

Fact Sheet¹
Water Quality Credits at Former Mine Lands:
Improving America's Water Resources, Reclaiming Lost Landscapes

This fact sheet is intended to educate communities, mine land owners, potentially responsible parties, companies, and other interested groups about how water quality trading credits can be used as part of an integrated strategy to clean up and restore former mine lands. It is one of a series of papers that describe a variety of tools that can be used to reuse former mining sites. Other topics in this series include carbon sequestration, wetlands banking, and land conservation. This fact sheet focuses on one tool, water quality trading credits, that may be applicable to only a small percentage of the former mine lands throughout the country. However, given the number of former mine lands, that small percentage may represent thousands of actual sites. This document also describes the opportunities and limitations associated with using water quality trading credits and provides resource and contact information.

Introduction

In 1972, the U.S. Congress passed the Clean Water Act (CWA) to restore and maintain the chemical, physical, and biological integrity of the nation's waters. Thirty years later, forty percent of the country's rivers, forty-five percent of its streams, and fifty percent of all lakes assessed by states and tribes are still not clean enough to meet the goals set by the Act. In light of the statutory obligations under CWA to meet those goals, some stakeholders have begun seeking innovative ways to improve water quality.

EPA is investigating innovative approaches to encourage the cleanup of former mine lands. One potential remediation opportunity for former mine lands that contaminate water resources is the creation and sale of water quality credits. This fact sheet will introduce interested parties to this potentially useful, and dollar-generating alternative to traditional cleanup approaches. A West Virginia community's efforts to improve its local river and watershed serves as a case study to illustrate processes needed to capitalize on water quality credits.

Former mine lands continue to cause water quality problems because they are a major source of heavy metal pollutants. Mining often requires deforestation



Acid mine drainage at Minnesota Ridge, Black Hills, South Dakota. (Source: BLM)

¹ This document does not represent official US EPA policy or guidance. Rather this material presents alternative approaches which may lead to environmental improvements at mining sites.

and road construction, both of which reduce water quality due to sediment and nutrient runoff. In addition, mining and milling processes may also produce acid mine drainage (AMD), a highly acidic byproduct laced with dissolved heavy metals. This drainage can flow into streams and groundwater, harming wildlife and making the water unsafe for human consumption or recreation.

What are Water Quality Trading Credits?

EPA believes that market-based approaches, such as the trading of water quality credits, can improve water quality and provide more flexibility and better results than traditional regulatory approaches. On January 13, 2003, EPA issued the Water Quality Trading Policy (see <http://www.epa.gov/owow/watershed/trading/finalpolicy2003.html>). The policy provides guidance to states, interstate agencies, and tribes in the development and implementation of water quality trading programs for nutrients, sediments, and other pollutants.

Water quality credits are created when water quality is improved beyond government requirements. In most cases, a managing authority would establish a credit trading system and would determine what qualifies as a credit under the system. A water quality trading system may encompass an entire watershed or may be used to address a single polluter. For instance, a single polluter with more than one facility could reduce discharges at one facility to generate credits for another facility.

The entity that generated the credits can sell a percentage of the credits to polluters that are unable, either economically or technically, to comply with pollution limits. The remaining unsold credits are permanently taken out of the trading market and “retired.” By lowering the overall amount of effluent that can be traded, this retirement mechanism ensures a net improvement in water quality. The credit generator may also choose to use the saleable credits itself. As in the single polluter example, an entity that has more than one polluting facilities in the same watershed may use credits it created to offset its own discharges.

Several pilot projects for water quality trading credits are already underway. EPA’s Region 10 office in Seattle, Washington, is helping dischargers to the Lower Boise River develop the knowledge base and techniques they need to achieve pollution reductions through trades. In West Virginia, EPA is also supporting a stakeholder-driven project to achieve reductions in acid mine drainage pollution in the Cheat River watershed through a credit trading program.

Potential Benefits of Water Quality Trading Credits

The use of water quality credits has a number of possible advantages over traditional systems for eliciting water quality improvements. Some potential benefits of this approach are economic and environmental, but water quality credits trading can have social benefits as well.

Economic and Environmental Benefits

Because water quality credits trading uses market forces to encourage cleanup of watersheds, it may be a more cost-effective solution than traditional approaches. Owners of former mine lands or groups who generate the credits can receive direct income by selling the credits to polluters within the watershed who are otherwise unable to meet pollution standards. Credit purchasers also benefit financially because, for them, buying credits costs less than meeting pollution limits through traditional means. By allowing remuneration for those who generate water quality credits, the new policy encourages polluters to fund activities—such as constructing wetlands, removing mine tailings, and planting vegetation—that benefit water quality within the watershed.

Planting trees and other vegetation can be an effective and low cost way to clean up contaminants associated with mining and to reduce soil erosion.² Revegetation helps to remediate former mine lands in several ways. The tree and plant roots stabilize the mine land soil, which is often highly erodible. By holding the soil in place the plants prevent excess sediments and nutrients from washing into nearby streams and rivers during storms. Trees, grasses, and other vegetation may also help remediate sites by drawing up some minerals and water pollutants through their root systems and either storing the contaminants, immobilizing them, or metabolizing them. This process is called phytoremediation.

Not only can revegetation and other cleanup activities generate water quality credits, they also create wildlife habitat and natural landscapes that attract tourists and local recreation enthusiasts. The increased tourism and recreational use in turn bring economic benefits to the surrounding localities in the form of higher tax revenues and more commerce for local businesses.

² Soil improvement may be a necessary first step to allow trees to live and grow.

Sucher Creek Project, Oregon



The Sucher Creek Project in Oregon restored a functioning stream bed and planted vegetation; the result, improved salmon and wildlife habitat. (Source: BLM)

Social Benefits

The development of a successful water quality trading system within a watershed may foster relationships among a wide range of groups and agencies such as states, tribes, homeowners, farmers and ranchers, fishermen, community leaders, members of civic and environmental groups, water and sewer system managers, business and local government representatives, EPA, the U.S. Forest Service, and the U.S. Corps of Engineers. These kinds of partnerships can lead to grassroots alliances committed to long-term environmental improvements. Such collaboration can tap into unexpected reservoirs of energy, talent, and inspiration. Watershed partnerships can also generate new ideas and information, help defuse polarization between competing interests, and lead to a common understanding of individual roles, priorities, and responsibilities. By drawing attention to the cumulative effects of human activities and focusing efforts on the most critical problems within a watershed, partnerships provide opportunities for communities to build sustainable futures.

Applying the Water Quality Trading Policy

The potential economic and environmental benefits associated with the remediation of streams, rivers, and watersheds have prompted several local communities to explore the viability of water quality trading credits. These communities are moving forward with the development of trading systems to find a more efficient alternative to traditional methods for cleaning up water.

In FY2002, EPA provided \$800,000 to support eleven water quality trading pilot projects around the country. (http://www.epa.gov/newsroom/headline_011303.htm) A number of the pilot projects target excess nutrients in watersheds, but one project, involving the Cheat River in West Virginia, specifically addresses acid mine drainage caused by former mining sites. The effort to reduce AMD and improve water quality in the Cheat watershed received \$50,000 and illustrates how EPA's guidance can be applied to remediate former mine lands.

The experience in the Cheat watershed is only one example of the many ways that the water quality trading concept may be adapted. Using water quality credits to address contamination from mines is such

a new approach that applications of it are still experimental, and because water quality problems are site specific, trading systems should be tailored to meet the needs of each watershed. The following description of the framework being developed for the Cheat watershed shows how stakeholders created a water quality trading system to address acid mine drainage from former mine lands.

The Cheat River Trading Framework—A Case Study

The Cheat River is the largest undammed river east of the Mississippi and runs north to south through eastern West Virginia. Its watershed encompasses more than 900,000 acres. State agencies estimate that about 200 miles of the Cheat River are affected by acid mine drainage, a legacy left by more than a century of mining in the area. Since 1994, an alliance of government agencies, private industry, academics, community organizations, and landowners has worked to address the severe AMD contamination in the Cheat watershed. These diverse interests formed a Stakeholder Committee, which is using the funding from EPA, supplemented by state funds, to develop a water quality trading framework. Taking the lead in this effort is a subgroup of the Committee referred to as the technical team. This team is basing the trading framework on total maximum daily load allocations (TMDLs)³ for fifty-five segments of the Cheat River that were set by EPA in 2001.

³The maximum amount of a pollutant a body of water can accommodate without becoming impaired is termed the total maximum daily load (TMDL). EPA's TMDL programs allow trading among all types of contaminant sources. Under the Clean Water Act, specific discharge sources of polluted water (known as point

Discharge to Muddy Creek



Untreated acid mine drainage in the Cheat River Watershed. (Source: WVDEP 1996)

In designing the framework, the technical team is considering a variety of elements, some of which are unique to watersheds degraded by acid mine drainage. They include:

- allowing trades among different pollutants (cross-pollutant trades) as well as same-pollutant trades;
- specifically targeting acid mine drainage pollutants such as iron, aluminum, and manganese;
- creating a local board (the Cheat Watershed Restoration Authority) to manage trades and ensure that they result in a net environmental improvement; and
- allowing trades between point sources and non-point sources.

Trading Scenarios

The Stakeholder Committee envisions two different kinds of possible trades: same-pollutant trades and cross-pollutant trades. Same-pollutant trades are possible within the Cheat watershed because it contains permitted as well as former mine lands. Permitted mines generate the same kinds of pollutants that exist at former mines, so trades could be made on a pollutant-by-pollutant basis. A typical same-pollutant trading scenario for the Cheat would involve a permitted coal mine that has been assigned new, stricter discharge limits under the TMDL. If meeting these limits would entail significant costs, the mine owner may prefer to purchase pollution

Water Quality Trading Credit Terms

Total Maximum Daily Load: The amount of a pollutant a body of water can accommodate and still meet water quality standards.

Abandoned Mine Land Reclamation Trust Fund: A program established under the Surface Mining Law requiring mine operators to pay certain fees into a fund for reclamation of mines abandoned before 1977.

Same-Pollutant Trades: Trading of water quality credits in which increases in a certain pollutant are offset by reductions in that same pollutant.

Cross-Pollutant Trades: Water quality credit trades in which increases in one pollutant can be offset by reductions in different pollutant.

Point Source: An identifiable and confined discharge point for one or more water pollutants, such as an industrial facility.

Non-point Source: A diffuse, unconfined discharge of polluted water into a water body, such as runoff from city streets and agricultural areas.

Information Sources:

<http://www.epa.gov/owow/tmdl/intro.html>

<http://www.osmre.gov/fundstat.htm>

http://downstreamstrategies.com/CheatTradingFramework_FINAL2-18-04.doc

Stevenson, L. Harold and Bruce Wyman. 1991. **The Facts on File Dictionary of Environmental Science.** Facts on File, Inc. pp. 170 and 190.

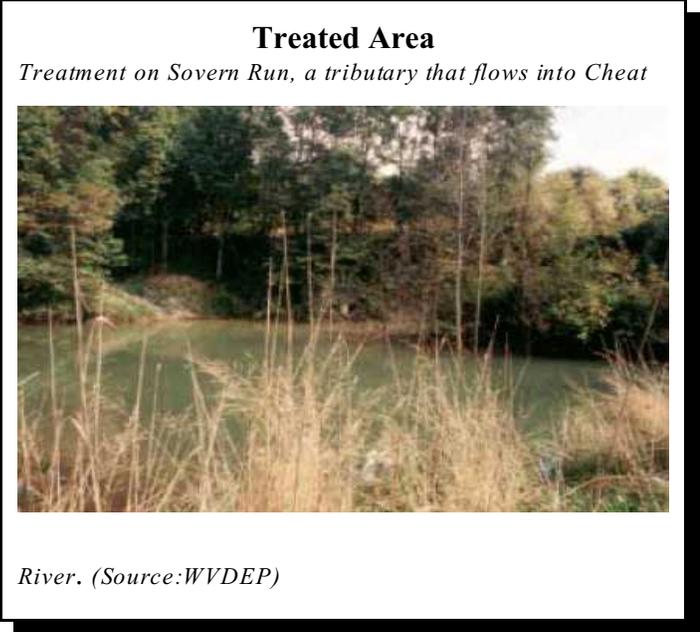
sources) are subject to restrictions on the physical, chemical, and biological properties of their discharges. These point sources include sewage treatment plants, municipal storm water collection systems, and industrial facilities such as power plants. Pollution from non-point sources includes fertilizer and pesticides/herbicides that runoff from agricultural fields and golf courses, siltation from agriculture and logging, acidic drainage from mine tailings, the “settling” of pollutants from the atmosphere (known as deposition), and bacteria from livestock and faulty septic systems. Non-point-source pollution is best addressed together with point-source discharges in a watershed-wide approach that considers the cumulative effects of all pollution sources—including natural sources—affecting the entire watershed.

reduction credits at a lower cost, rather than investing in additional discharge reductions. The mine owner could then purchase water quality credits in lieu of meeting the discharge limits. In the Cheat watershed, the most likely source of credits would be acid mine drainage remediation on the former mine lands.

Several other scenarios involving different credit buyers and credit sellers are also possible. For example, a more complex scenario would involve trading among different kinds of pollutants. This type of cross-pollutant trade depends on an ability to calculate equivalencies between ecological condition, environmental stressors, and dollars. The Cheat watershed technical team developed equivalencies between acid mine drainage and thermal effluent from a power plant. These equivalencies would make it possible for an existing coal-fired power plant on the Cheat River to offset its thermal effluent⁴ by purchasing credits generated through AMD remediation.

The team calculated that thermal effluent produced by the plant has an ecological effect equivalent to 1,110 tons per year of acidity. Given this impact and the cost of AMD remediation (\$300 for each ton of acidity per year [DRAFT Cheat Trading Report: <http://wvri.nrcce.wvu.edu/CheatTradingTEXT-DRAFT-10Nov03.pdf>]), the dollar equivalency between the plant's thermal effluent and AMD would be \$333,087 per year. If it would cost the power plant more than this amount to reduce its thermal effluent to required levels, the plant owners would likely be willing to buy trading credits in return for an extension of their thermal variance. (For more details about calculating cross-pollutant equivalencies, see the diagram in Appendix B.)

Under the nascent Cheat trading framework, a Cheat Water Restoration Authority (CWRA) would oversee both types of trades—same-pollutant and cross-pollutant. The Cheat Watershed Restoration Authority would also ensure that all trades are acceptable to stakeholders and that they meet watershed restoration goals. Keith Pitzer, a member of the Stakeholder Committee, says one of the main benefits of the trading framework and CWRA is that together they would serve to unify restoration activities watershed-wide so financial resources can be used most efficiently.



⁴Thermal effluent is excessive waste heat added to a water body, usually by the discharge of cooling water from an electric power plant. The shift to a warmer aquatic environment can cause changes in species composition and can lower the dissolved oxygen content of the water.

To generate the credits, the state may fund remediation through the Abandoned Mine Land Trust Fund. Other agencies such as the Army Corps of Engineers or the Office of Surface Mining may also provide grants or use other mechanisms to fund cleanup activities such as:

- passive treatments including the creation of limestone leach beds, open limestone channels, wetland systems or other alkaline producing systems; and
- active systems that use chemical alkaline treatment, settling ponds, and sludge removal.

Requirements and Limitations

EPA's Water Quality Trading Policy presents several recommendations for trading water quality credits. First, any water quality trading or other market-based programs must be consistent with the Clean Water Act and water quality management plans. In addition, all water quality trading should take place within the same watershed or defined area for which a TMDL has been approved. This stipulation helps ensure that watersheds and surrounding areas experience a net improvement in water quality.

Currently, EPA does not support trading of certain chemicals such as persistent bioaccumulative toxics (PBTs) including dioxins, furans, polychlorinated biphenyls, and mercury. PBTs are slow to break down in the environment and they bioaccumulate in food chains, posing human health and ecosystem risks to current and future generations. EPA also does not support trading that results in locally high pollutant concentrations, or "hot spots." Without this restriction, trading programs could lead to net pollution reductions across a watershed while at the same time creating a localized pollution increase. By preventing hot spots EPA helps to protect communities from bearing an unfair and disproportionate amount of water pollution.

Finally, credits should be generated before or during the time period in which they are used. The length of the appropriate time period is stipulated by the monthly, seasonal, or annual requirements of a National Pollutant Discharge Elimination System⁵ permit. Polluters interested in pursuing water trading credits should work with their local or state water authority and watershed managers to understand the specific requirements for their particular watershed.

See Appendix A for a selection of grants that can provide technical and financial assistance for the reclamation of watersheds contaminated by mining activities.

⁵Under the Clean Water Act, all point sources of water pollution are required to obtain a National Pollutant Discharge Elimination System permit issued by the U.S. EPA or by a state environmental agency. The permit lists all permissible discharges and/or the level of cleanup required for wastewater.

Conclusions

The creation of water quality trading credits may present a new and exciting incentive for cleaning up former mine lands on a watershed level. Water quality trading credits have the potential to allow communities to benefit from improved water quality beyond that required by governmental regulations, and to provide a way for parties interested in improving water quality to financially benefit. Tools such as carbon sequestration, wetland banking, and land conservation could be used in conjunction with water quality trading credits to increase economic opportunities, tourism, and recreation. The creation of water quality trading credits can be a win-win solution. In a successful trading system, groups generating the credits are compensated for improving the quality of the environment, while communities enjoy the long-term benefits associated with cleaner watersheds.

Contact Information

- Abandoned Mine Lands Reclamation Program in the Office of Surface Mining provides information about funding projects at: <http://www.osmre.gov/osmaml.htm> and can be reached at: (202) 208-2719.
- U.S. Army Corps of Engineers' Restoration of Abandoned Mine Sites program can be accessed at: <http://www.nwo.usace.army.mil/html/rams/rams.html>
- EPA's Abandoned Mine Land Team can provide communities with support and resources as they explore reuse opportunities at former mine lands. For more information about EPA's Abandoned Mine Land Team, please see the Web site at: <http://www.epa.gov/superfund/programs/aml/>
- EPA's office of Wetlands, Oceans, and Watershed, which approves TMDL management programs can be reached <http://www.epa.gov/owow/> This office also provides information and guidance on water quality trading programs at: <http://www.epa.gov/owow/watershed/trading.htm>
- EPA also supports the reuse of former mining sites through the Superfund Redevelopment Initiative (SRI). For further information see the (SRI) Web site at: www.epa.gov/superfund/programs/recycle, which provides tools, case studies, and resource information on remediating and reusing Superfund sites, including abandoned mine lands.

SOURCES:

National Water Quality Inventory, 2000 Report, EPA.

Clean Water Action Plan, 1998

<http://www.cleanwater.gov>

Final Water Quality Trading Policy

<http://www.epa.gov/owow/watershed/trading/finalpolicy2003.html>

EPA 2003 Water Quality Trading Policy: Questions and Answers

<http://www.epa.gov/owow/watershed/trading/policyfaq.html>

Information about the Cheat River Work Group taken from:

<http://downstreamstrategies.com/CheatTradingMinutes6-27-03.doc>

<http://downstreamstrategies.com/CheatTradingMinutes5-8-03.doc>

Information on Cheat River Water Quality Trading Framework taken from:

wwri.nrece.wvu.edu/CheatTradingTEXT-DRAFT-10Nov03.pdf

Managing Water Resources: The Watershed Approach

http://216.239.53.104/search?q=cache:G1JUzE_Hz3YJ:www.epri.com/corporate/discover_epri/news/HotTopics/env_WaterResources.pdf+water+quality+trading+credits+on+mine+lands&hl=en&ie=UTF-8

Information about the Clean Water Initiative:

<http://www.cleanwater.gov/action/toc.html>

Region 10 Water Quality Trading Assessment Handbook

<http://yosemite.epa.gov/R10/OI.NSF/0/642397cf31d9997388256d66007d53a7?OpenDocument>

South Dakota department of environment and natural resources Web site provided the picture of the Minnesota Ridge Mine:

<http://www.state.sd.us/denr/des/Mining/acidmine.htm>

Information about the Kalamazoo Water Quality Trading Demonstration Project was provided by the state of Michigan's Department of Environmental Quality and Kieser and Associates:

<http://www.deq.state.mi.us/documents/deq-swq-trading-TradingDemonstration.doc>

<http://www.kieser-associates.com/wqt.pdf>

The West Virginia DEP Web site provided pictures from the Cheat watershed:

<http://www.wvdep.org/alt.cfm?asid=96>

APPENDIX A

The following table provides a selection of grants that can provide technical and financial assistance for the reclamation of watersheds contaminated by mining activities. Additional grants can be identified using the web tool available at the following link:

Catalog of Federal Funding Sources for Watershed Protection: The Catalog of Federal Funding Sources for Watershed Protection Web site is a searchable database of financial assistance sources (grants, loans, cost-sharing) available to fund a variety of watershed protection projects. Interested parties can search using subject matter criteria or words in the title of the funding program. Criteria searches include the type of organization (e.g., non-profit groups, private landowner, state, business), type of assistance sought (grants or loans), and keywords (e.g., agriculture, wildlife habitat).

<http://cfpub.epa.gov/fedfund/>

Table of Funding Opportunities for Watershed Cleanup:

Name & Location	Overview
Abandoned Mine Lands Reclamation Program http://www.osmre.gov/grantsprograms.htm	The Abandoned Mine Land Reclamation (AMLR) Program is designed to protect the public and correct environmental damage caused by coal and, to a limited extent, non-coal mining practices that occurred prior to August 3, 1977. AMLR provides for the restoration of eligible lands mined and abandoned or left inadequately restored. AMLR is divided into two programs, the State Indian Reclamation Program and the Federal Reclamation Program. Both programs address problems such as dangerous highwalls, slides, subsidence, dangerous portals, and polluted water. Water projects related to mine drainage acidity, metals, or toxicity may be eligible under the AMLR's Appalachian Clean Streams Initiative. As part of the Appalachian Clean Streams initiative, funds are available to award cooperative agreements to not-for-profit organizations, especially small watershed groups, that undertake local acid mine drainage (AMD) reclamation projects. The maximum award amount for each cooperative agreement will normally be \$100,000 in order to assist as many groups as possible to undertake actual construction projects to clean streams impacted by acid mine drainage.
Watershed Protection and Flood Prevention Program http://aspe.os.dhs.gov/cfda/p10904.htm	Also known as the "Small Watershed Program" or the "PL 566 Program," this program provides technical and financial assistance to address resource and related economic problems on a watershed basis. Projects related to watershed protection, flood prevention, water supply, water quality, erosion and sediment control, wetland creation and restoration, fish and wildlife habitat enhancement, and public recreation are eligible for assistance. Technical and financial assistance is also available for planning and installation of projects to protect, develop, and use land and water resources in small watersheds.

Name & Location	Overview
<p>Transportation Equity Act for the 21st Century-Funding Programs http://www.fhwa.dot.gov/tea21/</p>	<p>The Transportation Equity Act for the 21st Century (TEA-21) funds numerous transportation programs to improve the nation’s transportation infrastructure, enhance economic growth, and protect the environment. Through increased funding to the Surface Transportation Program (STP) and the National Highway System (NHS), TEA-21 allows for more environmental projects. States may spend up to 20 percent of their STP dollars (used for transportation facility reconstruction, rehabilitation, resurfacing, or restoration projects) for environmental restoration and pollution abatement projects, including the construction of stormwater treatment systems. Additionally, each state sets aside 10 percent of STP funds for transportation enhancement projects, which can include acquisition of conservation and scenic easements, wetland mitigation, and pollution abatement, as well as scenic beautification, pedestrian and bicycle trails, archaeological planning, and historic preservation. These varied project types can be used to protect source water areas during construction of transportation corridors.</p>
<p>Capitalization Grants for Clean Water State Revolving Funds http://www.epa.gov/owm/cwfinance/cwsrf/index.htm</p>	<p>EPA awards grants to states to capitalize their Clean Water State Revolving Funds (CWSRFs). The states, through the CWSRF, make loans for high-priority water quality activities. As loan recipients make payments back into the fund, money is available for new loans to be issued to other recipients. Although traditionally used to build wastewater treatment facilities, loans are also used for other water quality management and source water protection activities, including (1) agricultural, silvicultural, rural, and urban runoff control; (2) estuary improvement projects; (3) wet weather flow control, including storm water and sewer overflows; (4) alternative wastewater treatment technologies; and (5) landfills and riparian buffers.</p>
<p>Capitalization Grants for Drinking Water State Revolving Fund http://aspe.os.dhs.gov/cfda/p66468.htm</p>	<p>EPA awards grants to states to capitalize their Drinking Water State Revolving Fund (DWSRF). States use a portion of their capitalization grants to set up a revolving fund from which loans and other types of assistance are provided to eligible public water systems (publicly and privately owned) to finance the costs of infrastructure projects. Loan repayments made by assistance recipients provide a continuing source of infrastructure financing. States may also use a portion of their capitalization grants to fund set-aside activities that help to prevent contamination of surface and ground water drinking water supplies, as well as enhance water system management through source water protection, capacity development, and operator certification programs.</p>
<p>Great Lakes Program http://aspe.os.dhs.gov/cfda/p66469.htm</p>	<p>EPA’s Great Lakes Program issues awards to monitor Great Lakes ecosystem indicators; provides public access to Great Lakes data; helps communities address contaminated sediments in their harbors; supports local protection and restoration of important habitats; promotes pollution prevention through activities and projects such as the Canada-U.S. Binational Toxics Strategy; and provides assistance to implement community-based Remedial Action Plans for Areas of Concern and for development of Lake-wide Management Plans and the reduction of critical pollutants pursuant to those plans.</p>
<p>Nonpoint Source Implementation Grants (319 Program) http://aspe.os.dhs.gov/cfda/p66460.htm</p>	<p>The 319 program provides formula grants to the states and tribes to implement nonpoint source projects and programs in accordance with section 319 of the Clean Water Act (CWA). Nonpoint source pollution reduction projects can be used to protect source water areas and the general quality of water resources in a watershed. Examples of previously funded projects include installation of best management practices (BMPs) for animal waste; design and implementation of BMP systems for stream, lake, and estuary watersheds; basinwide landowner education programs; and lake projects previously funded under the CWA section 314 Clean Lakes Program.</p>

Name & Location	Overview
<p>U.S. Army Corps of Engineers Aquatic Ecosystem Restoration http://www.usace.army.mil</p>	<p>The types of work that can be accomplished under this program are structural or operational changes to improve the environment, such as reconnecting old river channels and backwaters, creating wetland sub-impoundments on the perimeters of reservoirs, improving water quality through the reduction of erosion and sedimentation, manipulating wetlands and vegetation in shallow headwaters of reservoirs, and planting woody vegetation in flood plains. If a non-Federal sponsor is interested in cost-sharing a project, the Corps will prepare a study proposal at 100 percent Federal cost. If the study proposal is approved, the subsequent costs for the feasibility study, plans and specifications, and construction are cost-shared. The sponsor's share is 35 percent of these costs but is not payable unless and until the project enters the construction phase. In-kind services provided during design or construction can be credited toward a sponsor's share. Sponsors are usually public agencies; however, Indian Tribes and national nonprofit organizations such as Ducks Unlimited and the National Wildlife Federation may also qualify as sponsors. A private interest may qualify as a non-Federal sponsor if the proposed modifications do not require future operation and maintenance.</p>
<p>U.S. Army Corps of Engineers Planning Assistance to the States http://www.usace.army.mil</p>	<p>Studies are cost-shared on a 50-50 basis with one (or more) non-Federal sponsor (a State, a public entity within a State, or an Indian Tribe). Assistance, not to exceed \$500,000 in funds per State or Tribe per year, can be granted for: flood damage reduction; hydrologic analysis; bank stabilization; hydraulic analysis; sedimentation; hydropower; dredging; flood hazard mitigation; navigation; environmental preservation and enhancement; hazardous, toxic, and radioactive wastes; fish, wildlife, water conservation; cultural resources; water quality; flood plain information; surface water; ecosystem and watershed planning; ground water; recreation; and streambed degradation.</p>
<p>U.S. Army Corps of Engineers Restoration of Abandoned Mine Sites http://www.usace.army.mil</p>	<p>This program provides technical planning and design assistance to Federal and non-Federal interests for carrying out projects to address water quality problems caused by drainage and related activities from abandoned and inactive non-coal mines. It also provides assistance to non-Federal and nonprofit entities to develop, manage, and maintain a database of technologies for reclamation of abandoned and inactive non-coal mine sites. Cost-sharing with sponsors is authorized for both Federal and non-Federal agencies. The Federal share of the cost of a project carried out under this program is 50 percent, except for any project located on Federal lands, in which case, the Federal share is 100 percent of the cost. The Corps' share will be determined through negotiation with the other Federal agency. Assistance may be provided under the RAMS program in support of a Federal or non-Federal project for the following purposes: (1) Response, control, and remediation of hazardous, toxic, and radioactive waste and improvement of the quality of the environment associated with abandoned or inactive non-coal mines. (2) Restoration and protection of streams, rivers, wetlands, groundwater sources, and other water bodies and all ecosystems, including terrestrial ecosystems degraded, or with the potential to become degraded, from abandoned or inactive non-coal mines. (3) Demonstration and implementation of treatment technologies, including innovative and alternative technologies, to minimize or eliminate adverse environmental effects associated with abandoned or inactive non-coal mines. (4) Demonstration and implementation of management practices to address environmental effects associated with abandoned or inactive non-coal mines. (5) Remediation and restoration of abandoned or inactive non-coal mine sites for public health or safety purposes. (6) Expedition of the remediation or restoration of abandoned or inactive non-coal mines to minimize adverse impacts to the environment.</p>

Name & Location	Overview
<p>U.S. Army Corps of Engineers Water Resources Projects http://www.usace.army.mil</p>	<p>This program is designed to assist with the construction of large projects to reduce flood damages or to restore the environment and to provide Corps assistance in resolving more complex flood-related water resources problems. This program includes projects ranging from those that solve costly flood problems for a single community to those that solve more complex flooding problems involving multiple communities or large agricultural areas. This program can be used to evaluate multipurpose projects that can include flood damage reduction, water supply, ecosystem restoration, sedimentation reduction, cultural resources preservation, recreation, or other purposes. Examples of projects developed under this program are reservoirs, diversions, levees, channels, floodwalls, pump stations, and nonstructural measures such as flood plain parks, flood warning systems, flood proofing, and the relocation of flood-prone development. The Corps works with the project sponsor to (1) define the problem and related water resources opportunities, (2) evaluate flood control or multipurpose solutions, (3) select a plan, (4) develop the design, and (5) construct a project. The reconnaissance study determines if there is at least one potentially feasible solution to the identified water resources problem. The \$100,000 cost of the reconnaissance study is paid by the Federal Government. If a feasible solution is found during the reconnaissance study, the Corps, along with a non-Federal sponsor, conducts a feasibility study (1) to further evaluate the plan identified in the reconnaissance study and any other potentially feasible solutions and (2) to determine whether the Federal Government and the non-Federal sponsor should construct the project. Fifty percent of the cost of the feasibility study is paid by the non-Federal sponsor in the form of cash and in-kind services.</p>
<p>Water Pollution Control Program Grants http://www.epa.gov/owm/cwfinance/pollutioncontrol.htm</p>	<p>Section 106 of the Clean Water Act authorizes EPA to provide federal assistance to states (including territories, the District of Columbia, and Indian Tribes) and interstate agencies to establish and implement ongoing water pollution control programs. Prevention and control measures supported by State Water Quality Management programs include permitting, pollution control activities, surveillance, monitoring, and enforcement; advice and assistance to local agencies; and the provision of training and public information.</p>
<p>Water Quality Cooperative Agreements http://www.epa.gov/owm/cwfinance/waterquality.htm</p>	<p>Grants are provided to support the creation of unique and new approaches to meeting stormwater, sanitary sewer, and combined sewer outflows, biosolids, and pretreatment requirements, as well as enhancing state capabilities. Eligible projects include research, investigations, experiments, training, demonstrations, surveys, and studies related to the causes, effects, extent, and prevention of pollution.</p>
<p>Watershed Assistance Grants http://www.rivernetwork.org/howwecanhelp/index.cfm?doc_id=94</p>	<p>The Clean Water Action Plan calls for the creation of a dedicated source of funding to build the capacity of existing or new watershed partnerships to protect and restore their watershed. These partnerships would serve as national demonstrations or models of how to bring together diverse interests to achieve watershed protection and restoration and of how to ensure diversity in watershed partnerships. In September 1998, the Environmental Protection Agency's Office of Wetlands, Oceans, & Watersheds selected River Network to coordinate and administer the Watershed Assistance Grants Program (WAG). The WAG program will make grants to local watershed partnerships to support their organizational development and long-term effectiveness. Grants will be distributed to a pool of applicants, which are diverse in terms of geography, watershed issues, the type of partnership, and approaches.</p>

APPENDIX B

Determining Cross-pollutant Equivalencies

