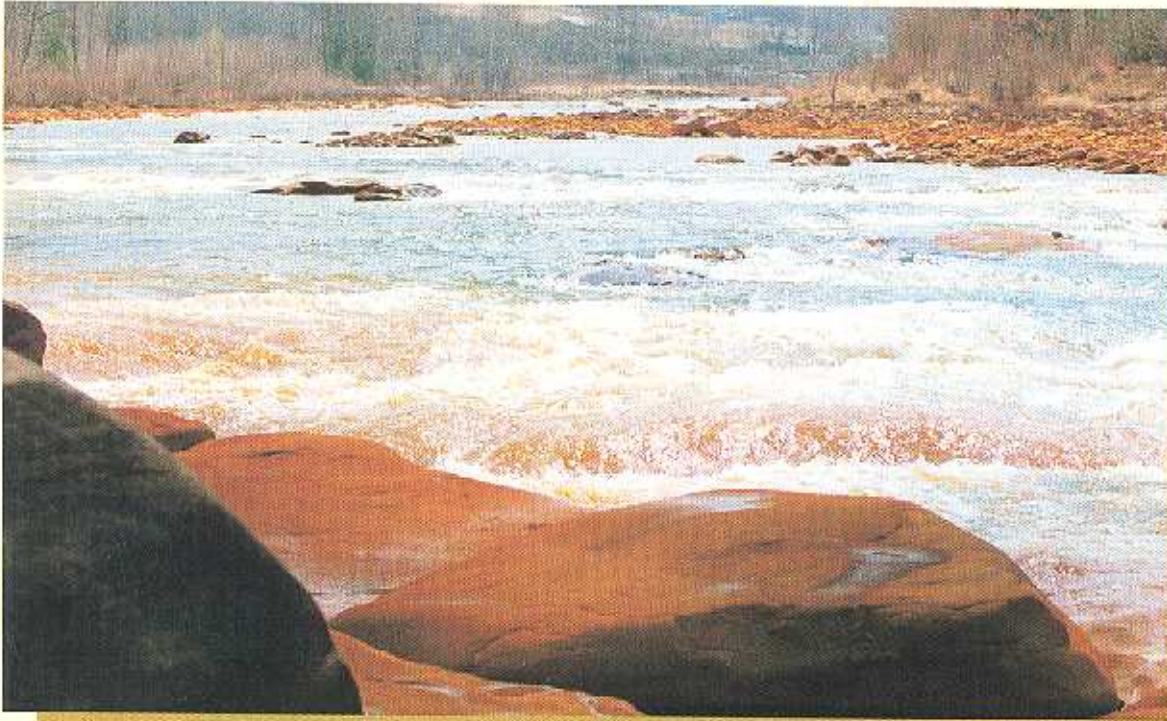
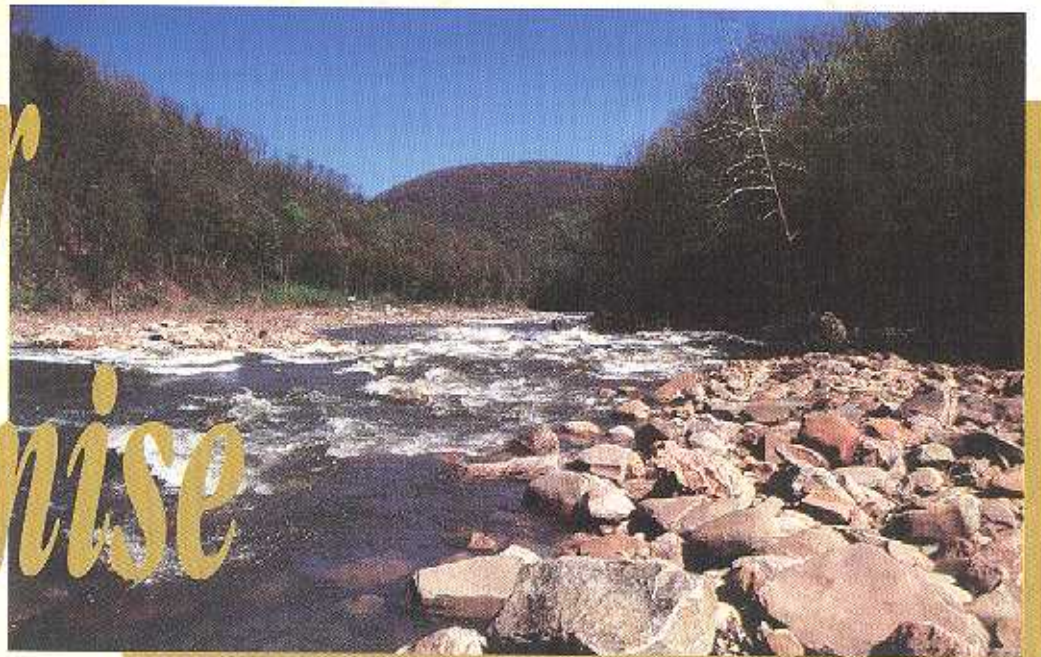


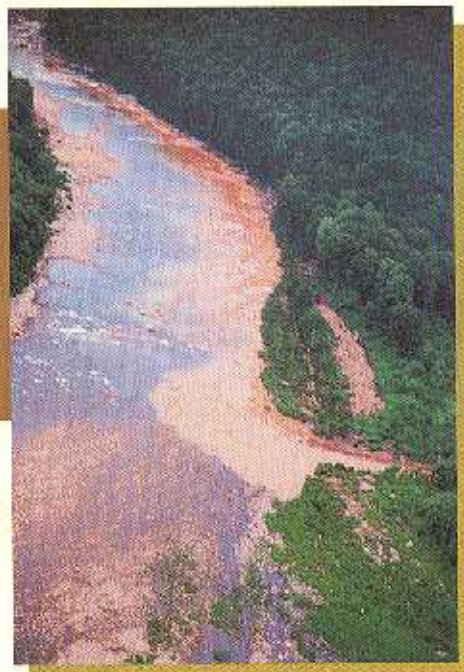
# The Cheat River:



*A River  
of Promise*



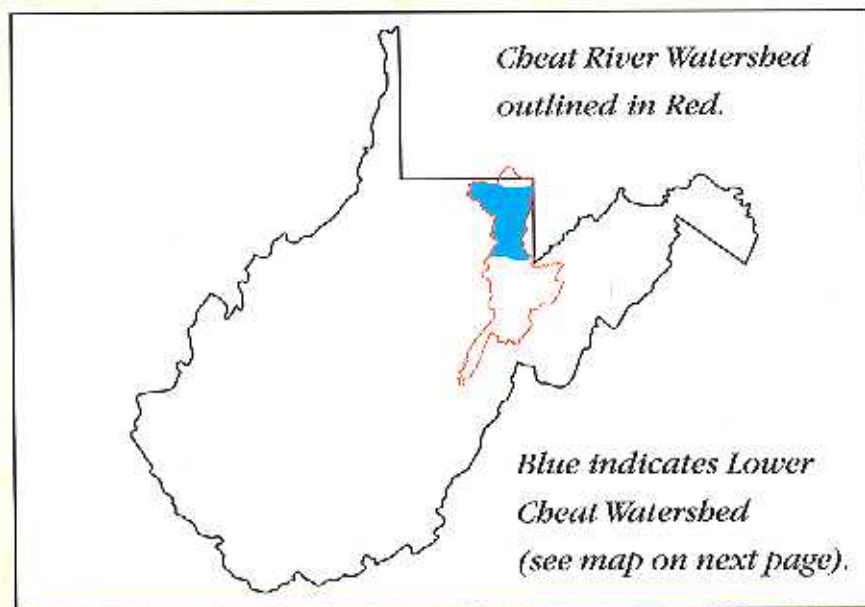
*Ninety percent  
of the Cheat is  
remarkably unspoiled,*



*but many visitors  
see only the worst  
ten percent.*

## **We Have A Problem**

**T**he Cheat River drains the largest free-flowing watershed in the East. Its 157 linear miles collect water from 1,424 square miles of the uppermost reaches of the Mississippi River watershed. Whitewater enthusiasts, fishermen and nature lovers from all over the world venture to West Virginia to share the rugged beauty of this sustainable resource with local residents who live, work, and recreate here. But while the headwaters of the Cheat River support native trout, water quality problems downstream have eliminated virtually all life in some of the more impacted sections of tributaries and the mainstem. In the "Canyon" stretch of the mainstem, which attracts thousands of whitewater enthusiasts each year, iron has stained the rocks orange and low flows can concentrate acid pollutants into an unappealing eye-burning soup.



*Cheat River Watershed  
outlined in Red.*

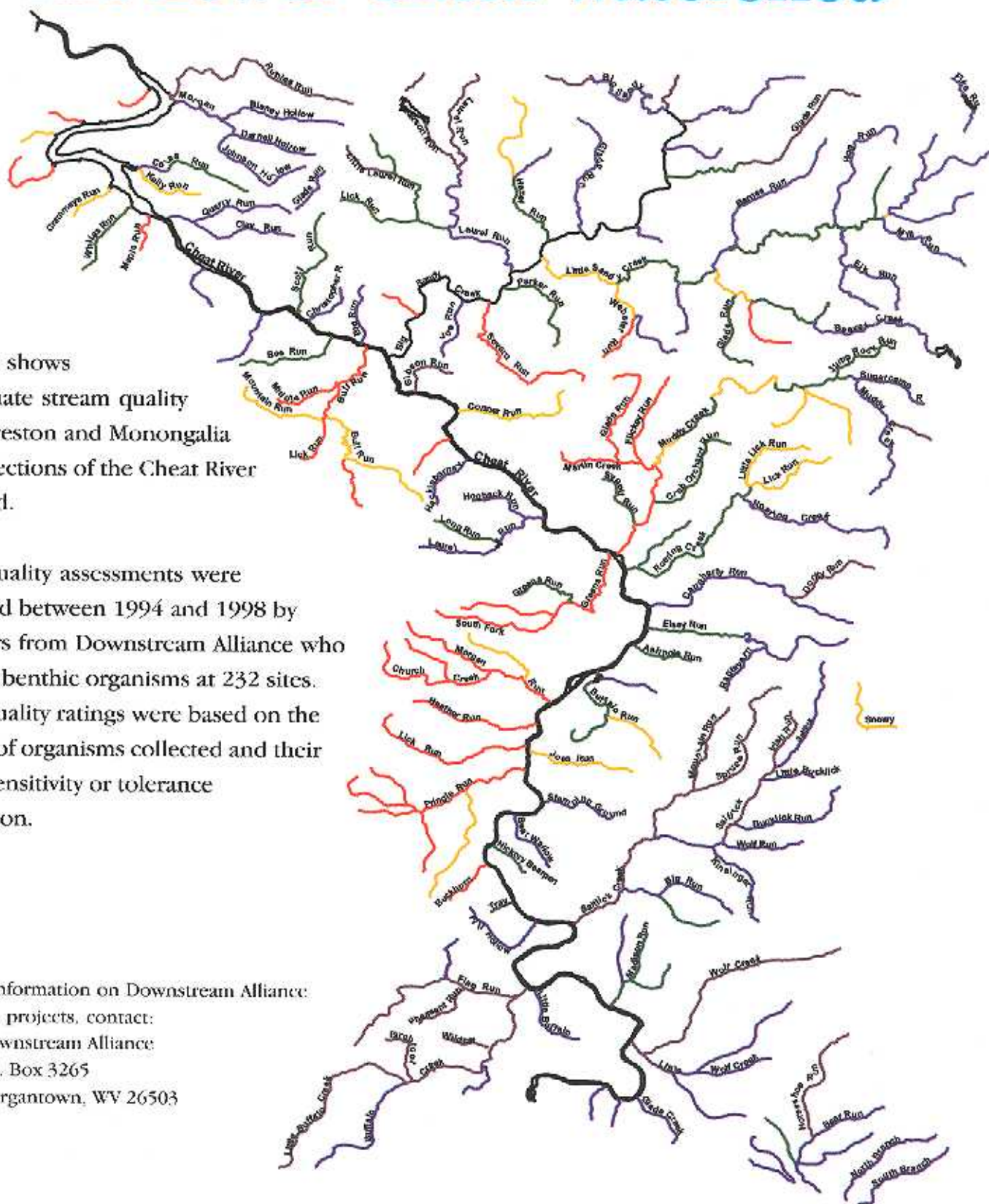
*Blue indicates Lower  
Cheat Watershed  
(see map on next page).*

# The Lower Cheat Watershed

This map shows approximate stream quality for the Preston and Monongalia County sections of the Cheat River watershed.

Stream quality assessments were conducted between 1994 and 1998 by volunteers from Downstream Alliance who collected benthic organisms at 232 sites. Stream quality ratings were based on the diversity of organisms collected and their relative sensitivity or tolerance to pollution.

For more information on Downstream Alliance monitoring projects, contact:  
 Downstream Alliance  
 P.O. Box 3265  
 Morgantown, WV 26503



## Approximate Water Quality

Very Good
  Good
  Fair
  Poor
  Very Poor

# What Is “AMD” ?

**W**hat has had such a terrible effect on the health and aesthetic qualities of the Cheat River? Acid Mine Drainage (AMD) is acid water that contains iron and other metals. It forms when sulfide minerals in rocks are exposed to oxidizing conditions by mining, highway construction, and other deep excavations. Unfortunately, much of the coal in the Cheat River watershed is high sulfur or associated with high sulfur rocks such as pyrite. When this pyrite is exposed to air and water it generates AMD, and in the presence of certain bacteria the rate of these reactions can be accelerated up to a million times.

**N**early 10,000 acres of abandoned mines drain millions of gallons of AMD into the Cheat River daily. Most of these mines were played out before the passage of significant environmental legislation and their water pours out untreated. This water is so acidic that it dissolves minerals such as iron and aluminum into solution as it surfaces from deep underground. As this polluted water is diluted by cleaner water, the pH rises and the metal drops out in tiny particles. These mineral “floculates” settle in a layer over stream bottoms, choking off life, and covering rocks with an ugly orange slime.



*The  
pollution  
is easy  
to see,*



*but  
difficult  
to treat.*

## How Did This Happen?

Coal mining in West Virginia has provided thousands of jobs across many decades, fueling the country's energy needs and even supporting war efforts. Coal became a driving force of the economy during the 1800's and went on to peak in 1947, employing 120,000 people to extract 170 million tons across the state. Although the production of coal is slowly increasing, mechanization has actually decreased the number of jobs to nearly 25,000.

The first attempts to address pollution in West Virginia were made in 1939 with an unsuccessful bond policy. It was not until the federal passage of the Surface Mining Control and Reclamation Act (SMCRA) of 1977 that coal operators were required to reclaim their sites and treat mine impacted waters. Unfortunately, many of the coal mines that riddle the mountains of the Cheat River

watershed pre-date SMCRA. Little or no reclamation was required of these mines and now the responsibility for their treatment has fallen to the state.

*We are up against an  
awesome acid  
generating machine,*



*but we have the power  
of an awesome  
collective effort.*

*In time,  
the Cheat will  
become*



*the  
River of  
Promises...kept.*

*Dave Bassage, Executive Director of Friends of the Cheat (left)  
and the late John Fallis of Anker Energy.*

## What Can Be Done?

**A**bandoned underground coal mines are particularly difficult to treat because flows may be large and there is often too little room for settling ponds or other remediation structures between the out-flow and the stream it impacts. Technology is available to help mitigate some of the effects of AMD. Research to identify new treatment techniques continues.

**L**imestone and other alkaline materials are quite useful in the treatment of AMD. Limestone dissolves in water and raises pH, causing metals to precipitate out of solution.

Open limestone channels direct water over limestone boulders. Gradually the metals coat the rock with "armoring" which reduces the effectiveness of the limestone by almost 90 percent.

"Anoxic" limestone drains are buried limestone channels that avoid armoring due to the lack of oxygen exposure.

Mine portals may be pneumatically (using air pressure) filled with limestone to treat the AMD before it leaves the ground.

**I**n severe cases, chemicals such as caustic soda or anhydrous ammonia may be used to raise the pH quickly and precipitate metals into limited settling ponds. The sludge must then be removed to a safe disposal area.

These efforts, while improving water quality, are not a cure. They require high and expensive levels of maintenance and are not adequate long-term solutions.

**C**urrent research seeks to develop methods that address AMD by eliminating it at its source. One approach is to fill mines with grout or weak cement made from coal combustion by-products such as alkaline fly ash or other cementing materials. By replacing water with cement, these methods may prevent the reactions that produce AMD. Continued research is steadily leading to more successful and feasible means of treatment.

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*A lot of work needs to be done  
to return these streams to life.*

*Caring for  
the watershed*



*is a  
collective effort.*

## Who Is Helping?

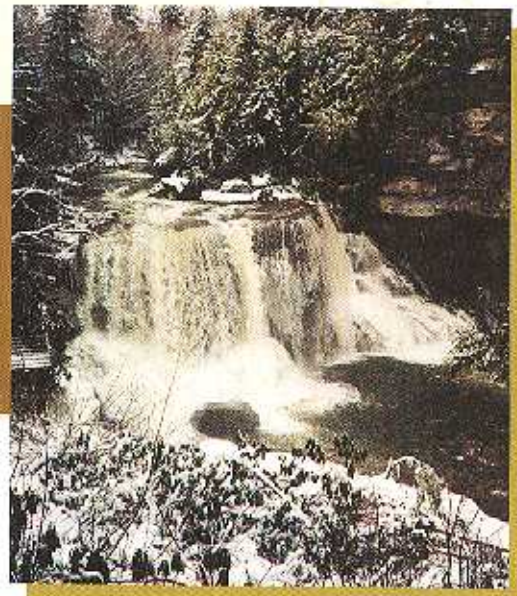
**R**emediation efforts have been focused through coordination of state and federal agencies, local private enterprises, and non-profit groups. A coalition of such organizations, the “River of Promise” team, is dedicated to restoring the natural beauty and health of the Cheat River and her tributaries. This can only be accomplished with the

help of all the stakeholders in the watershed. The “River of Promise” team represents the most comprehensive and able attempt at reclamation to date in the watershed. The combined efforts of “River of Promise” team members are making a positive difference in the quality of water and life in the Cheat River basin.

### *River of Promise Signatories*

Allegheny Power  
Anker Energy  
Canaan Valley Institute  
Cheat Lake Environment and Recreation Association  
Downstream Alliance  
Friends of the Cheat  
National Mine Lands Reclamation Center  
Preston County Commission  
Trout Unlimited, WV State Council  
West Virginia Division of Environmental Protection  
West Virginia Division of Natural Resources  
West Virginia Rivers Coalition  
West Virginia University: College of Agriculture and Forestry  
United States Department of Agriculture  
    Natural Resources Conservation Service  
United States Department of Energy  
    Federal Energy Technology Center  
United States Department of the Interior  
    Fish and Wildlife Service  
    National Park Service Rivers, Trails, and  
    Conservation Assistance Program  
    Office of Surface Mining  
    United States Geological Survey  
United States Environmental Protection Agency Region III

**T**he Cheat River is the essential centerpiece of a wonderful place to live and recreate: the Cheat River watershed. Improving its water quality ensures a better life for our children and their children.





*Photo by Greg Green*

**This booklet was prepared by the Friends of the Cheat and the River of Promise Task Force. Funding provided by a WV Stream Partners Grant.**

**To help, please contact:**



**Friends of the Cheat  
119 S. Price St., Suite 206  
Kingwood, WV 26537  
(304) 329-3621  
FOC@cheat.org  
<http://www.Cheat.org>**



*The enemy lurks in the hills...  
...It runs but it can't hide*