

Slabcamp Run Tributary AMD remediation projects

A project eligible for Clean Water Act, title 319(h) funding

Requested by

Friends of Deckers Creek
and

The West Virginia Department of Environmental Protection
Division of Water and Waste Management
Nonpoint Source Program

In collaboration with the Deckers Creek Restoration Team

June 1, 2011

Source	Amount
319(h) funds	\$274,089
Friends of Deckers Creek (OSM WCAP)	\$127,908
Non-Federal Partner	\$54,818
Friends of Deckers Creek (In-kind)	\$3,000
Total	\$459,815

Subwatershed information

WVDNR Code	WVM-8-F
8-digit HUC Code	05020003, Monongahela River
10-digit HUC Code	0502000302, Deckers Creek
12-digit HUC Code	050200030201, Headwaters Deckers Creek
Reach Code	05020003000237, Slabcamp Run
TMDL (USEPA, 2002) Subwatershed	23

Loads to be removed (from USEPA 2002)

Acidity	63,000 lbs per year
Iron	3,700 lbs per year
Aluminum	4,900 lbs per year

Project Summary (Abstract)

Friends of Deckers Creek (FODC) requests \$274,089 for eliminating acid mine drainage in the unnamed tributary to Slabcamp Run. The acid mine drainage comes from mines closed before 1977, and the project is eligible for both Clean Water Act section 319 and Abandoned Mine Lands Trust Fund expenditures. The unnamed tributary receives 24.5 tons/year of acidity, 3 tons/year of aluminum, and 8 tons/year of iron. The goal of the project is rehabilitation of a diverse community in a 5.4 acre wetland that adjoins a popular rail-trail. The project will complete restoration efforts carried out with FY 2003 319 funds first by the West Virginia Department of Environmental Protection (Office of Abandoned Mine Lands and Reclamation) and then by Friends of Deckers Creek. The project will use self-flushing limestone leachbeds. Friends of Deckers Creek will obtain matching funds through the Office of Surface Mining's Watershed Cooperative Agreement Program, and through a second non-federal source, such as the Stream Restoration Fund in the WVDEP Division of Mining and Reclamation. In addition, minor modifications are required to improve performance of three previous projects: Valley Point #12, Kanesh Creek South Site #1, and Valley Highwall #3. All work will be complete by September 30, 2013.

Table of Contents

Project Summary (Abstract).....	2
Table of Contents.....	2
Background.....	3
Non-point source problems and sources:.....	3
Type of project.....	5
The Lead Agency and contacts:.....	5
GOALS AND OBJECTIVES.....	6
Restoration benefits.....	6
Educational outputs.....	6
PROJECT DESCRIPTION.....	6
Project Plan.....	6
Conceptual design.....	7
Partner Involvement.....	11
Education and Outreach.....	12
Maintenance of Effort.....	13
Monitoring.....	13
Milestone Schedule.....	13
Budget.....	14
Budget justification.....	15
Literature cited.....	16

Background

Watershed Information and Location

WVDNR Code	WVM-8-F
8-digit HUC Code	05020003, Monongahela River
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Subwatershed information for major project

Reach Code	05020003000237, Slabcamp Run
TMDL (USEPA, 2002) Subwatershed	23

Subwatershed information for maintenance work

Reach Code	05020003000250, Kanes Creek
TMDL (USEPA, 2002) Subwatershed	206

Nonpoint problems and sources:

The Slabcamp project will neutralize acid mine drainage (AMD) in an unnamed tributary of Slabcamp Run, which is a tributary to Deckers Creek, which is a tributary to the Monongahela River (Figure 1). Slabcamp Run and Deckers Creek are both impaired by acid mine drainage (WVDEP 2009). The unnamed tributary is not listed as impaired, but monitoring data demonstrate violations of pH, iron, and dissolved aluminum standards (Table 1).

Table 1: Water quality data at the mouth of the unnamed tributary to Slabcamp Run

<u>Measurement</u>	<u>Units</u>	<u>Number of measurements</u>	<u>Average</u>	<u>Standard</u>
Dissolved aluminum	mg/L	4	5.6	≤0.75
Total iron	mg/L	18	1.6	≤1.5
pH	S.U.	20	3.7	6 to 9

The modifications to previous projects all take place on projects discharging to Kanes Creek.

The Valley Point #12 (VP12) modifications will capture AMD from a seep located near a project that was completed with FY04 319 funds. That project constructed sulfate-reducing bioreactors. However, an additional AMD source, which was discovered during construction, is causing this project to operate less effectively than it might. Not only does the additional source contribute AMD, it also prevents revegetation of the project from becoming complete. In addition, one unlined retention pond leaks, and will be lined.

The Kanes Creek South Site #1 (KCS1) and Valley Highwall #3 (VH3) projects require measures to retain iron that precipitates out of the AMD as a result of the lime dosers installed in 2008 (using FY 2006 319 funds). At each site, a 3,000 tank will be buried. Pipes will be installed for pumping the sludge out of the bottom of the tank to a gravel lined bed. Water draining from from sludge will move

through the gravel bed and into an open limestone channel. FODC pump sludge from the tanks and dispose of dried hydroxides as needed.

The AMD is nonpoint source pollution because it flows from mines abandoned before 1977. While eliminating this form of nonpoint source (NPS) pollution is a goal of the Clean Water Act, it is also desirable for the community. In particular, a popular rail-trail runs along the edge of a wetland that will be restored by the Slabcamp project. The rail-trail is already regarded as one of the best birding destinations in the area. With restoration of the wetland, the wildlife diversity and the numbers who come to the area to enjoy it will increase. In anticipation of eliminating the AMD, FODC has already built nesting boxes for wood ducks, bluebirds and bats, all of which dwell or forage in wetlands.

Two projects have already been completed in the Slabcamp subwatershed using 319 funds from Fiscal Year 2003, abandoned mine lands reclamation funds, and Watershed Cooperative Agreement Program (WCAP) funds from Office of Surface Mining (OSM). These projects have not yet eliminated enough acidity from the water in the wetland to allow it to support a diverse aquatic community. FODC adds limestone fines to the unnamed tributary and the mainstem and maintains a limestone leach bed and slag bed, but they also do not neutralize the entire acid load.

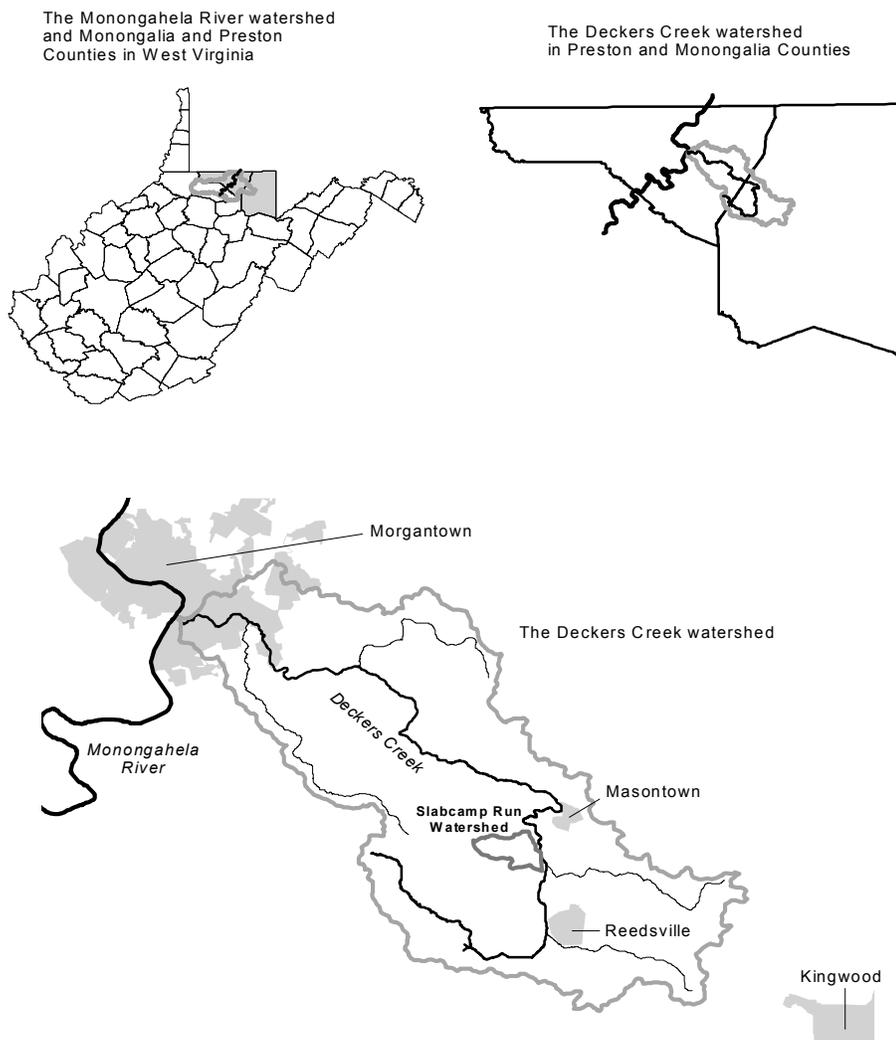


Figure 1: Location of the Monongahela River, Deckers Creek and Slabcamp Run watersheds

Neutral water discharges from the limestone leachbed/steel slag bed, so no sources upstream from that project continue to damage the unnamed tributary. FODC has monitored water in two open limestone channels (OLCs) discharging from portals that were sealed in 2004. The loads are slightly less than those measured at the mouth of the unnamed tributary (Table 2). A third source, a collapsed portal on the south side of the tributary, has been identified and may account for the missing load. It will be monitored over the coming year.

Table 2: Loads in the unnamed tributary to Slabcamp Run

Site	Aluminum	Iron	Manganese	Acidity
	-----mg/L-----			
OLC 250	3,960	300	167	32,768
OLC300	1,345	595	46	12,933
Sum of inputs	5,306	895	212	45,701
Mouth of unnamed tributary (output)	5,808	1,447	172	50,229
<i>Unexplained load</i>	<i>502</i>	<i>552</i>	<i>40</i>	<i>4,528</i>

The dominance of aluminum in the OLC discharges and in the unnamed tributary suggests that self-flushing limestone leachbeds, rather than reducing and alkalinity producing systems, will be the best AMD treatment technique.

Type of project

This project eliminates nonpoint source pollution caused by ***resource extraction***.

The Lead Agency and contacts:

FODC will coordinate the work described in this proposal. The mission of FODC is to improve the natural qualities of, increase public concern for, and promote the enjoyment of the Deckers Creek watershed. FODC is a non-profit, 501(c)(3) organization.

FODC's accomplishments include:

- Compilation of a USEPA-approved Watershed Based Plan (Christ and Pavlick, 2006)
- Preparation of a storm water curriculum, which explains the nature and problems of urban storm runoff to middle- and high-school students (Pavlick, 2006)
- An annual community festival, which has now become an annual adventure race
- Development of a nine-member board of directors including a local businesswoman, and a high school biology teacher, a fish expert from a local university, and a foundation executive
- Development of a membership of approximately 300 individuals and 50 local businesses
- Development of a mailing list of approximately 1,100 supporters
- Other projects funded by OSM WCAP (Slabcamp Run #2, Valley Point #12, Kanesh Creek South site 1, Valley Highwall #3)
- A number of successful environmental education projects funded by the West Virginia Commission for National and Community Service, the EPA Environmental Education program, and other foundations
- Development of a Youth Advisory Board
- Brownfield assessment work funded by the USEPA Brownfields program

FODC currently has two staff members, an OSM-VISTA worker placed through the Appalachian Coal Country Watershed Team, and two contractors, one in charge of coordinating education activities, and one who specializes in greenspace design and development.

GOALS AND OBJECTIVES

The goal of this work is to eliminate acid mine drainage in the unnamed tributary of Slabcamp Run so that a diverse aquatic community can develop in the stream and in the large wetland through which it passes. The objective of the project is to construct self-flushing limestone leachbeds to treat the three acid mine drainage sources. An additional objective is to manage the off-project AMD source and fix leaks at the VP12 project.

The project is designed to eliminate AMD so that the 2,000 feet of the unnamed tributary is no longer impaired, and the 5.4-acre wetland will support fish and a diverse aquatic community.

FODC will also continue to conduct educational programs during the project, and will bring four school trips to the site to discuss wetlands, nonpoint source pollution, and stream restoration.

Restoration benefits

The project will improve water quality in Slabcamp Run. When the project is finished, water quality in Slabcamp Run will no longer present an obstacle to fish passage between the mainstem of Deckers Creek and the wetland on the unnamed tributary of Slabcamp run. The reduction in acid loads from Slabcamp Run will also protect water quality in the mainstem of Deckers Creek downstream.

Educational outputs

The Slabcamp wetland is a focus of research in wetland restoration at West Virginia University (WVU). FODC will work with WVU to establish wetland plants in the wetland, once its pH improves. WVU plans to involve local groups, including classes from WVU, children from Valley Elementary School in Arthurdale, and Boy Scouts in planting projects. Over the two years of the Slabcamp project, at least two school groups will visit the site to learn about wetland protection, elimination of nonpoint source pollution, and water quality.

FODC has a very active education program, which has introduced nonpoint source pollution issues, such as sediment, bacteria and acid mine drainage, to students at Morgantown High School, Preston High School, Rowlesburg Middle School, and the Mountaineer Challenge Academy. FODC has also created a Youth Advisory Board. The youth regularly participate in outreach events, and have become very knowledgeable about stream protection.

PROJECT DESCRIPTION

Project Plan

The Slabcamp project is located 1.4 miles southwest of Masontown in Valley District of Preston County, near the intersection of McKinney Cave Road (County Road 7/2) and Miller Mine Road (County road 7/29). The VP12 project is located two miles east of Reedsville on Hawley Lane, near Route 7.

The project will be divided into several phases. FODC has monitored AMD loads to the unnamed tributary and will continue to do so until 319 funds are approved. During this same time period, FODC will work with landowners to determine precise locations for the AMD treatment projects.

Once 319 funding has been approved, FODC will seek matching funding through OSM WCAP grants and other sources as necessary.

The second phase will begin as soon as WCAP funding or other matching funding becomes available. FODC will hire an engineer to do the final design for the AMD remediation project, provide plans and specifications to possible contractors, run the pre-bid meeting, and participate in oversight during the construction period.

Also during this period, FODC will perform other tasks that are not associated with direct implementation of the project. Other tasks will include research and planning to support future projects to eliminate nonpoint source pollution, outreach to the community concerning nonpoint source pollution, and environmental education.

Once construction is complete, FODC will continue to monitor the performance of the site during the period of the 319 grant and thereafter.

Conceptual design

In the Slabcamp Run subwatershed, the AMD to be neutralized is net acidic, and therefore cannot be addressed by aeration and settling. Aluminum concentrations and oxygen concentrations exceed 1 mg/L, so anoxic limestone drains will not be effective. Iron concentrations are low, so reducing and alkalinity producing systems (such as vertical flow ponds or sulfate reducing bioreactors) will have little advantage over limestone leach beds, which are the preferred treatment methods for such waters. Frequent flushing maintains the effectiveness of such treatments.

One limestone leachbed will treat AMD flowing through OLC 250 (Figure 2). This discharge has an average flow of 94 gpm. Flows of 120 gpm are not uncommon.

The second limestone leachbed will be located across Miller Mine Road from OLC 300. This leachbed will receive AMD from both OLC 300 and from the collapsed portal. The collapsed portal will be excavated and wet-sealed, and its AMD will be conveyed to the second leachbed using a buried pipe. Flows from OLC 300 average 20 gpm. Higher flows that include AMD from the collapsed portal will be close to 30 gpm.

Both leachbeds will be four feet deep, and will be sized for 24 hours retention time. Because much of the material in the area consists of coal spoil, synthetic liners will be required. Table 3 compiles construction costs for the leach beds. Default costs in AMDTreat are low compared to FODC's experience, and have been increased. AMDTreat reports for the two leachbeds are included in Figure 2 and Figure 3.

Figure 2: AMDTreat cost estimate for the leachbed for AMD from OLC250

Figure 3: AMDTreat cost estimate for the leachbed for AMD from OLC300 and the collapsed portal

Table 3: Costs for limestone leachbeds

Component	Leachbed 1	Leachbed 2	Assumed unit cost
Excavation	63,877	19,983	\$6/cubic yard
Limestone	88,653	22,163	\$35/ton
Liner	18,284	9,994	\$7/square yard
Piping	19,102	6,217	AMDTreat lump sum
Siphon/Automated outlet	5,000	5,000	AMDTreat lump sum
TOTAL	194,916	63,357	

Additional costs will include wet-sealing the collapsed portal (\$12,000), and piping its AMD to the leachbed (350 feet @ \$10/foot=\$3,500). Engineering costs are expected to be 12% of construction costs. The construction cost of the entire project will be \$316,788 (Table 4). Figure 4 shows the layout of the project.

Table 4: Construction costs

Item	Cost
Leachbed 1	\$194,916
Leachbed 2	\$63,357
Sealing portal	\$12,000
Pipe from portal to Leachbed 2	\$3,500
Road improvements	\$5,000
Engineering cost	\$38,014
TOTAL	\$316,788

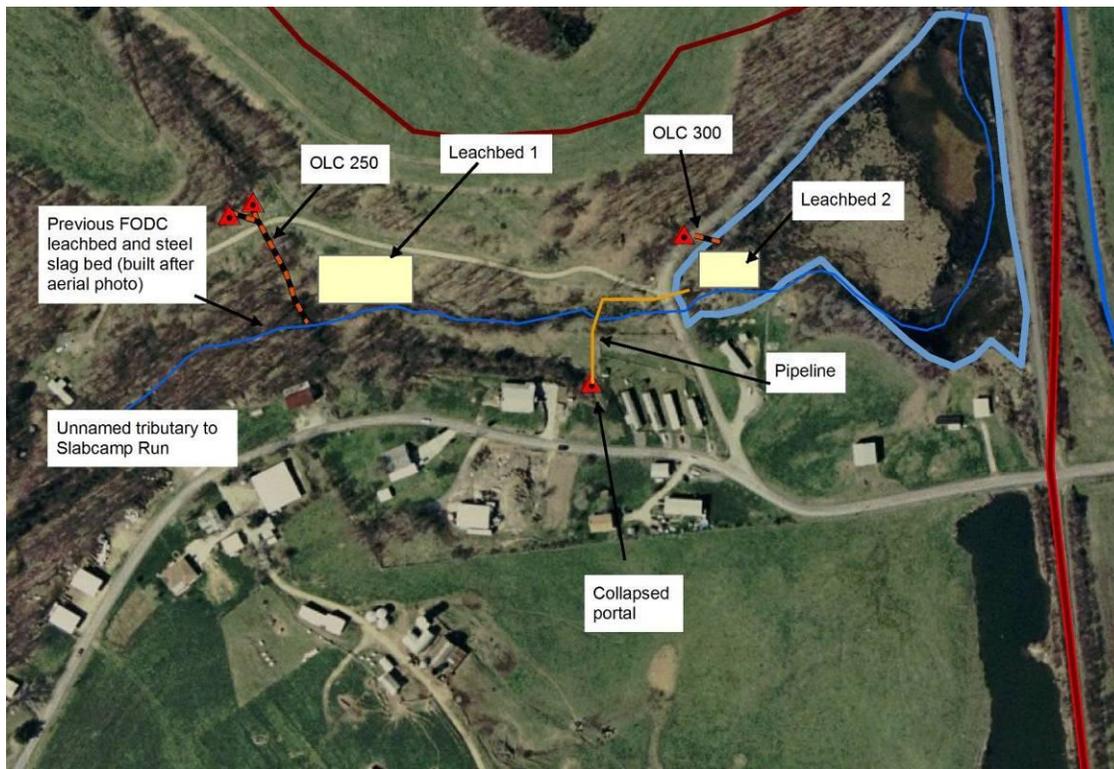


Figure 4: Layout of project on unnamed tributary to Slabcamp Run

Modifications at the existing Kanes Creek projects will include:

- Lining a retention pond at the VP12 project
- Installation of an under drain to catch AMD from the uncontrolled seep at VP12, and pipe it into the neutralization system.
- Installation of hydroxide settling tanks at the KCS1 and VH3 sites
- Installation of hydroxide drying beds at the KCS1 and VH3 sites

Construction costs are estimated at \$57,800, engineering costs are estimated at \$6,000 (Table 5). The total construction costs in this proposal is \$374,588.

Table 5: Cost estimates for modification of previous projects.

Project	Component	Cost
VP12	Project costs (mobilization, erosion and sediment control)	3,500
	Lining Retention Pond #1	16,300
	Under drain to capture seep	4,000
	TOTAL	23,800
KCS1	Project costs (mobilization, erosion and sediment control)	3,500
	Hydroxide settling tank	8,000
	Hydroxide drying bed	2,500
	TOTAL	14,000
VH3	Project costs (mobilization, erosion and sediment control)	3,500
	Hydroxide settling tank	8,000
	Hydroxide drying bed	2,500
	TOTAL	14,000
Engineering for all projects		6,000
Project Modification total		57,800

Partner Involvement

A number of partners will be involved in this project:

Friends of Deckers Creek will serve as the lead agency for this project. FODC will:

- Manage 319 funds according to rules provided by WVDEP
- Provide for planning, final design, contracting, and reclamation oversight for the project
- Hire, through a competitive bidding process consistent with the laws and regulations of West Virginia, a contractor or contractors to complete the work
- Apply for and secure additional funds through the OSM WCAP.
- Manage WCAP funds according to rules provided by OSM
- Monitor the performance of the treatment measures through quarterly water sampling at various points within the treatment systems
- Monitor the effects of the treatment measures through quarterly in-stream sampling up- and downstream from the treatment measures
- Coordinate with WVDEP for additional water sampling
- Define and delineate additional sites within the watershed for abatement and to achieve TMDL goals

West Virginia Department of Environmental Protection Nonpoint Source Program will:

- Advise FODC in completing proposals for 319(h) funds as well as for OSM's WCAP funds
- Consider the project for funding via mitigation projects in the Deckers Creek or nearby watersheds
- Provide periodic inspections during construction
- Assist with planning, final design, contracting, and reclamation oversight for the project
- Assist with management and oversight of the design and construction on the site and certification of completion of work

Office of Surface Mining will

- Advise FODC in completing proposals for 319(h) funds and WCAP funds
- Contribute funds toward a match of at least 28% of the total cost of the project, pending successful completion of WCAP proposals
- Advise FODC at all phases of the project, including design, contracting, construction and review of work

Landowners

- Provide Rights-of-Entry to FODC and its collaborators for the sake of designing and building nonpoint-source pollution control measures
- Provide Rights-of-Entry to FODC and its collaborators for the sake of monitoring the performance of those measures
- Provide Rights-of-Entry to FODC and its collaborators for the sake of maintaining, repairing or improving those measures

Area businesses and local governments—FODC will approach local governments and area business for contributions for the sake of minor maintenance and operation of the project.

Education and Outreach

FODC conducts several outreach programs related to nonpoint source pollution, and will conduct additional outreach to communicate the importance of projects on Slabcamp Run. FODC will not require additional funds for its education and outreach program related to this project. With support from the West Virginia Commission for National and Community Service (WVCNCS), FODC is working with a number of school groups in the area, including Preston High School, the Mountaineer ChalleNGe Academy, West Preston Middle School, and its own Youth Advisory Board.

FODC's Clean Creek Program consists of outreach as well as monitoring work. In this program, FODC assesses water quality at 13 sites throughout the watershed. Chemical measurements are made seasonally,

and benthic macroinvertebrate and fish communities are surveyed annually. The results of these surveys are published in a State of the Creek report, which is delivered to schools, County Commissions, Town Councils and public libraries.

FODC will also send press releases to local newspapers containing progress reports for the project. These reports will also spread the word of any resulting changes in the water quality.

Maintenance of Effort

The nonpoint source pollution measures described in this proposal will require some maintenance. FODC will monitor all treatment measures during the next ten years. If needed, FODC will seek funding for repairs or recharges of all treatment measures using funds raised from state or federal agencies, foundation grants or in-kind or financial donations from area businesses.

Monitoring

To ensure that the funds in this project are being used effectively, FODC personnel will undertake several monitoring tasks. FODC will provide a Quality Assurance Project Plan for all monitoring activities.

1. Pre-design measurements

FODC will take monthly measurements of AMD pollutants and flows in the two OLCs and in the area near the collapsed portal for one year prior to award of 319 funds. Such data are necessary to obtain matching funds through OSM's WCAP.

2. Effects of Best Management Practices

Before and after construction of the BMPs, FODC will take quarterly measurements of AMD pollutants in the two OLCs and at other points in the entire Slabcamp Run watershed. These measurements will be used to evaluate the effect of the BMPs.

3. Benthic macroinvertebrate monitoring

FODC will arrange for benthic macroinvertebrate surveys in Slabcamp Run before and after BMPs are installed to determine the effect of the BMPs on aquatic communities.

Monitoring for tasks 1 and 2 will include field measurements of pH, conductivity, dissolved oxygen, temperature and flow at each site, and collection of water samples for analysis of pH, conductivity, hot acidity, alkalinity, sulfate, total aluminum, total iron, total manganese and ferrous iron.

FODC will continue to monitor other areas of the Deckers Creek watershed to plan new projects to address nonpoint source pollution.

Milestone Schedule

June 2010 Submit proposal for 319(h) funds to WVDEP

July 2011 Receive notice of approval for the Slabcamp Mainstem project

September 2011 Apply for OSM WCAP funds

November 2011 Receive approval for OSM WCAP funds

- December 2011 Advertise Request for Proposals to hire engineers
- January 2012 Hold field visit for engineers
- February 2012 Deadline for engineering proposals
- March 2012 Select engineer
- April-July 2012 Engineer designs project
- August 2012 Pre-bid meeting and contractor selection
- September 2012 –
 May 2013 Construction
- June 2013 –
 September 2014 Continued monitoring; Close-out of project.

Budget

Category	----- 319 request -----			Non-Federal Match	WCAP	FODC	Project total
	Total	Implementation	Non implementation				
Personnel	23,574	12,334	11,420	--	12,791	--	36,545
Contractual	216,073	204,653	11,420	54,818	115,117	--	386,008
Travel	3,198	914	2,284	--	--	--	3,198
Supplies	3,654	1,370	2,284	--	--	--	3,654
Operating Costs	27,409	--	27,409	--	--	--	27,409
Other	0	--	--	--	--	3,000	3,000
Totals	274,089	219,271	54,818	54,818	127,908	3,000	459,815

Budget justification

Overview:

The total cost of the project is \$459,815. Four partners will supply the resources for the project. This proposal requests \$274,089 (59.6%) from the Nonpoint Source Program of WVDEP. We plan to match this with \$54,818 (11.9%) through a state partner. The state partner may be the Stream Restoration Fund in DMR, or it may be a partner with a mitigation project arranged through the WVDEP-DMR.

FODC will continue its education and outreach work as a match to this project. The value of that work is valued at \$3,000, or 0.7%.

FODC will also request funding from the OSM WCAP. The expected requests will amount to \$127,908 and will contribute 27.8% of the entire project.

Construction

Of the support from the Nonpoint Source program, 80% will be used to fund implementation activities, including engineering, construction, and oversight. Similarly, 90% of the OSM WCAP request will fund engineering and construction. The entire sum from the additional non-federal matching partner will be used for construction. A small line is included for incidental supplies, such as videotapes for recording the bid, stakes for finalizing the layout and communicating with landowners, and other miscellaneous costs. Costs outlined in the budget table correspond to the construction cost \$374,588 of the project.

Non-implementation activities

The remainder of the funds requested from the 319 program will support the tasks of monitoring water quality during the project, of planning additional projects to eliminate nonpoint source pollution in the watershed in future projects, and for operating expenses for the organization. The monitoring task includes a “contractual” line (\$11,420) to fund analyses of water samples.

Specifically, we will spend non-implementation funds in the following way:

Category	Amount	Use
Personnel	\$11,420	To support workers in monitoring water quality, planning future nonpoint source pollution projects, and developing and executing education programs concerning surface water, water pollution, and the importance of addressing nonpoint source issues, and for overseeing the entire work of the water shed organization
Contractual	\$11,420	To pay for chemical analysis of samples at a WVDEP certified laboratory
Travel	\$2,284	To pay for travel while monitoring
Supplies	\$2,284	Monitoring supplies and office supplies
Operating Costs	\$27,409	Costs to help defray insurance (~\$7,500 for three years), rent (~\$11,000 for three years), utilities (\$3,600 for three years), and non-project staff labor.
TOTAL	\$54,817	

Non-construction costs associated with OSM WCAP

The remaining 10% of OSM WCAP funds will also directly support by paying for project oversight.

Literature cited

Christ, M., and M. Pavlick. 2006. Watershed based plan for the Deckers Creek watershed, Preston and Monongalia Counties, West Virginia. Morgantown, WV: Friends of Deckers Creek. August.

Pavlick, M. 2006. Storm Water Runoff and Pollution: A look at the causes and solutions. Friends of Deckers Creek. Morgantown.

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