

**INDIAN CREEK  
FAYETTE AND WESTMORELAND COUNTIES  
PENNSYLVANIA**

**WATERSHED PLAN  
AND  
ENVIRONMENTAL ASSESSMENT**

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

**IN COOPERATION WITH  
FAYETTE COUNTY COMMISSIONERS  
FAYETTE CONSERVATION DISTRICT  
MOUNTAIN WATERSHED ASSOCIATION**

**OCTOBER, 2000**

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**WATERSHED PLAN and ENVIRONMENTAL ASSESSMENT**  
**INDIAN CREEK**  
**FAYETTE and WESTMORELAND COUNTIES, PENNSYLVANIA**

**ABSTRACT:**

The Indian 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 Fayette County, Pennsylvania. Part of the watershed upstream of the project area is located in Westmoreland County. The Indian Creek project area drains into the Youghiogheny River, a tributary to the Monongahela 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 10 passive mine water treatment systems in the Indian Creek watershed. Economic benefits will exceed the costs. Sponsors will incur about fifty-one percent (51%) of the total project cost of \$ 4,166,000. The project will improve water quality and restore or enhance aquatic habitat in 17.4 miles of Indian Creek. Other project benefits include the elimination of safety hazards associated with deep mine openings and water filled pits, reduced road maintenance costs, increased property values, enhanced aesthetics, improved recreation potentials, reduced operating costs to the public drinking water system, 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 1969, as amended.

**FOR ADDITIONAL INFORMATION CONTACT:**

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

**PREPARED BY:**

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

In Cooperation with  
Fayette County Commissioners                      Fayette Conservation District  
Mountain Watershed Association

**INDIAN CREEK  
WATERSHED AGREEMENT**

**Between the**

**The Fayette County Commissioners  
and**

**The Fayette Conservation District  
and**

**The Mountain Watershed Association  
(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 Indian 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 Indian 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 \$92,000.)

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 | 51%                          | 49%                      | \$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>\$3,452,000</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 **\$174,000** each.
7. The Sponsors and NRCS will bear the costs of **project administration**, that each incurs estimated to be **\$137,000** each.
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 **\$17,000** per year.
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 INDIAN 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 Indian 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 Fayette County Commissioners adopted at a meeting held on 9/28/00.

Fayette County Commissioners  
Commissioners Office  
Fayette County Court House  
Uniontown, Pa 15401

COUNTY OF FAYETTE  
BOARD OF COMMISSIONERS

ATTEST:

Judith M. Bodden

Vincent A. Vicites  
Vincent A. Vicites, Chairman

Sean M. Cavanaugh  
Sean M. Cavanaugh

(SEAL)

Ronald Nehls  
Ronald Nehls

Sworn to and subscribed before  
me this 2<sup>nd</sup> day of Oct-19 2000  
Janice Winterhalter  
Janice Winterhalter Prothonotary of  
Fayette County, Pa.  
My Commission Expires First  
Monday of January 2024

## SIGNATURE SHEET

### PL 83-566 WATERSHED AGREEMENT INDIAN 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 Indian 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 Fayette Conservation District adopted at a meeting held on September 25, 2000.

Fayette Conservation District  
10 Nickman Plaza  
Lemont Furnace, PA  
15456-9732

By: Don Bower

Title: District Chairman

Date: Sept. 25, 2000

## SIGNATURE SHEET

### PL 83-566 WATERSHED AGREEMENT INDIAN 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 Indian 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 Mountain Watershed Association adopted at a meeting held on September 27, 2000.

Mountain Watershed Association  
P.O. Box 408  
Melcroft, PA 15462

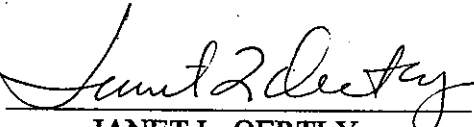
By: Beverly A. Broverman  
Title: Executive Director

Date: 9-27-2000

## SIGNATURE SHEET

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

United States Department of Agriculture  
Natural Resources Conservation Service

Approved by:   
JANET L. OERTLY  
STATE CONSERVATIONIST

Date: 10/11/00



## 1 - EXECUTIVE SUMMARY

The Natural Resources Conservation Service (NRCS) began work on Indian Creek in 1998 in cooperation with the Mountain Watershed Association.

The purpose of this project will be to improve water quality and aquatic habitat in Indian Creek, and tributaries Champion Creek, Poplar Run, Newmyer Run and Buck Run. The water quality in these streams will be improved by decreasing concentrations of acid, iron, and aluminum. Health and safety hazards associated with deep mine openings and water filled pits will be removed in the process of treating acid mine drainage. Basement flooding caused by acid mine drainage may be reduced in several homes at one site. 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. Increased land values, improved recreation potentials, technology transfer and environmental education opportunities will also occur.

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 proposed sites have a combination of problems that will be corrected. They include deep mine discharges that have large flows of mine drainage and smaller flows of nonpoint mine seepage. Deep mine portals 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 Indian Creek Watershed in the northeastern portion of Fayette County, Pennsylvania. All sites are within 11 miles of the Pennsylvania Turnpike exit 9, Donegal, Pennsylvania. The Indian Creek project area is within 40 miles of Pittsburgh, population 2.25 million, within 40 miles of Johnstown, within 30 miles of Greensburg and within 45 miles of Morgantown, West Virginia. The 1998 population in Fayette County was 144,847<sup>1</sup>.

Water treatment will be accomplished through the construction of Successive Alkalinity Producing Systems (SAPS), anoxic limestone drains (ALD), draining improperly backfilled stripmine highwalls, lowering deep mine pool elevations, aerobic wetlands, limestone waterways and settling ponds. These systems will reduce acid production on improperly backfilled stripmine highwalls, 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. Critically eroding areas will be stabilized by installing surface water controls and plantings of suitable vegetation. The addition of agricultural lime on these critically eroding areas 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.

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<sup>1</sup> U.S. Census Bureau, Web Page

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 sites are as listed below:

|                    | <b>PL 83-566</b>    |                           |                           |
|--------------------|---------------------|---------------------------|---------------------------|
|                    | <b><u>Funds</u></b> | <b><u>Other Funds</u></b> | <b><u>Total Costs</u></b> |
| Construction       | \$1,726,000         | \$1,726,000               | \$3,452,000               |
| Engineering        | \$ 174,000          | \$ 174,000                | \$ 348,000                |
| Project Admin.     | \$ 137,000          | \$ 137,000                | \$ 274,000                |
| Land Rights        | \$ 0                | \$ 92,000                 | \$ 92,000                 |
| <b>Total Costs</b> | <b>\$2,037,000</b>  | <b>\$2,129,000</b>        | <b>\$4,166,000</b>        |

It is not expected that there will be any housing relocation costs. Operation and maintenance (O&M) costs are estimated at \$17,000 for all sites annually.

There are numerous social and ecological benefits associated with this project. The project will improve public health and safety by eliminating deep mine portals and water filled pits and will improve water quality with regards to aquatic life in Indian Creek, Champion Creek, Poplar Run, Newmyer Run and Buck Run. Basement flooding in several homes may be reduced at one site. Visual and aesthetic benefits will be realized removing unsightly iron and aluminum staining from stream bottoms and by vegetating eroding mine spoil with suitable vegetation. Some specific social and ecological benefits include the enhancement of 2 acres of existing impaired wetland. Restoration of 9.4 miles of coldwater fishery, enhancement of 8 miles of existing coldwater fishery, for a total of 17.4 miles of continuous coldwater fishery. There will also be increased water contact recreation.

The Total Average Annual Benefits are \$886,000. This compares with the Total Average Annual Costs of \$363,000. The calculated benefit to cost ratio is 2.4:1.

Other economic benefits such as the reduced water treatment costs for the Indian Creek Valley Water Authority, 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 INDIAN CREEK WATERSHED PLAN and ENVIRONMENTAL ASSESSMENT

**PROJECT NAME:** Indian Creek      **County:** Fayette and Westmoreland Counties  
**State:** Pennsylvania

**SPONSORS:** Fayette County Commissioners  
Fayette County Conservation District  
Mountain Watershed Association

### **DESCRIPTION OF THE RECOMMENDED PLAN:**

The recommended plan will control seepage and deep mine drainage from discharge points at 10 locations. Successive Alkalinity Producing Systems (SAPS), anoxic limestone drains, (ALD), draining improperly backfilled stripmine highwalls, lowering deep mine pool elevations, 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 deep mine openings 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 and public water supply treatment costs, increase property values, improve recreation potentials and provide environmental education opportunities.

### **RESOURCE INFORMATION:**

|                              |        |
|------------------------------|--------|
| Size of watershed (acres)    | 80,000 |
| Cropland (acres)             | 7,900  |
| Pastureland (acres)          | 4,300  |
| Woodland (acres)             | 54,500 |
| Unclaimed Mined Land (acres) | 300    |
| Reclaimed Mined Land (acres) | 5,600  |
| Residential & Roads (acres)  | 7,400  |

Land ownership-Privately owned land: 42.3%; State owned land: 57.6%; Local municipality owned land: .04 %.

Important farmland: 28,544 acres

Wetlands: 4929 acres (USDA-SCS, Fayette and Westmoreland County Soil Surveys)

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

### **Indian Creek Watershed**

|                 |          |
|-----------------|----------|
| Population      | 9,589    |
| Low Income      | 1,849    |
| Unemployment    | 481      |
| Per Capita      | \$8,808  |
| Property Values | \$46,060 |

### **Minority Populations:**

Minority population information for the watershed area in Westmoreland County is as follows. In Donegal Township the following minority populations are present, African-American - 8, Asians - 7, and others - 0. In Donegal Borough there are no minority populations.

Minority population information for the watershed area in Fayette County is as follows. In Saltlick Township there are no minority populations. In Springfield Township there are no minority populations present. In Stewart Township there is one person from an unidentified minority population.

### **Cultural Resources:**

The Bureau for Historic Preservation (State Historic Preservation Office, SHPO) is reviewing the Indian Creek Plan-EA. The National Historic Preservation Act of 1966 will be adhered to during implementation.

### **PROBLEM IDENTIFICATION:**

1. Mine drainage from abandoned mines is degrading the quality and quantity of aquatic habitat in 17.4 miles of Indian Creek and its tributaries.
2. Deep mine openings and water filled pits create health and safety hazards.
3. Visual quality and aesthetics in Indian Creek and its tributaries are adversely affected by iron and aluminum staining of the stream bottom. Barren and poorly vegetated, abandoned strip mines adversely impact aesthetics.

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

**SPONSORS OBJECTIVES:** Return Indian Creek, Champion Creek, Newmeyer Run, Poplar Run and lower Buck 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), draining improperly backfilled stripmine highwalls, aerobic wetlands, settling ponds, surface water controls, surface addition of agricultural lime, seeding and access roads.

**PROJECT COSTS:<sup>2</sup>**

| <u>PL 83-566 Funds</u> | <u>Other Funds</u> | <u>Total Costs</u> |
|------------------------|--------------------|--------------------|
| \$2,037,000 (49%)      | \$2,129,000 (51%)  | \$4,166,000 (100%) |

Total Average Annual Costs \$363,000

**PROJECT BENEFITS<sup>3</sup>: ECONOMIC** Average Annual Benefits are \$886,000.  
Net Economic Benefit: \$523,000

**OTHER BENEFITS:** In addition to these benefits from an improved trout fishery, the project will improve aesthetics, reduce public health and safety hazards, reduce road maintenance costs and enhance recreation opportunities. Basement flooding caused by acid mine drainage may be reduced in several homes at one site. Increased land values, improved recreation opportunities, transfer of passive treatment technology and environmental education opportunities will also occur. Wildlife habitat for geese, wood ducks, turkey, mallard, and small game will be increased. The project reduces water treatment costs for domestic water supplies and improves water quality for other users downstream.

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<sup>2</sup> 1999 Price Base

<sup>2</sup> 1999 Price Base, amortized over 25 years at 6.6250% discount rate

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

|                         |   |
|-------------------------|---|
| Water Quality-          | (+) mine drainage contaminants (acid, iron, aluminum,) will be controlled, resulting in 17.4 stream miles improved.   |
| Aquatic Habitat (miles) | (+) 10.9 miles of Indian Creek, 0.8 miles of Champion Creek, 2.6 miles of Poplar Run, 2.6 miles of Newmeyer Run, and 0.5 miles of Buck Run will be restored or enhanced to support high quality cold water aquatic life, including trout.   |
| Health and Safety       | (+) 2 mine portals and one water filled pit will be eliminated.   |
| Recreation-             | (+) Increase of 17.4 miles of sport fishery in Indian Creek and its tributaries. Enhanced use of the Indian Creek hiking and biking trail.  |
| Civil Rights-           | (+) All people, including economically disadvantaged groups, minorities, women and persons with disabilities will be positively benefited by the project.   |
| Wildlife Habitat -      | (+) The cover types affected by the project are grassland, woodland, and mine land. Changes in acreage of these cover types will occur. The following changes will take place: Woodland -30 acres, Mined land -50 acres, Grassland +25.5 acres, Wetland +2 acres, Water +52.5 acres. These changes will improve Wood Duck, Mallard Duck, Canada Goose, and Wild Turkey habitat. |
| Erosion and Sediment -  | (+) 15 acres of poorly vegetated abandoned mine land will be vegetated. Erosion will be reduced by 375 tons per year and sediment will be reduced by 280 tons per year.   |
| Important Farmland-     | (-) 42.5 acres of important farmland will be converted to wetland, grassland and open water.  |
| Flood Plain-            | No effect.  |
| Visual Resources-       | (+) There will be an enhancement of the visual and aesthetic resources in the watershed.  |

|                                  |   |
|----------------------------------|---|
| Land Use Changes-                | (+) Woodland acreage will be reduced by 30 acres, mined land will be reduced by 50 acres, grassland will be increased by 25.5 acres, wetlands will be increased by 2 acres and water will be increased by 52.5 acres. |
| Threatened & Endangered Species- | None present.   |
| Wetland (acres)-                 | (+) About 2 acres of wetland will be created to increase removal of acid, iron, and aluminum.   |
| Flood Prevention-                | No effect.  |
| Municipal & Industrial Water-    | (+) Reduced water treatment costs for the Indian Creek Valley Water Authority.  |
| Information and Education-       | (+) The constructed treatment wetlands will enhance educational opportunities for local residents, local school districts and the Mountain Watershed Association.   |
| MITIGATION:                      | None.   |
| MAJOR CONCLUSIONS:               | A feasible project can be installed.  |
| AREAS OF CONTROVERSY:            | None.   |
| ISSUES TO BE RESOLVED:           | Status of Archaeological & Historical Concerns.   |

### **3 - INTRODUCTION**

The Watershed Plan and Environmental Assessment (Plan-EA) for Indian 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), lowering deep mine pool elevations, anoxic limestone drains (ALD) draining improperly backfilled stripmine highwalls, aerobic wetlands, limestone waterways, and settling ponds. 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 costs, and reduced public water supply costs, increased property values, enhanced aesthetics, and enhanced educational and recreation opportunities.

The sponsoring local organizations are:

**Fayette County Commissioners**

**Fayette Conservation District**

**Mountain Watershed Association**

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.



#### 4 - PROJECT SETTING

The Indian Creek Watershed constitutes a portion of the headwaters of the Ohio River Drainage Area. Of more importance locally however, this headwater stream is severely impacted by acid mine drainage. Previous mining endeavors as early as the late 1800's for coal and fire clay have rendered 17.4 miles of stream acidic, and laden with toxic metals. The watershed is listed as a *high priority, category 1* watershed by the Commonwealth of Pennsylvania, Bureau of Watershed Conservation's, Unified Watershed Assessment. Indian Creek is designated as watershed 19E, which is tributary to the Youghiogheny River, which is tributary to the Monongahela 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, Penn's Corner Resource Conservation And Development Area, along with the Fayette County Conservation District, have come together to mutually work toward remediating the natural resource problems in the watershed.

Catholic Campaign for Human Development, The Western Pennsylvania Watershed Restoration Program, a project of the Heinz Endowment, the Eberly Foundation, the Canaan Valley Institute, Allegheny Power Environmental Stewardship Program, McKenna Foundation, and the Western Pennsylvania Coalition for Abandoned Mine Reclamation have also supplied financial and/or technical assistance toward remediation efforts.

The **Mountain Watershed Association** has been the local forum for bringing together these agencies with local groups interested in enhancing and preserving the communities natural resources. The local groups that have provided assistance, or endorsement in this watershed planning effort include the:

- Fayette County Conservation District
- Westmoreland County Conservation District
- Indian Creek Valley Lions Club
- Western Pennsylvania Conservancy
- Indian Creek Valley Water Authority
- Chestnut Ridge Chapter of Trout Unlimited
- Richard King Mellon Foundation
- Menallen Coke Co. of New Salem
- Joseph and Anna Gartner Foundation
- Baltimore Life Insurance
- Donegal Borough
- Donegal Township
- Saltlick Township
- Springfield Township
- Indian Creek Valley Water Authority
- Municipal Authority of Westmoreland County
- Mountain Laurel Chamber of Commerce

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

### **Location and Size**

Indian Creek Watershed is located in the north central portion of the upper Youghiogheny River basin occupying portions of Saltlick Township, Springfield Township and Stewart Township in Fayette County, and Donegal Borough and Donegal Township in Westmoreland County, Pennsylvania. The watershed lies primarily south of the Pennsylvania Turnpike, between Laurel Ridge and Chestnut Ridge.

Indian Creek flows in a southerly direction for approximately 26 miles to its confluence with the Youghiogheny River. The creek drains an area of 125 square miles (80,000 acres). The watershed attains an average width of 8.0 miles (east – west) and an approximate length of 16 miles (north – south). The maximum relief attained is 2021 feet ranging from an elevation of 971 at the mouth of Indian Creek to elevation 2992 at the top of Neals Run near Seven Springs. The average gradient is 78 feet per mile.

State Route 381 bisects the watershed from the headwaters, to Mill Run in a northeast to southwest direction. Physiographically, the watershed is located in the Pittsburgh Plateau Section of the Appalachian Plateau Province. The topography mostly steep hillsides and valleys from the top of laurel ridge to the Indian Creek valley continuing through the lower part of the watershed to the Youghiogheny River. From Indian Creek west to the top of Chestnut Ridge the hillsides and valleys are more rolling with broader ridgetops and hilltops.

### **Soils**

The soil survey for Fayette County, Pennsylvania (March 1973), lists four general soil associations within the watershed. These associations are: 1. Gilpin-Wharton-Ernest, 2. Dekalb-Hazleton-Cookport, 3. Upshur-Albrights and 4 Monongahela-Philo-Atkins.

The Gilpin-Wharton-Ernest Association consists of moderately deep and deep well drained and moderately well drained, medium textured, nearly level to very steep soils underlain by acid shale and sandstone, on uplands. The Gilpin soils are on the upper, generally smooth slopes. They are well drained and moderately deep.

The Wharton soils formed in place on ridge tops and benches. They are moderately well drained, are deep, and have a fine textured and moderately fine textured subsoil. Areas of both Wharton and Ernest soils are irregular and have numerous drainage ways and seeps.

The Ernest soils generally are on the lower slopes. They are formed in colluvium and have a fragipan.

Most of the other soils in this association are in the Weikert, Cavode, Philo, Brinkerton, and Armagh series. Areas of Strip mine spoil, acid, also occur.

This association has some of the better farming soils of the county. The area is adapted to pasture and general crops. Restricted drainage in the Wharton and Ernest soils impedes the movement of air and water within the soil.

The soils of this association have moderate to severe limitations to use as building sites. Springs and wells generally supply enough water for livestock and the household.

The Dekalb-Hazleton-Cookport, Association consists of moderately deep and deep, well drained and moderately well drained, medium coarse textured, and medium textured, nearly level to very steep soils underlain by bedrock that is dominantly acid sandstone, on uplands. The Dekalb soils are moderately deep and well drained. They are mostly very stony and very steep. Dekalb soils have low available moisture capacity and low natural fertility.

The Hazleton soils are deep and well drained. These nearly level to moderately steep soils are nonstony and have low to moderate available moisture capacity. The Cookport soils are deep and moderately well drained. They are nearly level to sloping and are mostly very stony.

The minor soils are in the Gilpin, Weikert, Clymer, Andover, and Buchanan series. Except for Clymer soils, all are steep, stony, or both. Rubble land is also in this association.

Most of this association is in trees, for which it is suited. The soils of this association are not good soils for farming. The limitations to most uses are the restricted depth to bedrock of Dekalb soils and seasonal wetness of Cookport soils.

The Upshur-Albrights association consists of deep well drained to somewhat poorly drained, gently sloping to very steep, reddish colored soils, on uplands. The Upshur soils are deep and well drained. They formed in place from red shale and limestone and have a clayey subsoil. Slips and slides occur on the steeper Upshur soils. The Albrights soils are deep and moderately well drained to somewhat poorly drained. They have a fragipan and formed in material accumulated on mid and lower slopes.

The major soils of this association have moderate water holding capacity and natural fertility. They are normally nonacid. The minor soils are mostly the shallow, well-drained Weikert and moderately deep, well-drained Gilpin soils. They occur on valley sides and are steep. The minor soils are droughty and are best suited to trees.

The Upshur and Albrights soils are well suited to crops and trees. Black locust and yellow-poplar trees grow naturally on these soils. The principal soil limitations to use for farming are wetness and erosion. Beef cattle and general farming are the principal types of farming.

The Monongahela-Philo-Atkins Association consists of deep, moderately well drained and poorly drained, medium textured, nearly level to sloping soils on stream terraces and flood plains. The Monongahela soils are nearly level to sloping and occur on terraces. They are moderately well drained and have a fragipan in the subsoil. The Philo soils are nearly level, are moderately well drained, and occur on flood plains. The Atkins soils are nearly level, are poorly drained, and also occur on flood plains.

The minor soils are mostly in the Chavies, Allegheny, Tyler, Elkins, and Purdy series. These soils formed mostly in slack water and trace deposits. Also in the association on nearby uplands are Gilpin, Weikert, and Wharton soils.

The soils of this association have moderate to severe limitations as sites for most kinds of buildings. The low flood plains along the rivers and other streams are subject to flooding. A seasonal high water table restricts the downward movement of air and water through these soils. Farming is of little importance in this association because of flooding and wetness. Also, in many places these soils are in nonfarm uses.

Parts of this association have areas of the most community and industrial development in the county. But space for future building sites is limited because of the narrow area between the rivers and steep valley sides.

### **Geology**

The Indian Creek watershed is situated in the Allegheny Mountain section of the Appalachian Plateau Physiographic Province. Three major geologic structures influence the occurrence and attitudes of rock formations within the Indian Creek valley. These are the Chestnut Ridge anticline, the Laurel Hill anticline and the intermediate Ohiopyle (Ligonier) syncline.

The northeast – southwest trends of the Chestnut Ridge and Laurel Hill anticlines coincide with the high topography forming the western and eastern borders of the watershed. The parallel trend of the Ohiopyle syncline corresponds with the low topography along the main stem of Indian Creek. The west limb of the syncline rises gradually and becomes increasingly steeper toward the Chestnut Ridge anticline, and the east limb of the syncline rises more abruptly to become the west limb of the topographically higher Laurel Hill anticline. The dip of the rock strata along the limbs of the syncline ranges from relatively flat lying along the axis to approximately four percent along the western limb.

The trace of the axis of the Ohiopyle syncline crosses Indian Creek north of Indian Head and again south of Champion. The syncline is doubly plunging from a local structural high at Fowl Hill. The plunge to the southwest is approximately 1.0 percent. North of Jones Mills, the axis of the syncline becomes less defined, until a few miles north of Donegal where it resumes plunging to the northeast.

The geologic structure and the resulting topography within the Indian Creek watershed combine to give the appearance of an inversion of the stratigraphic sequence. Because of the relatively steep dip of the strata along the flanks of the Laurel Hill and Chestnut Ridge anticlines, the older Pennsylvanian and Mississippian rocks are found on top of these ridges, whereas the stratigraphically higher, younger Pennsylvanian rocks primarily are found along the valley of Indian Creek.

All known surface exposures of consolidated rock within the study area are of sedimentary origin of Pennsylvanian and Mississippian age. In descending stratigraphic order, the area contains exposures of Pennsylvanian formations of the Conemaugh, Allegheny, and Pottsville Groups, and exposures of the Mississippian Mauch Chunk Formation and Pocono Group. Two Conemaugh Group coals and all coals known to exist within the Allegheny Group, except the Lower Kittanning Coal, are present within the watershed.

### Pennsylvanian System

The Conemaugh, Allegheny, and Pottsville Groups of the Pennsylvanian System are found in the watershed. The stratigraphic intervals of the Conemaugh and Allegheny Groups are defined by the various coals they contain.

#### Conemaugh Group

The Conemaugh Group consists of sandstones, shales, sandy shales, coals and thin limestones, and forms the majority of the surface area west of Indian Creek and on the flank of the Chestnut Ridge anticline. Stratigraphically these are the youngest formations in the watershed except for the colluvium and alluvium Quaternary age found at the base of steep hills and along stream valley bottoms. The Conemaugh group is divided into the Casselman and Glenshaw formations. The Casselman Formation contains thin bedded calcareous claystones, siltstones, locally massive sandstones, and freshwater limestones. This formation occurs on two hilltops west of Indian Head and on several hilltops located between Donegal and Horners Mill. The Glenshaw formation is over 300 feet thick, and contains thinly bedded fossiliferous shales and claystones, freshwater and marine limestones, locally massive sandstones, and the Brush Creek Coal and Mahoning Coal.

#### Allegheny Group

The Allegheny Group is the dominant coal bearing strata within the watershed and is defined stratigraphically to be from the top of the Upper Freeport coal down to the base of the Brookville - Clarion coal. The Allegheny Group is exposed along most of Indian Creek and the smaller stream valleys located on the eastern side of Indian Creek and from Indian Creek westward to the Chestnut Ridge. Coals of the Allegheny Group present within the watershed include the Upper Freeport, Lower Freeport, Upper Kittanning rider, Upper Kittanning, Middle Kittanning, and the Brookville - Clarion coals. In addition to the coals, the rocks of the Allegheny Group are predominantly shales, siltstones, and sandstones.

## **Pottsville Group**

The Pottsville Group, which lies on top of the Mauch Chunk Formation of the Mississippian System, is the lowest stratigraphic unit of Pennsylvanian age. The Pottsville Group is approximately 200 feet thick and consists of three members: the Homewood sandstone, Mercer shales and Connoguensing sandstone.

## **Mississippian System**

Mississippian age rocks are the oldest found in the watershed. Their exposures are limited to the upper slopes and top of the Laurel Hill anticline. The Mauch Chunk Formation, Which is found at the top of the Mississippian System, is approximately 250 feet thick. This formation is composed of a sequence of red shales and siltstones with interbeds of gray shales, gray sandstones, greenish sandstones, and the Greenbrier Limestone Member.

## **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**

Indian Creek is the principal drainage way in the watershed. At its outlet, Indian Creek enters the Youghiogheny River, which is a major tributary of the Monongahela River, which in turn is a major contributor to flow of the Ohio River. The watershed is located within the Water Resources Council / USDA-Natural Resources Conservation Service Hydrologic Unit Number 05020006-100. Indian Creek outlets 5.7 miles up river from Connellsville on the Youghiogheny River.

The Pennsylvania Code, Title 25. Environmental Protection, DEP, Chapter 93. Water Quality Standards, list 18 stream segments for Indian Creek including the 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 twelve of these stream segments. Five of the segments, including the entire main stem from its source down to Champion Creek are High Quality Waters; Cold Water Fishery protected uses. There is one Exceptional Value Waters segment, Camp Run. The Youghiogheny River, at its confluence with Indian Creek has a Cold Water Fishery protected use. Raster Run has been designated a Class A Wild Trout Stream.

The Commonwealth of Pennsylvania, 1998 Water Quality Assessment, 305(b) Report, shows 17.47 miles of Indian Creek degraded and not supporting designated uses. The Non Point Source (NPS) problem is identified as metals from abandoned mine drainage.

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 Indian Creek basin are Indian Creek from its confluence with Champion Creek to Back Creek, Indian Creek from Poplar Run to its mouth, also lower Champion Creek, Poplar Run, Newmyer Run and the lower reach of Buck Run. The reach between Back Creek and Poplar Run is adversely affected by acid mine drainage, however the high quality water quality in Back Creek dilutes the impact of the acid mine drainage in this reach of Indian Creek.

### **Socioeconomics**

This area is economically, socially and environmentally disadvantaged due in large part to past mining activity and the adverse impact of mining on the water resources of the area. The major industries now in the area are farming, logging, tourism and recreation.

### **Socioeconomics By Municipality**

#### **Westmoreland County: Donegal Township and Donegal Borough**

##### **Donegal Township:**

|                   |                                      |
|-------------------|--------------------------------------|
| Population        | 2,419                                |
| Low Income        | 357 people below poverty level       |
| Unemployment      | 89                                   |
| Per Capita Income | \$10,785 (National Average \$21,170) |
| Property Values   | \$55,800 (State Median \$69,100)     |

##### **Donegal Borough:**

|                   |          |
|-------------------|----------|
| Population        | 216      |
| Low income        | 28       |
| Unemployment      | 19       |
| Per Capita Income | \$10,439 |
| Property Values   | \$40,000 |

#### **Fayette County: Saltlick, Springfield, and Stewart Townships**

##### **Saltlick Township:**

|                   |          |
|-------------------|----------|
| Population        | 3,268    |
| Low income        | 478      |
| Unemployment      | 117      |
| Per Capita Income | \$9,545  |
| Property Values   | \$51,800 |

**Springfield Township:**

|                   |          |
|-------------------|----------|
| Population        | 2,953    |
| Low income        | 812      |
| Unemployment      | 209      |
| Per Capita Income | \$6,639  |
| Property Values   | \$40,200 |

**Stewart Township:**

|                   |          |
|-------------------|----------|
| Population        | 733      |
| Low income        | 174      |
| Unemployment      | 47       |
| Per Capita Income | \$7,243  |
| Property Values   | \$42,500 |

There are 36,384 people in the watershed and surrounding areas that would benefit from the project. Approximately 9,585 persons live in the watershed of which 73 are on farms and 9,512 are rural non-farm.

There are 16.4% of the households in the watershed that have income below the poverty level. Seventy six percent (76%) of the families in the watershed with children are in poverty. Unemployment is 14.2%, which is 44% more than the national average of 6.3%. Per capita income in the watershed is \$8,808 which is 42% of the national average of \$21,170 and median home value is \$46,060, which is 66% of the state median home value of \$69,100.

**Minority Populations**

Minority population information for the watershed area in Westmoreland County is as follows. In Donegal Township the following minority populations are present, African-American - 8, Asians - 7, and others - 0. In Donegal Borough there are no minority populations.

Minority population information for the watershed area in Fayette County is as follows. In Saltlick Township there are no minority populations. In Springfield Township there are no minority populations present. In Stewart Township there is one person from an unidentified minority population.



## 5 - PROBLEMS AND OPPORTUNITIES

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

1. Mine drainage from abandoned coal mines is degrading the quality and quantity of aquatic habitat in 17.4 miles of Indian Creek and its tributaries.
2. Hazardous deep mine portals and a water filled pit are health and safety hazards.
3. Visual quality and aesthetics on Indian Creek and its tributaries are adversely affected by iron and aluminum staining of the stream bottom and the land surface.

### IMPAIRED WATER QUALITY

#### INDIAN CREEK

Extensive bituminous coal mining has resulted in discharges of acid mine drainage with elevated concentrations of acid, iron, and aluminum. The impacts of these discharges on the streams varies depending on the volume of the discharge and the buffering capacity of the receiving stream. In general Indian Creek and most of its tributaries have a high natural buffering capacity due mostly to the geology of the watershed. This buffering capacity neutralizes the acidity from most discharges in relatively short distance from their point of entry into the stream. Neutralizing the acidity allows the dissolved metals to precipitate in the receiving stream, coating the stream bottom with metal precipitates.

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

Water quality and quantity samples have been obtained for 119 discharge points. These data were obtained from various sources. The majority of the information was obtained from the *Chemical Analysis Results for Surface and Mine Water Discharges within the Indian Creek Watershed, Unpublished Report 1998* Department of Environmental Protection, Bureau of Mining and Reclamation. The Bureau of Abandoned Mine Reclamation provided current water quality data on proposed remediation sites. The loading of acid, iron and aluminum is summarized by sub-watershed in Table A.

**TABLE A**

**CONTAMINANT LOADING FROM ACID MINE DRAINAGE  
IN INDIAN CREEK AND AFFECTED TRIBUTARIES**

| <b>SUBWATERSHED</b>   | <b>ACID<br/>LOAD<br/>TONS PER<br/>YEAR</b> | <b>IRON<br/>LOAD<br/>TONS PER<br/>YEAR</b> | <b>ALUMINUM<br/>LOAD<br/>TONS PER<br/>YEAR</b> |
|-----------------------|--|--|--|
| <b>Indian Creek</b>   | 543.9                                      | 158.6                                      | 25.5   |
| <b>Champion Creek</b> | 100.1                                      | 20   | 6.1  |
| <b>Poplar Run</b>     | 33.0                                       | 7.4  | 0.9  |
| <b>Newmyer</b>        | 268  | 19.7                                       | 21.4   |
| <b>Buck Run</b>       | 210.3                                      | 24   | 17.4   |

These quantities of acidity, iron, and aluminum substantially exceed habitat thresholds as evidenced by the impaired aquatic life in significant reaches of Indian Creek and its tributaries (See Project Map, Appendix D).

From 1994 through 1997, stoneflies were sampled at 10 locations on Indian Creek and its tributaries. These locations are from a thesis by Jane Earle, *Stoneflies of Indian Creek, A Watershed affected by Abandoned Mine Drainage, 1997*. Table B shows the number of Stonflies collected at each sampling location.

**TABLE B**

**STONEFLY SAMPLING LOCATIONS ON AFFECTED TRIBUTARIES**

| <b>Sampling<br/>Location<br/>Symbol</b> | <b>Description of sampling location</b>  | <b>Individuals<br/>Observed</b> | <b>Species<br/>Observed</b> |
|---|--|---------------------------------|-----------------------------|
| <b>ICJM</b>                             | Indian Creek @ Jones Mills               | 175                             | 22                          |
| <b>ICDV</b>                             | Indian Creek @ Davis town                | 3                               | 2                           |
| <b>ICSG</b>                             | Indian Creek @ Sagamore                  | 3                               | 2                           |
| <b>ICIH</b>                             | Indian Creek @ Indian Head               | 52                              | 11                          |
| <b>CCp</b>                              | Champion Creek downstream of Puzzle Run  | 4                               | 2                           |
| <b>CCm</b>                              | Champion Creek at Melcroft               | 90                              | 8                           |
| <b>PORh</b>                             | Poplar Run @ Clinton                     | 4                               | 1                           |
| <b>POR</b>                              | Poplar Run upstream of Newmyer Run       | 44                              | 10                          |
| <b>PORm</b>                             | Poplar Run at confluence with Indian Ck. | 10                              | 6                           |
| <b>NEM</b>                              | Newmyer Run at confluence With Pop. Run  | 0                               | 0                           |

The effects of acid mine drainage on a receiving stream depend on several factors, the most important being the stream's natural capacity to buffer hydrogen ion concentrations.

If the carbonate buffer system of a stream can neutralize the increased hydrogen ion concentrations from acid mine drainage, the pH will remain near neutral and the iron will be oxidized into ferric hydroxide precipitate which will coat the stream substrate. However, if buffering capacity is not sufficient to neutralize the acidity, the receiving stream will become acidic and often carry excessive amounts of iron, and aluminum.

Acid mine drainage with elevated metal concentrations discharging into lightly buffered streams can have a devastating effect on aquatic life. The benthic fauna may be virtually eliminated if a stream becomes acidic with elevated concentrations of metals (Roback and Richardson, 1969). Deposition of iron hydroxide affects stream macroinvertebrates, either directly through interference with respiration, attachment or feeding mechanisms, or indirectly through effects on food sources (Koryak et al. 1972; Letterman and Mitsch, 1978). Secondary effects of acid mine discharges, such as increased carbon dioxide tensions, oxygen reduction through oxidation of metals, increased osmotic pressure from high concentrations of mineral salts, and synergistic effects of metal ions, also contribute to toxicity (Parsons, 1957).

Benthic macroinvertebrates are often used as indicators of water quality because of their limited mobility, relatively long residence times, and varying degrees of sensitivity to pollutants. Unaffected streams, (see ICJM location in Table B), generally have a high richness, with representatives of all aquatic insect orders, including a high diversity of Ephemeroptera, Plecoptera, and Trichoptera (EPT taxa) (Moon and Lucostic, 1979).

Like many other pollutants, mine drainage can cause a reduction in the diversity and total number or abundance of macroinvertebrates and changes in community structure, such as a lower percentage of EPT taxa, (see ICSG location in Table B).

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 Indian Creek did not directly attribute reduced macro-invertebrate populations to sedimentation of the stream.

Another water quality concern of the Mountain Watershed Association is sewage from inadequate on-lot sewage systems. Inadequately treated sewage from on-lot sewage systems does not appear to be a major problem in the watershed. Most of the watershed population is dispersed throughout the watershed and large concentrations of sewage do not reach the stream. Long distances of flow from houses to the stream allow for settling and oxidation of organic matter prior to reaching the stream.

## HEALTH AND SAFETY HAZARDS

Deep mine portals and/or water filled pits are present at three 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 and aluminum deposits coat the stream bottom and smother most aquatic life in Indian Creek.

### PROBLEM SITES

There are one hundred nineteen (119) mine water discharge points flowing into Indian Creek that are severely degrading the streams water quality. Ten (10) treatment sites have been identified that will treat 94% of the acid, 90% of the iron and 94% of the aluminum entering Indian Creek and its tributaries. The discharges are the result of seepage and direct flows from abandoned deep mines and stripmines.

The 10 treatment sites are shown on the Project Map, Appendix D. The impacts of treating these discharges are addressed by site in the remainder of this document. The impacted watersheds are Indian Creek, Champion Creek, Poplar Run, Newmyer Run and Buck Run.

**Indian Creek** – Indian Creek from its headwaters down to its confluence with Champion Creek is minimally affected by mine drainage. The rich stonefly diversity at the Jones Mill sampling location (ICJM) and Indian Creek at Nebo Road location (ICNR) confirms the minimal impact. From Champion Creek downstream 2.9 miles to Back Creek, Indian Creek is adversely impacted by Champion Creek and the **Kalp** discharge. The Kalp discharge has the highest flow and metal loading of any discharge in the watershed.

Indian Creek from Back Creek to Poplar Run (1.6 miles) shows improving water quality due to the positive impact of the high quality water quality of Back Creek. The main stem of Indian Creek is again degraded when the **Gallentine** discharge meets the stream just upstream of the confluence of Poplar Run. Poplar Run further degrades Indian Creek. The **Permapress** discharge, a high aluminum discharge enters Indian Creek near Route 653. From this point on Indian Creek slowly improves in water quality as it flows toward the Mill Run reservoir. A total of 10.9 miles of the main stem of Indian Creek is adversely affected by mine drainage.

On Indian Creek there are a total of 27 discharges that produce 543.9 tons of acid, 158.6 tons of iron, and 25.5 tons of aluminum per year. Four of these discharges produce 96% of the acid, 98% of the iron and 92% of the aluminum. The remaining 23 discharges are either low volume or alkaline discharges that have minimal impacts on the water quality of Indian Creek.

**Champion Creek** – The most heavily impacted reach of Champion Creek is the 0.8 miles from Puzzle Run downstream to its mouth on Indian Creek. Upstream from this point, the stonefly richness is greatly improved. The **Melcroft #3** Portal Pond and associated discharges are the source of the acid mine drainage adversely impacting this section of stream.

On Champion Creek and its tributaries there are 43 abandoned mine discharges that produce 100.1 tons of acid, 20 tons of iron and 6.1 tons of aluminum per year. Five of these discharges produce 71% of the acid, 60% of the iron and 65% of the aluminum. The remaining 38 discharges are low volume and/or alkaline discharges that have minimal impact on the stream.

**Poplar Run** – Poplar Run is adversely impacted near its headwaters, at the **Nicholson** discharge, and improves and degrades cyclically due to alternating good quality and poor quality water entering the stream. Seasonal variations in the quality and quantity of the stream flow tends to reduce the richness of the stonefly taxa in this stream. The **Fulton** discharge degrades water quality near the mouth of Newmyer Run.

The flow from Newmyer Run, the most adversely affected tributary in the watershed, has a definite adverse effect on the stream from its confluence to the mouth of the stream. A total of 2.6 miles of Poplar Run is adversely impacted.

There are 26 discharges on Poplar Run that produce 33 tons of acid, 7.4 tons of iron and 0.9 tons of aluminum per year. Two of these discharges produce 59% of the acid, 78% of the iron and 14% of the aluminum. The remaining 24 discharges are low volume and/or alkaline discharges that have minimal impacts on the stream.

**Newmyer Run** – Newmyer Run is the most adversely impacted tributary in the watershed. The adverse impact of heavy loading of acid and aluminum in the headwaters at the **Rondell-Correal** discharge along with another heavy load of acid and aluminum at the **Marsolino-Leighty** discharge near its mouth is affirmed by the fact that no stoneflies were observed from 1994 through 1997. Acidity levels at the Rondell-Correal discharge have exceeded 1000 mg/L and aluminum levels have exceeded 140 mg/L. The **Rondell-Correal** site also has severe erosion and sedimentation problems associated with water quality concerns. A total of 2.6 miles of Newmyer Run is adversely impacted.

Newmyer Run has 14 discharges that produce 210.3 tons of acid, 24 tons of iron and 17.4 tons of aluminum per year. Four of these discharges produce 99% of the acid, 99% of the iron and 99% of the aluminum per year. The remaining 10 discharges are low volume and/or alkaline discharges that have minimal impacts on the stream.

**Buck Run** – Buck Run is impacted negatively for the last half of a mile (0.5mile) before its confluence with Indian Creek. Buck Run upstream of this point is a trout fishery.

There are 9 discharges on Buck Run that produce 210.3 tons of acid, 24 tons of iron and 17.4 tons of aluminum per year. Five of these discharges produce 99% of the acid, 58% of the iron and 99% of the aluminum per year. These discharges are located on the **Buck Run** and **Lawrence Coal** sites.

## **EDUCATIONAL OPPORTUNITIES**

Several opportunities exist to use the Indian 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 Mountain Watershed Association has developed and is implementing an outreach program to educate local residents about water quality and watershed health. They work with local schools and provide information tables at community events. The Saltlick Township supervisors and the Mountain Watershed Association have worked cooperatively on the Sagamore mine drainage remediation project. The Indian Creek trail passes through the Sagamore project and will provide an outdoor classroom opportunity for educating the public about AMD and its treatment. The trail's close proximity to several mine discharges and passive treatment systems will enhance the watershed association's outreach 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 Indian 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>                          |
|---|----------------------------------|--|---|
| Surface Water Quality   | High                             | High   | Principal objective, severe degradation |
| Ground Water Quality  | High                             | High   | Determines treatment methodology        |
| Aquatic Habitat   | High                             | High   | Degradation                             |
| Public Health & Safety  | High                             | High   |   |
| Recreation  | High                             | High   |   |
| Socioeconomics  | High                             | High   |   |
| Civil Rights  | High                             | High   |   |
| Wildlife Habitat  | High                             | High   |   |
| Erosion & Sediment Damages  | High                             | High   |   |
| Important Farmland  | High                             | Medium   |   |
| Soil Resource Base  | High                             | Medium   |   |
| Flood Plains  | High                             | Medium   |   |
| Visual & Aesthetics   | High                             | High   |   |
| Land Use Changes  | High                             | High   |   |
| Threatened & Endangered<br>Species                                  | High                             | Medium   | None present                            |
| Cultural Resources  | High                             | High   | Phase 1 needed at Kalp & Nicholson      |
| Wild & Scenic River   | High                             | Low  | None present                            |
| Wetlands  | High                             | High   | Project will enlarge and enhance        |
| Water Conservation  | Medium                           | Low  |   |
| Water Quantity  | High                             | High   |   |
| Air Quality   | High                             | Low  |   |
| Flood Water Damages   | Medium                           | Low  |   |

<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 Mountain Watershed Association along with cooperating agencies and groups provided resource data, analysis and evaluation needed to make decisions on alternative plans.

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 three of these facilities due to the excessive operating costs.

Some of the major treatment plants that have been abandoned due to excessive operating 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 potential for remining at the 10 proposed treatment sites has been evaluated. The mineable coals at the sites to be treated are not significant. Since the extent of mineable coals is not significant, stripmining of the abandoned workings would not result in significant water quality benefits. The lack of coal to mine at these sites precludes this alternative from being considered in the 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 draining improperly backfilled stripmine highwalls, lowering deep mine pool elevations 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. An organic layer (typically spent mushroom compost) is placed over limestone rock to convert ferric 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. If ferric iron is present, it will coat the limestone rock and impede the reaction of the acid in the water with the limestone. This reaction causes the acid to be neutralized which raises the pH of the water.

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 Indian Creek Watershed, the following water quality improvements are expected with SAP technology. These systems must be flushed on a regular basis when high levels of aluminum and iron are being treated. Acidity will be completely neutralized and net alkalinity will be produced. Iron and aluminum levels will be reduced to 1 mg/l or less.

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 will tend to clog the drains, coat the rock with precipitate and make them less effective. Water with ferrous iron can be effectively treated with ALD technology. These systems must be flushed on a regular basis when high levels of aluminum are being treated.

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 Indian 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 precipitates from SAPS or ALD's.

Limestone open channels 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 open channels 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. At slower velocities, treatment is reduced.

Land liming is used to neutralize acid producing rocks and minerals associated with some seams of coal. On Indian 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 Indian 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, draining improperly backfilled highwalls, lowering deep mine pool elevations, land liming, settling ponds, limestone drains and seeding. The passive treatment systems will remove acid, iron, and aluminum 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 50 acres of abandoned mine land will be treated with the addition of lime to reduce acidity levels of surface water runoff from abandoned strip mines.

In the process of treating the water quality problems, two deep mine portals and one water filled pit will be eliminated. As a result, the safety hazards associated with these features will be eliminated.

**TABLE D - ECONOMIC BENEFITS**  
**Recommended Plan**

| <b>Defined Area</b>          | <b>Miles of Restored Stream</b> | <b>Annual Value</b> |
|------------------------------|---------------------------------|---------------------|
| Indian Creek and tributaries | 17.4                            | \$886,000           |
| <b>TOTAL</b>                 | <b>17.4</b>                     | <b>\$886,000</b>    |

Benefits are based on the new recreational cold water fishing with implementation of the project. (Arway 1995)

The total cost of the Recommended Plan is \$4,166,000. The average annual cost is \$363,000. The total operation and maintenance cost is estimated to be \$17,000 per year. Total average annual benefits are \$886,000.

## **EFFECTS OF ALTERNATIVE PLANS**

### **Surface Water Quality**

The effects of alternatives are compared to conditions likely to prevail 25 years hence. The effects of each resource condition include projected direct and indirect effects.

No Action - Without the project, the water quality in Indian 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 17.4 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 alternative would reduce iron, acid and aluminum levels entering Indian 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 at 7 of the 10 proposed sites. At 2 sites, efforts will be made to drain improperly backfilled strip mines to reduce ground water contact time with acid bearing materials in the mine spoil. At these sites, what is referred to as a "low wall seal" was installed during the original back filling process. The low wall seal was intended to flood the mine floor to reduce oxygen levels and supposedly reduce acid production. The clay used in these seals had a very high aluminum content which causes very high levels of acidity to be produced. Removing these low wall seals at the low point in the backfill will reduce acid production. The PADEP Bureau of Abandoned Mine Reclamation has completed extensive hydro-geologic investigations at these sites to define the areas where this technology will improve ground water quality. Significant water quality improvements are expected by draining these improperly back filled stripmines

At one site the water elevation in a deep mine pool will be lowered to facilitate capturing the entire flow from the deep mine. Currently the mine water outlets at the mine portal and at several seeps along the hillside outcrop line of the coal seam. This lowering of the water elevation may reduce water quality in the mine by exposing more of the acid bearing materials in the mine to higher concentrations of oxygen. The reduction in water quality is not expected to be significant and will result in water qualities that are treatable with passive treatment techniques

Lowering the mine pool will have two benefits. First, the mine water will outlet at one location, (mine portal) instead of at several seeps along the hillside. This will insure that all of the mine water is captured and directed to the treatment system. Second, lowering the mine pool will alleviate the problem of water from the deep mine flowing into the home of several families in the village of Melcroft. Historic information about the mine water elevations confirm that lowering the mine water elevation will have this effect.

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.

### **Aquatic Habitat**

No Action – Without the project the exiting degraded aquatic habitat will continue to be impaired by the acidity and metals that are characteristic of the mine drainage in the Indian Creek watershed. The reduced species diversity and abundance present now, will continue into the future.

Alternative 1 (Recommended) – The implementation of the recommended plan will reduce acidity and metals in Indian Creek and affected tributaries, allowing the return of a greater diversity and abundance of benthic species. More importantly the return of a healthy and diverse benthic community will allow for the return of a trout fishery on 17.4 mile of stream.

### **Public Health and Safety**

No Action – Without the project one water filled pit and two deep mine portals that are safety concerns of the local residents will remain. These sites show evidence of frequent visitation by local youth.

Alternative 1 (Recommended) – The safety hazards will be eliminated. To accomplish the treatment of the mine drainage at these sites, the removal of the mine portals and water filled pit will be necessary to accommodate the placement of the treatment systems.

### **Recreation**

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

Alternative 1 (Recommended) – Implementation of this plan will restore, or enhance 17.4 miles of cold water fishery to Indian 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 54.5 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.

### **Social Concerns and Civil Rights**

No Action - Without the project, Indian Creek and its tributaries would remain contaminated by mine drainage and limited recreational fishing opportunities would be available. Other water related outdoor recreational activities would continue to be adversely affected. Damages caused by acid mine drainage to roads, culverts, bridges and water supply lines would continue. The safety hazards associated with two deep mine portals and a water pit would continue to be a concern to local residents. Land values will continue to be depressed due to the adverse effects of mine drainage.

The impacts of the past mining operations listed above have degraded the economic base in the watershed. Socially, the economy causes poverty and degraded community pride.

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

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

Alternative 1 (Recommended) – Implementation of the recommended plan would create increased fishing and water related recreational activities. Damages to roads, culverts, bridges and water supply lines would be greatly reduced. Elimination of two deep mine portals and a water filled pit will remove local concerns about safety. Existing recreational facilities, Resh Park and the Indian Creek Trail will be enhanced. Local sporting and recreational businesses will have increased economic opportunities due to the improved water quality in Indian Creek and its tributaries. The annual economic benefits of the project (\$886,000) will provide economic opportunity for the local residents.

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

### **Economics**

No Action – Without the project, the adverse impacts of past mining on Indian Creek and its tributaries will continue to degrade the economic base of the watershed. This condition is expected to continue into the future. The estimated project investment of \$4,166,000 will not be utilized with this alternative, and the net economic benefit of \$523,000 will not be realized.

Alternative 1 (Recommended) – The benefits versus the cost of the recommended plan is 2.4:1. The benefits are based on the new recreational cold water fishing expected with implementation of the project (Arway 1995). The Benefits were determined by the

Pennsylvania Fish and Boat Commission. The average annual benefit of this alternative is \$886,000, the average annual cost is \$363,000, which yields a net economic benefit of \$523,000.

### **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 forest land and state gamelands (42 %) 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 54.5 acres of wetland and open water that will be productive waterfowl habitat. From past experience on similar projects, it is known that wood duck, mallards and Canada goose utilize these project areas. Wild turkey will also utilize the open areas created by this project.

Approximately 50 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 25 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 50 acres of barren and/or poorly vegetated abandoned strip mines that are eroding at rates of nine to thirty tons per acre per year. Approximately 50% 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 and revegetation of barren and poorly vegetated areas will promote vegetative growth, 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 900 tons per year and sedimentation will be reduced by 720 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 28,544 acres of Statewide Important Farmland in the Indian 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 42.5 acres of statewide important farmland. Alternative sites that would not impact important farmland are not available.

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 has a relative value of 28.8. This means that 71.2% of the farmland in the watershed has a higher relative farmland value. None of the 10 proposed sites are currently used for hay, pasture or cropland production. 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 50 acres of barren eroding strip mine spoil. The addition of lime, fertilizer, mulch and seed to the spoil will promote plant growth and revegetation. Acid production from the spoil will be reduced.

### **Flood Plains**

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

Alternative 1 (Recommended) - The Recommended Plan would have no significant impact on the flood plain or downstream flooding on Indian 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 and aluminum deposits on the stream bottom of Indian Creek and its tributaries, will continue to have a negative impact if the project is not completed.

Alternative 1 (Recommended) - The visual appearance of 17.4 miles Indian Creek and its tributaries will be returned to a natural visual condition. The revegetation of 50 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 through natural succession.

Alternative 1 (Recommended) - The following land use changes will take place: Woodland will be decreased by 30 acres, mine land will be decreased by 50 acres, grassland will be increased by 25.5 acres, wetlands will be increased by 2 acres and water will be increased by 52.5 acres.

## **Threatened and Endangered Species**

No. Action - No Federal or state endangered animal 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. No change is expected.

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. No threatened or endangered species exist on any site.

Alternative 1 (Recommended) - The Pennsylvania Natural Diversity Inventory (PNDI) maintained by the Department of Conservation and Natural Resources (DCNR), Bureau of Forestry was contacted. No threatened or endangered species exist on any site.

## **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 two sites (Kalp and Nicholson) needs a phase 1 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 2 acres of new wetlands and enhance 2 acres of existing acid mine drainage wetlands. The Recommended Plan is in compliance with Executive Order 11990, Protection of Wetlands.

## **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. 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.

## **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 resources 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 environment's long-term productivity. The works of improvement will cause some minor irreversible or irretrievable uses of natural resources. These include the conversion of 42.5 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 Indian Creek and its tributaries.

Alternative 1 (Recommended) - The Indian Creek Watershed project is compatible with the comprehensive plan for Fayette County, 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                             | 2 ac. new constructed wetlands<br>50 ac. mine land reclaimed<br>104 ac. seeding<br>6,600 ft. runoff controls<br>99 ac. clearing and grubbing<br>10 successive alkalinity producing systems (SAPS)<br>4 anoxic limestone drains (ALD's)<br>500 feet of access roads<br>9 constructed wetlands<br>19 settling basins<br>3350 feet limestone channels.<br>50 acres of land liming<br>3 hazards removed |
| <u>Project Investment</u>        | <u>Project Investment</u>   |
| \$0                              | \$4,166,000   |
| <u>Average Annual Benefit</u>    | <u>Average Annual Benefit</u>   |
| \$0                              | \$886,000   |
| <u>Average Annual Cost</u>       | <u>Average Annual Cost</u>  |
| \$0                              | \$363,000   |
| <u>Net Economic Benefit</u>      | <u>Net Economic Benefit</u>   |
| \$0                              | \$523,000   |

**COMPARISON OF ALTERNATIVE PLANS**  
(continued)

| <b>NO ACTION<br/>ALTERNATIVE</b>   | <b>RECOMMENDED<br/>PLAN</b>   |
|--|---|
| <u>Water Quality</u>   | <u>Water Quality</u>  |
| Mine Drainage continues to pollute Indian Creek and its tributaries  | Mine drainage is treated, and 17.4 miles of Indian Creek has improved water quality   |
| <u>Ground Water</u>  | <u>Ground Water</u>   |
| Deep mine drainage occurring in several Homes in the village of Melcroft will continue.  | Deep mine drainage in several homes in Melcroft will be reduced.  |
| Ground water quality at Rondell-Correal and Marsolino-Leighty will continue to be adversely affected by clay seals installed during mining operations. | Ground water quality at Rondell-Correal and Marsolino-Leighty will be improved by the removal of clay seals installed during mining operations. |
| <u>Aquatic Habitat</u>   | <u>Aquatic Habitat</u>  |
| 17.4 miles of riverine aquatic habitat remains severely degraded   | 17.4 miles of riverine aquatic habitat enhanced   |
| <u>Health &amp; Safety Hazards</u>   | <u>Health &amp; Safety Hazards</u>  |
| Existing hazards remain  | Three safety hazards removed  |
| <u>Recreation</u>  | <u>Recreation</u>   |
| Sport fishing opportunities severely impacted by mine drainage   | Sport fishing opportunities enhanced on 17.4 miles of stream  |
| Hunting opportunities for wood ducks, geese and wild turkey remain nearly constant   | Increased hunting opportunities for wood duck, geese, wild turkey, deer   |

# **COMPARISON OF ALTERNATIVE PLANS** (continued)

| <p style="text-align: center;"><b>NO ACTION<br/>ALTERNATIVE</b></p>  | <p style="text-align: center;"><b>RECOMMENDED<br/>PLAN</b></p>  |
|--|---|
| <p><u>Social Concerns</u></p> <p>Impaired recreational opportunities, safety hazards, degraded economic opportunities and community pride will continue to be local social concerns.</p>                   | <p><u>Social Concerns</u></p> <p>Improved recreational opportunities, elimination of safety hazards, enhanced economic opportunity and community pride will result with implementation of the recommended plan.</p> |
| <p><u>Civil Rights</u></p> <p>All people, including economically disadvantaged groups, minorities women and persons with disabilities will continue to be adversely impacted by degraded water quality</p> | <p><u>Civil Rights</u></p> <p>All people, including economically disadvantaged groups, minorities women and persons with disabilities will be positively benefited by the project</p>                               |
| <p><u>Wildlife Habitat</u></p> <p>No waterfowl habitat</p> <p>Less than 1 habitat unit change for any upland specie</p>  | <p><u>Wildlife Habitat</u></p> <p>50 wood duck habitat units will be created<br/>104 Canada geese habitat units will be created<br/>25 wild turkey habitat units will be created</p>                                |
| <p><u>Erosion and Sedimentation</u></p> <p>Slight decrease due to natural revegetation</p>   | <p><u>Erosion and Sedimentation</u></p> <p>Erosion will be reduced by 900 tons per year<br/>Sedimentation will be reduced by 720 tons per year</p>  |
| <p><u>Important Farmlands</u></p> <p>Minor impacts</p>   | <p><u>Important Farmlands</u></p> <p>42.5 acres of Statewide important farmland impacted</p>  |

**COMPARISON OF ALTERNATIVE PLANS**  
(continued)

| <b>NO ACTION<br/>ALTERNATIVE</b>  | <b>RECOMMENDED<br/>PLAN</b>  |
|---|--|
| <u>Soil Resource Base</u>   | <u>Soil Resource Base</u>  |
| 50 acres of strip mine spoil will continue to degraded and unproductive | 50 acres strip mine spoil will be improved by the addition of lime fertilizer, mulch and seeding   |
| <u>Aesthetics</u>   | <u>Aesthetics</u>  |
| No change   | The visual appearance of 17.4 miles of stream will be returned to a natural condition  |
| <u>Land use</u>   | <u>Land use</u>  |
| No change   | Woodland acreage will be reduced by 30 acres<br>Grassland will be increased by 25.5 acres<br>Abandoned mine land will be reduced by 50 acres<br>Wetlands will be increased by 2 acres<br>Water will increase by 52.5 acres |
| <u>Cultural Resources</u>   | <u>Cultural Resources</u>  |
| No effect   | Two phase 1 studies to be completed<br>Cultural Resources will be protected  |
| <u>Wetlands</u>   | <u>Wetlands</u>  |
| No effect   | 2 acres of wetland will be constructed to enhance pollutant removal  |
| <u>Water Quantity</u>   | <u>Water Quantity</u>  |
| No Change   | No Change  |
| <u>Education</u>  | <u>Education</u>   |
| Education potential limited   | Education potential created  |



## **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 Indian 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 extensive 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).

The lowering of water elevations in deep mine pools has some risk and uncertainty associated with it. The response of the mine pool to drainage efforts can be calculated, however; assumptions must be made about the accuracy of mine maps, the structural stability of the mine roof, the extent of subsidence within the mine and the impact of subsidence on flow patterns within the mine. The PADEP, Bureau of Abandoned Mine Reclamation (BAMR) has extensive experience in applying this technology. They have done extensive research at the Melcroft Portal Pond site where this technology is to be applied and have a high degree of confidence that the intended results will be achieved.

## **RATIONALE FOR PLAN SELECTION**

All of the identified mine water treatment sites will need to be implemented to reach a water quality threshold in Indian 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 Mountain Watershed Association and agency partners. 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 of 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 Indian Creek Basin first began with the establishment of the Mountain Watershed Association (MWA) in 1994. The MWA has actively pursued the collection and interpretation of resource information to quantify and qualify the resource problems in the Indian 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 April 22, 1999, the Fayette 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. The application was approved by the State Conservation Commission on May 20, 1999.

### **BACKGROUND**

The first meeting of the Mountain Watershed Association (MWA) took place in March of 1994 among ten residents of the Indian Creek Watershed who were concerned about a deep mine proposal in the area. They decided to hire a hydrogeologist to review the mining permit application. They also went out into the community to talk to other people and found that over 150 years of underground and strip mining had caused serious damage to the watershed. The hydrogeologist informed the group that the proposed deep mine would cause additional mine discharges. The Department of Environmental Protection denied the permit application. This denial was appealed. MWA intervened on the side of the Department in the litigation that followed, and the growing membership determined to settle in for the long haul to rehabilitate the watershed it was working so hard to protect.

MWA is now six years old and has grown from a membership of ten to over 600. The members report a legacy of dead streams and creeks, but also that people's homes, yards, gardens, and fields are being devoured, and devalued, by mine drainage and subsidence.

One family moved their utilities from the basement to the first floor and filled their basement with sand to absorb the mine drainage leaking into their home. Other families have had enormous family garden plots and fields consumed by discharges. People find their properties worth less than they invested in them. Homes are hard, if not impossible, to sell, and people's major life investments, their homes, are diminished or lost completely.

MWA has spent six years informing the community about environmental issues. Its members have worked to empower the community to support clean up of the environment, promote a healthy environment, and form relationships with other groups to get release of more money for remediation projects. It has worked to identify people in the area with problems caused from mining and encouraged them to become actively involved in finding solutions to those problems.

MWA is funded in part by the Catholic Campaign for Human Development. With the funds received from CCHD for organizational development, MWA built an organization that has been able to raise \$17,000 in grassroots fundraising in one year and leveraged those funds into over \$700,000 in grants and gifts for construction of remediation projects, property for a community nature trail, and funds for a river conservation study.

MWA has done outreach on several subjects, including mine subsidence, blasting damages, environmental justice, and watershed degradation from mine discharges. Outreach is done so the community can make informed decisions about environmental projects. People in the area are skeptical that remediation can be done, and many do not understand the nature of the pollution problem that has been caused by mine drainage.

### **ONGOING PUBLIC INFORMATION ACTIVITIES**

The PL 83-566 planning process has been enhanced by the current and previous efforts of the Association. Local individuals and groups along with State and other Federal partners were involved in the development of the plan. The specific sites for remediation have been identified, inventoried and evaluated to determine the most effective plan for meeting the objectives outlined by the Association.

MWA has a quarterly community meeting. These meetings are often carried out in the form of tabling, that is, the membership takes a table at community functions like fairs or expos and hands out information, talking to people about what the organization does. A quarterly newsletter is published and sent out to over 500 people. The group also does blanket mailings, sending out flyers on various subjects to as many as 2000 people.

Another form of outreach includes offering a "stream school" to local children and at local campgrounds to show them about life in Indian Creek. The group gives presentations at other community meetings, such as the Lions' Club and Library Day at the local elementary school.

MWA received a grant from the Canaan Valley Institute for the development of a brochure that discusses the various goals of the organization. It invites people to help turn mine drainage sites into healthy water resources. This is a tremendous tool for outreach.

The group has also received a Regional Watershed Support Initiative grant to develop a booklet about caring for water resources. The need for this became painfully aware when three miles of the healthy part of Indian Creek was wiped out after some unknown substance was dumped down a drain that empties directly into the creek. The booklet was distributed in June of 1999.

MWA received funding through the Catholic Campaign for Human Development, which was established by the National Conference of Catholic Bishops in 1969. This funding has enabled the group to maintain an office and do vigorous community outreach. The purposes of this grant project will compliment the PL-566 process because they both require and encourage public involvement. Two of the CCHD project goals are community outreach and information distribution with the long-range goals of organizing the community to deal with mine drainage problems. The CCHD grant has provided MWA with the tools to inform people about the PL-566 planning and implementation process and what it means to the community.

In February MWA published a web-site to further its outreach efforts. The site address is [mtwatershed.com](http://mtwatershed.com).

There was a technical review of this document by local groups, individuals, government agencies and NRCS technical specialists. A 45 day review of the draft Plan-Environmental Assessment and a public meeting will be held to facilitate and encourage the on going public involvement efforts of the watershed association. Depending on the outcome of the initial review, additional public review meetings may be held to encourage public comment and project awareness. The following agencies and groups among others will be provided with a Draft Watershed Plan and Environmental Assessment for review. The public will also be notified of the public meeting and plan review by published notification in local newspapers and by news articles.

Congressman John P. Murtha  
Congressman Frank Mascara  
U.S. Senator Rick Santorum  
U.S. Senator Arlen Specter  
State Senator Richard Kasunic  
State Representative Jess Stairs  
State Representative Larry Roberts  
Catholic Campaign for Human Development  
Western Pennsylvania Watershed Protection Program  
Richard King Mellon Foundation  
Canaan Valley Institute  
U. S. Environmental Protection Agency  
Pennsylvania Historical and Museum Commission  
Pennsylvania Association of Conservation Districts Inc.  
Pennsylvania Department of Agriculture

Pennsylvania Department of Environmental Protection  
Office of Policy  
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  
Pennsylvania Department of Conservation and Natural Resources,  
Bureau of Recreation and Conservation  
Pennsylvania Fish and Boat Commission  
Pennsylvania Game Commission  
Commonwealth of Pennsylvania, Governors Policy Office  
Westmoreland County Conservation District  
Fayette County Planning Commission  
Westmoreland County Planning Commission  
State Conservation Commission  
Saltlick Township  
Springfield Township  
Stewart Township  
Donegal Township  
Donegal Borough  
Indian Creek Valley Sportsmen's Club  
Indian Creek Valley Lions' Club  
Indian Creek Valley Water Authority  
Western Pennsylvania Conservancy  
Chestnut Ridge Chapter Trout Unlimited  
Western Pennsylvania Coalition for Abandoned Mine Reclamation  
U.S. Army Corps of Engineers  
U.S.D.A. Farm Service Agency  
U.S.D.A. Forest Service  
U.S.D.I. Geological Survey  
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  
South Western PA Regional Planning and Development Commission

## **MINORITY AND UNDER SERVED POPULATIONS**

The vast majority of the minority populations in Fayette and Westmoreland Counties live outside the watershed boundaries, in the population centers of both counties. The 1990 census documents the following minority populations exist in the watershed: Donegal Township, African Americans, - 8, Asians, - 7, and others, 0.

Donegal Borough, no minorities

Saltlick Township, no minorities

Springfield Township, no minorities

Stewart Township, one person of unidentified minority

The extensive outreach efforts being made by the MWA will inform minorities, including, under served Appalachians, of the watershed problems and potentials. The MWA has helped many grass roots organizations and will provide assistance to any individuals, groups, or organizations without discrimination.

Nine thousand eight hundred twenty-six residents in the watershed are classified as rural non-farm. Per Capita income in the watershed is \$8,808, which is 43% of the national average. The economic benefits that will be gained through the implementation of the watershed plan will provide economic benefits to these rural non-farm residents.

Over the past five years MWA has reached people in the community through a number of methods. A major part of the group's purpose and function has been to do community outreach. They publish a quarterly newsletter, send out flyers concerning major issues in the community, do tabling at local fairs and other community functions, give presentations at the local schools, and communicate with newspapers and other media. These methods have been successful. Many community members who do not read the papers, the newsletters, or the flyers (the under-served residents below poverty level) will attend local fairs and community functions. It gives members of MWA an opportunity to talk to people about what they are doing. Present and future outreach includes, and will include, discussions about the PL 566 planning and implementation process and what this will mean to the future of the watershed community.

## **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, Southwest Regional Office

The Southwest office provided several general comments and several comments specific to Bureaus within the DEP. All of the comments raised by the Southwest Regional Office have been considered in the development of the Plan-EA. During the development of site specific designs for each site, the comments raised in the comment letter will be revisited for compliance.

## **9 - RECOMMENDED PLAN**

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

This plan is designed to meet the Sponsor's objectives to improve water quality in 17.4 miles of Indian 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 and metal precipitates. The planned action will treat 20 acid mine drainage discharges at 10 sites and provide for the revegetation of 50 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. 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, SAPS may be replaced with or supplemented by an anoxic limestone drain (ALD).

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 treatment measures to be installed.

#### **Melcroft # 3**

The Melcroft #3 deep mine is located at the west end of the village of Melcroft, (Latitude 40-03-30, Longitude 79-23-39). The deep mine is partially flooded and flows out of the mine at the mine portal and at several locations at or below the crop line of the coal seam. The water flowing from the mine enters Champion Creek about 0.8 mile upstream from its confluence with Indian Creek. There are 5 discharges that are attributed to the Melcroft #3 mine in this vicinity. The combined volume of flow is 150 gallons per minute. Acid levels from these discharges range from 100 to 400 mg/L, iron 7 to 88 mg/L, and aluminum levels range from 1 to 33 mg/L. Several intermittent flows associated with the deep mine refuse pile west of the Portal Pond will also be treated at this site when they flow.

In order to facilitate the collection of these discharges the pool elevation in the Melcroft #3 mine will be lowered to an elevation of 1443 feet above sea level. Historical information from the mining operations along with research of mine maps indicate that the flow from the coal outcrop and seeps can be drained and outlet at the portal opening, when the mine pool is lowered to this elevation. Once the mine water is directed to this one location it can be transported to a treatment area. The planned treatment system at this site will convey the water from the portal pond via pipes and rock lined waterways under State Route 1007 to the treatment area. Additional channels will be constructed to collect and convey the intermittent flow associated with the deep mine refuse piles west of the portal pond.

Water will be collected and directed to a settling basin, the first component of the treatment system. The purpose of this basin is to provide a place for iron and aluminum to settle before entering a SAPS. The SAPS will provide alkalinity from limestone to neutralize the acid in the water and raise the pH of the water. The water will be directed into another settling basin to allow the remainder of the iron and aluminum to precipitate and settle out. The final component of the system will be an aerobic wetland that will filter out any remaining pollutants. The treated water will flow out of the system in a rock lined waterway to Champion Creek.

### **Kalp**

The Kalp discharge is located along State Route 711 about a mile south of Melcroft, (Latitude 40-02-48, Longitude 79-42-12). This discharge flows from the Melcroft #1 mine into Indian Creek and is the largest discharge in the watershed. In 1997 and 1998 the median flow was 525 gallons per minute, the minimum flow was 230 gallons per minute and the maximum flow was 840 gallons per minute. Acid levels range from 64 to 310 mg/L, iron from 53 to 84 mg/L and aluminum from 7 to 11mg/L. A 20 gallons per minute discharge about 1000 feet north of the Kalp discharge will also be treated at this location. To treat the Kalp discharge it must first be captured in a water control structure and then piped 1600 feet to the treatment area. To construct the water control structure the mine pool will need to be pumped to lower the pool elevation below the current outlet elevation. Lowering the mine pool to this elevation will allow the construction of the control structure in dry conditions.

Water will be collected and directed to a settling basin, the first component of the treatment system. The purpose of this basin is to provide a place for iron and aluminum to settle before entering a SAPS. The SAPS will provide alkalinity from limestone to neutralize the acid in the water and raise the pH of the water. The water will be directed into another settling basin to allow the remainder of the iron and aluminum to precipitate and settle out. The treated water will flow out of the system in a rock lined waterway to Indian Creek.



## **Gallentine**

The Gallentine discharge is located 500 ft. east of State Route 711, approximately 1 ½ miles south of the village of Indian Head, (Latitude 40-01-00, Longitude 79-24-31). The discharge at this site flows from a hazardous deep mine portal into Indian Creek. The flow from this discharge ranges from 18 to 199 gallons per minute. Acid levels range from 124 mg/L to 195 mg/L, iron is nearly constant at 74 mg/L and aluminum ranges from 7 to 11 mg/L.

The treatment system at this location will be the same as at the Kalp site. A settling basin followed by a SAPS and settling basin will accomplish the treatment of this water.

## **Rondell-Correal**

The Rondell-Correal site is located in the headwaters of Newmyer Run, about ¾ of a mile north west of the village of Clinton, (Latitude 40-03-13, Longitude 79-28-42). This site produces the most degraded water of any site in the watershed. Acidity levels range from 908 to 1188 mg/L, iron ranges from 61 to 123 mg/L and aluminum ranges from 68 to 124 mg/L. The maximum flow at this site is 45 gallon per minute, although during dry periods of the year, flows as low as 2 gallons per minute have been recorded. This poor quality discharge is the result of strip mine operations that used low wall clay sealing technology to trap water in the backfilled strip mine pit to reduce oxygen levels with the intended results of lowered acid production. The clay used in this seal has a very high aluminum content which causes high levels of acidity to be produced. Removing these low wall seals at the low point in the backfill will reduce acid production by reducing the time the water is in contact with the acid producing material. The PADEP, Bureau of Abandoned Mine Reclamation (BAMR) has completed extensive geophysical surveys and exploratory drilling to define the extent of the problem and location of the proposed drain. Significant water quality improvements are expected by draining this improperly back filled stripmine.

The implementation of the remediation at this site will be phased. Initially the stripmine low wall will be removed to drain the impounded water. The water quality will be monitored for a year after the draining of the low wall to determine the needed components for this system. To develop the costs for this system a worst case situation was assumed and costs were calculated for a treatment system with existing water quality data. To treat the current water quality 3 SAPS and 3 settling basins are planned.

There is also a severe problem of sheet, rill, and gully erosion associated with this stripmine. Diversions, rock lined waterways and seeding will be used to control erosion on this site.

## **Marsolino-Leighty**

The Marsolino-Leighty Stripmine is located approximately 1 mile east of the village of Clinton and ½ mile north of State Route 1054 on Newmyer Run (Latitude 40-02-41, Longitude 79-26-23). This site has several locations where mine water flows to the surface. The combined flow rate for these discharges is 250 gallons per minute at high flow periods of the year, dropping to 100 gallons per minute during dry periods. The acidity levels range from 186 mg/L to 364 mg/L, iron levels range from 61 to 124 mg/L and aluminum levels range from 68 to 124 mg/L. The clay seal technology that was used at the Rondell-Correal site was also used here. The PADEP, BAMR has completed extensive geophysical surveys and exploratory drilling to define the extent of the problem and location of the proposed drain. Significant water quality improvements are expected by draining this improperly back filled stripmine.

The implementation of the remediation at this site will be phased. Initially the stripmine low wall will be removed to drain the impounded water. The water quality will be monitored for a year after the draining of the low wall to determine the needed components for this system. To develop the costs for this system a worst case situation was assumed and costs were calculated for a treatment system with existing water quality data. To treat the current water quality 1 SAPS, 1 ALD, 1 wetland and 1 settling basin is planned. The iron sludge that has accumulated in the existing ponds will be removed after the ponds are dewatered. Up slope from the proposed treatment systems are a number of abandoned settling ponds that receive surface runoff from the reclaimed stripmine area. The water these ponds receive does not outlet. All of the water seeps into the reclaimed stripmine spoil. The water infiltrating into the spoil from these abandoned settling ponds is a possible source for some of the acid mine drainage flowing to the surface down slope of the ponds. To reduce the amount of flow needing treatment, these ponds will be removed and graded so that positive drainage is achieved.

## **Fulton**

The Fulton discharge is located on Poplar Run near the confluence of Newmyer Run about 300 feet south of State Route 1054 (Latitude 40-02-12, Longitude 79-26-33). Acidity levels at this discharge are 150 mg/L, iron is 50 mg/L and aluminum is 1 mg/L. The maximum flow from this discharge is 50 gallons per minute during wet periods of the year and as low as 5 gallons per minute during dry periods of the year.

The proposed treatment at this site is an ALD and settling basin. The area needed to construct this treatment is very limited and it is possible that the system constructed here will not be large enough for total treatment during periods of high flow. The occurrence of these high flow periods will coincide with high stream flows, which will minimize the impact on Poplar Run. The flow from the discharge is not expected to exceed the system design size more than 8% of the year.

### **Nicholson**

The Nicholson discharge occurs in the headwaters of Poplar Run about ¼ mile southwest of the village of Clinton (Latitude 40-01-53, Longitude 70-23-40). This discharge flows from a reclaimed strip mine at a relatively low rate of 20 gallons per minute, but this discharge has a negative impact on one mile of Poplar Run. The acidity of this discharge is 138 mg/L, iron is 18 mg/L and aluminum is 1 mg/L.

Treatment will be accomplished at this site by an ALD and a settling basin.

### **Lawrence Coal**

The Lawrence Coal stripmine consists of two discharges along township routes T683 and T685 about ½ mile east of Rogers Mill (Latitude 39-59-33, Longitude 79-24-31). These discharges flow from a reclaimed stripmine and have a combined flow of 150 gallons per minute. The acidity is 400 mg/L, iron is 20 mg/L and aluminum is 40 mg/L.

An ALD and settling basin are proposed for each discharge.

### **Buck Run**

The Buck Run discharge is located along township route T693 about ½ mile east of Rogers Mill (Latitude 39-59-20, Longitude 70-24-25). This discharge flows from a reclaimed stripmine on the north side of township route T693. The proposed treatment area is south of T693. The flow of this discharge ranges from 5 to 50 gallons per minute. The acidity is 200 mg/L, iron is 5 mg/L and aluminum is 30 mg/L.

The proposed treatment sequence is a settling basin, SAPS, settling basin.

### **Permapress**

The Permapress site is located 2 miles east of Normalville, 100 yards north of State Route 653 (Latitude 39-59-18, Longitude 79-25-23). This discharge flows from a reclaimed stripmine at a rate of 20 gallons per minute. The discharge flows into an unnamed tributary of Indian Creek. The acidity is 150 mg/L, iron is <1 mg/L and aluminum is 23 mg/L.

The proposed treatment sequence is a settling basin, SAPS, settling basin.

## **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 \$2,037,000 or 49 percent of the total costs. Locally acquired funds will total \$2,129,000 or 51 percent of the total costs. The Total costs are \$4,166,000.

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 of 12% was added. PL-566 funds will bear no more than fifty percent (50%) of the total construction costs estimated at \$3,452,000. 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 \$174,000 each. The total engineering cost is estimated at \$348,000.

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 \$274,000. The Sponsors will bear \$137,000 and PL-566 funds will bear \$137,000.

Land rights costs include purchasing or acquiring easements for the treatment sites. Land rights costs, based on local estimates will be \$92,000 and will be incurred locally.

Utility relocations and modifications are considered a part of land rights costs. For this Indian 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 49 percent of the costs and locally acquired funds will bear 51 percent of the costs.

Table 4 contains Average Annual project costs. Costs are based on a 1999 price base and are discounted at an interest rate of 6.6250 percent over a 25 year evaluation period. It is the sponsors responsibility to bear all operation and maintenance costs which are estimated to be at total cost of \$17,000 per year for all sites.

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 2.4 : 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 consists of 10 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 be the Gallentine discharge. Significant design work has been completed and project funding has already been committed to this project. The second year of construction will be the Melcroft #3 and Nicholson sites. Year 3 will see the completion of the Kalp and Rondell-Correal sites. In the fourth year The Marsolino-Leichty site will be constructed. Year 5 the Buck Run and Permapress sites will be completed. Years 6 and 7 will see the completion of the Fulton and Lawrence Coal sites respectively.

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

| YEAR | ITEM           | PL-566<br>FUNDS | OTHER<br>FUNDS | TOTAL<br>FUNDS |
|------|----------------|-----------------|----------------|----------------|
| 1ST  | CONSTRUCTION   | \$105,000       | \$105,000      | \$210,000      |
|      | ENGINEERING    | \$10,000        | \$10,000       | \$20,000       |
|      | PROJECT ADMIN. | \$8,000         | \$8,000        | \$16,000       |
|      | LAND RIGHTS    | \$0             | \$7,000        | \$7,000        |
| 2ND  | CONSTRUCTION   | \$288,000       | \$288,000      | \$576,000      |
|      | ENGINEERING    | \$29,000        | \$29,000       | \$58,000       |
|      | PROJECT ADMIN. | \$23,000        | \$23,000       | \$46,000       |
|      | LAND RIGHTS    | \$0             | \$12,000       | \$12,000       |
| 3RD  | CONSTRUCTION   | \$663,000       | \$663,000      | \$1,326,000    |
|      | ENGINEERING    | \$67,000        | \$67,000       | \$134,000      |
|      | PROJECT ADMIN. | \$53,000        | \$53,000       | \$106,000      |
|      | LAND RIGHTS    | \$0             | \$46,000       | \$46,000       |
| 4TH  | CONSTRUCTION   | \$466,000       | \$466,000      | \$932,000      |
|      | ENGINEERING    | \$47,000        | \$47,000       | \$94,000       |
|      | PROJECT ADMIN. | \$37,000        | \$37,000       | \$74,000       |
|      | LAND RIGHTS    | \$0             | \$11,000       | \$11,000       |

**TABLE F (Continued)**

| <b>YEAR</b>  | <b>ITEM</b>    | <b>PL-566<br/>FUNDS</b> | <b>OTHER<br/>FUNDS</b> | <b>TOTAL<br/>FUNDS</b> |
|--------------|----------------|-------------------------|------------------------|------------------------|
| 5TH          | CONSTRUCTION   | \$77,000                | \$77,000               | \$154,000              |
|              | ENGINEERING    | \$8,000                 | \$8,000                | \$16,000               |
|              | PROJECT ADMIN. | \$6,000                 | \$6,000                | \$12,000               |
|              | LAND RIGHTS    | \$0                     | \$8,000                | \$8,000                |
| 6TH          | CONSTRUCTION   | \$29,000                | \$29,000               | \$58,000               |
|              | ENGINEERING    | \$3,000                 | \$3,000                | \$6,000                |
|              | PROJECT ADMIN. | \$2,000                 | \$2,000                | \$4,000                |
|              | LAND RIGHTS    | \$0                     | \$1,000                | \$1,000                |
| 7TH          | CONSTRUCTION   | \$98,000                | \$98,000               | \$196,000              |
|              | ENGINEERING    | \$10,000                | \$10,000               | \$20,000               |
|              | PROJECT ADMIN. | \$8,000                 | \$8,000                | \$16,000               |
|              | LAND RIGHTS    | \$0                     | \$7,000                | \$7,000                |
| <b>TOTAL</b> | CONSTRUCTION   | \$1,726,000             | \$1,726,000            | \$3,452,000            |
|              | ENGINEERING    | \$174,000               | \$174,000              | \$348,000              |
|              | PROJECT ADMIN. | \$137,000               | \$137,000              | \$274,000              |
|              | LAND RIGHTS    | \$0                     | \$92,000               | \$92,000               |
|              |                | \$2,037,000             | \$2,129,000            | \$4,166,000            |

### **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, 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 Indian Creek project area to determine the presence and significance of prehistoric and historic archaeological resources. The Commission found that the Kalp and Nicholson sites need a phase 1 archaeological survey. NRCS will complete the phase 1 survey. The results will be provided to the Pennsylvania 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. It is anticipated that the local share of the construction costs will be provided by grants from other state and federal programs.

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. Iron and aluminum collected in settling basins will need to be removed when the capacity of the settling basins is reduced by half. Total annual maintenance cost is estimated at \$17,000 per year. This annual operation and maintenance cost is the Sponsor's 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**

No changes to the Plan-EA were required as a result of the public participation review and comment period.

**TABLE 1 - ESTIMATED INSTALLATION COST<sup>1</sup>****Indian Creek, Fayette County, 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> |                        |              |              |
| Nicholson                     | 30,000                 | 34,000       | 64,000       |
| Melcroft #3                   | 310,000                | 318,000      | 628,000      |
| Gallentine                    | 123,000                | 130,000      | 253,000      |
| Kalp                          | 526,000                | 561,000      | 1,087,000    |
| Rondell-Correal               | 257,000                | 268,000      | 525,000      |
| Marsolino-Leighty             | 550,000                | 561,000      | 1,111,000    |
| Fulton                        | 34,000                 | 35,000       | 69,000       |
| Permapress                    | 44,000                 | 48,000       | 92,000       |
| Lawrence Coal                 | 116,000                | 123,000      | 239,000      |
| Buck Run                      | 47,000                 | 51,000       | 98,000       |
| Total                         | 2,037,000              | 2,129,000    | 4,166,000    |

<sup>1</sup>Price Base 1999

TABLE 2 - ESTIMATED COST DISTRIBUTION

Indian Creek, Fayette County, PA

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

| Evaluation Unit   | PL-566 FUNDS      |                  |                   |                   | OTHER FUNDS       |                       |                |                   |                | TOTAL COST  |
|-------------------|-------------------|------------------|-------------------|-------------------|-------------------|-----------------------|----------------|-------------------|----------------|-------------|
|                   | Construct-<br>ion | Engineer-<br>ing | Project<br>Admin. | TOTAL<br>P.L. 566 | Construct-<br>ion | Sponsor<br>Eng. Costs | Land<br>Rights | Project<br>Admin. | Total<br>Other |             |
| Treatment Site    | \$                | \$               | \$                | \$                | \$                | \$                    | \$             | \$                | \$             | \$          |
| Nicholson         | \$25,000          | \$3,000          | \$2,000           | \$30,000          | \$25,000          | \$3,000               | \$4,000        | \$2,000           | \$34,000       | \$64,000    |
| Melcroft #3       | \$263,000         | \$26,000         | \$21,000          | \$310,000         | \$263,000         | \$26,000              | \$8,000        | \$21,000          | \$318,000      | \$628,000   |
| Gallentine        | \$105,000         | \$10,000         | \$8,000           | \$123,000         | \$105,000         | \$10,000              | \$7,000        | \$8,000           | \$130,000      | \$253,000   |
| Kalp              | \$445,000         | \$45,000         | \$36,000          | \$526,000         | \$445,000         | \$45,000              | \$35,000       | \$36,000          | \$561,000      | \$1,087,000 |
| Rondell-Correal   | \$218,000         | \$22,000         | \$17,000          | \$257,000         | \$218,000         | \$22,000              | \$11,000       | \$17,000          | \$268,000      | \$525,000   |
| Marsolino-Leighty | \$466,000         | \$47,000         | \$37,000          | \$550,000         | \$466,000         | \$47,000              | \$11,000       | \$37,000          | \$561,000      | \$1,111,000 |
| Fulton            | \$29,000          | \$3,000          | \$2,000           | \$34,000          | \$29,000          | \$3,000               | \$1,000        | \$2,000           | \$35,000       | \$69,000    |
| Permapress        | \$37,000          | \$4,000          | \$3,000           | \$44,000          | \$37,000          | \$4,000               | \$4,000        | \$3,000           | \$48,000       | \$92,000    |
| Lawrence Coal     | \$98,000          | \$10,000         | \$8,000           | \$116,000         | \$98,000          | \$10,000              | \$7,000        | \$8,000           | \$123,000      | \$239,000   |
| Buck Run          | \$40,000          | \$4,000          | \$3,000           | \$47,000          | \$40,000          | \$4,000               | \$4,000        | \$3,000           | \$51,000       | \$98,000    |
| All Watersheds    | \$1,726,000       | \$174,000        | \$137,000         | \$2,037,000       | \$1,726,000       | \$174,000             | \$92,000       | \$137,000         | \$2,129,000    | \$4,166,000 |

<sup>1</sup> Price Base 1999

TABLE 3C - STRUCTURAL SUMMARY FOR INDIAN CREEK

| SITE NAME         | NUMBER ANOXIC DRAINS | NUMBER SAPS | NUMBER WETLANDS | NUMBER SETTLING BASINS | FEET LIMESTONE CHANNELS | FEET DIVERSION | FEET ACCESS ROADS | ACRES CLEARING GRUBBING | ACRES SEEDING | FEET POLLUTION CONTROL |
|-------------------|----------------------|-------------|-----------------|------------------------|-------------------------|----------------|-------------------|-------------------------|---------------|------------------------|
| MELCROFT #3       | 0                    | 2           | 1               | 3                      | 1600                    | 0              | 0                 | 15                      | 12            | 1000                   |
| KALP              | 0                    | 1           | 1               | 2                      | 100                     | 1000           | 0                 | 15                      | 12            | 1000                   |
| NICHOLSON         | 1                    | 0           | 0               | 1                      | 100                     | 300            | 500               | 3                       | 3             | 300                    |
| MARSOLINO-LEIGHTY | 1                    | 1           | 1               | 1                      | 250                     | 1500           | 0                 | 12                      | 20            | 1000                   |
| RONDELL-CORREAL   | 0                    | 3           | 1               | 3                      | 650                     | 1500           | 0                 | 15                      | 20            | 1000                   |
| FULTON            | 0                    | 0           | 1               | 1                      | 100                     | 0              | 0                 | 3                       | 2             | 300                    |
| GALLENINE         | 0                    | 1           | 1               | 2                      | 200                     | 1000           | 0                 | 10                      | 10            | 1000                   |
| LAWRENCE COAL     | 2                    | 0           | 1               | 2                      | 200                     | 500            | 0                 | 10                      | 10            | 500                    |
| BUCK RUN          | 0                    | 1           | 1               | 2                      | 100                     | 300            | 0                 | 6                       | 5             | 400                    |
| PERMAPRESS        | 0                    | 1           | 1               | 2                      | 50                      | 500            | 0                 | 10                      | 10            | 500                    |
| TOTALS            | 4                    | 10          | 9               | 19                     | 3350                    | 6600           | 500               | 99                      | 104           | 7000                   |

**TABLE 4 - ESTIMATED AVERAGE ANNUAL COSTS**

**Indian Creek, Fayette County, Pennsylvania  
(Dollars)<sup>1</sup>**

| Evaluation Unit            | Project<br>Amortization <sup>3</sup><br>of Installation<br>Cost | Outlays<br>Operation <sup>2</sup><br>Maintenance &<br>Replacement<br>Cost | Other<br>Direct<br>Cost | Total<br>Average<br>Annual<br>Cost | Total<br>Installation<br>Cost |
|----------------------------|---|---|-------------------------|------------------------------------|-------------------------------|
| <b>Structural Measures</b> |   |   |                         |                                    |                               |
| Nicholson                  | \$ 5,000  | \$ 500  | \$0                     | \$ 5,500                           | \$ 64,000                     |
| Melcroft #3                | \$ 52,000   | \$ 1,700  | \$0                     | \$ 53,700                          | \$ 628,000                    |
| Gallentine                 | \$ 21,000   | \$ 1,500  | \$0                     | \$ 22,500                          | \$ 253,000                    |
| Kalp                       | \$ 90,000   | \$ 6,600  | \$0                     | \$ 96,600                          | \$1,087,000                   |
| Rondell-Correal            | \$ 44,000   | \$ 1,300  | \$0                     | \$ 45,300                          | \$ 525,000                    |
| Marsolino-Leighy           | \$ 92,000   | \$ 1,900  | \$0                     | \$ 93,900                          | \$1,111,000                   |
| Fulton                     | \$ 6,000  | \$ 800  | \$0                     | \$ 6,800                           | \$ 69,000                     |
| Permapress                 | \$ 8,000  | \$ 500  | \$0                     | \$ 8,500                           | \$ 92,000                     |
| Lawrence Coal              | \$ 20,000   | \$ 1,500  | \$0                     | \$ 21,500                          | \$ 239,000                    |
| Buck Run                   | \$ 8,000  | \$ 700  | \$0                     | \$ 8,700                           | \$ 98,000                     |
| <b>Total</b>               | <b>\$346,000</b>  | <b>\$17,000</b>   | <b>\$0</b>              | <b>\$363,000</b>                   | <b>\$4,166,000</b>            |

<sup>1</sup> Price Base 1999, Amortized over 25 years at a 6.6250% discount rate

<sup>2</sup> There are no anticipated replacement costs over the 25 year period of analysis

<sup>3</sup> Costs for Project Administration, Engineering and Landrights are included

**TABLE 5A - ESTIMATED AVERAGE ANNUAL ECONOMIC BENEFITS<sup>1</sup>**  
**Indian Creek, Fayette County, Pennsylvania**

| BENEFIT ITEM                         | BENEFIT          |
|--------------------------------------|------------------|
| OFF SITE                             |                  |
| Fishery                              | \$886,000        |
| <b>TOTAL AVERAGE ANNUAL BENEFITS</b> | <b>\$886,000</b> |

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

**Indian Creek, Fayette County, Pennsylvania**

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

| Item                               | Average Annual<br>Benefits<br>Water Quality | Average<br>Annual<br>Costs | Benefit<br>Cost<br>Ratio |
|------------------------------------|---|----------------------------|--------------------------|
| Water Quality<br>Evaluation Unit 1 | \$ 886,000                                  | \$ 363,000                 | 2.4 : 1.00               |
| Grand Total                        | \$ 886,000                                  | \$ 363,000                 | 2.4 : 1.00               |

<sup>1</sup> Base Price 1999, amortized over 25 years at 6.6250% discount rate

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## 11 - LIST OF PREPARERS

| NAME              | PRESENT TITLE                              | YEARS OF<br>EXPERIENCE | EDUCATION                                |
|-------------------|--|------------------------|--|
| Beverly Braverman | Executive Director, MWA                    | 23                     | JDL-Law Degree                           |
| Pamela Shea       | Office Manager, MWA                        | 18                     | Executive Secretarial                    |
| Pamela Milavec    | Water Pollution Biologist III<br>DEP/BAMR  | 15                     | BS-Env. Biology                          |
| Richard Beam      | Hydrogeologist II, DEP/BAMR                | 16                     | BS-Geology                               |
| George Skovran    | Project Engineer, NRCS                     | 14                     | BS-Agricultural Engineering              |
| Wayne Bogovich    | Area Engineer, NRCS                        | 20                     | BS-Agricultural Engineering              |
| Jeff Mahood       | Environmental Planning<br>Specialist, NRCS | 23                     | BS-Environmental Resources<br>Management |
| Dale Pekar        | Agricultural Economist, NRCS               | 24                     | MS-Economics                             |
| William J. Bowers | State Conservation Engineer, NRCS          | 30                     | BS-Agricultural Engineering              |
| Daniel Seibert    | Resource Conservationist, NRCS             | 28                     | BS-Agronomy                              |
| Barry Isaacs      | Biologist, NRCS                            | 22                     | BS-Forestry                              |
| Lisa Walker       | Clerk-Typist, NRCS                         | 12                     |  |

**APPENDIX A**

**LETTERS  
OF  
COMMENT  
(Reserved)**



Southwestern  
Pennsylvania  
Commission

Regional Enterprise Tower  
425 Sixth Avenue, Suite 2500  
Pittsburgh, PA 15219-1619  
Telephone: 412.391.5590  
Fax: 412.391.9160  
E-Mail: comments@spc9.org

Officers:

Westmoreland County  
Tom Balya

*Chairman*

Washington County  
J. Bracken Burns

*Vice-Chairman*

City of Pittsburgh  
Eloise Hirsh

*Secretary-Treasurer*

June 22, 2000

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

Executive Committee:

Allegheny County  
Bob Cranmer

Armstrong County  
James V. Scahill

Beaver County  
Charles A. Camp

Butler County  
James L. Kennedy

Fayette County  
Vincent A. Vicites

Greene County  
Dave Coder

Indiana County  
Bernie Smith

At-Large  
Gealy W. Wallwork

Governor's Office  
Henry Fisher

PA Dept. of Transportation  
Larry M. King

PA Dept. of Community and  
Economic Development  
Ellen G. Kight

Executive Director  
Bob Kochanowski

Dear Mr. Seibert:

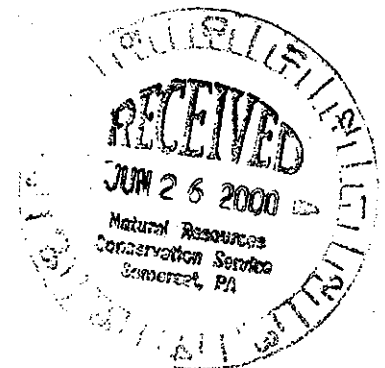
The Southwestern Pennsylvania Commission staff has reviewed the Draft Watershed Plan and Environmental Assessment (Plan EA) for the Indian Creek project located in Fayette County, Pennsylvania. We have no comments.

Sincerely,

Robert Kochanowski  
Executive Director

KOCH:RLP:dlp

cc: Janet L. Oertly  
State Conservationist  
Christopher Sepesy, Director  
Fayette County Office of Planning and  
Community Development



Thomas C. Ceraso  
Commissioner

Tom Balya  
Chairman

Scott Conner  
Commissioner



DEPARTMENT OF  
PLANNING AND DEVELOPMENT  
COURTHOUSE SQUARE  
2 N. MAIN ST. STE. 601  
GREENSBURG, PA 15601

Telephone:  
(724) 830-3600  
FAX: (724) 830-3611  
TDD: (724) 830-3802

June 29, 2000

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

RE: Indian Creek Draft Watershed Plan  
and Environmental Assessment

Dear Mr. Seibert:

Please be advised that the above referenced project has been reviewed by the Westmoreland County Department of Planning and Development. From the information provided, the proposed does not appear to conflict with the general planning guidelines of Westmoreland County.

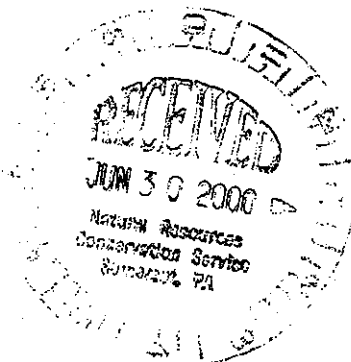
Please feel free to contact me at 724-830-3995 with any questions.

Sincerely,

A handwritten signature in dark ink, appearing to read "Daniel T. Weimer", is written over a horizontal line.

Daniel T. Weimer  
Planning Coordinator

DTW/pas  
cc: File





# United States Department of the Interior

FISH AND WILDLIFE SERVICE  
Pennsylvania Field Office  
315 South Allen Street, Suite 322  
State College, Pennsylvania 16801-4850



June 28, 2000

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

Dear Ms. Oertly:

The Fish and Wildlife Service has reviewed the Environmental Assessment and draft Finding of No Significant Impact for the Indian Creek PL83-566 project in Fayette County, Pennsylvania. This report is prepared and submitted in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 *et seq.*).

No significant adverse effects on fish and wildlife are expected to result from the proposed activity. Therefore, the Service has no objection, from a standpoint of fish and wildlife, to this project.

Please contact Bonnie Crosby of my staff at 814-234-4090 if you have any questions.

Sincerely,

David Densmore  
Supervisor



Bill USB  
jo  
copy sent to Don Se. Lt.  
7/1/00



Pennsylvania Department of Environmental Protection

Rachel Carson State Office Building

P.O. Box 8476

Harrisburg, PA 17105-8476

July 7, 2000

Bureau of Abandoned Mine Reclamation

717-783-2267

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

Re: Indian Creek Watershed Plan  
and Environmental Assessment

Dear Mr. <sup>Dan</sup>Seibert:

Thank you for the opportunity to review and comment on the Draft Watershed Plan and Environmental Assessment (Plan-EA) for the Indian Creek Watershed in Fayette and Westmoreland Counties, Pennsylvania.

The Department of Environmental Protection, Bureau of Abandoned Mine Reclamation, strongly supports and has been actively involved in restoration efforts in the Indian Creek Watershed. Staff from the bureau have reviewed the Plan-EA and agree with its scope and the evaluation of the environmental impacts of the proposed projects.

The bureau appreciates the continued inter-agency cooperation and public/private partnership efforts occurring in this watershed. The PL83-566 authorization will be a substantial addition to achieving restoration of the Indian Creek Watershed.

If you have any additional questions or require more information, please contact Eric Cavazza, Acting District Engineer, at the Ebensburg District Office, Bureau of Abandoned Mine Reclamation, at 814-472-1800.

Sincerely,

Roderick A. Fletcher, P.E.  
Director  
Bureau of Abandoned Mine Reclamation



# Canaan Valley Institute



P.O. Box 673  
Davis, WV 26260  
Telephone: 800-922-3601  
Fax: 304-866-4759

11 E. Beverley Street  
Staunton, VA 24401  
Telephone: 540-887-9898  
Fax: 540-887-8373

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

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

[www.canaanvi.org](http://www.canaanvi.org)

July 12, 2000

Mr. Dan Siebert  
USDA-NRCS  
North Ridge Building-Suite 105  
1590 North Center Ave  
Somerset, PA 15501

Dear Dan,

First of all, nice job with the Indian Creek Watershed Plan and Environmental Assessment through the PL-83-566 Program. I have reviewed it and concur with the findings and recommendations. The strategy to treat the top 10 of the 119 discharges for a loading reduction of over 90% is very achievable and cost effective. More importantly, the socio economic benefits gained for this depressed rural area will be substantial.

Canaan Valley Institute has had the opportunity to work with the Mountain Watershed Association on various organizational and programmatic levels. The Association has done a tremendous job of informing and educating community members and stakeholders. They have consistently strived to be inclusive and involve a broad spectrum of the community in the decision making process. It is impressive to see this rather young group achieve so much in a short amount of time.

The plan merits implementation. Thank you for the opportunity to review it.

Sincerely,

Janie French  
Watershed Coordinator

Cc: Beverly Braverman, Mountain Watershed Association



Pennsylvania Department of Conservation and Natural Resources

Rachel Carson State Office Building  
PO Box 8475  
Harrisburg, PA 17105-8475  
July 13, 2000

Bureau of Recreation and Conservation

717-787-2316

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

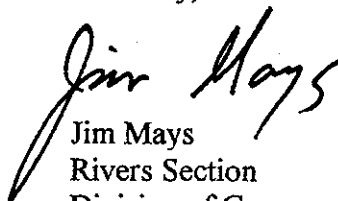
Dear Mr. Seibert:

Thank you for the opportunity to review the Draft Watershed Plan and Environmental Assessment for Indian Creek. We presently have a Rivers Conservation Planning project in this watershed and are pleased to hear the NRCS is assisting the local communities to solve some of their water resource problems.

The DCNR Rivers Program Staff is given the responsibility to review and assess impacts from projects on or along designated PA Scenic Rivers and 1-A Priority waterways. A 3-mile segment of Indian Creek, from Mill Run Reservoir to its confluence with the Youghiogheny River is a 1-A Priority waterway.

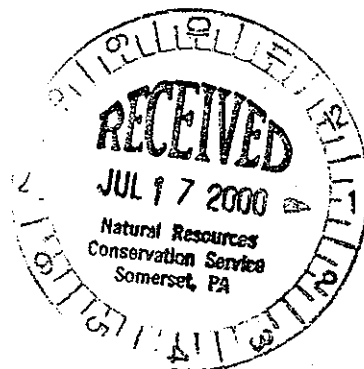
Since this project does not cause any apparent adverse environmental impacts to the watershed, we are in support of the implementation of this plan.

Sincerely,



Jim Mays  
Rivers Section  
Division of Greenways and Conservation Partnerships

cc: T. Robinson  
M. Hrubovcak



Stewardship

Partnership

Service





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

July 20, 2000

Ms. Janet L. Oertly  
USDA - NRCS  
Suite 340  
One Credit Union Place  
Harrisburg, PA 17110-2993

Re: Indian Creek  
Draft Watershed Plan and Environmental Assessment

Dear Ms. Oertly:

The subject environmental assessment addresses areas within the Indian Creek watershed which are degraded from acid mine drainage. The Pennsylvania Fish and Boat Commission has also surveyed within the watershed and documented areas of degradation caused by coal mining activities. Recent remining projects have helped to reduce loading within the watershed and additional reductions in the acid mine drainage loadings should continue to improve the physio-chemical and biological quality of the downstream areas. Continued efforts should also be made to evaluate additional remining, reclamation and permanent abatement projects as part of the final proposal. Once discharge loadings are reduced, the proposed passive treatment technologies suggested would be more likely to function for longer periods of time.

In conclusion, the Pennsylvania Fish and Boat Commission strongly supports the Draft Watershed Plan and Environmental Assessment which would remediate mine drainage problems in the watershed and re-establish a viable fishery in the lower Indian Creek watershed.

Sincerely,

Steven R. Kepler, Fisheries Biologist  
Division of Environmental Services

SRK:dms

c: L. Young

AUG 23 2000



## Pennsylvania Department of Environmental Protection

400 Waterfront Drive  
Pittsburgh, PA 15222-4745  
July 31, 2000

## Southwest Regional Office

412-442-4189  
Fax 412-442-4194

USDA NRCS  
Suite 340 One Credit Union Place  
Harrisburg, PA 17110-2993

Re: Environmental Assessment Project  
Indian Creek Draft Watershed Plan  
Fayette and Westmoreland Counties

Dear Sirs:

The Department of Environmental Protection's (DEP) regional program staff have reviewed the above project for environmental regulatory and policy requirements, and submit the following comments for your attention:

**General**

1. It is recommended that the applicant contact the Pennsylvania Historical and Museum Commission, Bureau for Historic Preservation, Box 1026, Harrisburg, PA 17108-1026, telephone number 717-787-8947, to determine if the project will pass through or otherwise impact historic or archaeological sites. Any review comments by the commission should be included with the appropriate DEP permit applications.
2. The Pennsylvania Natural Diversity Inventory List (PNDI) should be cross-checked against the site location to determine if any resources of special concern are located within the project area.
3. Any utility company with transmission lines within the project area should be contacted at least 30 days prior to work start by the contractor. It is further recommended that the applicant or contractor call 1-800-242-1776 before beginning any excavation.
4. Please be advised that the Southwest Regional Office of DEP lacks available staff time to perform an extensive file review for the above project. You may make arrangements to have your staff review the appropriate files by contacting File Clerk Edward Duval, at this address and telephone number.



JSDA NRCS

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July 31, 2000

**Air Quality**

5. Please be advised that all asbestos abatement procedures must conform to the requirements of the National Emission Standards for Hazardous Air Pollutants, 40 CFR Part 61, Subpart M. Any contractor removing asbestos must be licensed by the Pennsylvania Department of Labor and Industry. Removal of asbestos materials must take place prior to general demolition and also requires at least ten (10) days advance notification to the following individuals:

Regional Air Quality Manager  
PA Department of Environmental Protection  
400 Waterfront Drive  
Pittsburgh, PA 15222-4745  
412-442-4000

and

Region III Asbestos Coordinator  
U.S. Environmental Protection Agency  
1650 Arch Street  
Philadelphia, PA 19103-2029

6. Demolition waste cannot be burned.
7. Fugitive dust emissions must be controlled according to 25 Pa. Code Section 123.1.

**Mining**

8. Water quality data is available from the Greensburg District Office (GDMO) files for these discharges and receiving streams. Please contact Greensburg District Office, Armbrust Professional Center, RD #2, Box 603-C, Greensburg, PA 15601; 724-925-5500.
9. To the extent that coal removal would be required at any of the proposed remediation sites, a permit or government financed construction contract would be required from the GDMO.

JSDA NRCS

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July 31, 2000

10. Good Samaritan protection from liability application should be submitted to the GDMO for each of the remediation sites.
11. No doubt Indian Creek and its tributaries receive sediment from sources other than 50 acres of improperly reclaimed mine land. While this plan is specific to remediation of mine drainage related problems, agricultural practices, construction activities and dirt roads may contribute a far greater sediment load to Indian Creek and its tributaries than the above mentioned 50 acres. A comprehensive plan should identify measures to reduce sediment from other sources to effect the greatest degree of improvement to these streams.

#### Oil and Gas

12. It is recommended that the applicant or contractor contact DEP's Oil and Gas Management Program at this address and phone number in order to determine whether any existing or abandoned oil and gas wells are known to exist within the project's boundary. Adequate plugging of any such wells is required.

#### Soils and Waterways - Phone 412-442-4315

13. Work in and along streams and wetlands is likely to require a Water Obstruction and Encroachment Permit from the Soils and Waterways Section. The area regulated is the stream and any area within the 100-year flood boundaries of any Federal Flood Insurance Study or 50 feet from the top of each stream bank if no flood insurance study exists. All wetland impacts are regulated. Please contact the Soils and Waterways representative at this address.
14. Earth moving activities, including pipe trenching, may require an NPDES Storm Water Permit for Discharges of Storm Water Associated With Construction Activities.
  - a. If the proposed disturbed area is less than 5 acres in extent, only an Erosion and Sedimentation Control Plan is required to be maintained and implemented at the site.
  - b. If the disturbed area is 5 acres or more a General NPDES Storm Water Permit for Discharges of Storm Water Associated With Construction Activities is required except in watersheds designated High Quality or Exceptional Value (see Item C, below).

JSDA NRCS

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July 31, 2000

- c. If the disturbed area equals or exceeds 5 acres in a watershed designated High Quality or Exceptional Value an individual NPDES Storm Water Permit for Discharges of Storm Water Associated With Construction Activities is required.

For further information, contact the Conservation District Office in the county in which the earth moving will take place.

**Waste Management** - Phone 412-442-4125

15. Any solid waste generated by this project must be disposed at an approved landfill or other facility approved by DEP's Southwest Regional Office of Waste Management. For further information call 412-442-4127.

**Water Supply Management** - 412-442-4217

16. All downstream public water supplies which may potentially be affected by sedimentation or stream flow changes must be directly contacted by the contractor at least 30 days prior to work start. Any public water supply problem resulting from this project must immediately be reported to DEP's Water Supply Management at this address.
17. If this project impacts any public drinking water source, both the public water supply and the appropriate DEP District Office or DEP's Water Supply Management Program must be notified at least 30 days prior to work start.

Armstrong-Westmoreland Co.

Armbrust Building  
R.D. #2, Box 603-C  
Greensburg, PA 15601  
412-925-5400

Fayette-Greene Co.

Fayette County Health Center  
100 New Salem Road  
Uniontown, PA 15401  
412-439-7431

Beaver County

206 Municipal Building  
715 Fifteenth Street  
Beaver Falls, PA 15010  
412-847-5270

Cambria-Indiana-Somerset

R.D. #3, Wilmore Road  
P.O. Box 625  
Ebensburg, PA 15931  
814-471-5071

Washington Co.

3913 S. Washington Road  
McMurray, PA 15317  
412-565-5080

JSDA NRCS

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July 31, 2000

Should you have any questions or if the project is significantly modified in the future, please contact this office at the telephone number listed above.

Sincerely,

*Joseph W. Chnupa*

Joseph W. Chnupa  
Assistant Regional Director  
Southwest Regional Office



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

August 1, 2000

REPLY TO  
ATTENTION OF

Natural & Cultural  
Resources Section  
Planning Branch

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

Dear Mr. Seibert:

This is in response to your letter dated June 16, 2000 requesting our review and comments to the Draft Watershed Plan and Environmental Assessment (Plan-EA) for the Indian Creek project area in Fayette County, Pennsylvania. The proposed action is to improve water quality in Indian Creek, Champion Creek, Buck Run, Poplar Run and Newmyer Run by installing passive treatment systems, grading, land liming, water controls and vegetation.

The Draft Plan-EA has been reviewed and we have no major comments. The plan appears complete and comprehensive and has adequately addressed issues relating to the flood plains, wetlands, and cultural resources. We have no objection to proceeding with the project as planned. Should there be any significant changes in the proposed work, please keep us advised and provide us an opportunity to review.

If you have questions or need additional information, please contact Ms. Nancy Piotrowski at 412-395-7226..

Sincerely,

Jeffrey E. Fritz, P.E.  
Acting Chief, Natural & Cultural  
Resources Section  
Planning Branch



## **APPENDIX B**

### **INVESTIGATIONS AND ANALYSES REPORT**

#### **INTRODUCTION**

The Investigations and Analyses Report presents information that supports the formulation, evaluation, and conclusions of the Indian 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 Indian 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 Pennsylvania Fish and Boat Commission (PFBC), and the Mountain Watershed Association. 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 and Bureau of Mining and Reclamation. All of these agencies along with the Mountain Watershed Association 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 were used to estimate water quality in Indian 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**

Ten project sites were identified in this plan. The ten sites were chosen based on their detrimental loads of acid, iron, and aluminum in the Indian Creek watershed. These ten sites will treat 94% of the acid load, 90% of the iron and 93% of the aluminum.

Analysis of water samples for acid, iron and aluminum and flow measurements taken at each location are the basis for this plan. The Mountain Watershed Association, PADEP, Bureau of Abandoned Mine Reclamation and Bureau of Mining and Reclamation provided the data.

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 Indian 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 is the new recreational cold water fishing which is associated with project implementation. 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).

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 visit. The PFBC recommended \$52.68 (adjusted for inflation) per angler visit and 1100 angler visits per mile per year for the Indian Creek Watershed.

The costs and benefits were amortized to annual equivalents over a 25 year period using the established water resources discount rate for 1999, which is 6.6250%. For this project, the annualized benefits are \$886,000 and the annualized costs are \$362,494. The net economic benefits are \$523,506. This amount does not include the additional benefits for which economic values were not quantified. Other benefits, including reduced operating

expense for public drinking water supply, improved aesthetics, enhanced educational facilities, business and industry were not specifically evaluated at this time. The annualized benefit to cost ratio is 2.4:1.

**EFFECTS OF THE RECOMMENDED PLAN ON RESOURCES OF PRINCIPAL NATIONAL RECOGNITION  
INDIAN CREEK, FAYETTE AND WESTMORELAND 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.)   | To be determined   |
| Fish and Wildlife Habitat                              | Fish and Wildlife Coordination Act (16 U.S.C.<br>Sec. 661 et seq.)   | 17.4 miles of aquatic habitat improved<br>2 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 | 42.5 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  
INDIAN CREEK, FAYETTE AND WESTMORELAND 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<br>et seq.)  | Improves surface water quality                              |
| Wetlands                  | Executive Order 11990, Protection of Wetlands,<br>Clean Water Act of 1977 (33 U.S.C. 1251<br>et seq.)<br>Food Security Act of 1985 | Wetland will be created to<br>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> Two Phase 1 archaeological studies to be conducted

**APPENDIX C**

**PROJECT DATA**

**PL 83-566 PROJECT INFORMATION**  
**INDIAN CREEK**  
Fayette and Westmoreland Counties, Pennsylvania

(When Fully Implemented)

Longitude/Latitude (midpoint): 40-02-48, 79-24-12

Price Base (year): 1999

Project Interest Rate (%): 6.6250

Project Evaluated Life (yrs): 25 years

Total PL 83-566 Financial Assistance (\$): \$1,726,000

Total PL 83-566 Technical Assistance (\$): \$174,000

Total PL 83-566 Administration (\$): \$137,000

Total Local Costs (\$): \$2,129,000

Primary Project Purpose: WQ

Other Project Purposes: NA

(FP = Flood Prevention; WP = Watershed Protection; WQ = Water Quality; F&W = Fish & Wildlife Development; Rec = Water-Based Recreation; M&I = Municipal & Industrial water supply)

Resource Concerns: RC 11, RC 13, RC 01,02

(RC 01,02 = Soil Erosion & Sediment Control; RC 03, 04, 05 = Flood Protection; RC 06 - 10 = Soil, Water & Air Quality (Animal Waste Management); RC 11 = Soil, Water & Air Quality (Other); RC 12 = Grazing Land; RC 13 = Wetlands, Fish & Wildlife; RC 14,15,16 = Farmland Protection, Forestland, Other)

Complementing Programs: Title IV, SMACRA, Section 319 Clean Water Act, Appalachian Clean Steam Initiative

(319 program, CREP, CRP, EQIP, EWP, FPP, FIP, WRP, WHIP, Other Federal Programs or State Cost/Share Program)

Type of Work: 3, 4, 8

(1 = cost-shared land treatment; 2 = non-cost shared land treatment; 3 = structure installation; 4 = investigation and designs; 6 = Forest Service; 7 = Conservation Easements; 8 = Other)

Total Acres Benefited: 104

Physical Work: 7, 5

(1 = retention structures; 2 = channels; 3 = grade stabilization; 5 = critical area treatment; 6 = mitigation; 7 = other)

Congressional District(s): 12 and 20

County(ies): Fayette and Westmoreland

Hydrologic Unit (8-digit as a minimum): 05020006

Monetary Agricultural (including Rural Areas) Flood Damage Reduction Benefits (present value): NA

Monetary Non-Agricultural Flood Damage Reduction Benefits (present value): NA

Monetary Agricultural (including Rural Areas) Benefits (present value): \$10,683,464

Monetary Non-Agricultural Benefits (present value): NA

Off-Site Monetary Benefits--Watershed Protection Only (present value): NA

On-Site Monetary Benefits--Watershed Protection Only (present value): NA

Nitrogen Fertilizer Reduced (total tons/yr of n): NA

Phosphate Fertilizer Reduced (total tons/yr of p): NA

Reduced Use of Herbicides and/or Fungicides (total lbs/yr): NA

Reduced Use of Insecticides (total lbs/yr): NA

ICM/Chemical / Nutrient Management (acres): NA

Proper Animal Waste Disposal (total tons/yr): NA

Reduced Erosion (total tons/yr): 375

Reduced Sedimentation (total tons/yr): 280

Lakes/Reservoirs Enhanced/Protected (surface acres): 50

Streams/Corridors Enhanced/Protected (miles): 17.4

Public Domestic Water Supplies & Aquifers Benefited (#): 1

Incidental Recreation (# of water bodies created): 10 SAPS  
9 Wetlands  
19 Basins

Water Conserved (total annual acre-feet): NA

Beneficial Uses of Conserved Water: NA

(F&W = Fish & Wildlife Development; Rec = Water-Based Recreation; M&I = Municipal & Industrial water supply)

Ground Water Recharge (total annual acre-feet): NA

Streams Meeting State Water Quality Standards (miles): NA

Water Bodies Meeting State Water Quality Standards (number): NA

Aquifers Meeting State Water Quality Standards (yes/no): no

Wetlands Created or Restored (acres): 2

Wetlands Enhanced (acres): 2

Upland Habitat Dedicated (acres): NA

Upland Habitat Enhanced (acres): 50

Threatened and Endangered Species Benefited (name): none present

Jobs Created – Construction (total person-yrs): 17

Public Access Area Provided (acres): NA

Total Direct Beneficiaries (#): 36,384

Historically Underserved Project Beneficiaries (#): 1,849

Visitor Days Supplied (total annual recreation days): 19,400

Employment in Operation, Maintenance and Replacement (total person-yrs/year): 1/2

Sponsor OM&R Costs (total \$/yr): \$17,000

Farms and Ranches Benefited (#): NA

Bridges and Culverts Benefited (#): NA

Roads Benefited (miles): NA

Public Facilities Benefited-schools, parks, utilities, gov't bldgs (#): 2-Indian Creek Valley Hike and  
Bike Trail and Resh Park

Businesses Benefited (#): 2

Houses Benefited (#): 13

Long Term Contracts to be Signed (#): NA

Long Term Contracts (acres): NA

Land Rights (# of parcels acquired using federal funds): NA

Project Phase Designs (#): 33

Construction Phases (#): 150

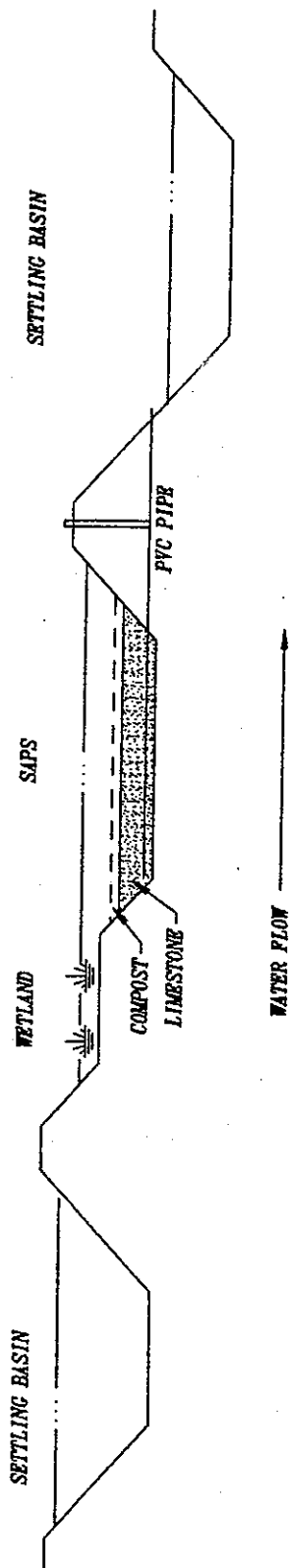
Mitigation (acres): 0



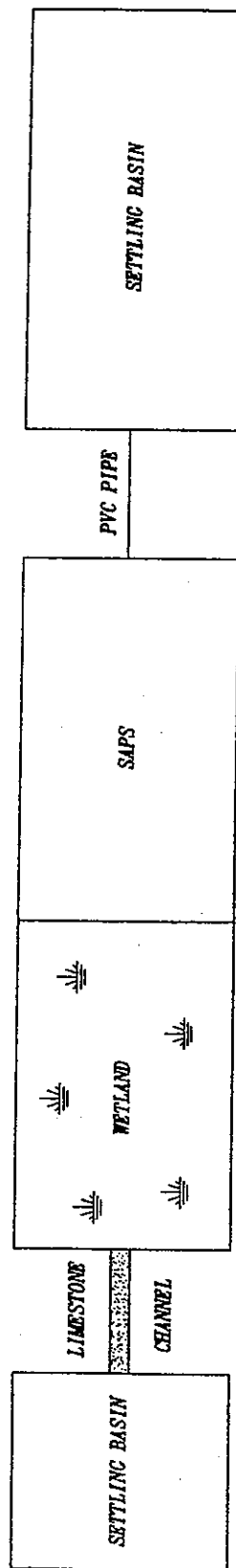
# APPENDIX D

## TYPICAL SAP TREATMENT SYSTEM INDIAN CREEK

### PROFILE



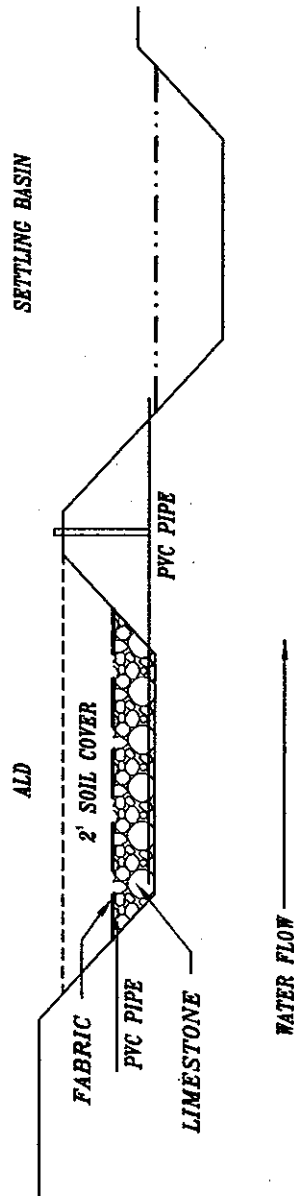
### PLAN VIEW



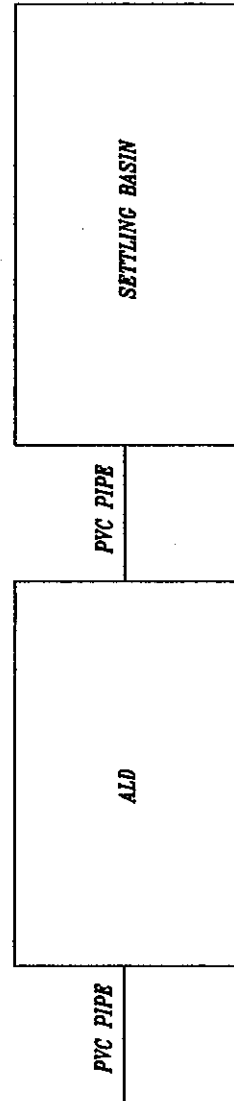
# APPENDIX D

## TYPICAL ALD TREATMENT SYSTEM INDIAN CREEK

### PROFILE



### PLAN VIEW



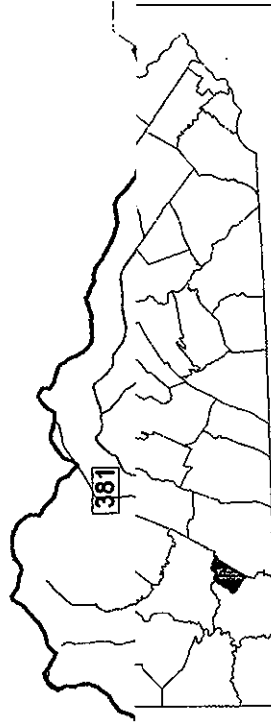
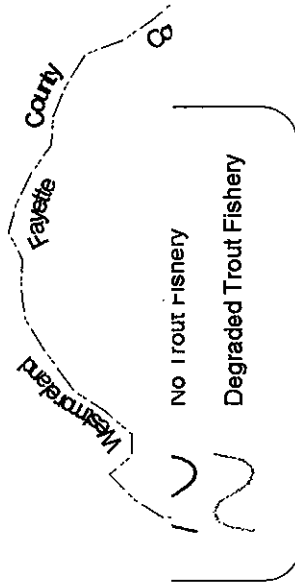
**APPENDIX E**

**PROJECT**

**MAP**

# Project Map

## Indian Creek AMD Sites



Location of Indian Creek Watershed



