

## **PACD Engineering Technical Assistance Program Final Report Highlights August 2013 to December 2015**

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### **Narrative Description of Project**

The PACD Engineering Technical Assistance Program was launched in 2001 with the goal of providing high level engineering technical assistance to Pennsylvania's conservation community, in order to reduce nonpoint source pollution. Any entity eligible to receive a Growing Greener grant is eligible for PACD engineering technical assistance, including watershed organizations, county conservation districts, 501(c) 3 non-profit organizations, municipalities, and educational institutions.

During this grant period, the program has continued to provide quality engineering technical assistance to the conservation community, helping to reduce nonpoint source pollution throughout the state of Pennsylvania. All conservation partners receiving assistance from the program have received quality engineering assistance in a timely manner. All areas of the state are free to use the program and use of the program continues to be high.

During the grant period, the PACD Engineering Assistance Program has provided engineering technical assistance for 175 individual projects statewide. These projects include 11 abandoned mine drainage projects, 11 stream corridor restoration projects, and 151 agricultural projects. The primary reasons for the program's success are a) the quality of the staff and b) the partnership between PACD and NRCS, which ensures that program goals are met and solutions are properly implemented.

Each project offers its own unique challenges, and PACD staff work with project partners to identify and overcome these challenges using the most up-to-date methods available. The Rock Tunnel Abandoned Mine Drainage project, which is highlighted in the accompanying project summary handout, is just one such example. Prior to PACD undertaking this project, it had undergone three failed cycles of design and construction. PACD project staff were tasked with developing a plan that would treat the water, reduce sludge volumes, and address high flow conditions, all within a relatively small footprint. Staff were able to accomplish this by using an innovative design that incorporates multiple elements to both spread flows and reduce sludge volumes. (See summary handout for additional details.)

Funded construction projects worth an estimated total of \$10 million are currently awaiting PACD engineering assistance statewide. This indicates a strong need for continued funding, and possibly additional staff, should funding be available.



The ultimate goal of the program is to reduce non-point source pollution. During this grant period, program staff have completed projects across the state that conserve, restore, and enhance natural resources. Estimated improvements from these projects total:

**Abandoned Mine Drainage:**

- 3.3 million gallons per day (MGD) of mine water treated [.5 MGD in the Chesapeake Bay Watershed (CBW)]
- 80 tons annually of acidity removed (10 tons annually in the CBW)
- 30 tons annually of iron removed (5 tons annually in the CBW)
- 13 tons annually of aluminum removed (6 tons annually in the CBW)
- 80 tons annually of manganese removed (10 tons annually in the CBW)

**Stream Corridor Restoration:**

- 50,610 linear feet of streambank restored (35,400 linear feet in the CBW)
- 500+ individual structures installed (325+ in the CBW)

**Agricultural BMPs:**

- Management of 93,925 tons of manure annually (70,000 tons annually in the CBW)
- 260,900 square feet of heavy use area installed (200,000 square feet in the CBW)
- 69,000 linear feet of clean water pipelines (55,000 linear feet in the CBW)
- 26,600 linear feet of clean water diversions (22,000 linear feet in the CBW)
- 8,000 linear feet of waste transfer pipelines (5,500 linear feet in the CBW)
- 240,000 square feet of improved access areas, trails, and animal walkways (170,000 square feet in the CBW)
- 120,000 square feet of vegetated filter area (100,000 square feet in the CBW)
- 28,900 linear feet of management fencing (23,000 linear feet in the CBW)
- 20 animal crossings and 4 spring developments (all in the CBW)

Estimated pollutant load reductions that can be attributed to the implementation of PACD Engineering Assistance Program projects are: 100,000 Tons of sediment, 110 Tons N, 55 Tons P, 88 Tons K, 30 Tons Fe, 13 Tons Al, 15 Tons Mn, and 40 Tons Acidity annually.



## Rock Tunnel Abandoned Mine Drainage Reconstruction/Reconfiguration Project

Funded by the PA Department of Community and Economic Development (DCED)  
Sponsors: Somerset County Conservation District, Mountain Laurel Chapter of Trout Unlimited,  
PACD Engineering Assistance Program

**Project Description:** The Rock Tunnel discharge is a large (2,000 GPM+) alkaline iron and aluminum discharge that significantly impacts the lower section of the South Fork of Bens Creek. The primary impact of the discharge is iron sludge, which coats the bottom of the stream and effectively eliminates any macroinvertebrate life and, subsequently, trout and other fish and aquatic life. Three prior attempts to treat the discharge had failed due to site limitations. PACD Engineering Assistance Program staff were able to successfully treat the site through an innovative design employing a large three-stage trompe, concrete and rock spreaders, strategic wetland plantings, and a spread multi-outfall system.

**Project Goals:** To treat the water, contain the precipitated iron within the system, and control the water to allow the wetland plants to take hold and provide flow capacity for any catastrophic high flow conditions, all while staying within the current footprint.

**Project Results:** Within the first year's growth of the wetland vegetation, negligible iron and aluminum are exiting the treatment system. The project is currently removing 100 lb. per day of iron within a remarkably small footprint for such a large discharge. Sludge volumes are also reduced, as a large portion of the iron is taken up by the wetland plants and precipitated as ferrous (black) rather than ferric (yellow boy) iron, which is known for its low solids per volume.

Water Quality	Pretreatment Discharge	Post Treatment Discharge
pH	6.5	6.6
Aluminum	2.0	0.6
Iron	5.0	0.3
Manganese	0.3	0.3



*Before Treatment*



*After Treatment – 3 months growth*

**Project Costs:** \$160,000 through DCED

**Lessons Learned:** By applying new technologies and partnering with different organizations with the most current available technical expertise, previously under-treated or untreated systems can be treated, and additional passive systems constructed, restoring more sections of stream and aquatic resources.

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