

# THE USE OF WATERSHED COOPERATIVE AGREEMENT PROGRAM FUNDS TO RECLAIM SMALL ACID MINE DRAINAGE PROBLEMS<sup>1</sup>

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**Abstract:** Acid mine drainage (AMD), which is a by-product of many abandoned surface and under ground coal mines, is detrimental to the environment. The toxic runoff has destroyed thousands of miles of streams and adjacent areas. Though programs are in place to attempt to ameliorate the AMD concerns, AMD continues to pose a potential problem in many areas, despite regulations, improved prediction, and prevention techniques.

On March 31, 1997, Kathrine L. Henry, Acting Director of OSM, issued a memorandum “A Message Concerning Acid Mine Drainage”, stating, “The prevention of future acid and toxic discharges from coal mining operations into surface and ground waters and the remediation of mining-related pollutional discharges are high priorities of the Office of Surface Mining Reclamation and Enforcement (OSM). To advance these priorities, OSM previously established the Appalachian Clean Streams Initiative (ACSI), with a primary focus on eliminating acid and toxic mine drainage from abandoned mines, and the Acid Drainage Technology Initiative, which concentrates on the prevention and remediation of AMD from modern coal mining.”

In response to the Acting Director’s concerns, OSM established an AMD Policy Team and after extensive input from all affected parties developed policy goals, objectives and strategies to protect the hydrologic balance in coal mining areas from the effects of AMD. Two and a half years later, during 1999, OSM initiated the Watershed Cooperative Agreement Program (WCAP) as part of the Appalachian Clean Streams Initiative. The purpose of this program was to develop partnerships and assist local not-for-profit organizations in funding for the remediation of small local AMD concerns. This program expanded rapidly in several eastern states, as strong and very proactive local watershed groups and other environmentally conscious organizations looked for ways to assist in cleaning up the environment --- especially as it affected the water of the area and its potential effects on their economy and living environment.

Implementation of the WCAP in Iowa, Kansas and Illinois is in its infancy. Amelioration of the AMD concerns was recently completed on their first projects. Future success will depend on funding and expansion of the program through education and public involvement.

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## INTRODUCTION

Acid Mine Drainage (AMD) flows from abandoned surface and underground coal mines and their refuse piles, causing severe environmental and ecological problems. The pollution in many cases is so severe that plant and animal life in affected stream and adjacent areas cannot survive. Thousands of miles of streams and adjacent land acres are affected throughout the coal mine area in the United States, but mainly in the eastern portions. Both surface and underground water become contaminated due to this AMD.

The U.S. Environmental Protection Agency (EPA) has singled out drainage from abandoned coal mines as the number one water quality problem in the Appalachian Region, especially in Pennsylvania and West Virginia. It has been estimated that 90% of the pollution problem originates with abandoned underground mining operations, with 10% of the AMD coming from old surface mines and their spoil piles<sup>1</sup>.

What is being done to address this issue? Congress passed the Surface Mine Control and Reclamation Act in 1977. One portion of this law, Title IV, set forth the provisions of the Abandoned Mine Land Reclamation Program. Under this provision, coal companies are assessed a fee on each ton of coal mined. A portion of the funds generated are allocated to the coal mine states on a coal production formula. These funds provide for the restoration of lands mined and abandoned or left inadequately restored before August 3, 1977.

The OSM 2006 Annual Report noted that from January 30, 1978, when the coal companies first paid their fees, through September 30, 2006, the fee collections totaled \$7,748,540,449.00. For this same period, appropriations from the fund to the States and tribes totaled \$5,893,900,952.00.

These funds were spent on a priority listing of abandoned mined land sites developed by the States looking at a variety of parameters, including dangerous highwalls and impoundments, clogged stream and stream lands, dangerous piles, embankments and slide areas, etc. Depending of the severity of the listed site, they were categorized as a Priority 1, 2 or 3, with Priority 1 being the most eminent to reclaim.

To date, a great many of the Priority 1 & 2 AML sites have been reclaimed. However, a great deal of reclamation work remains. For September 2000, the "Office of Surface Mining – Reclamation and Enforcement, Abandoned Mine Land Inventory System (AMLIS) Problem Type Unit & Cost (National) s/ GPRA" reported the following dollars, spent on Priority 1 & 2 sites with associated GPRA acres<sup>2</sup>.

Completed	\$1.3 billion	112,451 acres	38.6 Percent
Funded	\$0.2 billion	29,296 acres	10.0 Percent
Unfunded	\$6.4 billion	149,868 acres	51.4 Percent
Total	\$7.9 billion	291,615 acres	100.0 Percent

<sup>1</sup> Office of Surface Mining Home Page,, ACIS Plan, "A Plan to clean up streams polluted by acid drainage" The Problem, 2006

<sup>2</sup> Office of Surface Mining - Reclamation and Enforcement, Abandoned Mine Land Inventory System (AMLIS), Problem Type Unite \* Cost (National) s/GPRA, Report Selection Criteria for Priority 1 & 2 for September 2000,

Due to urban sprawl and other factors from 2000 to 2006, states have re-evaluated many of these AML sites, changing their priority listing as well as adding additional sites and potential costs to their inventory. This has resulted in an increase of .7 billion dollars in the estimated cost to reclaim all listed sites.

The September 2006, OSMRE AMLIS, Problem Type & Cost (National) reported the following dollars, spend on Priority 21& 2 sites with associated GPRA acres<sup>3</sup>

Completed	\$ 1.7 billion	234,368 acres	49.1 Percent
Funded	\$ 0.2 billion	27,322 acres	5.7 Percent
Unfunded	\$ 6.7 billion	215,464 acres	45.2 Percent
Total	\$ 8.6 billion	477,154 acres	100.0 Percent

If Priority 3 sites were to be added to the list of outstanding projects and additional 3.2 billion dollars would be required. How is all this to be funded? There is a beautiful ray of sunshine for the funding of the AML program. Early Saturday morning of December 9, 2006, the 109<sup>th</sup> Congress passed the “Tax Relief and Health Care Act of 2006”. The bill was signed by President Bush on December 10, 2006. This Act contained several significant provisions including:

- Extending the AML Fee Collection Authority of OSM to September 30, 2021.
- Mandatory allocation of funds for certain reclamation grants.
- Increasing grant amounts for AML programs that receive minimum-level funding.
- Increased set asides for acid mine drainage plans.

In the Land Letter Newsletter of January 11, 2007, Reporter Russell J. Dinnage interviewed OSM spokesman Ben Owens who stated, “Beginning this year, states can submit reclamation project proposals to OSM with a new degree of certainty that the money requested will be allocated more closely to the requested amount rather than based on an unpredictable congressional decision. The new law takes the money out of the approval cycle and instead allocates it based on state appeals weighted with the level of historical [environmental] damage caused in the state.” The exact details of the allocation of these dollars will be determined by OSM in the future.

In the mean time, many of the AML projects yet to be reclaimed include lands classified under the “Clean Streams Program”. This program began as the Appalachian Clean Streams Initiative (ACSI) in the fall of 1994. The program supports local efforts to eliminate environmental and economic impacts of acid mine drainage from abandoned coal mines. The mission is to facilitate the efforts of a diverse mixture of state, federal, local, industry, citizen groups, educational groups and others in cleaning streams polluted by acid mine drainage. The ACSI program has expanded to include 12 of the 26 coal mine states. Since the inception of the

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<sup>3</sup> Office of Surface Mining - Reclamation and Enforcement, Abandoned Mine Land Inventory System (AMLIS), Problem Type Unite \* Cost (National) s/GPRA, Report Selection Criteria for Priority 1 & 2 for September 2006

program to September 30, 2005, OSM has provided supplemental grants of over 47 million dollars for 158 clean stream projects. Thirty five million dollars of outside funding has been contributed for these projects<sup>4</sup>.

One component of the Clean Stream Program is the Watershed Cooperative Agreements Program (WCAP). This program began in 1999 with the stated purpose to partnerships with local not-for-profit organizations, especially small local watershed groups and other private entities, to acquire funding for local acid mine drainage remediation. A significant component of the program is for the watershed groups to provide at least 60% funding of the total project, in cash or in-kind services. This is the ultimate goal for the group. From 1999 through 2005, 142 cooperative agreement projects have been initiated with an investment from the OSM Watershed Cooperative Agreement Program of over 12.5 million dollars.

Normally, OSM will fund up to a maximum of \$100,000 for a project that would cover the construction phase of the project plus part of the administrative and design costs associated with the completion of the project. There have been some incidents where a Phase II of a project was approved and additional funding was awarded.

The Cooperative Watershed Agreement Program has a solid foot hold in the Appalachian areas, where there are many well organized private organizations that assist in identifying and reclaiming AMD lands and affected streams. One of the main reasons for the success of these organizations is that AMD greatly affects their water quality, aquatic habitats, fish and wildlife resources, aesthetics of their areas, and in many cases, the economic viability of many areas. As a result of this pro-activity, many well organized citizen groups have been formed to work with the communities in cleaning up the AMD on a local and a regional level. These groups seek out state, local, federal, and private partnership funds to assist in the AMD clean up efforts. Several groups in the Midwestern states have seen the success of these groups and are trying to build their own networking systems to clean up some local AMD concerns.

While the majority of the Watershed Cooperative Agreements funds have been going to the east, there are also many small AMD problems that need to be addressed in the Mid-West, including the States of Iowa, Missouri, Illinois, Indiana, Kansas, and Alabama.

During 2005 and 2006, for the first time since the inception of the program, the states of Iowa, Kansas and Illinois participated in the Watershed Cooperative Agreement Program, receiving \$413,604.00 for five projects. It is anticipated that in 2007, OSM will receive at least three new applications in Iowa and Illinois for additional funding and/or new projects totaling \$235,000.00.

As previously noted, organizations that wish to participate in the WCAP must seek out partners who will contribute either financially or in-kind services. These partners can be other government and federal agencies, state and local agencies, and private individuals and organizations. In Iowa, Kansas and Illinois, new groups and communities are becoming more aware that there are avenues to assist in the cleanup of acid mine drainage discharge, and for complete or partial reclamation of the mine site and restitution of environment. Being new in this area, these states are working on determining what new and or existing partnership dollars may be available and how they can leverage their efforts to achieve AML/AMD cleanup efforts in their respective states.

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<sup>4</sup> Office of Surface Mining 2005 Annual Report, Abandoned Mine Land Reclamation

Several Eastern States have benefited from EPA 319 money and Brownfield Dollars as well as from state and local funding sources. Except for EPA 319 funds, which have not been used to date in the Mid-western states in contribution with watershed funds, other funding sources are somewhat limited. EPA 319 funds came available in 1987 when Congress amended the Clean Water Act to establish the Section 319 Nonpoint Source Management Program. Section 319 provides grants to states for implementation of nonpoint source (NPS) pollution control programs and projects to help protect or improve water quality.

Brownfield dollars come from the EPA's Brownfields Program which has its inception in 1995. A brownfield is a property which may be complicated for its development by the presence of a hazardous substance, pollutant or contaminant, such as acid mine drainage. The EPA's Brownfield Program is designed to empower through a two year grant, states, communities and other stakeholders in economic redevelopment and cleanup polluted lands.

Iowa and Kansas receive only the minimum level of AML program funds, which is currently set at 1.5 million dollars annually in the form of grants from OSM. They also receive some clean streams money when they have approved projects. Since many of their projects exceed this annual AML dollar allocation, their states have begun working closely with watershed groups to leverage AML dollars to assist in reclaiming some of their AML/ AMD sites.

In the OSMRE Bureau highlights of February 6, 2007 it noted that "The OSM will continue to support the Watershed Cooperative Agreement program through discretionary funds in 2008. The budget request includes \$1.6 million for this program, \$500,000 above the 2007 President's request."

The following are examples of two of the successful WCAP projects being finished within the State of Iowa that demonstrate the power of partnerships between the State AML program, watershed groups and other concerned governmental, private organizations and the citizenry.

The first WCPA project in Iowa was the Red Rock Environmental Education Fund (RREEF) partnership. The RREEF project is an AML/AMD abandoned surface coal mine site, mined prior to 1938. The site is located near the town of Pella, Iowa and the largest reservoir in Iowa, Lake Red Rock. The project site is owned by the U. S. Army Core of Engineers (COE). They also manage Lake Red Rock, which is a high recreational use area.

The abandoned surface coal mine site consists of a rectangular area of approximately eight acres of highly eroded soils along a flood overflow ditch. There are large erosion gullies, acidic spoil material and 0.2 miles of clogged stream lands. The area consists of poorly vegetated lands, covered with shrubby, scattered woodland to the east and south. The vegetative cover consists of young shrubs and timber composed of Russian olive, prickly ash, eastern red cedar, prickly ash, silver maple, and willow. The scattered grassland areas are primarily brome with a few invasive weedy forbs.

No permanent or perennial surface water is present on the site. The wildlife benefits of the area are limited and there are no Threatened and Endangered (T&E) species or unique habitat on the site.

The acidic spoil piles contribute to the degradation of the immediate area by killing vegetation, creating massive erosion gullies, and damaging downstream habitat by transporting acid forming materials and excessive sediment. The acid forming material is also deposited into

the main body of Lake Red Rock, which lies within ¼ mile of the site. The pH's of the soils in the two composite sample areas were 2.9 and 3.7.



Figure 1. Gulley erosion of acid materials



Figure 2. AMD proximity to Red Rock

Reclamation of the site eliminated erosion of the acidic spoil material by creating terraces that direct water flow to multiple wetlands that will control and filter surface runoff. The site was graded to approximate original contour. To neutralize the acidic spoil material, agricultural limestone at a rate of 15,000 tons per acre was disked into the top 24 inches of the subgrade. Borrow material from the adjacent, undisturbed area was used to cover the entire site with approximately 12 inches of high quality growing material. The area was seeded with native vegetation to stabilize the slopes. Trees will be planted in selected areas as part of the habitat restoration. Terraces and wetland were also added to control surface water runoff.



Figure 3. Topsoiled & ready for seeding.



Figure 4. Sedimentation pond – wetlands & adjacent area ready for seeding.

The reclaimed site is now more aesthetically pleasing to the thousands of visitors who utilize the Lake Red Rock Recreation Area every year and the AMD concern has been eliminated.

The RREEF project is a partnership of over 9 organizations, including state, county, federal, local organizations such as the Pleasantville Vocational Agriculture/FFA Program, Knoxville High School FFA Chapter, Pheasants Forever, Trees Forever, and other local groups.

These groups contributed funds and in-kind services such as soil analysis, survey work, and equipment for the seeding of the vegetative cover and trees, labor, providing the grass seed, technical assistance, and the planting of trees, etc. These groups partnershopped 30% of the total funding for the project. This first WCAP reclamation project was very successful and is being used as a model as future projects are planned and executed.

The second WCAP project in IOWA, named the Roozeboom AML/AMD Project. This project is a partnership between the Pathfinder Resource Conversation and Development Area, Inc., the Mahaska Water & Soil Conservation District, the Office of Surface Mining Reclamation and Enforcement & the Iowa Division of Soil Conservation.

The Roozeboom AML/AMD Site was disturbed by past coal mining practices in the 1960's, and left in an unreclaimed state. The site is located near Oskaloosa in Mahaska County, Iowa and lies adjacent to the Little Muchakinock Creek, which empties directly into Muchakinock Creek.

The site is approximately 20 acres in size, located mostly on a gently sloping hillside, and consists primarily of clogged stream land and a small section of clogged stream. The site contains multiple large gullies that contain acid and toxic materials that prevent vegetation from becoming established. Existing vegetation of the site consists of sparse grasses, autumn olive trees, and other shrubs. The acid and toxic sediment that has been transported from the site by erosion has degraded the nearby water flow channel by depositing acid forming materials. About 75% of the site is considered clogged stream land. The barren 20 to 30 foot high spoil piles with deep erosion cuts have been contributing sediment to Little Muchakinock Creek which runs through the middle of the site for 1 mile. The spoil also contributes acid sediment into a pond.

The site contains 700 feet of dangerous highwall. About 200 feet of the highwall is located about 250 feet from an occupied house and the other 500 feet of highwall is located within 250 feet of another business and home.

Four ponds are located on the site. Three of the ponds, two wetland areas and a stream, a total surface area of approximately 9.5 acres, were delineated by the US Army Corps of Engineers as regulated water bodies of the United States. Pond #3 has poor water quality (pH 4.13). Barren, acidic spoil piles line the north and west shores and very little aquatic life present. Runoff from this pond goes into the Little Muchakinock Creek.



Figure 5. Acidic spoil piles.



Figure 6. Acidic spoil piles with pond in background .

Reclamation activities included the clearing of existing vegetation, filling and grading the erosion gullies, smoothing out uneven grades to approximately contours, and neutralizing acid/and toxic material in the subgrade. Soil was tested to determine lime and fertilizer application rates prior to establishing a successful vegetative cover. This vegetation cover consisted of warm/cool season grass mixture and trees planted in selected areas.

Terraces and outlet structures were sited to reduce erosion. Multiple wetlands were built to capture surface runoff and create seasonal pools that will be used by local wildlife. Riprap and permanent reinforced turf mat were used to stabilize the wetland discharge points.

The two ponds were backfilled in the grading process. Prior to this backfilling, any acidic waters were neutralized and discharged. A new larger 2 ½ acre pond and wetlands were created to mitigate the loss with equal waters. Two of the existing ponds were enhanced. The wetlands and waters of the U.S. mitigation area were seeded above and below the waterline.



Figure 7. Pond being reconstructed.



Figure 8. Pond and terraces being reconstructed.



In summary, the Roozeboom Reclamation Project eliminated priority one and two dangerous highwalls, clogged stream, clogged stream land, dangerous piles and embankments of toxic spoil and hazardous water bodies associated with the site. This reclamation has enhanced the wildlife habitat as shown in the next two photographs taken in March 2007.



Figure 9. 2 ½ acre pond reconstructed.



Figure 10. Reconstructed pond.

This project was made possible because of a unique public and private partnership. The Mahaska Soil and Water Conservation District (MS&WCD) contributed \$167,000 obtained through the Watershed Improvement Review Board (WIRB) funding opportunity provided by the State of Iowa. (This is somewhat similar to the EPA 319 monies). The Pathfinders RC&D, which obtained \$100,000 from OSM through a Watershed Cooperative Grant Agreement and the Iowa Division of Soil Conservation provided funds obtained through its annual allocation from OSM for their AML Grant.

Partnership dollars for the Roozeboom project as follows:

• Mahaska S&WCD	\$167,000.00
• DSC AML Grant	\$419,000.00
• <u>OSM WCAP Grant</u>	<u>\$100,000.00</u>
Total	\$686,568.00

The partnership dollars of state/local represented approximately 85 percent of the total cost of the project, with the OSM WCAP grant equaling approximately 15 percent. The result of this partnership encouraged OSM to nominate this reclamation project and all partners for the Department of the Interior, prestige's Cooperative Conservation Award. All agencies within the Department of the Interior (DOI) are eligible to nominate cooperative conservation projects for this award. The DOI is currently reviewing all nominated partnership efforts. The winners will be announced mid April 2007.

Where do we go from here? The “Tax Relief and Health Care Act of 2006,” extending the AML fee program to September 30, 2021 was signed into law on December 10, 2006, by President Bush. Direct funding of the Appalachian Clean Stream Initiative in now out and future funding will now need come out of the “set-aside funds for acid mine drainage treatment and abatement. The bill increases the amount that may be set aside to 30% of state-share and historical production grant funds. This is an increase in the set aside funding of 20%. However, how the states use this increased set-aside money has yet to be determined. The allocations of funds for these programs are still an unknown, and many elements of the allocation of funds will be determined in 2007, 2008 and future years.

The Watershed Cooperative Agreement Program was extended and additional funding of \$500,000 was added to the FY 2008 budget. The question now is how long will this program be continued? If future funds are not allocated, what will happen to the potential AMD projects? Will other funding become available? What will happen to the partnership groups? How long will the AMD continue without being addressed? What is the long term impact on the environment? There are many unanswered questions. However, many of these concerns will be resolved in the near future as the states view the increased funding of their AML programs and how to reprioritize and allocate their funds.

Putting these concerns aside, the Watershed Cooperative Agreement Program projects in Iowa, Illinois and Kansas have been a success. Because of these successes in eliminating AMD discharges, the partner-shipping opportunities in these states are being examined by other not-for-profit organizations and are expanding. This is especially true in Iowa, where other not-for-profit organizations are seeking guidance on how they participate in the program. These organizations are looking at developing potential funding partnerships options to enter into the WCAP to reduce and/or eliminate AMD concerns within their various watershed areas.

As the Watershed Cooperative Agreement Program expands in the Midwestern Sates, the resulting actions will be an enhanced environment, aid in preserving the water quality, aquatic, and wildlife habitat of the affected areas as well as providing many other amenities.