did not directly attribute reduced macro-invertebrate populations to sedimentation of the stream.

Another minor water quality concern addressed by the Coalition was the impact of acid precipitation. Discussions with faculty at Clarion University, concluded that acid precipitation does occur in the watershed but the impacts could be offset by passive treatment systems that generate excess alkalinity. The excess alkalinity would be available to neutralize acid from atmospheric deposition.

### **HEALTH AND SAFETY HAZARDS**

Stripmine highwalls and/or water filled stripmine pits are present at four sites. The obvious safety hazards associated with these features, falling and drowning, are concerns to local residents. The treatment of the AMD problems at these sites will involve the removal of these hazards to accomplish the needed water treatment.

### **VISUAL RESOURCE PROBLEMS**

A dramatic, visually displeasing event occurs at each of the mine water discharge points when the iron and acid laden waters flow across the earth surface. The discharges kill all vegetation, and turns the streams orange with iron precipitate. The heavy iron deposits coat the stream bottom and smother most aquatic life in Mill Creek.

The 300 acres of nearly barren, eroding strip mine spoil present visual images that are inconsistent with the upland hardwood forest surrounding them.

### **PROBLEM SITES**

There are seventy-five (75) mine water discharge points flowing into Mill Creek that are severely degrading the streams water quality. Fifty-eight (58) treatment sites have been identified to treat these discharges. The discharges are the result of seepage and direct flows from abandoned deep mines and stripmines. Some of these discharges flow from abandoned gas wells that have been hydraulically impacted by mining operations.

The 58 treatment sites are shown on the Project Map, Appendix D. The impacts of treating these discharges are addressed by sub watershed in the remainder of this document. The impacted watersheds are Mill Creek, Little Mill Creek, Douglass Run, Jones Run and Whites Run.

**Mill Creek** – Mill Creek from its headwaters down to PA Route 949 is minimally affected by mine drainage. From Route 949 downstream 5.7 miles the stream is degraded to the point that trout do not reproduce and stocked trout are somewhat stunted due to a

reduced benthic population. The stream from its confluence with Little Mill Creek down to its mouth on the Clarion River does not support any cold water fishery. A total of 11.8 miles of Mill Creek are adversely affected by mine drainage. The sections of stream that have impaired benthic populations also have degraded aesthetics due to iron staining of the stream bottom. No health and safety hazards associated with strip mine highwalls or water filled pits is present in the main Mill Creek drainage, but there are health and safety hazards in sub-watershed areas.

Eleven mine drainage discharges and ten treatment sites have been identified on Mill Creek. The combined flow of mine drainage from these sites is 315 gallons per minute. The pollutant loading from these discharges is 144 tons of acidity per year, 49 tons of iron per year, and aluminum 3.4 tons per year.

**Little Mill Creek** – Little Mill Creek does not support a cold water fishery. 11.5 miles of Little Mill Creek and its tributaries are degraded by mine drainage. Extensive mine water treatment projects has been completed on Little Mill Creek through local efforts coordinated by the Mill Creek Coalition. Significant improvements in water quality have been achieved in the upper reaches of the watershed. Additional water treatment needs to be completed to establish a cold water fishery. At site 54 there is a strip mine highwall and water filled pit that are safety hazards. The iron staining on the 11.5 miles of degraded stream has a negative impact on stream aesthetics.

Twenty-seven mine drainage discharges that can be treated at twenty-two sites have been identified on Little Mill Creek. The combined flow of mine drainage from these discharges is 966 gallons per minute. The pollutant loading from these discharges is 427 tons of acid per year, 153 tons of iron per year, and 10.4 tons of aluminum per year.

**Douglass Run** – Douglass Run enters Mill Creek from the south about 3000 feet downstream of the Mill Creek-Little Mill Creek Confluence. This tributary does not support a cold water fishery. There are no health and safety hazards located at any proposed sites on Douglass Run. The stream aesthetics are adversely affected by iron staining on the stream bottom.

Ten discharges and treatment sites have been identified on Douglass Run. The combined flow of mine drainage from these discharges is 480 gallons per minute. The pollutant loading from these discharges is 184 tons of acid per year, 5.5 tons of iron per year, and 14.4 tons of aluminum per year.

**Jones Run** – Jones Run is a tributary to Douglass Run and does not support a cold water fishery. Many of the discharges along Jones Run are located near the stream and the lower portion of the watershed has steep valley slopes that make access difficult. There may also be some mine drainage entering the base flow of the stream through the stream bottom. Restoration of a cold water fishery in the entire length of the stream may be difficult to achieve given these limiting site conditions. However, water quality improvement on Jones run would have a positive effect on Douglass Run and Mill Creek.

There are no health and safety hazards located at any proposed sites on Jones Run. The stream aesthetics are adversely affected by iron staining on the stream bottom. Several hundred acres of barren and/or poorly vegetated abandoned strip mines have a negative impact on the aesthetics of this watershed. These barren and poorly vegetated areas also add to the stream acid load from surface water that is degraded by the highly acidic strip mine spoil.

Twenty-three mine water discharges have been identified in this watershed. Twelve site locations have been identified to treat these discharges. The combined flow of mine drainage from these discharges is 678 gallons per minute. The pollutant loading from these discharges is 388 tons of acid per year, 73 tons of iron per year, and 21.5 tons of aluminum per year.

**Whites Run** – Whites Run like Douglass Run enters Mill Creek from the south, near the mouth of Mill Creek. There is no cold water fishery in Whites Run. The Glacial site (site 24, Appendix D), has the highest acid load of any site in the Mill Creek watershed. Two water filled pits are safety hazards in this watershed. Iron staining of the stream bottom and barren strip mine areas have a negative impact on the aesthetics of this watershed.

Four mine water discharges, at four separate sites have been identified in this watershed. The combined flow of mine drainage from these discharges is 215 gallons per minute. The pollutant loading from these discharges is 352 tons of acid per year, 149 tons of iron per year, and 3.8 tons of aluminum per year.

## **EDUCATIONAL OPPORTUNITIES**

Several opportunities exist to use the Mill Creek Watershed restoration as an educational tool. These opportunities exist currently in the monitoring of existing conditions to document baseline conditions in the watershed. During the implementation phase of this project there will be opportunities to expand monitoring to document changes in water quality. Once the watershed plan is completely implemented there will be educational opportunities to document and evaluate changes in water quality, stream biology, wildlife habitat and diversity, and geologic influences.

The Clarion University of Pennsylvania, and faculty within the Biology Department, provide facilities and under-graduate and graduate students to assist in monitoring activities. Dr. Peter Dalby and Dr. Terry Morrow are two faculty members who have provided considerable efforts and leadership to the coalition. In all phases of data gathering, from establishing base line conditions to monitoring and evaluating the implemented plan, the University can and is providing student interns for these activities. Presently the watershed provides an excellent outdoor classroom for many of the majors at the Clarion University, and the local school system. During the following years of implementing and completing the watershed plan, educational opportunities will continue to be an important benefit of the restoration efforts.

## **OTHER OPPORTUNITIES**

Solutions to the water quality problems will provide many associated beneficial effects. These effects include increased property values, economic development, enhanced educational and recreational opportunities, and improved aesthetics. Experience has shown that mine reclamation also stimulates community pride. This pride is often reflected in improved property maintenance.

Opportunities exist at a number of locations within the Mill Creek project area to re-establish upland wildlife habitats. Most importantly development of wetlands for the treatment of mine drainage will provide suitable wetland habitats for shorebirds, waterfowl, migratory birds, amphibians and upland wildlife.

## 6 - SCOPE OF THE ENVIRONMENTAL ASSESSMENT

The purpose of this section is to document the range of issues and impacts considered in developing the Watershed Plan and Environmental Assessment. Table C outlines the concerns identified during project development. The degree of concern and significance to decision making were determined by consensus of the technical specialists, agencies, and managers involved in project development.

**TABLE C - IDENTIFIED CONCERNS**

| <b>ECONOMIC, SOCIAL<br/>ENVIRONMENTAL AND<br/>CULTURAL CONCERNS</b> | <b>DEGREE<br/>OF<br/>CONCERN</b> | <b>DEGREE OF<br/>SIGNIFICANCE<br/>TO DECISION<br/>MAKING<sup>1</sup></b> | <b>REMARKS</b>  |
|---|----------------------------------|--|---|
| Public Health & Safety  | High                             | High   | Principal objective, severe degradation<br>Determines treatment methodology<br>Severe degradation |
| Surface Water Quality   | High                             | High   |   |
| Ground Water Quality  | High                             | High   |   |
| Aquatic Habitat   | High                             | High   |   |
| Flood Water Damages   | Medium                           | Low  | None identified in watershed  |
| Sediment Damages  | High                             | High   |   |
| Threatened & Endangered<br>Species                                  | High                             | Low  |   |
| Cultural Resources  | High                             | High   |   |
| Wild & Scenic River   | High                             | Low  | Phase I needed on one site  |
| Water Conservation  | Medium                           | Low  |   |
| Important Farmland  | High                             | Medium   |   |
| Wetlands  | High                             | High   |   |
| Flood Plains  | High                             | Medium   | Project will enlarge and enhance  |
| Air Quality   | High                             | Low  |   |
| Soil Resource Base  | High                             | Medium   |   |
| Wildlife Habitat  | High                             | High   |   |
| Visual & Aesthetics   | High                             | High   |   |
| Water Quantity  | High                             | High   |   |
| Socioeconomics  | High                             | High   |   |
| Land Use Changes  | High                             | High   |   |
| Civil Rights  | High                             | High   |   |
| Recreation  | High                             | High   |   |

<sup>1</sup> High - must be considered in the evaluation of alternatives.

Medium - some alternatives may effect resource conditions.

Low - need not be considered in the evaluation of alternatives.



## **7 - FORMULATION OF ALTERNATIVES**

### **FORMULATION PROCESS**

The Mill Creek Coalition along with cooperating agencies and groups provided resource data, analysis and evaluation needed to make decisions on alternative analysis.

The formulation process involved evaluation of alternatives to solve the principal problem of degraded aquatic habitat due to impaired water quality primarily caused by acid mine drainage. Economic, environmental, social, cultural and civil rights impacts were considered in the analysis. In compliance with Executive Order 11988, Flood Plain Management, alternatives were developed which avoid adverse effects and incompatible development in the base flood plain. In compliance with Executive Order 11990, Protection of Wetlands, alternatives were developed which avoid adverse effects to wetlands. Effects on water quality, ground water recharge and discharge, maintenance of natural systems, and the recreational, scientific and educational uses of wetlands were considered. Few viable alternatives were identified.

### **Physical Chemical Treatment Plants**

Installation of a physical/chemical treatment plant with a stream discharge at each site would be impractical. High initial construction costs along with annual operation and maintenance costs, which would include labor, electricity, chemicals, equipment repair, and other ancillary costs would be prohibitive. This alternative may require additional discharge permits and would entail the costs of sludge removal.

The Pennsylvania Department of Environmental Protection has used physical/chemical treatment facilities in the past to treat mine drainage discharges. In the early 1960's Operation Scarlift was established by the Pennsylvania Legislature to reclaim abandoned mine land and water. A bond issue was used to fund Operation Scarlift. One of the major endeavors of Operation Scarlift was the construction of physical/chemical mine drainage treatment plants. These treatment plants generally were effective in removing pollutants but the yearly maintenance costs were excessive and the State has abandoned all but two of these facilities due to the excessive operating costs.

Some of the major treatment plants that have been abandoned due to excessive operation costs include: Hawk Run in Clearfield County, the Carl White plant on Crooked Creek, Indiana County, Slippery Rock Creek, Butler County, and Smith Run in Washington County. Yearly operating costs for these plants ranged between \$90,000 and \$500,000 per year.

Estimates were made of total costs of treatment plants and were compared to other alternatives. Total costs associated with chemical/physical treatment plants make the construction of a treatment plant an unacceptable alternative for the sponsors.

## **Remining**

The concept of remining was also explored as a potential technology for eliminating the source of mine drainage and resulting polluted discharges. In some situations, improved strip mining techniques, methods and equipment utilized in areas that have been previously deep mined, have allowed the reduction and/or elimination of mine drainage discharges.

The Mill Creek Coalition has explored this potential reclamation methodology in the watershed. The mineable coals in the watershed are relatively shallow which has caused most of the mining in the watershed to be stripmining operations. Small scale drift deep mining has occurred, but acid mine drainage from these sources is not significant. Since the extent of abandoned deep mines is not significant, stripmining of the abandoned workings would not result in significant water quality benefits.

Unreclaimed and/or improperly reclaimed stripmine areas are the source of most of the acid mine drainage in the watershed. Remining of these areas may provide a cost effective method of reducing or eliminating acid mine drainage on some sites. Careful examination of the geology and hydrology at any site to be remined is needed to insure that the quantity and quality of mine drainage leaving the site after remining is not worse than before remining.

At this time, uncertainties about coal market financial limitations and uncertainties about the response of the geologic overburden on water quality and quantity. These uncertainties preclude this alternative from being considered in this plan.

## **Passive Treatment Technologies**

The mechanics of using the only viable alternative, passive treatment technology, produced many treatment scenarios at each site.

Once the quantity and quality of the water needing treatment was determined and the chemical/physical alternative was eliminated, the consideration of viable alternatives centered around the evaluation of methodologies for capturing the acid mine water, treatment and preventing clean surface water from entering the passive treatment system.

Treatment alternatives were evaluated at each discharge location. The treatments were assessed in relation to the water quality benefit vs. cost, effectiveness and appropriateness for treating the discharge water chemistry and flow rate. The environmental impacts of each alternative were considered. The treatment methodologies and components that were evaluated at each discharge include: Successive Alkalinity Producing Systems (SAPS), Anoxic Limestone Drains (ALD), aerobic wetlands, land liming, settling ponds, limestone drains and seeding.

Successive Alkalinity Producing Systems (SAPS) are water filled ponds that have limestone rock placed in them to react with the acid in the mine water and neutralize it

(see Figure 8, Chapter 9). An organic layer is placed over the rock to convert all iron in the discharge water to a ferrous form that will not coat the limestone and allow the acid to readily react with the limestone.

Three to five feet of water is maintained above the compost to provide head pressure to move the water through the compost and limestone into outlet pipes located below the limestone. Once the water has traveled through the SAPS it has acquired increased alkalinity and pH that allows the iron and aluminum to precipitate.

With the water qualities of the mine water discharges in the Mill Creek watershed, the following water quality improvements are expected with SAP technology. Acidity will be completely neutralized and net alkalinity will be produced. Iron and aluminum levels will be reduced to 1 mg/l or less and manganese levels will be reduced by 1/4.

Anoxic Limestone Drains (ALD) are similar to SAPS except the limestone is placed under ground and the mine water flows through limestone rock. They have somewhat limited application because water with high levels of ferric iron and aluminum will tend to clog the drains, coat the rock with precipitate and make them less effective. Water with ferrous iron and low aluminum levels can be effectively treated with ALD technology.

When the above water quality conditions can be met, the water quality improvement potentials for ALD's are similar to SAPS.

Aerobic wetlands can only fully treat water that is net alkaline. This does not preclude their use in systems that incorporate other treatment components to generate alkalinity to treat acid water. Their use in Mill Creek will be to enhance the effectiveness of other treatment measures. Wetlands will promote oxidation, precipitation and settling of iron and aluminum. They accomplish these tasks by generating alkalinity, especially in summer months due to higher temperature, filtering the water flowing through them, and slowing the flow of water.

Water quality improvements achieved by aerobic wetlands are variable. They do enhance the function of other treatment components by acting as a filter for precipitates. Aerobic wetlands can add some alkalinity through sulfate reduction.

Settling ponds provide many of the same functions as wetlands, but provide a much larger capacity for collecting and storing precipitates. Most often, settling ponds are placed to collect the flow from SAPS or ALDS where precipitation is most likely to occur.

Limestone drains are used to provide oxygen and add small amounts of alkalinity to the water being treated. As the water flows down a limestone drain, the velocity of water causes riffles that bring about increases in the dissolved oxygen content of the water. The water flow over the limestone also causes dissolution of calcium from the rock, which results in increased alkalinity in the water. The increased oxygen and alkalinity levels promote the precipitation of the metals in the water.

Limestone drains provide variable treatment results depending on the velocity of the water flow. Experience has shown that limestone drains can remove 25% of the aluminum and reduce acidity if the water is flowing at eight feet per second or faster.

Land liming is used to neutralize acid producing rocks and minerals associated with some seams of coal. On Mill Creek, land liming will be used on unvegetated barren areas and unreclaimed stripmines. Ground limestone will be added to these areas in quantities sufficient to bring the pH of the material to seven or higher. Critical areas will be stabilized with vegetation. These levels of land liming will reduce the production of acid and add alkalinity to runoff water.

### **Summary of Alternatives Considered**

1. Physical/Chemical Treatment Plants - This alternative was not chosen due to a lower benefit to cost ratio than passive treatment systems.
2. Remining - This alternative was not chosen because of uncertainties in the commercial coal market, and the uncertainties of viable economic coal resources at each site.
3. Passive Treatment Technologies - The mechanics of using the only viable alternative, passive treatment technology, produced many treatment scenarios at each site. Extensive data gathering and technical evaluation of the data reduced the number of potential treatment methodologies at each site to the most economical and effective treatments.

### **DESCRIPTION OF ALTERNATIVE PLANS**

As a result of the formulation process, two alternatives were evaluated, the No Action Alternative and the Recommended Plan.

#### **No Action Alternative**

This alternative represents conditions that will likely prevail 25 years in the future, if no project action is taken. The identified mine discharges will continue to impair water quality and aquatic habitat.

The local community will be denied the positive economic, environmental, social and cultural benefits, which could be realized by improved water quality in Mill Creek and its tributaries.

In short, conditions will remain much the same as exist today. Only slight improvements in water quality could be expected with time.

## **Recommended Plan**

This alternative is being evaluated over a 25 year period. Chemical and biological treatment via passive treatment technologies will be utilized to improve water quality. Design of the treatment system will be based on experience from other sites and from chemistry and flow data from each proposed site. An effort will be made to research design data and use the most current technology at the time of design of each component. Components that may be used at each site, depending on water chemistry are: Successive Alkalinity Producing Systems (SAPS), Anoxic Limestone Drains (ALD), aerobic wetlands, land liming settling ponds, limestone drains and seeding. The passive treatment systems will remove acid, iron, aluminum, and reduce manganese from the water by promoting chemical and microbial processes. Oxidation and precipitation will continually increase as the drainage water flows through the treatment systems. Wetland vegetation will be planted to promote oxidation and prevent channelized flow through constructed wetlands. Treated water will then be released through diversions and rock-lined waterways to the receiving streams. Also, approximately 300 acres of abandoned mine land will be treated with the addition of agricultural limestone to reduce acidity levels of surface water runoff from abandoned strip mines.

In the process of treating the water quality problems, four water filled pits and one hazardous strip mine highwall will be eliminated. As a result, the safety hazards associated with these features will be eliminated.

The total cost of the Recommended Plan is \$7,277,000. The average annual cost is \$566,000. The total operation and maintenance cost is estimated to be \$48,000 per year. Total average annual benefits are \$814,000.

## **EFFECTS OF ALTERNATIVE PLANS**

### **Water Quality**

No Action - Without the project, the water quality in Mill Creek and its tributaries below the planned project is expected to improve only slightly due to a slow natural depletion of iron and acid-bearing materials. The 32.8 miles of the stream that is currently degraded by mine drainage would continue to be contaminated and have impaired water quality

Alternative 1 (Recommended) - The implementation of this technology would reduce iron, acid and aluminum levels entering Mill Creek and its tributaries by 95 to 99 percent. Water quality will be improved to a level that will support trout fishery, and recreation. The project reduces water treatment costs and improves water quality for other users downstream.

This projection is supported by experience gained by the USDA, Natural Resources Conservation Service through constructing passive treatment systems on RAMP (Rural Abandoned Mine Program) sites and PL-566 (Watershed Protection and Flood Prevention Program) sites, and sites NRCS has designed for the Western Pennsylvania Coalition for

Abandoned Mine Reclamation. The Department of Environmental Protection, Bureau of Abandoned Mine Reclamation, a partner in this watershed, also has experience in treating mine water with passive treatment systems.

### **Ground Water Quality**

No Action – Without the project the ground water quality will change very little during the 25 year life span of this project. The existing mine water discharges may improve slightly during this period of time. Slight decreases in concentrations of iron, aluminum and other metals associated with AMD may occur.

Alternative 1 (Recommended) - The implementation of the recommended plan will not change the ground water quality in the ground. The change in water quality will occur after the water flows onto the surface of the ground.

Consideration of the ground water quality is a major factor in determining the types of treatment systems that are to be installed at each site. The ground water discharges associated with AMD will be monitored to insure that appropriate treatment systems will be installed at each site.

### **Water Quantity**

No Action – Without the project the ground water quantity will change very little during the 25 year life span of this project. The existing mine water flow rates will continue to vary with seasonal variations depending on precipitation.

Alternative 1 (Recommended) - The implementation of the recommended plan will not change the water quantity in the watershed. As with No Action alternative, the existing mine water flow rates will continue to vary with seasonal variations depending on precipitation.

The importance of water quantity to this plan comes into play when the treatment sites are to be designed for each site. The volume of water flowing from each discharge will be monitored so that the appropriate sized system will be designed at each site.

The establishment of permanent vegetation will reduce the formation of acid in the spoil which will result in higher quality surface water runoff. Erosion will be reduced and organic matter produced by permanent vegetation will increase the moisture holding capacity of the soil.

### **Aquatic Habitat**

No Action – Mill Creek and its tributaries will continue to be severely degraded and nearly void of aquatic life. The 32.8 mile reach of the stream that is currently degraded will continue to have reduced quality of benthic organisms, and fish habitat.

Alternative 1 (Recommended) - Reduction of mine water pollution in Mill Creek and its tributaries will allow the return of aquatic life to the stream. This alternative will allow the return of sustained aquatic life and an enhanced cold water fishery in 11.8 miles of Mill Creek, 11.5 miles of Little Mill Creek, 3.5 miles of Jones Run, 4.0 miles of Douglass Run, and 2 miles of Whites Run.

Maintenance of riparian forest buffers at project sites will enhance aquatic habitat restoration by maintaining favorable water temperatures and providing a food source for aquatic organisms

### **Threatened and Endangered Species**

No. Action - No Federal or state endangered species are known to occur within the project area. The Pennsylvania Fish and Boat Commission has been contacted and they have stated that none of the fish, amphibians or reptiles listed by them occur at or in the immediate project area.

The Pennsylvania Game Commission has reviewed the project area and has stated that no Federal or state listed threatened or endangered species are known to exist within the proposed project area. No change is expected.

The Pennsylvania Natural Diversity Inventory (PNDI) maintained by the Department of Conservation and Natural Resources (DCNR), Bureau of Forestry was contacted and the PNDI staff did not anticipate any impact on rare, threatened or endangered species at the project location.

Alternative 1 (Recommended) - No Effect

### **Wildlife Habitat**

No Action - Without the project, there will be no change in wildlife species that utilize woodland as habitat. A slight increase in woodland landuse is expected due to natural reforestation of abandoned mine lands over the life of the project. The steep terrain over much of the area along with extensive state gamelands (17%) precludes its use for intensive residential development purposes.

Alternative 1 (Recommended) - With the project, there would be a diversity of wildlife present that does not currently exist. The Pennsylvania Modified Habitat Evaluation Procedure (PAM-HEP) was used to assess wildlife habitat. The project will create approximately 96 acres of wetland and open water that will be productive waterfowl habitat. From past experience on similar projects, it is known that wood duck and Canada goose utilize these project areas. Wild turkey will also utilize the open areas created by this project.

Approximately 36 wood duck habitat units (one habitat unit equals one acre of optimum habitat) and 104 Canada goose habitat units will be created as a result of the project. An increase of 111 wild turkey habitat units is expected. It is expected that the open areas created by constructing the treatment systems will increase the forage for young turkey poults.

### **Erosion and Sediment**

No Action – Currently there are approximately 300 acres of barren and/or poorly vegetated abandoned strip mines that are eroding at average rates of nine tons per acre per year. Approximately 60% of this erosion makes its way to streams. This rate of erosion and sedimentation will slowly decrease with time as natural succession takes place and vegetation becomes established. During the 25 year life span of this project, it is estimated that the barren and unvegetated areas will be reduced between 15 and 20 percent through natural succession.

Alternative 1 (Recommended) – Land liming of barren and poorly vegetated areas will promote vegetative growth, (some areas may be seeded and fertilized also) and reduce erosion to two tons per acre or less and reduce sediment delivery rates to the stream to 20% or less. Erosion will be reduced by 2100 tons per year and sedimentation will be reduced by 1260 tons per year.

### **Important Farmland**

No Action – Small amounts of Important Farmland will be impacted by residential development, gas well development, and stripmining, along with other miscellaneous activities by man.

Alternative 1 (Recommended) – There are 4767 acres of Prime Farmland and 11,648 acres of Statewide Important Farmland in the Mill Creek watershed. Most of the land that will be used in the implementation of this alternative has been disturbed by mining or adversely affected by acid mine drainage. Implementation of this project will impact 96 acres of statewide important farmland. Alternative sites that would not impact important farmland are not available at these sites.

The impacted farmland for this project was rated using Land Evaluation and Site Assessment (LESA) guidelines for the Farmland Protection Policy Act of 1981, (FPPA).

The important farmland affected by this project in Clarion County has a relative value of 15.6 and the relative value of the farmland affected in Jefferson County is 29. This means that 84.4% of the farmland in Clarion County has a higher relative farmland value, and 71% of the farmland in Jefferson County has a higher relative farmland value. Only 2 of the 58 proposed sites are currently used for hay production, no sites are used for row crop production. The combined score of the relative value and total site assessment is 81 for Clarion County and 94 for Jefferson County out of a possible 160 total points. No further consideration under the Farmland Protection Policy Act (PL 97-98, Dec. 2 1981) is required.



## **Soil Resource Base**

No Action – Without the project the degraded soil resource base that was created by inadequate strip mining practices will continue to be a source of sediment and acid from the spoil.

Alternative 1 (Recommended) – This alternative will improve the soil resource base on 300 acres of barren eroding strip mine spoil. The addition of and incorporation of lime to the spoil will promote plant growth and revegetation. Acid production from the spoil will be reduced.

## **Recreation**

No Action – Water related recreational activities will continue to be adversely impacted by acid mine drainage in the Mill Creek watershed.

Alternative 1 (Recommended) – Implementation of this plan will restore 32.8 miles of cold water fishery to Mill creek and its tributaries. Upland hunting for deer and wild turkey will be enhanced by a diversification of habitat and increases in edge areas. Waterfowl hunting for Canada geese, mallards and wood ducks will be enhanced by the creation of 92 acres of open water and wetlands.

Other recreational activities such as hiking, canoeing, bird watching will also be enhanced through improved stream water quality and improvement of landscape and stream aesthetics.

## **Health and Safety Hazards**

No Action – Safety hazards associated with existing water filled pits and a stripmine highwall will continue.

Alternative 1 (Recommended) – Three water filled pits and a strip mine highwall will be removed in the process of constructing passive treatment systems at three sites.

## **Cultural Resources**

No Action – No effect on archaeological resources.

There are no historical resources that are eligible for the National Register of Historic Places.

Alternative 1 (Recommended) - Preliminary investigations by the Pennsylvania Historical and Museum Commission (PHMC) indicate that only one site (site 53) needs a phase 1 pedestrian archaeological study completed. If cultural resources are discovered, NRCS will take action to mitigate the resources in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended in 1980, and the regulations (36CFR, Part

800) of the Advisory Council on Historic Preservation. NRCS will continue to work closely with the State Historic Preservation Officer on ways to reduce project effects on cultural resources.

### **Wetlands**

No Action - There are no jurisdictional wetlands within any of the proposed treatment sites. There are wetland areas that have been created by acid mine drainage hydrology within the project sites, that do not have low chroma soil colors necessary to meet the criteria for jurisdictional wetlands. The high concentrations of ferric iron at the treatment sites prevent the formation of gleyed soil layers near the soil surface. This alternative will not change the existing condition.

Alternative 1 (Recommended) - The project when fully implemented will create approximately 21 acres of new wetlands and enhance 20.5 acres of existing acid mine drainage wetland type areas. The Recommended Plan is in compliance with Executive Order 11990, Protection of Wetlands.

### **Flood Plains**

No Action - Without the project, the existing flood plain will continue to provide natural flooding area for Mill Creek and its tributaries.

Alternative 1 (Recommended) - The Recommended Plan would have no significant impact on the flood plain or downstream flooding on Mill Creek or its tributaries. The Recommended Plan is in compliance with Executive Order 11988, Flood Plain Management.

### **Visual Resources**

No Action - The degraded visual resources associated with the iron deposits on the stream bottom of Mill Creek and its tributaries, will continue to have a negative impact if the project is not completed.

Alternative 1 (Recommended) - The visual appearance of 32.8 miles Mill Creek and its tributaries will be returned to a natural visual condition. The land liming of 300 acres of abandoned strip mines will change barren strip mine spoil to a vegetated condition, making the visual resources consistent with surrounding areas.

### **Land Use**

No Action - Without the project, it is anticipated that the existing woodland will increase and grassland will decrease over the next 25 years.

Alternative 1 (Recommended) – The following land use changes will take place: Woodland will be decreased by 211 acres, mine land will be decreased by 35 acres, grassland will be increased by 152 acres, wetlands will be increased by 21 acres and water will be increased by 71 acres.

### Socioeconomics and Civil Rights

No Action - Without the project, Mill Creek and its tributaries would remain contaminated by mine drainage and no recreational fishing opportunities would be available. Economic opportunities associated with a restored trout fishery would continue to be absent. Fishing and other related outdoor activities would continue to be adversely affected. Damages caused by acid mine drainage to roads culverts and bridges would continue.

Land values will continue to be depressed due to the adverse effects of mine drainage.

All of these negative impacts will be shared equally by all local residents including any economically disadvantaged groups, minorities, women and persons with disabilities.

Alternative 1 (Recommended) - The economic benefits of improving water quality and restoring aquatic habitat to the impacted area is displayed on Table D.

**TABLE D - ECONOMIC BENEFITS  
Recommended Plan**

| Defined Area       | Miles of Restored Stream | Annual Value     |
|--------------------|--------------------------|------------------|
| Little Mill Creek  | 11.5                     | \$285,000        |
| Mill Creek (UPPER) | 5.7                      | \$133,000        |
| Mill Creek (LOWER) | 6.1                      | \$151,000        |
| Douglas            | 4.0                      | \$99,000         |
| Jones              | 3.5                      | \$ 43,000        |
| Whites Run         | 2.0                      | \$ 50,000        |
| <b>Subtotal</b>    | <b>32.8</b>              | <b>\$761,000</b> |
| Roads and Culverts |                          | \$ 53,000        |
| <b>TOTAL</b>       |                          | <b>\$814,000</b> |

The dollar value is obtained from two sources, increased economic activity, i.e., sales of goods and services in the area and reduced costs for road and culvert maintenance for

Pennsylvania Department of Transportation and local municipal officials. The project will allow a more intensive use of the recreation area drawing more people to use the commercial services in the area (Walsh et al., 1988).

The positive impacts of the Recommended Plan will benefit all local residents including any economically disadvantaged groups, minorities, women and persons with disabilities.

### **Educational Opportunities**

No Action - Without the project the potential for educational use will be limited. The area will be a good outdoor learning area for showing the impacts of acid mine drainage on streams.

Alternative 1 (Recommended) - Implementation of the Recommended Plan will create educational opportunities. The passive treatment systems will be easily accessed for field studies. Flow measuring devices will be installed that will allow quantitative chemical analysis. The passive treatment systems will have a more diverse plant community that will enhance and expand the animal community, creating enhanced opportunities for ecological studies.

### **Other Effects**

No Action - All of the short term and temporary impacts of increased noise, air and water disturbances normally associated with a project action will not occur in the No Action alternative. Other short term effects that would be impacted in a project action that will not be impacted with this alternative include disruption to wildlife resources, traffic delays and minor disruption of utilities.

Enhancements and improvements that would be realized through the Recommended Plan will not occur with this alternative. No irreversible or irretrievable uses to the resource base will occur in this alternative.

Alternative 1 (Recommended) - Some temporary effects could occur involving usual short term increased noise, air and water disturbance. Wildlife resources may experience temporary disturbance during the installation of the works of improvement. These wildlife values will be restored or enhanced in value within one growing season. Additional short term effects may involve traffic delays and minor disruption of utility services in and around the construction areas.

By altering the short term uses of man's environment, the project will retain and enhance the environments long-term productivity. The works of improvement will cause some minor irreversible or irretrievable uses of natural resources. These include the conversion of 96 acres of important farmland to passive treatment systems and minor amounts of fossil fuel, limestone and some equipment components with no recycling potential.

## Relationship to Local and Regional Plans

No Action - Implementing the No Action Alternative will prevent the local sponsors from realizing the objective of restoring aquatic habitat by improving water quality in Mill Creek and its tributaries.

Alternative 1 (Recommended) - The Mill Creek Watershed project is compatible with the comprehensive plans for Clarion and Jefferson Counties, and local municipalities. The project supplements the Pennsylvania Department of Environmental Protection; Bureau of Abandoned Mine Reclamation Title IV, mine reclamation program and the Title IV, 10% set aside program.

## COMPARISON OF ALTERNATIVE PLANS

Table E - Comparison of Alternative Plans presents the impacts of each alternative on key economic, environmental, social and cultural concerns.

**TABLE E - COMPARISON OF ALTERNATIVE PLANS**

| <b>NO ACTION<br/>ALTERNATIVE</b> | <b>RECOMMENDED<br/>PLAN</b>   |
|----------------------------------|---|
| <u>Measures</u>                  | <u>Measures</u>   |
| NONE                             | 21ac. new constructed wetlands.<br>35 ac. mine land reclaimed.<br>260 ac. seeding.<br>12,350 ft. runoff controls.<br>287 ac. clearing and grubbing.<br>61 successive alkalinity producing systems.<br>10 anoxic limestone drain.<br>58 access roads.<br>49 constructed wetlands.<br>84 settling basins.<br>4450 feet limestone channels.<br>300 acres of land liming<br>4 hazards removed |
| <u>Project Investment</u>        | <u>Project Investment</u>   |
| \$0                              | \$7,277,000   |
| <u>Average Annual Benefit</u>    | <u>Average Annual Benefit</u>   |
| \$0                              | \$814,000   |

**COMPARISON OF ALTERNATIVE PLANS**  
(continued)

| <b>NO ACTION<br/>ALTERNATIVE</b>                                     | <b>RECOMMENDED<br/>PLAN</b>   |
|--|---|
| <u>Average Annual Cost</u>   | <u>Average Annual Cost</u>  |
| \$0  | \$566,000   |
| <u>Net Economic Benefit</u>  | <u>Net Economic Benefit</u>   |
| \$0  | \$248,000   |
| <u>Water Quality</u>   | <u>Water Quality</u>  |
| Mine Drainage continues to pollute<br>Mill Creek and its tributaries | Mine drainage is treated, and<br>32.8 miles of Mill Creek has<br>improved water quality.  |
| <u>Important Farmlands</u>   | <u>Important Farmlands</u>  |
| Minor impacts  | 96 acres of Statewide important<br>Farmland impacted  |
| <u>Health &amp; Safety Hazards</u>                                   | <u>Health &amp; Safety Hazards</u>  |
| Existing hazards remain  | Four safety hazards removed   |
| <u>Cultural Resources</u>  | <u>Cultural Resources</u>   |
| No effect  | One phase 1 study to be<br>Completed.<br>Cultural Resources will be<br>protected  |
| <u>Wetlands</u>  | <u>Wetlands</u>   |
| No effect  | 21 acres of wetland will be<br>constructed to enhance pollutant<br>removal.   |
| <u>Habitat</u>   | <u>Habitat</u>  |
| 32.8 miles of riverine aquatic<br>habitat remains severely degraded. | 32.8 miles of riverine aquatic<br>habitat enhanced.   |
| No waterfowl habitat.  | 36 wood duck habitat units will<br>be created.<br>104 Canada geese habitat units<br>will be created.<br>111 wild turkey habitat units<br>will be created. |
| Less than 1 habitat unit change<br>for any upland specie.            |   |

# COMPARISON OF ALTERNATIVE PLANS (continued)

| NO ACTION<br>ALTERNATIVE   | RECOMMENDED<br>PLAN  |
|--|--|
| <u>Erosion and Sedimentation</u>   | <u>Erosion and Sedimentation</u>   |
| Slight decrease due to natural revegetation.   | Erosion will be reduced by 2100 tons per year.<br>Sedimentation will be reduced by 1260 tons per year.   |
| <u>Land use</u>  | <u>Land use</u>  |
| No change  | Woodland acreage will be reduced by 211 acres.<br>Grassland will be increased by 152 acres.<br>Abandoned mine land will be reduced by 35 acres.<br>Wetlands will be increased by 21 acres. |
| <u>Recreation</u>  | <u>Recreation</u>  |
| Sport fishing opportunities severely impacted by mine drainage   | Sport fishing opportunities enhanced on 32.8 miles of stream.  |
| Hunting opportunities for wood ducks, geese and Wild turkey remain nearly constant   | Increased hunting opportunities for wood duck, geese and wild turkey.  |
| <u>Aesthetics</u>  | <u>Aesthetics</u>  |
| No change  | The visual appearance of 32.8 miles of stream will be returned to a natural condition.   |
| <u>Education</u>   | <u>Education</u>   |
| Education potential limited.   | Education potential created.   |
| <u>Civil Rights</u>  | <u>Civil Rights</u>  |
| All people, including economically disadvantaged groups, minorities women and persons with disabilities will continue to be adversely impacted by degraded water quality | All people, including economically disadvantaged groups, minorities women and persons with disabilities will be positively benefited by the project  |

## **RISK AND UNCERTAINTY**

The treatment of acid mine drainage water using passive technology is a relatively basic concept that is well proven. The criteria used in sizing the wetlands were developed from monitoring of systems built during the last few years.

The chemistry of the mine water in the Mill Creek watershed has not changed dramatically over the past 25 years. Future changes in water chemistry are not expected to be significant.

Deep mine subsidence within the watershed is not apparent at this time. Future subsidence within deep mine workings may alter ground water hydrology along with chemical reactions within the mine. These potential changes may cause current discharge flow rates to increase or decrease with time (Bradford and Dzombak, 1994).

## **RATIONALE FOR PLAN SELECTION**

All of the identified mine water pollution sources will need to be treated by passive treatment systems to reach a water quality threshold in Mill Creek which will allow restoration of the sport fishery. This level of treatment will also substantially increase local property values, improve aesthetics and enhance educational opportunities and allow for technology transfer. Non-water based recreation would also be enhanced.

Many different alternatives for treatment were considered by the Mill Creek Coalition. Measures such as conventional mechanical treatment are costly to construct and maintain. Water collection for this type of treatment would also be costly and difficult to achieve. This treatment methodology, although considered, was discarded as an alternative due to high cost.

Numerous passive treatment scenarios were considered before arriving at the proposed plan. Most of these scenarios dealt with the collection, and treatment the discharges at each treatment site.

The selected plan meets the sponsors' objectives and solves the identified resource problems with the combined ecological, social and economic benefits clearly exceeding costs. Obviously recognized but difficult to quantify economic benefits such as aesthetics along with ecological, social and unquantified down stream benefits make the benefits of this project exceed the costs.



## **8 - CONSULTATION AND PUBLIC PARTICIPATION**

### **GENERAL**

The total resource management approach to water resource planning in the Mill Creek Basin first began with the establishment of the Mill Creek Coalition in 1990. The Coalition has actively pursued the collection and interpretation of resource information to quantify and qualify the resource problems in the Mill Creek watershed. Initially the coalition gathered land use, chemical, biological and flow information in the watershed to determine the kind and extent of all water quality problems.

On August 24, 1993 the Clarion and Jefferson County Commissioners submitted an application to the State Conservation Commission requesting Federal assistance through the PL 83-566 Watershed Protection and Flood Prevention Program, administered by the USDA Natural Resources Conservation Service.

### **WATERSHED SUCCESSES**

The success of the Coalition and the Headwaters Charitable Trust in obtaining grants for the construction of passive mine water treatment systems in the Mill Creek watershed has provided a continuous flow of news articles in local, state and national publications. Since 1991 the coalition has obtained approximately \$600,000 for project construction. This has been supplemented by countless hours of service provided by volunteers.

These efforts and funding have resulted in passive treatment systems installed at three sites treating five discharges on Mill Creek and six passive treatment systems addressing ten discharges on Little Mill Creek. As a result, fishing activities have been reestablished on 5.5 miles of Mill Creek.

These successes have provided opportunities for media exposure of the Coalition's activities. The following media events have allowed a widespread public recognition of the watershed planning and implementation progress in the Mill Creek watershed.

### **PUBLIC RECOGNITION OF SUCCESSES**

The successes noted above have created a broad public support in Clarion and Jefferson Counties for the goals of the coalition. Evidence of the Coalition's impact and successes are demonstrated by national and international visitors from various agencies and organizations who have toured the completed sites.

Numerous news articles have been published in Clarion, Clearfield, Erie, Indiana, Jefferson and Venango County newspapers. Additional articles have appeared in Pennsylvania Trout magazine (1992), National Wildlife Federation's The Leader (1993), Pennsylvania

Resources (1994), Pennsylvania Game News (1994), and the quarterly newsletter of the Society for Ecological Restoration (1994). The restoration efforts on Mill Creek were featured on ESPN's On the Fly (1994). A 1995 issue of Trout (national Trout Unlimited magazine) featured an article on the restoration of Mill Creek and Trout Unlimited's role in the Mill Creek Coalition.

Recognition of the Coalition's work has been acknowledged through a number of awards. In 1992, the Coalition received the "Pride in Pennsylvania Award". In 1993 it received the "Pennsylvania Watershed Protection Award" from the Pennsylvania association of Conservation District Directors. During 1994, it was honored by the Pennsylvania Wildlife Federation with the "Conservation Organization" award, and received a "Certificate of Recognition" from the Northeast Section of The Wildlife Society. In 1998 the Coalition received the Three Rivers Environmental Award from the Pennsylvania Environmental Council. "The Gold Trout Award" was given by the national Trout Unlimited to the local chapter for conservation activities within the Coalition.

In light of the recognition it has received, the Coalition has participated in a number of national, regional and state conferences dealing with AMD and watershed restoration. Some of these include the 1994 joint International Land Reclamation and Mine Drainage Conference (Pittsburgh), the 1994 Acid Mine Drainage Workshop (Morgantown), the 1995 Conference on Mid-Atlantic Highlands Environment Now and Tomorrow (Davis WV), the 1996 meeting of the National Coalition for Abandoned Mine Reclamation (Pittsburgh). The Coalition participated in a number of state meetings, the most recent being the 1997 Allegheny Watershed Conference (Meadville), and the Feb. 1998 Cold Water Conservation: What Works and How to Do It (State College). Additionally, in June, 1995 the Coalition cosponsored a regional conference on Mine Drainage and Watersheds held at Clarion University.

All of the successes and public recognition along with the monthly Coalition meetings provides an on going public outreach for public input into the restoration of the Mill Creek watershed.

The Mill Creek Coalition is composed of the following groups:

- Alliance for Wetlands and Wildlife
- Conservation District, Clarion County
- Conservation District, Jefferson County
- Federation of Sportsmen, Clarion County
- Federation of Sportsmen, Jefferson County
- Iron Furnace Chapter of Trout Unlimited
- Magic Forest of West-Central Pennsylvania
- Mill Creek Chapter National Wild Turkey Federation
- League of Women Voters of Clarion County
- Seneca Rocks Audubon Society

The coalition has received technical assistance from the following:

Clarion University  
Biology Department  
Chemistry Department  
Geography Department  
USDA Natural Resources Conservation Service  
DEP Bureau of Abandoned Mine Reclamation  
DEP Bureau of Mining and Reclamation  
DEP Bureau of Oil and Gas  
Pennsylvania Fish and Boat Commission  
Pennsylvania Game Commission  
U.S. ARMY, Corp of Engineers  
Damariscotta

These groups and agencies were very supportive of the comprehensive planning concept, and through the coalition they acted as a steering committee for the watershed plan development.

The Mill Creek Coalition objectives are to guide the overall cleanup effort by searching out and developing local support, coordinating funding efforts and identifying action items for project implementation.

The technical committee gathered and evaluated technical resource information to guide the development of a technically sound stream restoration plan.

Various other agencies, groups and individuals have been involved in the Mill Creek Coalition effort and are prepared to support water quality projects in the area. They are:

U.S. Congressman John Peterson  
U.S. Senator Rick Santorum  
State Senator Mary Jo White  
State Representative Fred McIlhattan  
State Representative Sam Smith  
U.S.D.A., Forest Service  
U.S. Environmental Protection Agency  
Pennsylvania Department of Environmental Protection,  
Bureau of Watershed Conservation  
Bureau of Water Quality Protection

## **PLAN REVIEW**

The following is a list of agencies, organizations, and persons to whom copies of the draft Watershed Plan and Environmental Assessment were sent for review and comment.

Congressman John Peterson  
U.S. Senator Rick Santorum  
State Senator Mary Jo White  
State Representative Fred McIlhattan  
State Representative Sam Smith  
Pennsylvania Association of Conservation  
Districts Inc.  
Pennsylvania Department of Agriculture  
Pennsylvania Department of Environmental Protection  
Office of Policy  
Harrisburg Regional Office  
Pittsburgh Regional Office  
Bureau of Abandoned Mine Reclamation  
Bureau of Mining and Reclamation  
Bureau of Water Quality Protection  
Deputy Secretary for Water Management  
Sp. Asst. for Secretary for Intergovernmental Affairs  
Bureau of Watershed Conservation  
Bureau of Oil and Gas  
Pennsylvania Department of Conservation and Natural Resources,  
Bureau of Recreation and Conservation  
Pennsylvania Fish and Boat Commission  
Pennsylvania Game Commission  
Pennsylvania Historical and Museum Commission  
Commonwealth of Pennsylvania, Governors Policy Office  
Clarion County Planning Commission  
Jefferson County Planning Commission  
State Conservation Commission  
North Central Pennsylvania Regional Planning & Development  
Commission  
Mill Creek Township  
Clarion Township  
Union Township  
Elder Township  
Alliance for Wetlands and Wildlife  
Federation of Sportsmen, Clarion County  
Magic Forest of West-Central Pennsylvania  
Mill Creek Chapter  
Valley , National Wild Turkey Federation  
Seneca Rocks Audubon Society  
League of Women Voters of Clarion County  
Iron Furnace Chapter Trout Unlimited

U. S. Environmental Protection Agency  
U.S. Geological Survey  
U.S. Army Corps of Engineers  
U.S.D.A. Farm Service Agency  
U.S.D.A. Forest Service  
U.S.D.I. Fish & Wildlife Service  
U.S.D.I. Office of Surface Mining  
U.S.D.A., Rural Development  
Appalachian Regional Commission  
Ohio River Basin Commission  
Canaan Valley Institute

## **REVIEW COMMENTS AND RESPONSES**

The following section summarizes comments received during the 45 day review period of the draft Plan-EA and the NRCS response. Letters of comment received are found in Appendix A.

### **Department of Environmental Protection, Bureau of Abandoned Mine Reclamation.**

#### **Comment #1**

In section 1-1 of the plan document, a statement is made with respect to lime application on approximately 300 acres of the watershed. The plan indicates that this application will increase in-stream alkalinity and promote vegetative cover. While the lime application will likely aid in establishing vegetation, we do not believe that it will result in any net noticeable reduction in in-stream acidity concentrations. This assessment is based on knowledge of overburden analysis data of coal seams mined in this watershed. The overburden historically has large alkaline deficiencies which would require much larger than normal application rates for both surface application and alkaline addition spoil blending during site reclamation.

Response: The intent of the lime application is not to neutralize the overburden above the coal. The intent is to establish a vegetative cover and reduce the formation of acid on the surface of the ground. The establishment of a good vegetative cover reduces acid production on the soil surface, and with time produces alkalinity in the surface runoff. The positive impact of the lime application will appear in surface water runoff, not in the base flow of the acid mine discharges.

#### **Comment #2**

Based on our review of the Jones Run and Douglas Runs, we do not believe that they will be restored to such an extent as to support a Cold Water Fishery (CWF). There are strong indications of groundwater contamination in this sub-watershed as evidenced by polluted

water supply wells and by polutional discharges which surface much lower in elevation than the croplines of the coal seams mined.

Response: We agree. The lower portions of Jones and Douglass Runs were not used in calculating the benefits for the overall watershed project. The work proposed on this sub-watershed will significantly reduce iron, aluminum and acidity levels in these streams and provide benefits mainly to Mill Creek. The proposed works of improvement will reduce the acid load by more than 300 tons per year. The reduction of this amount of acid from the stream and the production of alkalinity by the passive systems will have significant downstream benefits.

### Comment #3

A review of some of the current field sample data for a number of the discharges proposed for treatment have very high aluminum concentrations. Consequently, a more intensive flushing and maintenance plan will be required for the selected passive treatment systems. Will the local sponsor accept and be capable of performing these operation and maintenance duties.

Response: We Agree. Increased frequency of flushing for passive treatment systems with high aluminum concentrations is essential for long term performance. NRCS enters into an operation and maintenance with the project sponsors prior to construction of an individual project site.

The following comments were received by telephone and/or handwritten notes.

Frank S. Rhoades, RR-1, Box 140, Corsica, PA 15829 (handwritten note)

Comment: I wish to report what I consider a No. 1 source of pollution of Mill Creek in Clarion Twp., Clarion, Co., PA. This red seepage is along a well traveled dirt roadway, with a State Game Land Marker in it's midst. It is only a few miles north of Rt. 322. Turn north on the road at State Stock clarion Twp. anti-skid piles of sand, salt etc. Take the next right hand turn and you come to State Game Land #74 on the left. The red muck is right along the road. I have send phones of this mess to the Biology Dept. Clarion Univ.

Response: This discharge is included in the Plan (site 25).

Ed Fegert, Box 31, Callensburg, PA 16213 (telephone)

Comment: I am well aware of problems in Mill Creek based on hundreds of trips in the Watershed. I know of no other program that can address the problems on a watershed scale. I strong support the PL-566 proposal on Mill Creek.

Judith Rock, PEACE, R.D. 2, Summerville, PA 15864 (handwritten note)

Comment: Please amend your draft writeup to specify "natural limestone-rock" instead of "alkaline addition" for liming, and lime uses in the plans.

Response: Changes were made in the Plan to remove the terminology of "alkaline addition".

Michael S. Butler (handwritten note)

Comment: Concerns exist regarding the terminology "alkaline additions" may refer to materials such as- Coal Combustion Waste-Steel Slag-etc. - Some clarification in the project plan should be made to reflect the guarantee of- agricultural lime.

Response: Changes were made in the Plan to remove the terminology of "alkaline addition".

## **9 - RECOMMENDED PLAN**

### **PURPOSE AND SUMMARY (See Project Map, Appendix D)**

This plan is designed to meet the Sponsor's objectives to improve water quality in 32.8 miles of Mill Creek and its tributaries. The Recommended Plan will improve the water quality and restore or enhance aquatic habitat in the stream which is now impaired due to acid mine drainage. The planned action will treat 75 acid mine drainage discharges at 58 sites and provide for the addition of agricultural lime on 300 acres of abandoned mine land. The most current technology available at the time of implementation will be utilized to insure the most effective and efficient treatment of the mine water.

### **MEASURES TO BE INSTALLED (See Table 3C, Structural Summary)**

Typical treatment systems configurations in all sub-watersheds will usually consist of a treatment sequence of the following components: settling basin, wetland, successive alkalinity producing system (SAPS), settling basin (Figure 8). This sequence will vary where the water chemistry allows for alternative components. At discharges where acidity levels exceed 300 MG/L the sequence of components listed above will be repeated to assure the complete treatment of the acidity. At sites where the iron in the discharges is dominated by ferrous iron and the area present for treatment is limited, the SAP will be replaced with anoxic limestone drain (ALD). At the few sites where the discharge water is net alkaline no SAPS or ALDS will be used. The alkaline sites will usually be treated with settling basins and aerobic wetlands to achieve a three day detention time to allow iron and aluminum to fully precipitate.

The treatment measures to be installed were determined with the following chemical parameters: discharge flow rate, acidity/alkalinity levels, iron and aluminum. The site location and space available were also considerations in determining treatments measures to be installed. Table A (Chapter 5) shows the discharge flow rates and chemistry at each site.

#### **Mill Creek**

Eleven mine drainage discharges and ten treatment sites have been identified on Mill Creek. The combined flow of mine drainage from these sites is 315 gallons per minute. The pollutant loading from these discharges is 144 tons of acidity per year, 49 tons of iron per year, and aluminum 3.4 tons per year.

To treat the mine drainage discharges in this watershed the following structural items would be needed: 3 anoxic limestone drains, 8 SAPS, 10 constructed wetlands 17 settling basins, 800 feet of limestone channels, 1200 feet of diversions, 1500 feet of access roads, 41 acres of clearing and grubbing, 29 acres of seeding, and 2900 feet of temporary pollution control devices.

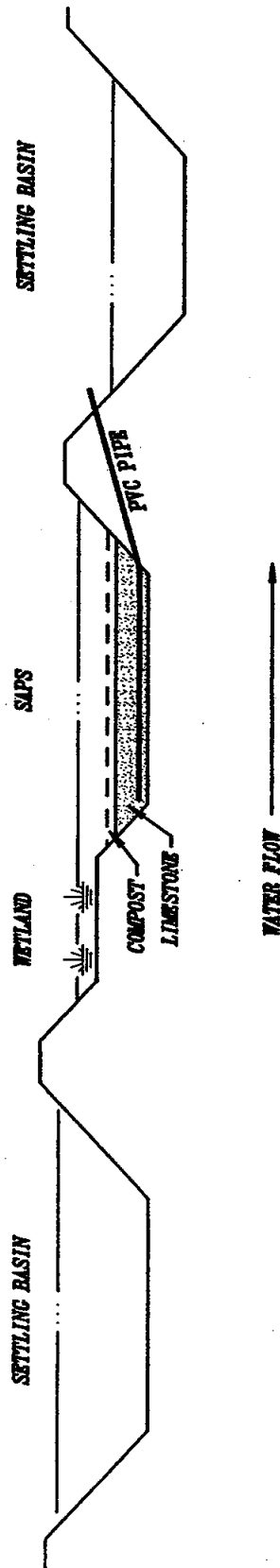
The following sites are located in the Mill Creek sub-watershed; (see Appendix D, Project Map) Site # 5,20,21,22,23,40,41,42, 43 and 57.



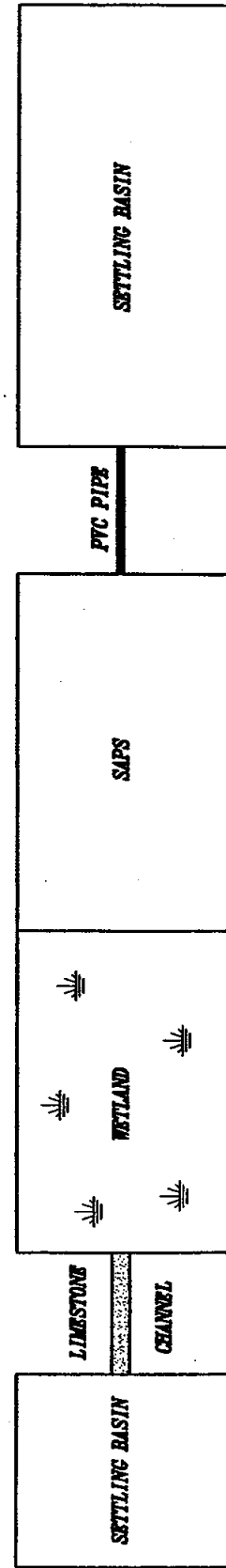
# FIGURE 8

## TYPICAL PASSIVE TREATMENT SYSTEM MILL CREEK

### PROFILE



### PLAN VIEW



## **Little Mill Creek**

Twenty seven mine drainage discharges that can be treated at twenty two sites have been identified on Little Mill Creek. The combined flow of mine drainage from these discharges is 966 gallons per minute. The pollutant loading from these discharges is 427 tons of acid per year, 153 tons of iron per year, and 10.4 tons of aluminum per year.

To treat the mine drainage discharges in the Little Mill watershed the following structural items would be needed: 6 anoxic limestone drains, 16 SAPS, 13 wetlands, 30 settling basins, 2000 feet of limestone channels, 3700 feet of diversions, 8000 feet of access roads, 98 acres of clearing and grubbing, 118 acres of seeding, and 8950 feet of temporary pollution control devices.

The following sites are located in the Little Mill Creek sub-watershed; (see Appendix D, Project Map) Site # 1,2,3,4,6,7,8,9,10,11,12,13,14,15,16,17,18, 19,53,54,55,and 58.

## **Douglass Run**

Ten discharges and treatment sites have been identified on Douglass Run. The combined flow of mine drainage from these discharges is 480 gallons per minute. The pollutant loading from these discharges is 184 tons of acid per year, 5.5 tons of iron per year, and 14.4 tons of aluminum per year.

To treat these mine drainage discharges, the following structural items would be 10 SAPS, 10 wetlands, 10 settling basins, 1000 feet of limestone channels, 1600 feet of diversions, 2800 feet of access roads, 41 acres of clearing and grubbing, 35 acres of seeding, and 2450 feet of temporary pollution control devices.

The following sites are located in the Douglass Run sub-watershed; (see Appendix D, Project Map) Site # 44,45,46,47,48,49,50,51,52 and 56.

## **Jones Run**

Twenty three mine water discharges have been identified in this watershed. Twelve site locations have been identified to treat these discharges. The combined flow of mine drainage from these discharges is 678 gallons per minute. The pollutant loading from these discharges is 388 tons of acid per year, 73 tons of iron per year, and 21.5 tons of aluminum per year.

To treat the mine drainage discharges in this watershed the following structural items would be needed: 1 anoxic limestone drain, 19 SAPS, 9 wetlands, 16 settling basins, 500 feet of limestone channels, 1200 feet of diversions, 4300 feet of access roads, 82 acres of clearing and grubbing, 59 acres of seeding, and 4250 feet of temporary pollution control devices.

The following sites are located in the Jones Run sub-watershed; (see Appendix D, Project Map) Site # 25,26,27,28,29,30,31,32,33,34,35, and 36.

## **Whites Run**

Four mine water discharges have been identified in this watershed. That can be treated at four site locations. The combined flow of mine drainage from these discharges is 215 gallons per minute. The pollutant loading from these discharges is 352 tons of acid per year, 149 tons of iron per year, and 3.8 tons of aluminum per year.

To treat the mine drainage discharges in the Whites Run watershed the following structural items would be needed: 8 SAPS, 7 wetlands, 11 settling basins, 150 feet of limestone channels, 200 feet of diversions, 800 feet of access roads, 25 acres of clearing and grubbing, 19 acres of seeding, and 1500 feet of temporary pollution control device

The following sites are located in the Jones Run sub-watershed; (see Appendix D, Project Map) Site # 24,37,38,39.

## **PERMITS AND COMPLIANCE**

The Sponsors will acquire any necessary deed restrictions, permits and land rights to install the project. Applications for permits shall be filed with the U.S. Army Corps of Engineers, Pittsburgh District (404); the Pennsylvania Department of Environmental Protection (PADEP), Bureau of Water Quality Protection, Division of Dams, Waterways, Wetlands and Erosion Control, the PADEP, Bureau of Watershed Conservation; and other agencies, as required.

## **COSTS**

Table 1 displays total estimated project costs by site for the project. PL-566 funds will total \$3,530,000 or 48 percent of the total costs. Locally acquired funds will total \$3,747,000 or 52 percent of the total costs. The Total costs are \$7,277,000.

The distribution of project costs is shown in Table 2. These include construction costs, engineering services, project administration, and land rights costs.

Construction cost estimates are based on estimated quantities. Unit prices reflect the values obtained from previous work for similar materials and work. Construction costs include grading and seeding disturbed areas. A contingency allowance was added. PL-566 funds will bear no more than fifty percent (50%) of the total construction costs estimated at \$5,982,000. The Sponsors will bear at least fifty percent (50%) of the total construction costs, however, the percentage may vary from site to site.

Engineering costs include the direct cost of engineering, surveys, investigations, and the design and specifications of structural measures. PL-566 funds and the sponsors will each bear about fifty percent (50%) of these costs or \$300,000 each. The total engineering cost estimated at \$600,000.

Project administration costs include contract administration, review of engineering plans prepared by others, contract administrators, inspection services during construction, advisory services, and administration of relocation payments, if necessary. The total estimated cost of project administration is \$478,000. The Sponsors will bear \$239,000 and PL-566 funds will bear \$239,000.

Land rights costs include purchasing or acquiring easements for the treatment sites. Land rights costs, based on local estimates will be \$217,000 and will be incurred locally.

Utility relocations and modifications are considered a part of land rights costs. For this Mill Creek project area there are no known utility relocations. If utility relocation is needed, locally acquired funds must be used to relocate and modify all utilities.

Relocation payments are applicable to displaced persons or businesses. There are no relocations anticipated. If displacement becomes necessary, PL-566 funds will bear 48 percent of the costs and locally acquired funds will bear 52 percent of the costs.

Table 4 contains Average Annual project costs. Costs are based on a 1997 price base and are discounted at an interest rate of 7.125 percent over a 25 year evaluation period. It is the sponsors responsibility to bear all operation and maintenance costs which are estimated to be \$48,000.

Table 5A shows the source of the Estimated Average Annual Economic Benefits.

Table 6 combines the Average Annual Benefits and Costs to establish a project benefit to cost ratio. The expected B:C ratio is 1.4 : 1.0.

## **INSTALLATION AND FINANCING**

The framework for implementing the plan is described in this section. The planned sequence of installation; responsibilities of the Sponsors; NRCS; and others; protection of cultural resources, and methods of financing are described.

### **Sequence of Installation**

Installation of the works of improvement described in this plan consist of 58 project sites. The sites are proposed to be constructed in the following order based on resource information and local funding availability. The first year of implementation will include land liming in the Jones Run sub-watershed. The completion of this project will positively impact the surface water runoff from abandoned surface mines that currently produces acid runoff. This project is scheduled first so that the impact of the liming on Jones Run discharges can be assessed before any design work is completed on the Jones Run structural sites.

In years two through five, implementation will take place on Little Mill Creek. The second year of construction will ameliorate the acid mine drainage from sites 1,2 and 3. The third construction season will complete the construction of sites 4, 6, 7, 8, and 9. In the fourth year of implementation, sites 10, 11, 12, 13, 14, 53 and 55 will be treated. The fifth construction season will complete sites 15 through 19 and 54 and 58.

The sixth and seventh year will focus construction on Mill Creek. In year six, sites 5, 20, 21, 22, 40, 41, 42 and 57 will be completed. In year seven sites 23 and 24 will be completed.

Implementation will take place on Douglass Run in years eight and nine, with sites 50, 51, and 52 taking place in year eight, followed by sites 44, 45, 46, 47, 48, 49 and 56 in year nine.

Years ten, eleven, and twelve will complete all sites in Jones Run. Sites 26-west, 26-east, and 26-A through I will be completed in year ten. Sites 27, 28, 32, and 34 will be completed in year eleven. In year twelve, sites 25, 29, 30, 31, 33, 35, and 36 will be completed.

In the final year of implementation, sites 24, 37, 38, and 39 will be completed on Whites Run.

In the event that an unforeseen problem would arise that would alter this planned sequence of project implementation no adverse consequences are expected.

**TABLE F**

| <b>YEAR</b> | <b>ITEM</b>           | <b>PL-566<br/>FUNDS</b> | <b>OTHER<br/>FUNDS</b> | <b>TOTAL<br/>FUNDS</b> |
|-------------|-----------------------|-------------------------|------------------------|------------------------|
| <b>1ST</b>  | <b>CONSTRUCTION</b>   | <b>\$150,500</b>        | <b>\$150,500</b>       | <b>\$301,000</b>       |
|             | <b>ENGINEERING</b>    | <b>\$15,000</b>         | <b>\$15,000</b>        | <b>\$30,000</b>        |
|             | <b>PROJECT ADMIN.</b> | <b>\$12,000</b>         | <b>\$12,000</b>        | <b>\$24,000</b>        |
|             | <b>LAND RIGHTS</b>    | <b>\$0</b>              | <b>\$1000</b>          | <b>\$1000</b>          |
| <b>2ND</b>  | <b>CONSTRUCTION</b>   | <b>\$198,000</b>        | <b>\$198,000</b>       | <b>\$396,000</b>       |
|             | <b>ENGINEERING</b>    | <b>\$20,000</b>         | <b>\$20,000</b>        | <b>\$40,000</b>        |
|             | <b>PROJECT ADMIN.</b> | <b>\$16,000</b>         | <b>\$16,000</b>        | <b>\$32,000</b>        |
|             | <b>LAND RIGHTS</b>    | <b>\$0</b>              | <b>\$14,000</b>        | <b>\$14,000</b>        |
| <b>3RD</b>  | <b>CONSTRUCTION</b>   | <b>\$266,500</b>        | <b>\$266,500</b>       | <b>\$533,000</b>       |
|             | <b>ENGINEERING</b>    | <b>\$26,500</b>         | <b>\$26,500</b>        | <b>\$53,000</b>        |
|             | <b>PROJECT ADMIN.</b> | <b>\$21,500</b>         | <b>\$21,500</b>        | <b>\$43,000</b>        |
|             | <b>LAND RIGHTS</b>    | <b>\$0</b>              | <b>\$22,000</b>        | <b>\$22,000</b>        |
| <b>4TH</b>  | <b>CONSTRUCTION</b>   | <b>\$218,000</b>        | <b>\$218,000</b>       | <b>\$436,000</b>       |
|             | <b>ENGINEERING</b>    | <b>\$22,000</b>         | <b>\$22,000</b>        | <b>\$44,000</b>        |
|             | <b>PROJECT ADMIN.</b> | <b>\$17,500</b>         | <b>\$17,500</b>        | <b>\$35,000</b>        |
|             | <b>LAND RIGHTS</b>    | <b>\$0</b>              | <b>\$15,000</b>        | <b>\$15,000</b>        |

TABLE F (Continued)

| YEAR  | ITEM           | PL-566<br>FUNDS | OTHER<br>FUNDS | TOTAL<br>FUNDS           |
|-------|----------------|-----------------|----------------|--------------------------|
| 5TH   | CONSTRUCTION   | \$215,500       | \$215,500      | \$431,000                |
|       | ENGINEERING    | \$21,500        | \$21,500       | \$43,000                 |
|       | PROJECT ADMIN. | \$17,500        | \$17,500       | \$35,000                 |
|       | LAND RIGHTS    | \$0             | \$23,000       | \$23,000                 |
| 6TH   | CONSTRUCTION   | \$163,000       | \$163,000      | \$326,000                |
|       | ENGINEERING    | \$16,500        | \$16,500       | \$33,000                 |
|       | PROJECT ADMIN. | \$13,000        | \$13,000       | \$26,000                 |
|       | LAND RIGHTS    | \$0             | \$19,000       | \$19,000                 |
| 7TH   | CONSTRUCTION   | \$254,000       | \$254,000      | \$508,000                |
|       | ENGINEERING    | \$25,500        | \$25,500       | \$51,000                 |
|       | PROJECT ADMIN. | \$20,500        | \$20,500       | \$41,000                 |
|       | LAND RIGHTS    | \$0             | \$12,000       | \$12,000                 |
| 8TH   | CONSTRUCTION   | \$147,500       | \$147,500      | \$295,000                |
|       | ENGINEERING    | \$15,000        | \$15,000       | \$30,000                 |
|       | PROJECT ADMIN. | \$12,000        | \$12,000       | \$24,000                 |
|       | LAND RIGHTS    | \$0             | \$15,000       | \$15,000                 |
| 9TH   | CONSTRUCTION   | \$141,000       | \$141,000      | \$282,000                |
|       | ENGINEERING    | \$14,000        | \$14,000       | \$28,000                 |
|       | PROJECT ADMIN. | \$11,500        | \$11,500       | \$23,000                 |
|       | LAND RIGHTS    | \$0             | \$11,000       | \$11,000                 |
| 10TH  | CONSTRUCTION   | \$300,000       | \$300,000      | \$600,000                |
|       | ENGINEERING    | \$30,000        | \$30,000       | \$60,000                 |
|       | PROJECT ADMIN. | \$24,000        | \$24,000       | \$48,000                 |
|       | LAND RIGHTS    | \$0             | \$27,000       | \$27,000                 |
| 11TH  | CONSTRUCTION   | \$200,000       | \$200,000      | \$400,000                |
|       | ENGINEERING    | \$20,000        | \$20,000       | \$40,000                 |
|       | PROJECT ADMIN. | \$16,000        | \$16,000       | \$32,000                 |
|       | LAND RIGHTS    | \$0             | \$23,000       | \$23,000                 |
| 12TH  | CONSTRUCTION   | \$120,500       | \$120,500      | \$241,000                |
|       | ENGINEERING    | \$12,000        | \$12,000       | \$24,000                 |
|       | PROJECT ADMIN. | \$9,500         | \$9,500        | \$19,000                 |
|       | LAND RIGHTS    | \$0             | \$15,000       | \$15,000                 |
| 13TH  | CONSTRUCTION   | \$616,000       | \$616,000      | \$1,233,000              |
|       | ENGINEERING    | \$61,000        | \$61,000       | \$122,000                |
|       | PROJECT ADMIN. | \$49,500        | \$49,500       | \$99,000                 |
|       | LAND RIGHTS    | \$0             | \$20,000       | \$20,000                 |
| TOTAL | CONSTRUCTION   | \$2,990,500     | \$2,990,500    | \$5,981,000              |
|       | ENGINEERING    | \$299,000       | \$299,000      | \$598,000                |
|       | PROJECT ADMIN. | \$240,500       | \$240,500      | \$481,000                |
|       | LAND RIGHTS    | \$0             | \$217,000      | \$217,000                |
|       |                | \$3,530,000     | \$3,747,300    | \$7,277,000 <sup>1</sup> |

9-7

<sup>1</sup> Totals for construction, engineering and project administration vary slightly due to rounding.

## **Responsibilities**

Responsibilities for carrying out a project will be shared between the Natural Resources Conservation Service (NRCS) and the Sponsors.

NRCS responsibilities will be as follows:

- a. Provide overall project administration.
- b. Provide a government representative for each NRCS construction contract.
- c. Provide up to 50 percent of construction costs, and provide engineering design and construction inspection for works contracted by NRCS.

The Sponsors will:

- a. Provide funding for at least fifty percent (50%) of total construction costs, and cover costs for engineering, construction inspection, and project administration for works contracted by the sponsors.
- b. Be responsible for their own project administration costs.
- c. Acquire all necessary land and water rights to install and maintain all works of improvement.
- d. Enter into agreements with the appropriate utilities and others for relocating utilities and modifying roads or other public works affected by all works of improvement.
- e. Bear the costs of relocating or modifying utilities.
- f. Secure all required federal, state, and local permits.
- g. Be responsible for operation and maintenance of all components of the systems.

## **Contracting**

The project will be installed by means of a federal contract administered by NRCS, as requested by the Sponsors and by cooperating agencies. NRCS and cooperating agencies will perform construction inspection and contract administration at their own expense.

## **Land Rights and Relocation**

The Sponsors will be responsible for acquiring the land rights, water rights, and rights-of-way necessary to install, operate and maintain the structural measures. The Sponsors will also be responsible for the satisfactory relocation or modification of all utilities disturbed as a result of the project.

## **Solid and Hazardous Waste**

The Sponsors will assure that any solid or potential hazardous wastes at the treatment sites are identified and disposed of in accordance with all applicable federal, state and local rules and regulations. The Sponsors will be responsible for entering into agreements with affected landowners for waste identification and disposal, and if warranted, testing of soil and ground water and remediation plans. These activities will generally require the services of a hazardous waste consultant certified by the Pennsylvania Department of Environmental Protection, Bureau of Waste Management.

## **Cultural Resources**

The Pennsylvania Historical and Museum Commission completed a preliminary archaeological review in the Mill Creek project area to determine the presence and significance of prehistoric and historic archaeological resources. The Commission found that site 53 needs a phase 1 pedestrian survey after the surface is plowed. The results of the survey will be provided to the Bureau of Historic Preservation. If cultural resources are discovered during construction, at this site or other sites, NRCS will take action to mitigate the resources in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended in 1980, and the regulations (36 CFR, Part 800) of the Advisory Council on Historic Preservation. NRCS will continue to work closely with the State Historic Preservation Officer on ways to reduce project effects on cultural resources.

## **Financing**

The NRCS share of installation costs will be provided from funds appropriated under the authority of Public Law 83-566, the Watershed Protection and Flood Prevention Act. This is not a fund-obligating document and federal financial assistance is subject to the availability of congressional appropriations.

The Sponsors will bear the remaining costs for project administration, construction, land rights and relocation or modification of utilities. Their source of funds can include cash reserves, loans, bonds, grants, and/or annually appropriated tax revenues.

Cost allocation will be based on total project costs rather than by individual treatment sites. For construction costs, efforts will be made to keep the percentages of NRCS/Sponsor costs as close to 50/50 as possible, since continued funding cannot be guaranteed by either party. Sponsors must bear at least fifty percent (50%) of construction costs.



The Sponsors have analyzed the scheduled installation of works of improvement and will acquire funds when needed in cooperation with NRCS.

### **Conditions for Providing Assistance**

Federal assistance, including financial, engineering assistance, and other to be furnished by NRCS, is contingent on the appropriation of funds for this purpose.

Before federal construction funds are made available, the Sponsor will:

- a. Give written assurance that they have the legal authority, sufficient funding, and are willing and able to obtain all necessary land rights, easements, and permits, and to operate and maintain the structural measures.
- b. Execute an Operation and Maintenance Agreement.
- c. Execute a Project Agreement.
- d. Assure that any solid or hazardous wastes at the treatment sites are identified and disposed of in accordance with applicable rules and regulations.
- e. Prior to construction, certify that all required land rights, water rights, permits, and licenses were acquired and other related actions were taken to obtain the legal authority to install the project measures.

All construction will be in accordance with Occupational Safety and Health Administration Standards.

### **OPERATION AND MAINTENANCE**

The components of the passive treatment system will be designed to minimize maintenance. The treatment wetlands will be sized to maximum size based on existing available treatment areas. It is anticipated that a minimum 25 year lifespan is expected for all treatment areas.

Periodic maintenance will be needed to reseed and or repair parts of diversions and dikes that may be damaged by severe storms. Rock riprap in outlet structures that may be dislodged during severe storms will need to be replaced. Cutting of unwanted vegetation on the dikes is also anticipated. Total annual maintenance cost is estimated at \$48,000 per year. This annual operation and maintenance cost is the sponsors responsibility.

An operation and maintenance agreement will be executed between NRCS and the Sponsors prior to the signing of a land rights, relocation, or project agreement for each site. This agreement will contain, in addition to specific responsibilities for structural project measures, specific provisions for retention and disposal of real and personal property acquired or improved with PL 83-566 funds. An operation and maintenance plan will be prepared in accordance with the NRCS Pennsylvania Watershed Operation and Maintenance Handbook.

## **PUBLIC REVIEW CHANGES**

**Responses to the public review comments in Section VIII - Consultation and Public Participation will be incorporated into the final design of each site.**

**TABLE 1 - ESTIMATED INSTALLATION COST<sup>1</sup>****Mill Creek, Clarion and Jefferson Counties, Pennsylvania****(Dollars)**

| <b>Evaluation<br/>Unit</b>    | <b>ESTIMATED COSTS</b> |                    |                    |
|-------------------------------|------------------------|--------------------|--------------------|
|                               | <b>PL - 566</b>        | <b>OTHER</b>       | <b>TOTAL</b>       |
| <b><u>Treatment Sites</u></b> |                        |                    |                    |
| Little Mill Creek             | \$1,060,000            | \$1,134,000        | \$2,194,000        |
| Mill Creek                    | \$491,000              | \$522,000          | \$1,013,000        |
| Douglass Run                  | \$341,000              | \$367,000          | \$708,000          |
| Jones Run                     | \$910,000              | \$976,000          | \$1,886,000        |
| Whites Run                    | \$728,000              | \$748,000          | \$1,476,000        |
| <b>Total</b>                  | <b>\$3,530,000</b>     | <b>\$3,747,000</b> | <b>\$7,277,000</b> |

<sup>1</sup>Price Base 1997

**TABLE 2 - ESTIMATED COST DISTRIBUTION**

**Mill Creek, Clarion and Jefferson Counties, PA**

**INSTALLATION COST  
(Dollars)<sup>1</sup>**

| Evaluation Unit   | PL - 566 FUNDS    |                  |                   | OTHER FUNDS       |                   |                       |                |                   | Total Other | TOTAL COST |
|-------------------|-------------------|------------------|-------------------|-------------------|-------------------|-----------------------|----------------|-------------------|-------------|------------|
|                   | Construct-<br>ion | Engi-<br>neering | Project<br>Admin. | Total<br>P.L. 566 | Construct-<br>ion | Sponsor<br>Eng. Costs | Land<br>Rights | Project<br>Admin. |             |            |
| Treatment Site    | \$                | \$               | \$                | \$                | \$                | \$                    | \$             | \$                | \$          | \$         |
| Little Mill Creek | 898,000           | 90,000           | 72,000            | 1,060,000         | 898,000           | 90,000                | 74,000         | 72,000            | 1,134,000   | 2,194,000  |
| Mill Creek        | 416,000           | 42,000           | 33,000            | 491,000           | 416,000           | 42,000                | 31,000         | 33,000            | 522,000     | 1,013,000  |
| Douglass Run      | 289,000           | 29,000           | 23,000            | 341,000           | 289,000           | 29,000                | 26,000         | 23,000            | 367,000     | 708,000    |
| Jones Run         | 771,000           | 77,000           | 62,000            | 910,000           | 771,000           | 77,000                | 66,000         | 62,000            | 976,000     | 1,886,000  |
| Whites Run        | 617,000           | 62,000           | 49,000            | 728,000           | 617,000           | 62,000                | 20,000         | 49,000            | 748,000     | 1,476,000  |
| All Watersheds    | 2,991,000         | 300,000          | 239,000           | 3,530,000         | 2,991,000         | 300,000               | 217,000        | 239,000           | 3,747,000   | 7,277,000  |

<sup>1</sup> Price Base 1997

TABLE 3C - STRUCTURAL SUMMARY FOR MILL CREEK

| SITE NAME   | NUMBER ANOXIC DRAINS | NUMBER SAPS | NUMBER WETLANDS | NUMBER SETTLING BASINS | NUMBER FEET CHANNELS | FEET LIMESTONE DIVERSION | FEET ACCESS ROADS | ACRES CLEARING GRUBBING | ACRES SEEDING | FEET POLLUTION CONTROL |
|-------------|----------------------|-------------|-----------------|------------------------|----------------------|--------------------------|-------------------|-------------------------|---------------|------------------------|
| DOUGLASS    | 0                    | 10          | 10              | 10                     | 1,000                | 1,600                    | 2,800             | 41                      | 35            | 2,450                  |
| JONES       | 1                    | 19          | 9               | 16                     | 500                  | 1,200                    | 4,300             | 82                      | 59            | 4,250                  |
| LITTLE MILL | 6                    | 16          | 13              | 30                     | 2,000                | 3,700                    | 8,000             | 98                      | 118           | 8,950                  |
| MILL        | 3                    | 8           | 10              | 17                     | 800                  | 1,200                    | 1,500             | 41                      | 29            | 2,900                  |
| WHITES      | 0                    | 8           | 7               | 11                     | 150                  | 200                      | 800               | 25                      | 19            | 1,500                  |
| TOTALS      | 10                   | 61          | 49              | 84                     | 4,450                | 7,900                    | 17,400            | 287                     | 260           | 20,050                 |

**TABLE 4 - ESTIMATED AVERAGE ANNUAL COSTS**

**Mill Creek, Clarion and Jefferson Counties, Pennsylvania**

**(Dollars)<sup>1</sup>**

| Evaluation Unit     | Project Amortization <sup>2</sup> of Installation Cost | Operation <sup>3</sup> Maintenance & Replacement Cost | Total Average Annual Cost |
|---------------------|--|---|---------------------------|
| Structural measures |  |   |                           |
| Little Mill Creek   | \$ 156,000   | \$18,000  | \$ 174,000                |
| Mill Creek          | \$ 72,000  | \$ 7,000  | \$ 79,000                 |
| Douglass Run        | \$ 51,000  | \$ 5,000  | \$ 56,000                 |
| Jones Run           | \$ 134,000   | \$11,000  | \$ 145,000                |
| Whites Run          | \$ 105,000   | \$ 7,000  | \$ 112,000                |
| <b>Total</b>        | <b>\$ 518,000</b>                                      | <b>\$48,000</b>                                       | <b>\$ 566,000</b>         |

<sup>1</sup>Price Base 1997, Amortized over 25 years at a 7.125% discount rate

<sup>2</sup>Costs for Project Administration, Engineering and Landrights are included

<sup>3</sup>There are no anticipated replacement costs over the 25 year period of analysis

**TABLE 5A - ESTIMATED AVERAGE ANNUAL ECONOMIC BENEFITS<sup>1</sup>**  
**Mill Creek, Clarion and Jefferson Counties, Pennsylvania**

| BENEFIT ITEM                         | BENEFIT           |
|--------------------------------------|-------------------|
| OFF SITE                             |                   |
| Fishery                              | \$761,000         |
| Roads and Culverts                   | \$ 53,000         |
| <b>TOTAL AVERAGE ANNUAL BENEFITS</b> | <b>\$ 814,000</b> |

**TABLE 6 -COMPARISON OF RECOMMENDED  
PLAN BENEFITS AND COSTS**

**Mill Creek, Clarion and Jefferson Counties, Pennsylvania**

**(Dollars)<sup>1</sup>**

| Item         | Average Annual<br>Benefits<br>Water Quality | Average<br>Annual<br>Costs | Benefit<br>Cost<br>Ratio |
|--------------|---|----------------------------|--------------------------|
| <b>Total</b> | <b>\$ 814,000</b>                           | <b>\$ 566,000</b>          | <b>1.40 : 1.00</b>       |

<sup>1</sup> Base Price 1997, amortized over 25 years at 7.125% discount rate

## 10 - REFERENCES

- Arway, J. A., 1994, Recreational Use Loss Estimates for PA Streams Degraded by AMD, PA Fish and Boat Commission, Bellefonte, PA
- Department of Environmental Resources, 1979. Water Quality Standards (Title 25, Part I, Subpart C, Article II, Chapter 93). Commonwealth of Pennsylvania, Harrisburg, PA.
- Hedin, R. S., R. W. Nairn, April, 1992. Designing and Sizing Passive Mine Drainage Treatment Systems. U.S. Bureau of Mines, Pittsburgh Research Center, Pittsburgh, PA.
- Hedin, R. S., R. W. Nairn, and R. L. P. Kleinmann, draft 1993. The Passive Treatment of Coal Mine Drainage. Bureau of Mines, U.S. Department of the Interior, Pittsburgh, PA.
- Hyman, D. M., G.R. Watzlaf, Mine Drainage Characterization for Successful Design and Evaluation of Passive Treatment Systems, U.S. Bureau of Mines, Pittsburgh Research Center, Pittsburgh, PA
- Soil Conservation Service, 1955 Soil Survey of Clarion County, PA. U.S. Department of Agriculture, Washington, D.C.
- Soil Conservation Service, 1960. Soil Survey of Jefferson County, PA. U.S. Department of Agriculture, Washington, D.C.
- U.S. Fish and Wildlife Service, 1987. National Wetlands Inventory. U.S. Department of the Interior, U.S.F.W.S. Region V, Newton Center, MA.
- U.S. Water Resources Council, 1983. Economic and Environmental Principles and Guidelines For Water and Related Land Resources Implementation Studies. Washington, D.C.
- Walsh, R. G., D. M. Johnson and J. R. McKean, December, 1988. Review of Outdoor Recreation Economic Demand Studies with Non Market Benefit Estimates. Colorado State University, Fort Collins, CO.
- Watzlaf, G. R. D.M. Hyman, 1995, Limitations of Passive Systems for the Treatment of Mine Drainage, U.S. Bureau of Mines, Pittsburgh Research Center, Pittsburgh, PA
- Damariscotta, 1994 Passive Wetland Treatment Design, Oven Run Watershed, Somerset County, PA, Clarion, PA
- Commonwealth of Pennsylvania, Department of Environmental Resources, 1977 Mine Drainage Abatement Project for the Mill Creek Watershed, Clarion and Jefferson Counties, Engineering Report Project Number SL133-5 Harrisburg, PA,
- US Army, Corp of Engineers, 1981 Clarion River Basin Pennsylvania, Acid Mine Drainage Abatement Program, Phase 1 General Design Memorandum, Pittsburgh PA



## 11 - LIST OF PREPARERS

| NAME              | PRESENT TITLE                                       | YEARS OF<br>EXPERIENCE | EDUCATION  |
|-------------------|---|------------------------|--|
| Dr. Peter Dalby   | Professor of Biology, Clarion University            | 24                     | Ph.D.-Zoology  |
| Dr. Terry Morrow  | Professor of Biology, Clarion University            | 25                     | Ph.D.-Biology  |
| Dr. Jack Williams | Professor of Biology, Clarion University            | 35                     | Ph.D.-Zoology  |
| Douglas Kepler    | Co-Owner, Damariscotta Environmental<br>Consultants | 16                     | MS-Biology   |
| Eric McCleary     | Co-Owner, Damariscotta Environmental<br>Consultants | 10                     | MS-Ecology   |
| Charles Meyers    | District Engineer, DEP/BAMR                         | 29                     | Civil Engineering                                    |
| Eric Cavazza      | Design Section Chief, DEP/BAMR                      | 12                     | BS-Civil Engineering<br>MS-Environmental Engineering |
| Pamela Milavec    | Water Pollution Biologist III<br>DEP/BAMR           | 13                     | BS-Env. Biology                                      |
| Richard Beam      | Hydrogeologist II                                   | 14                     | BS-Geology   |
| Bernard J. Spozio | District Conservationist, NRCS                      | 25                     | BS-Biology   |
| Gary L. Swope     | District Conservationist, NRCS                      | 20                     | BS-Agronomy  |
| Wayne Bogovich    | Area Engineer, NRCS                                 | 18                     | BS-Agricultural Engineer                             |
| Jeff Mahood       | Environmental Planning<br>Specialist, NRCS          | 21                     | BS-Environmental Resources<br>Management             |
| June Grabemeyer   | Agricultural Economist, NRCS                        | 20                     | MS-Agricultural<br>Economics                         |
| William J Bowers  | State Conservation Engineer, NRCS                   | 28                     | BS-Agricultural<br>Engineering                       |
| Daniel Seibert    | Resource<br>Conservationist, NRCS                   | 26                     | BS-Agronomy  |
| Barry Isaacs      | Biologist-NRCS                                      | 24                     | BS-Forestry  |
| Lisa Walker       | Clerk-Typist, NRCS                                  | 10                     |  |

The draft watershed plan and environmental assessment was reviewed and concurred in by a team of NRCS technical specialists having responsibilities in administration, agronomy, biology, engineering, geology, resource conservation, soils, water quality and watershed planning.

**APPENDIX A**

**LETTERS  
Of  
COMMENT**



**United States  
Department of  
Agriculture**

Rural  
Development

Suite 330, One Credit Union Place  
Harrisburg, Pennsylvania 17110-2996  
(717) 237-2298 (phone)  
(717) 237-2188 (phone)  
(717) 237-2261 (tdd)  
(717) 237-2197 (fax)  
pfleszar@rdmail.rural.usda.gov

November 19, 1998

**SUBJECT: Mill Creek, Clarion and Jefferson Counties  
Draft Watershed Plan and Environmental Assessment**

**TO: Daniel Seibert  
NRCS, Somerset**

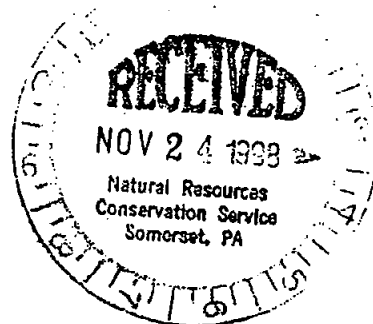
We have reviewed the subject document that outlines a proposed acid mine drainage remediation project on Mill Creek. Although a small portion of the Borough of Corsica lies within Mill Creek's watershed, Rural Development did not fund a sewage collection and treatment project there because their preapplication was withdrawn. According to our Butler Area Office, no Water and Waste Disposal projects are currently contemplated within the Mill Creek watershed.

Thus, we offer no comment on the proposed plan, and we applaud your significant effort to improve Pennsylvania's water quality.

Contact Peter Fleszar of this office if you have any questions or comments.

Sincerely,

  
KORAH ABRAHAM, P.E.  
Program Director  
Rural Utilities Service



REPLY TO  
ATTENTION OF

DEPARTMENT OF THE ARMY  
PITTSBURGH DISTRICT, CORPS OF ENGINEERS  
WILLIAM S. MOORHEAD FEDERAL BUILDING  
1000 LIBERTY AVENUE  
PITTSBURGH, PA 15222-4186

November 24, 1998

Plan Formulation Branch

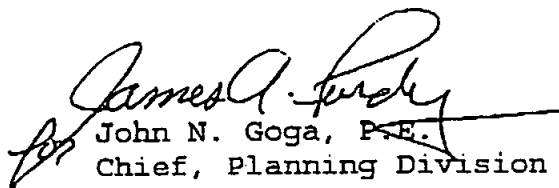
Ms. Janet Oertly  
State Conservationist USDA  
Natural Resources Conservation Service  
Suite 340, One Credit Union Place  
Harrisburg, Pennsylvania 17110-2993

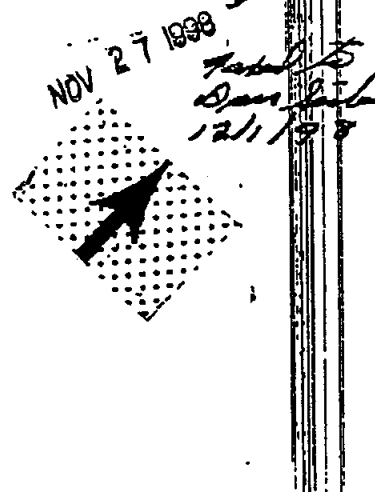
Dear Ms. Oertly:

We have reviewed the Draft Watershed Plan and Environmental Assessment for Mill Creek, Clarion and Jefferson Counties, Pennsylvania which you sent to us for review by cover letter dated November 9, 1998. The plan, if implemented, will clearly benefit the streams in the watershed by reducing the effects of uncontrolled acid mine flows. Although the plan is a long range effort, we would appreciate receiving any periodic updates that you may generate that describes the results of this acid mine drainage treatment program.

We have no other comments to offer at this time.

Sincerely,

  
John N. Goga, P.E.  
Chief, Planning Division





COMMONWEALTH OF PENNSYLVANIA

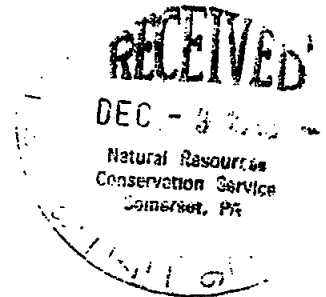
# PENNSYLVANIA GAME COMMISSION

2001 ELMERTON AVENUE  
HARRISBURG, PA 17110-9797

December 3, 1998

| ADMINISTRATIVE BUREAUS: |              |
|-------------------------|--------------|
| ADMINISTRATION          | 717-787-5570 |
| AUTOMOTIVE AND          |              |
| PROCUREMENT DIVISION    | 717-787-6534 |
| LICENSE DIVISION        | 717-787-2034 |
| PERSONNEL DIVISION      | 717-787-7536 |
| WILDLIFE MANAGEMENT     | 717-787-5529 |
| INFORMATION & EDUCATION | 717-787-6286 |
| LAW ENFORCEMENT         | 717-787-5740 |
| LAND MANAGEMENT         | 717-787-6618 |
| REAL ESTATE DIVISION    | 717-787-6568 |
| MANAGEMENT INFORMATION  |              |
| SYSTEMS                 | 717-787-4076 |

Daniel R. Seibert, USDA  
Natural Resources Conservation Service  
North Ridge Building  
1590 North Center Avenue, Suite 105  
Somerset, PA 15501



In re: Mill Creek Watershed  
Draft: Watershed Plan and Environmental Assessment

Dear Mr. Seibert:

Thank you for forwarding a copy of the Draft Watershed Plan and Environmental Assessment (Plan-EA) for the Mill Creek PL 83-566 project in Clarion and Jefferson Counties to our office for review.

We have completed an office review and concur with the findings as outlined in the Plan-EA.

If we can be of further assistance, please feel free to contact me at (717) 783-1728.

Very truly yours,

Barry K. Ray, Sr.  
Division of Environmental  
Planning and Habitat Protection  
Bureau of Land Management

BKR/bkr

18 December, 1998

Bernie Spozio, District Conservationist & Member  
PL-566 Watershed Protection and Flood Prevention Program

We live in the Millcreek Drainage and we are acutely aware of how important clean, potable and chemical-free water is to a community. Metals, acids and contaminants not only are abuses to those living in an area, but also prevent any economic development where the water is less than excellent. Recreational use suffers and income to the area from recreational use is destroyed.

Every community hopes for high quality development to locate in the vicinity. A moments reflection will bring recognition that no chief executive officer will favor an area with impure water. All of the space age manufacture of chips, resistors and transistors demands pure water. The presence of extraneous metals --even in the atmosphere contaminated from the water-- will destroy production.

From an aesthetic standpoint, who would care to live in a community where the water resembles a chemical sewer? The damage was done by rip-off ventures where a resource was destroyed by men that wanted a quick dollar and to hell with the future, the economic benefits of the region or how our children or grandchildren might suffer in employment opportunity. If we examine the entire income from these unregulated strip mines of the past, it is obvious that less money was earned than the cost it will require to clean up the mess they left. Our state would have been better off to purchase the mineral rights and leave the coal in the ground. However, this is hindsight. The best we can do is to spend huge sums and do our best to rectify the pollution that injures our water and the regional economy.

My family strongly supports the Mill Creek Watershed Plan and Environmental Assessment being developed by the Mill Creek Coalition.

Sincerely yours,

*Karl Schurr*

Dr. Karl Schurr  
Box 134 Fisher Pa. 16225



COMMONWEALTH OF PENNSYLVANIA  
PENNSYLVANIA FISH & BOAT COMMISSION  
Division of Environmental Services  
450 Robinson Lane  
Bellefonte, PA 16823-9620  
(814) 359-5147



December 23, 1998

Mr. Dan Seibert  
USDA - NRCS  
1590 North Center Avenue  
Suite 105  
Somerset, PA 15501

Re: Mill Creek  
Draft Watershed Plan and Environmental Assessment

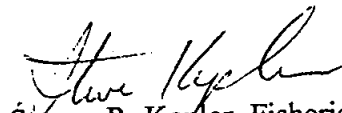
Dear Mr. Seibert:

There have been significant improvements in the water quality in Mill Creek and Little Mill Creek through construction of a variety of passive treatment systems on abandoned acid mine drainage discharges over the past few years. The stream quality prior to these passive systems contained a pH of 3.5 and present conditions contain pH readings of greater than 5.5. The present quality should now better support fish and aquatic life.

The Draft Watershed Plan and Environmental Assessment addresses the remaining mine drainage problems in the Mill Creek watershed and should continue to enhance the aquatic life in the stream system. Continued efforts should also be made to evaluate additional remining, reclamation and permanent abatement projects as part of the final proposal.

In conclusion, the Pennsylvania Fish and Boat Commission strongly supports the Draft Watershed Plan and Environmental Assessment which would continue to remediate mine drainage problems in the watershed.

Sincerely,

  
Steven R. Kepler, Fisheries Biologist  
Division of Environmental Services

SRK:dms



## IRON FURNACE CHAPTER • TROUT UNLIMITED

P.O. Box 324, Clarion, PA 16214

December 24, 1998

Gary Swope  
District Conservationist for Jefferson County  
478 Jeffers Street  
DuBois, PA 15801

Dear Mr. Swope:

The Iron Furnace Chapter of Trout Unlimited, which serves Clarion and Jefferson Counties, stands in strong support of the PL566 proposal developed by the Natural Resources and Conservation Service for the remediation of Mill Creek.

The Iron Furnace Chapter has been closely involved in the recovery of Mill Creek as a member of the Mill Creek Coalition since 1990 and is delighted by the prospect that the proposal will allow the complete recovery of this important watershed.

Both Clarion and Jefferson Counties will benefit economically from the recovery of the Mill Creek watershed.

Sincerely,

*James H. Knickerbocker*  
James H. Knickerbocker, Secretary  
Iron Furnace Chapter, Trout Unlimited



the

# Magic Forests

Visitors Bureau

Phone: 800-348-9393

814-849-5197

FAX: 814-849-1969

www.magicforests.org

175 Main Street • Brookville, PA 15825

December 29, 1998

Gary Swope  
Natural Resources Conservation Service  
478 Jeffers Street  
DuBois, PA 15801

Dear Mr. Swope:

Please consider this as a letter of support for application being submitted by the NRCS for restoration of the Mill Creek Watershed from acid mine drainage.

A majority of people who visit our region for recreational purposes do so to spend time in our woods and waters and to experience the natural beauty and serenity of our outdoors. These same visitors generate substantial income into our local economies. Our most recent data indicates that during 1997 visitors spent \$64 million in Clarion County and another \$57 million in Jefferson County.

The accomplishments of this project would improve the water quality and aquatic habitat in Little Mill Creek, Mill Creek, Jones Creek, Douglas Run, and Whites Run, and the Clarion River. The project would certainly serve to enhance and further protect these same natural resources which support this important segment of our economy and to insure the watershed area and the Clarion River continue to offer safe and healthy recreational opportunities.

Please let me know if I can be of any further assistance.

Sincerely,



Dave Morris  
Executive Director

# ***Seneca Rocks Audubon Society***

RD 2, Box 26  
Shippenville, PA 16254  
December 28, 1998

Mr. Gary Swope  
Natural Resources Conservation Service  
498 Jeffers St.  
DuBois, PA 15801

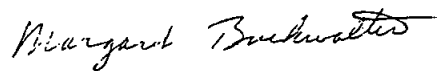
Dear Mr. Swope,

This is to inform you that the Seneca Rocks Audubon Society, which is a long-standing member of the Mill Creek Coalition, fully supports the PL 83-566 proposal for the Mill Creek Watershed Plan and Environmental Assessment substantially as specified in the Draft Review of March, 1998.

The benefits of this plan to the communities involved will far outweigh the cost. We who live in the Clarion/Jefferson County area look forward to the restoration of the Mill Creek watershed. For too long the results of the earlier strip-mining in this area have been allowed to pollute our streams and degrade our wildlife habitats.

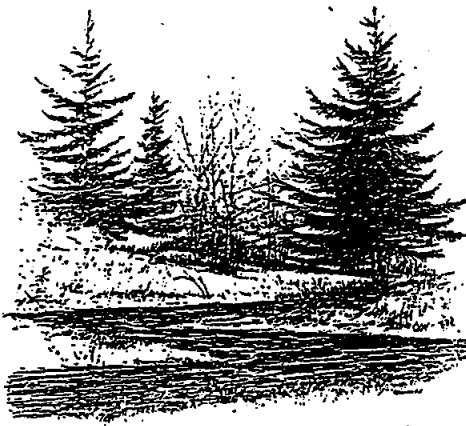
We commend your plan and offer you our whole-hearted support.

Sincerely,



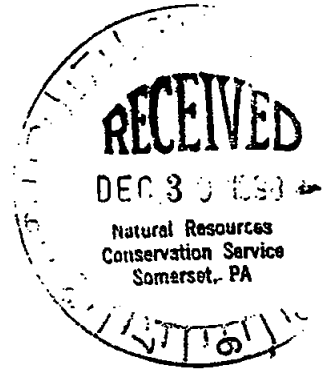
Margaret Buckwalter, President  
Seneca Rocks Audubon Society

# Canaan Valley Institute



December 29, 1998

Daniel R. Seibert  
USDA NRCS  
North Ridge Building  
1590 North Center Ave, Suite 105  
Somerset, PA 15501



Dear Dan,

P.O. Box 673  
Davis, WV 26260  
Telephone: 304-866-4739  
Fax: 304-866-4759

Nice job on the Mill Creek PL-566 draft. Below are several comments I would like to submit.

Page 7-2 Remining - I believe an unsuitable for mining petition was approved for a subwatershed - not sure which one. You may want to check with Bernie on this if it's important to include.

1 Creative Pl.  
NorthGate Business Park  
Charleston, WV 25311  
Telephone: 304-345-4550  
Fax: 304-342-3958

Page 8-1 Watershed Success - Please mention Headwaters Charitable Trust. After all, it was the Trust who submitted and administered several hundred thousand dollars of public funding and private foundation money on behalf of the coalition.

650 Leonard Street  
Clearfield, PA 16830  
Telephone: 814-768-9584  
Fax: 814-768-9587

Page 8-2 Mill Creek Coalition composition - Damariscotta resigned as members of the coalition in 1996. Did they rejoin? They are not listed on the coalition letterhead.

Page 8-4 Plan Review - Please include Canaan Valley Institute to the Plan Review List.

As for the cost estimates, I feel they should be fairly accurate. I used one of your initial estimates on the Filson 7 discharge which was bid, but never constructed due to an OSM intervention. The bids were very close to your estimate on design and construction.

Again, very nice job and thanks for the opportunity to review the plan. Good luck with the application.

Sincerely,

Janie French  
PA Watershed Coordinator

cc. Pete Dalby - Mill Creek Coalition  
cc. Eric Carlson - Headwaters RC & D



# Clarion County Federation of Sportsmen

## CLARION COUNTY, PENNSYLVANIA



Box 22  
Shops, PA 16255  
29 Dec. 1998

Alliance for Wetlands and Wildlife

Bios Club

Bucktails of Beaver Twp.

Clarion Co. Chapter -  
PA Trappers Assoc.

Concerned Sportsmen

Hawthorn Rod & Gun

Iron Furnace Chapter - TU

Rimersburg Rod & Gun

PFSC



PENNSYLVANIA FEDERATION OF  
SPORTSMEN'S CLUBS, INC.

Mr. Bernie Spozio  
NRCS  
RR 3, Box 265  
Clarion, PA 16214

Dear Mr. Spozio,

As a member group of the Mill Creek Coalition and after having representatives review drafts of the PL 566 grant proposal for the restoration of Mill Creek, and from attending the December 17 public meeting in Corsica, PA, the Clarion Co.

Federation of Sportsmen heartedly supports this grant proposal. This area has a strong hunting, fishing and outdoor recreation tradition enjoyed by the local community as well as by those from Pittsburgh and other urban areas in western PA and neighboring Ohio who have relatives and/or camps in this bicounty region.

Mill Creek is the largest stream draining Clarion County, and there are two locations that are presently stocked by the PA Fish & Boat Commission. The approval of this PL 566 proposal would increase not only the trout stocking locations but would also greatly improve native trout reproduction. The greatest potential for the fishery and the public will be in the lower half of the watershed, all of it in the public domain (Gamelands 74) and easily accessible.

In a county and region where most of the trout streams have been degraded or made devoid of life as a result of past surface mining practices, restoration of a single watershed is a tremendous benefit to the community. For that reason, in the Federation's view, the benefit to cost ratio is much higher than the calculated benefit to cost ratio found in the proposal. As a result, the eight clubs and 385 members of the Clarion County Federation of Sportsmen look forward to the restoration of Mill Creek and are prepared to assist in the restoration efforts in any way it can.

Sincerely,

Member of the PA Federation of Sportsmen's Clubs

Member of the Mill Creek Coalition of Clarion and Jefferson Counties

*Frank Saylor*



Mill Creek Coalition  
of  
Clarion and Jefferson Counties



6 E. 8th Ave  
Clarion, PA 16214  
29 December 1998

Alliance for Wetlands  
and Wildlife

Conservation District  
Clarion County

Conservation District  
Jefferson County

Federation of Sportsmen  
Clarion County

Federation of Sportsmen  
Jefferson County

Iron Furnace Chapter  
of Trout Unlimited

Magic Forest of West-Central  
Pennsylvania

Mill Creek Chapter  
National Wild Turkey Federation

League of Women Voters  
of Clarion County

Seneca Rocks  
Audubon Society

Natural Resources  
Conservation Service

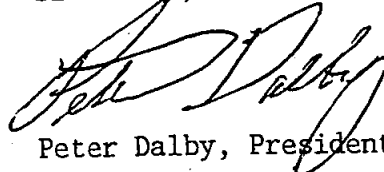
Mr. Bernie Spozio  
NRCS  
RR 3, Box 265  
Clarion, PA 16214

Dear Mr. Spozio:

As a cooperating entity of the Mill Creek, Clarion & Jefferson Counties, PA Watershed Plan submitted as a PL 83-566 proposal, the Mill Creek Coalition fully supports the plan. As you know only so well, NRCS and Coalition personnel have been working diligently on this proposal for the past several years. During this period, it has maintained a most cooperative and professional relationship with the Coalition.

The Coalition expects to continue working with NRCS toward the complete restoration of Mill Creek. This project's cost's are outweighed by the benefits that will be derived for the bicounty area once a stream of this size and importance is restored to its biological, aesthetic and recreational potential.

Sincerely,

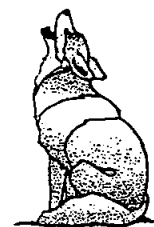
  
Peter Dalby, President

Member of  
Clarion River Basin Commission  
Pennsylvania Organization for Watersheds and Rivers



**ALLIANCE for  
WETLANDS and WILDLIFE**

R.D. 3, Box 276 Clarion, PA 16214  
Phone - (814) 226-7880  
Fax - (814) 226-7882



December 30, 1998

To: Mr. Bernie Spozio, District Conservationist  
USDA, NRCS  
R.D. 3 Box 265  
Clarion, PA 16214

Dear Mr. Spozio:

The Alliance for Wetlands and Wildlife would like to offer our full support to the PL566 grant proposal for the Mill Creek watershed.

We see the proposed treatment methods involving passive treatment wetlands and liming of acidic spoil areas to have not only a beneficial effect on the water quality of Mill Creek itself, but also on the wildlife populations in the watershed.

Our organization is active over all of Northwestern Pennsylvania and is ready to assist the NRCS in seeing this project to completion. Because so much of Mill Creek is on public land or land open to the public, the impact of this work will be very significant to Clarion and Jefferson Counties.

Sincerely,

Pamela J. Moore  
Secretary



LEAGUE OF WOMEN VOTERS OF CLARION COUNTY  
BOX 108, CLARION, PA. 16214

December 30, 1998

Mr. Daniel R. Siebert  
USDA  
Natural Resources Conservation Service  
North Ridge Building  
1590 North Center Avenue, Suite 105  
Somerset, PA 15501

Dear Mr. Seibert,

Water quality and wetlands have been priority issues for the League of Women Voters for several decades. We are pleased to support the plan to restore quality of the water in the Mill Creek watershed as described in the Mill Creek PL 83-566 application.

It is important to the larger Clarion River watershed and to the many people who depend upon it for their source of water that the acid mine drainage from Mill Creek be treated. In addition the economy of the area will be enhanced by the stream and habitat improvements.

We look forward to the approval and implementation of the plan for the Mill Creek watershed.

Sincerely,

Janice H. Horn,  
President



Pennsylvania Department of Environmental Protection

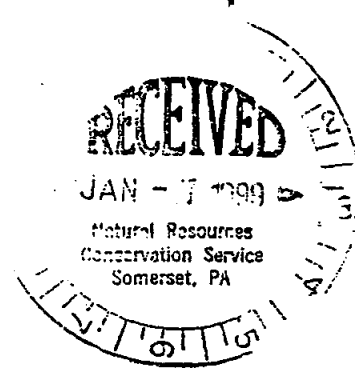
P.O. Box 149  
Ebensburg, PA 15931  
January 5, 1999

Bureau of Abandoned Mine Reclamation

814-472-1800

Mr. Daniel R. Seibert  
USDA, Natural Resources Conservation Service  
North Ridge Building  
1590 North Center Avenue, Suite 105  
Somerset, PA 15501

Re: Mill Creek Draft Watershed Plan and Environmental Assessment  
Clarion and Jefferson Counties



Dear Dan:

This letter is in support of the watershed remediation efforts being undertaken in the Mill Creek Watershed. This effort is in keeping with the Department of Environmental Protection's Mission Statement and the Bureau of Abandoned Mine Reclamation's effort to work in partnership involving a comprehensive mine reclamation strategy.

Thank you, also, for the opportunity to again review the subject draft watershed plan and environmental assessment (October 1998). Many of our initial concerns, that the desired abatement continues to be both difficult and costly, remain. These concerns may be offset by "additional" funding partners and the thirteen year time frame presented. A further suggested consideration would be to reduce the area of watershed remediation.

The following plan review comments are offered:

1. In Section 1-1 of the plan document, a statement is made with respect to lime application on approximately 300 acres of the watershed. The plan indicates that this application will increase in-stream alkalinity and promote vegetative cover. While the lime application will likely aid in establishing vegetation, we do not believe that it will result in any net noticeable reduction in in-stream acidity concentrations. This assessment is based on knowledge of overburden analysis data for coal seams mined in this watershed. The overburden historically has large alkaline deficiencies which would require much larger than normal application rates for both surface application and alkaline addition spoil blending during site reclamation.





Mr. Daniel R. Seibert

-2-

January 5, 1999

2. Based upon our review of Jones and Douglas Runs, we do not believe that they will be restored to such an extent as to support a Cold Water Fishery (CWF). There are strong indications of groundwater contamination in this sub-watershed as evidenced by polluted water supply wells and by pollutional discharges which surface much lower in elevation than the croplines of the coal seams mined.
3. A review of some of the current field sample data for a number of the discharges proposed for treatment have very high aluminum concentrations. Consequently, a more intensive flushing and maintenance plan will be required for the selected passive treatment systems. Will the local sponsor accept and be capable of performing these operation and maintenance duties.

It is the intent of the Bureau to continue to work with the Coalition and your agency to assist in the rehabilitation of the Mill Creek Watershed. If you would like to discuss these issues further, please feel free to contact Pam Milayec, Rich Beam or me.

Sincerely,

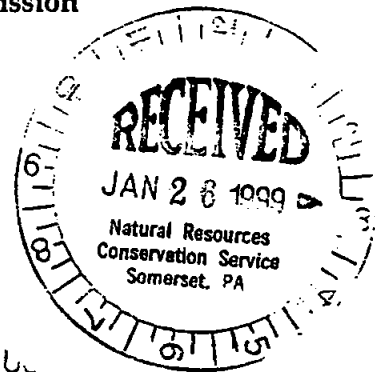


C. H. Meyers  
District Engineer  
Ebensburg District Office



Commonwealth of Pennsylvania  
**Pennsylvania Historical and Museum Commission**  
Bureau for Historic Preservation  
Post Office Box 1026  
Harrisburg, Pennsylvania 17108-1026

January 14, 1999



Daniel R. Seibert  
USDA, NRCS  
North Ridge Building, Suite 105  
1590 North Center Avenue  
Somerset, PA 115501

TO EXPEDITE REVIEW U.S.  
FHP REFERENCE NUMBER

Re: ER # 96-2789-042-D  
NRCS, Draft Watershed Plan and Environmental Assessment for Proposed Mill Creek  
Water Quality Improvement Project, Clarion and Jefferson Counties

Dear Mr. Seibert:

The Bureau for Historic Preservation (the State Historic Preservation Office) has reviewed the above named project in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended in 1980 and 1992, and the regulations (36 CFR Part 800) of the Advisory Council on Historic Preservation. These requirements include consideration of the project's potential effect upon both historic and archaeological resources.

Thank you for providing this document for our review. Based on in-field inspections by Mark McConaughy of our staff, we agree with the measures your agency has proposed to identify archaeological resources in Area 53. We also agree that no significant archaeological sites are likely to be located in the remainder of the project sites. If you have any questions, please contact Mark McConaughy at (724) 527-5585 or Andrew Wyatt at (717) 772-0923

In our opinion no evaluation of historic structures will be necessary for this project.

Sincerely,

Kurt W. Carr, Chief  
Division of Archaeology &  
Protection

cc:Mark McConaughy, Bushy Run Battlefield  
KWC:AW

## **APPENDIX B**

### **INVESTIGATIONS AND ANALYSES REPORT**

#### **INTRODUCTION**

The Investigations and Analyses Report presents information that supports the formulation, evaluation, and conclusions of the Mill Creek Watershed Plan and Environmental Assessment (Plan-EA). This report contains information required by the U.S. Water Resources Council's "Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies." Duplication of information presented in the Plan-EA was avoided unless required for clarity.

#### **PROBLEM IDENTIFICATION**

Resource problems in the Mill Creek project area were determined by a group of technical specialists and included input from Pennsylvania Department of Environmental Protection (PADEP), Bureau of Abandoned Mine Reclamation, the Bureau of Mining and Reclamation, the Clarion County Conservation District, Jefferson County Conservation District, the Pennsylvania Fish and Boat Commission (PFBC), and the Mill Creek Coalition. A resource inventory process was used to determine the degree of concern and importance to decision making for each resource consideration.

Surface water quality problems were documented by the PFBC, the USDA-Natural Resources Conservation Service (NRCS), PADEP, Bureau of Abandoned Mine Reclamation, Bureau of Mining and Reclamation, Damariscotta and Clarion University. The PFBC, and Clarion University documented the deleterious impacts of the mine drainage on aquatic life.

#### **COMPARISON OF ALTERNATIVE PLANS**

Comparison of the No Action and Recommended Plan alternatives was based on conditions expected to exist 25 years into the future. Professional judgement was used to predict future conditions if No Action was taken, since little change in conditions is likely.

Estimates of with-project impacts were determined by several methods. Water quality from constructed treatment wetlands is predictable due to data from similar sites treated using this technology and studies by the U.S.D.I.- Bureau of Mines. The projected water quality and yield from identified discharge points was used to estimate water quality in Mill Creek and its tributaries. The PFBC assisted in predicting improvements in aquatic habitat, which would result from reduced concentrations and yield of iron.

Changes in wildlife habitat were estimated using the Pennsylvania Modified Habitat Evaluation procedures. Changes in wildlife food and cover in wetland and upland habitat were the most important factors in the evaluation.

## **RECOMMENDED PLAN**

The Recommended Plan is the chosen alternative. There will be no known interactions between this plan and other federal and non-federal projects. The effects of the plan on resources of principal national recognition are shown on the accompanying table.

### **Engineering**

Fifty-eight project sites were identified in this plan. The 58 sites were chosen based on their detrimental loads of acid, iron, aluminum and manganese, in the Mill Creek watershed.

Samples and flow measurements taken at each location are the basis for this plan. Samples and flow measurements were provided by several sources. Damariscotta correlated sampling data for each site and provided the data to NRCS.

A method of treatment was determined for each site, based on existing and projected water quality and quantity data. The final treatment included those items necessary to control surface water as well as seepage and deep mine drainage from each site.

The construction cost included costs for clearing and grubbing, pollution control, seeding, drainfill, rockfill, diversion, rock-lined waterways, plastic pipe conduit, loose rock riprap, grading, water control structure, access roads, and constructed wetlands. Non-construction costs were estimated for engineering, project administration, land rights, and operation and maintenance.

### **Economics**

The primary problem in Mill Creek is degraded aquatic habitat due to impaired water quality. The primary economic benefit in restoring the water quality is the restoration of aquatic habitat, which is essential to restoring a fishery. The economic benefit that this can bring to the area is revenue from fishing including lodging, food, restaurants, recreation, fishing supplies and equipment. We contacted the PFBC to determine a dollar value to reflect the economic benefits. Some of the data provided was based on a publication entitled, "Review of Outdoor Recreation Demand Studies with Non-Market Benefit Estimates." (Walsh, et al, 1988). Economic benefit was also gained through reduced maintenance to roads and culverts. Clarion township and Elder township supervisors, along with Pennsylvania Department of Transportation officials in Punxsutawney, PA and Indiana, PA provided data on bridge and culvert damages caused by acid mine drainage in the Mill Creek watershed.

In addition, studies by the National Forest Service evaluated Recreational Units related to cold water fish. This study found a range of \$10.07 to \$118.12 per angler day. The PFBC recommended \$49.63 per angler day and 500 angler visits per mile per year for the Mill Creek watershed.

The costs and benefits were amortized to annual equivalents over a 25 year period using the established water resources discount rate for 1997, which is 7.125%. For this project, the annualized benefits are \$499,842 and the annualized costs are \$481,921. The net economic benefits are \$17,921. This amount does not include the additional benefits for which economic values were not quantified. Other benefits, including improved aesthetics, enhanced educational facilities; business and industry were not specifically evaluated at this time. The annualized benefit to cost ratio is 1.04:1.0.

**EFFECTS OF THE RECOMMENDED PLAN ON RESOURCES OF PRINCIPAL NATIONAL RECOGNITION  
MILLCREEK, CLARION AND JEFFERSON COUNTIES, PENNSYLVANIA**

| <b>TYPES OF RESOURCES</b>                              | <b>PRINCIPAL SOURCES OF<br/>NATIONAL RECOGNITION</b>   | <b>MEASUREMENT OF EFFECTS</b>  |
|--|--|--|
| Air Quality  | Clean Air Act, as amended<br>(42 U.S.C. 7401 et seq.)  | Temporary increase in particulates<br>during construction. Controls<br>will be used. |
| Areas of Particular Concern<br>within the Coastal Zone | Coastal Zone Management Act of 1972,<br>as amended (16 U.S.C. 1451 et seq.)  | Not present in planning area   |
| Endangered and Threatened<br>Species Critical Habitat  | Endangered Species Act of 1973, as amended<br>(16 U.S.C. 1531 et seq.)   | No effect  |
| Fish and Wildlife Habitat                              | Fish and Wildlife Coordination Act (16 U.S.C.<br>Sec. 661 et seq.)   | 32.8 miles of aquatic habitat improved<br>21 acres of wetland gained                 |
| Flood Plain  | Executive Order 11988, Flood Plain Management  | No effect  |
| Historic and Cultural<br>Properties                    | National Historic Preservation Act of 1966,<br>as amended (16 U.S.C. 470 et seq.)  | No effect <sup>1</sup>   |
| Prime and Unique Farmland                              | CEQ Memorandum of August 1, 1980; Analysis of<br>Impacts of Prime or Unique Agricultural<br>Lands in implementing the National<br>Environmental Policy Act | 96 acres of important farmland converted   |
|  | Farmland Protection Policy Act of 1981<br>(PL-97-98)   | No effect  |
|  | Food Security Act of 1985 (PL-99-198)  | No effect  |

**EFFECTS OF THE RECOMMENDED PLAN ON RESOURCES OF PRINCIPAL NATIONAL RECOGNITION  
MILL CREEK, CLARION AND JEFFERSON COUNTIES, PENNSYLVANIA**

| <b>TYPES OF RESOURCES</b> | <b>PRINCIPAL SOURCES OF<br/>NATIONAL RECOGNITION</b>  | <b>MEASUREMENT OF EFFECTS</b>                            |
|---------------------------|---|--|
| Water Quality             | Clean Water Act of 1977 (33 U.S.C. 1251 et seq.)  | Improves surface water quality                           |
| Wetlands                  | Executive Order 11990, Protection of Wetlands,<br>Clean Water Act of 1977 (33 U.S.C. 1251 et seq.)<br>Food Security Act of 1985 | Wetland will be created to address mine drainage problem |
| Wild and Scenic Rivers    | Wild and Scenic Rivers Act, as amended<br>(16 U.S.C. 1271 et seq.)  | Not present in planning area                             |

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<sup>1</sup> One Phase 1 archaeological study to be conducted

**APPENDIX C**

**PL 83-566  
PROJECT DATA**

**PL 83-566 PROJECT DATA**  
**MILL CREEK**  
**Clarion and Jefferson Counties, Pennsylvania**  
**(When Fully Implemented)**

**Longitude/Latitude (midpoint): 41-12-02, 79-13-23**

**PL 83-566 Project Purpose(s): Aquatic biology restoration through water quality improvement**

**Acres Benefited: 244**

**Monetary Agricultural (including Rural Areas) Flood Damage Reduction Benefits (average annual): NA**

**Monetary Non-Agricultural Flood Damage Reduction Benefits (average annual): NA**

**Monetary Agricultural (including Rural Areas) Benefits (average annual): 814,000**

**Monetary Non-Agricultural Benefits (average annual): NA**

**Houses Benefited (#): NA**

**Businesses Benefited (#): NA**

**Public Facilities Benefited (#): 1 State Game Land**

**Roads Benefited (miles): 40**

**Bridges and Culverts Benefited (#): 170**

**Farms and Ranches Benefited (#): 6**

**Economically/Socially Disadvantaged Project Beneficiaries (#): 630**

**Total Number of Direct Beneficiaries: 9800**

**Incidental Recreation (# of water bodies created): 61 SAPS  
49 Wetlands  
84 Basins**

**Reduced Erosion (average annual, tons/yr): 2100 tons**

**Reduced Sedimentation (average annual, tons/yr): 1260 tons**

**Nitrogen Fertilizer Reduced (average annual, tons/yr of n): NA**

**Phosphate Fertilizer Reduced (average annual, tons/yr of p): NA**

**Reduced Use of Insecticides (average annual, lbs/yr): NA**

**Reduced Use of Herbicides and/or Fungicides (average annual, lbs/yr): NA**



Lakes/Reservoirs Enhanced/Protected (surface acres): 1160

Streams/Corridors/Instream Flows Enhanced/Protected (miles): 32.8

Streams Meeting State Water Quality Standards (miles): 29.8

Water Bodies Meeting State Water Quality Standards (surface acres): NA

Aquifer Protected/Improved to State Water Quality Standards (yes/no): No

Proper Animal Waster Disposal (average annual, tons): NA

ICM/Chemical and Nutrient Management (acres): NA

Public Water Supplies Benefited (#): 1

Water Conserved (average annual, acre-feet): NA

Beneficial Use of Conserved Water (municipal water-supply, fish and wildlife, etc.): NA

Ground Water Recharge (average annual, acre-feet): NA

Wetlands Created (acres): 21

Wetlands Enhanced (acres): 20.5

Upland Habitat Dedicated (acres): NA

Upland Habitat Enhanced (acres): 70

Threatened and Endangered Species Benefited (yes/no): No

Visitor Days Supplied (average annual recreation, days): 15525

Public Access Area Provided (acres): NA

Complementing Program (yes/no): Yes

Historical or Archaeological concerns (yes/no): Yes

Sponsors Total Installation Cost (note price base year): \$3,747,000 1997

Sponsors Operation, Maintenance, and Replacement Cost (average annual-note price base year): \$48,000

Jobs Created – Construction (# of person-years): 29

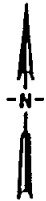
Employment in Operation, Maintenance, and Replacement (# of person years): 1

Benefit: Cost Ratio: 1.4:1

**Project Interest Rate: 7.125%**

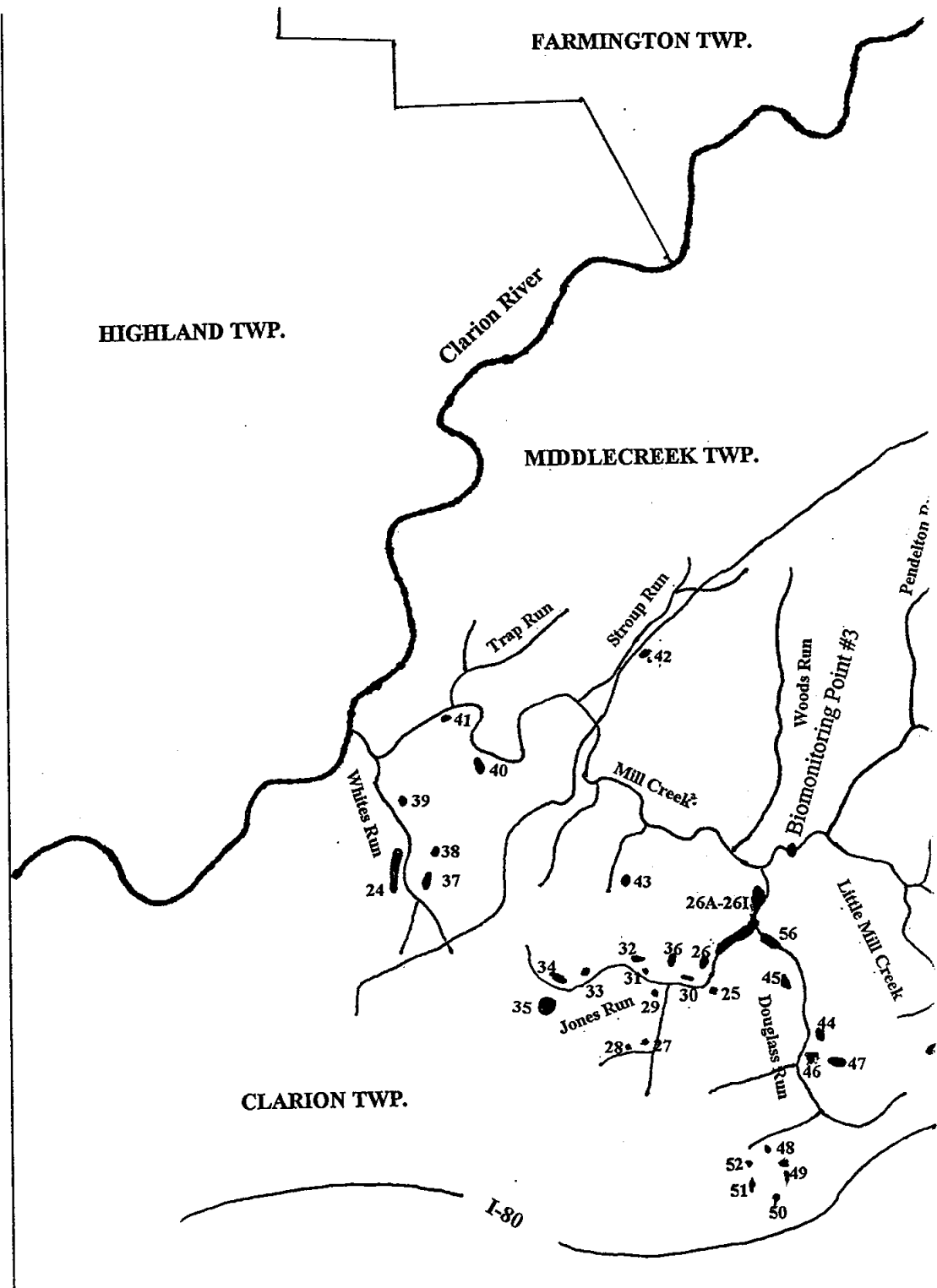
**Project Evaluated Life: 25 years**

# PROJECT MILL CREEK - AMD TR



## LEGEND

- Viable Trout Fishery
- Degraded Trout Fishery
- No Trout Fishery
- Roads
- AMD Sites



SCALE 1:101562

# JECT MAP

## ID TREATMENT SITES

