Watershed Project Implementation Guide

Friends of the Cheat

September, 2015

Funding from: West Virginia Department of Environmental Protection Watershed Improvement Branch & Friends of the Cheat

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2 OVERVIEW AND ACKNOWLEDGEMENTS

The Watershed Project Implementation Guide describes the methods and procedures that Friends of the Cheat uses to implement watershed projects. The document was originally intended to help transition between project management staff at Friends of the Cheat for acid mine drainage projects. However, the information and tools compiled may be adaptable for other types of watershed projects throughout West Virginia. The guide should be updated periodically in order to maintain relevance as a training and communication tool for watershed groups and project funders.

Many of the recommendations and procedures provided in this guide assume there is a person around to perform project management tasks with resources, like a computer with GIS software. In reality, most watershed groups do not have dedicated staff to work on watershed projects. Those that do often have many other simultaneous responsibilities to support the organization's mission. Nevertheless, the authors hope that this guide will help clarify how watershed projects are implemented so that organizations will have another resource to wield the best work possible.

The information presented here is meant to be informative and useful, but may not be accurate or current. Many aspects of project implementation such as grant administration, contractor procurement, and environmental permitting have important legal implications. Readers are encouraged to consult current professionals and officials when deciding how to use this information.

This work is the product of many people that work diligently to implement watershed improvement projects in West Virginia. Major contributors included Friends of the Cheat staff and WVDEP personnel.

3 INTRODUCTION

3.1 HISTORICAL CONTEXT & KEY LEGISLATION

From West Virginia DEP 2014, "Operation and Maintenance of Passive Acid Mine Drainage Treatment Systems: A Framework for Watershed Groups":

"Acid mine drainage (AMD) is a solution of sulfuric acid and metals that forms when mining exposes pyrite to air and water. AMD pollutes streams in many areas where coal was mined before passage of the Surface Mining Control and Reclamation Act (SMCRA, 30 U.S.C. §1201 et seq.). These polluted streams, including at least 5,200 miles of streams in West Virginia, may have pH values or concentrations of aluminum, iron, or manganese that interfere with their designated uses (WVDEP, 2011).

Both the Clean Water Act (CWA, 33 U.S.C. §1251 et seq.) and SMCRA have the purpose of improving water quality that is damaged by mines abandoned before August 3, 1977. However, neither law forces any party to undertake remediation projects. Both laws provide resources for those clean-ups, but because no one is compelled to perform remediation, the work is usually left to non-governmental organizations, especially watershed groups (WGs).

Both laws, however, provide support for remediation. Under CWA §319, EPA can fund state efforts to clean up nonpoint source drainage (including AMD from abandoned mines), and states can enter into agreements with other entities, such as non-profit WGs, to carry out the work. Similarly, SMCRA can fund non-profit organizations undertaking water remediation through OSM's Watershed Cooperative Agreement Program (WCAP). Both funding programs allow work periods of only a few years, the time it should take to construct a project. Neither supports operation and maintenance (O&M)."

In addition, states can implement programs to deal with abandoned mine lands and acid mine drainage. In West Virginia, the Office of Abandoned Mine Lands and Reclamation within the WV DEP receives funding from the federal Office of Surface Mining Reclamation and Enforcement (US OSMRE) to reclaim lands impacted by mining before the passing of SMCRA in 1977. West Virginia prioritizes types of impacts. A higher priority is assigned to human health over environmental impacts. For this reason a larger portion of funding is used to implement drinking water lines, deal with emergencies such as subsidence, flooding, or mine fires, and complete planned land reclamation of dangerous high walls, impoundments or open mine portals. Up to 30% of the annual federal funding for the AML program may be deposited into an AMD set-aside account for the abatement of acid mine drainage. However, states may choose not to deposit funds into the set-aside account for AMD water treatment.

The Clean Water Act requires all states to compile a list of impaired water bodies that do not meet water quality standards for designated uses. The list is called the 303(d) list referring to the section of the Clean Water Act requiring the list. States update the list every two years as part of a statewide integrated water resources report to EPA. States are also required to develop a total maximum daily load (TMDL) analysis for all impaired waters on the 303(d) list. The TMDL defines the maximum pollutant load that a water body can receive while remaining in compliance with applicable water quality standards. In practice, the TMDL acts as a "pollution diet" for waterways that do not meet their designated uses. In West Virginia, TMDL reports are developed using the watershed management framework, which systematically addresses all water bodies within hydrologically delineated geographic regions called watersheds.

Although the Clean Water Act does require states to use a TMDL analysis to manage point source discharges when issuing permits under the National Pollution Discharge Elimination System, it has not

required states or federal agencies to implement treatment measures in order to reduce pollution levels to the levels set by the TMDL.

The TMDL analysis reports serve as a useful starting point for watershed groups to determine restoration goals. All proposals and reports should compare water quality and water quality improvements to the TMDL. TMDLs for watersheds in West Virginia are developed by WV DEP Watershed Assessment Branch and consultant firms. The reports and their technical explanations of how the TMDL was developed can be found on the WV DEP website.

Section 319 of the Clean Water Act (CWA) requires states to form a Nonpoint Source Program and authorizes congress to provide funds for grants to the state. The goal of the Nonpoint Source Program is to protect and restore waters that are threatened or impaired by nonpoint source pollution. Acid mine drainage created prior to SMCRA in 1977 is considered nonpoint source pollution.

Watershed groups can seek Nonpoint Source funding through the EPA to help execute watershed projects. In order to obtain EPA Section 319 funds, organizations must submit a watershed based plan (WBP) for EPA approval. The plan must be a roadmap to achieving reductions that the TMDLs outline. Project proposals must reflect management strategies outlined in the watershed based plan.

3.2 LIFE-CYCLE OF A WATERSHED PROJECT

From start to finish, the lifecycle of a watershed project will generally take several years to complete. Many watershed projects also require continued operations and maintenance for many years beyond the implementation of the initial project. Thus, it is very important that the sponsoring organization understand all the work that is involved before starting a watershed project.

An example timeline for a watershed project is presented below. Each project can require different time constraints. In general, a project should have at least one year of monitoring data before being proposed for funding to the 319 program. Once a proposal is submitted, it usually takes one year before funding is received if the proposal is awarded. Procurement of engineering services, surveying, and design can take up to one year. Seeking additional funding from the WCAP program can also take up to one year depending on the responsiveness of the OSM program officers and progress toward completing the WCAP requirements such as obtaining signed landowner agreements, etc. Procurement of construction contractors and final environmental permits may take months. Actual construction typically spans 2 – 4 months depending on the size of the project and time of year. Although the entire process can take several years, maintaining a proactive attitude and fostering good relationships among stakeholders (cooperative landowners, competent consultants, etc.) can reduce the time needed to implement a watershed project.

3-1 General Example of a Watershed Project Timeline

	Pre	Year 1	Year 2	Year 3	Year 4	Year 5	Post
Planning							
Develop WBP	<--						
Collection of New Data/Monitoring							
Assess Project Sites							
Feasibility Study							
Landowner Contact							
Apply for Funding							
Receive Funding							
Implementation							
Engineering Services							
Environmental Permitting							
Construction							
Operation and Maintenance							-->
Monitoring and Reporting							

4 WATERSHED BASED PLANNING

The watershed based approach is a management framework that is used to prioritize and address environmental challenges within a hydrologically defined geographic area (watershed). This approach emphasizes the involvement and cooperation of all stakeholders, including federal, state, local, and private sectors as well as the community. The information presented in this guide is based on the watershed based approach.

Watershed based plans (WBP) must be developed and approved by EPA in order to obtain Clean Water Act Section 319 funds for watershed projects. A WBP is a strategic work plan that assesses the health of the watershed and outlines a "road map" of restoration activities that will allow an impaired watershed to meet water quality standards or Total Maximum Daily Loads for specific pollutants. Watershed based planning efforts are critical to understanding the state of a watershed and identifying the most effective use of limited resources for restoration.

In general, a WBP should help answer the following questions:

- For which water quality parameters is the watershed considered impaired?
- What are the average pollutant loads (Load = pollutant concentration x flow)?
- Where are the pollutant sources in the watershed?
- What are the pollutant load reductions necessary to meet water quality standards and/or TMDLs?
- Who are the stakeholders and partners interested in watershed restoration?
- What are the available technical and monetary resources for restoration?
- Which projects, if implemented, will allow the watershed to achieve restoration goals?

Below are a few resources for developing watershed based plans. Although each plan contains similar elements, remember that individual watersheds may have unique challenges with different solutions.

- *U.S. Environmental Protection Agency's "Handbook for Developing Watershed Based Plans to Restore and Protect our Waters" (2008)*
  - *http://water.epa.gov/polwaste/nps/handbook_index.cfm*
- WV Department of Environmental Protection's website contains many links to WBP resources as well as all of the WBPs that have been developed for WV watersheds.

- *http://www.dep.wv.gov/WWE/Programs/nonptsource/WBP/Pages/planning.aspx*

- Private consultants and existing watershed groups can have extensive experience assessing watersheds. It is a good idea to engage others who have gone through the process before because they may have insight into what worked well for their watershed.

There is no single plan that will restore every watershed. The best way to approach watershed based planning is to create a plan for assessing and evaluating the watershed through stakeholder engagement. Strategic planning consultants can help with some technical aspects such as water monitoring and GIS mapping, however, many components of the plan will rely on the vision and goals set by the watershed group and community.

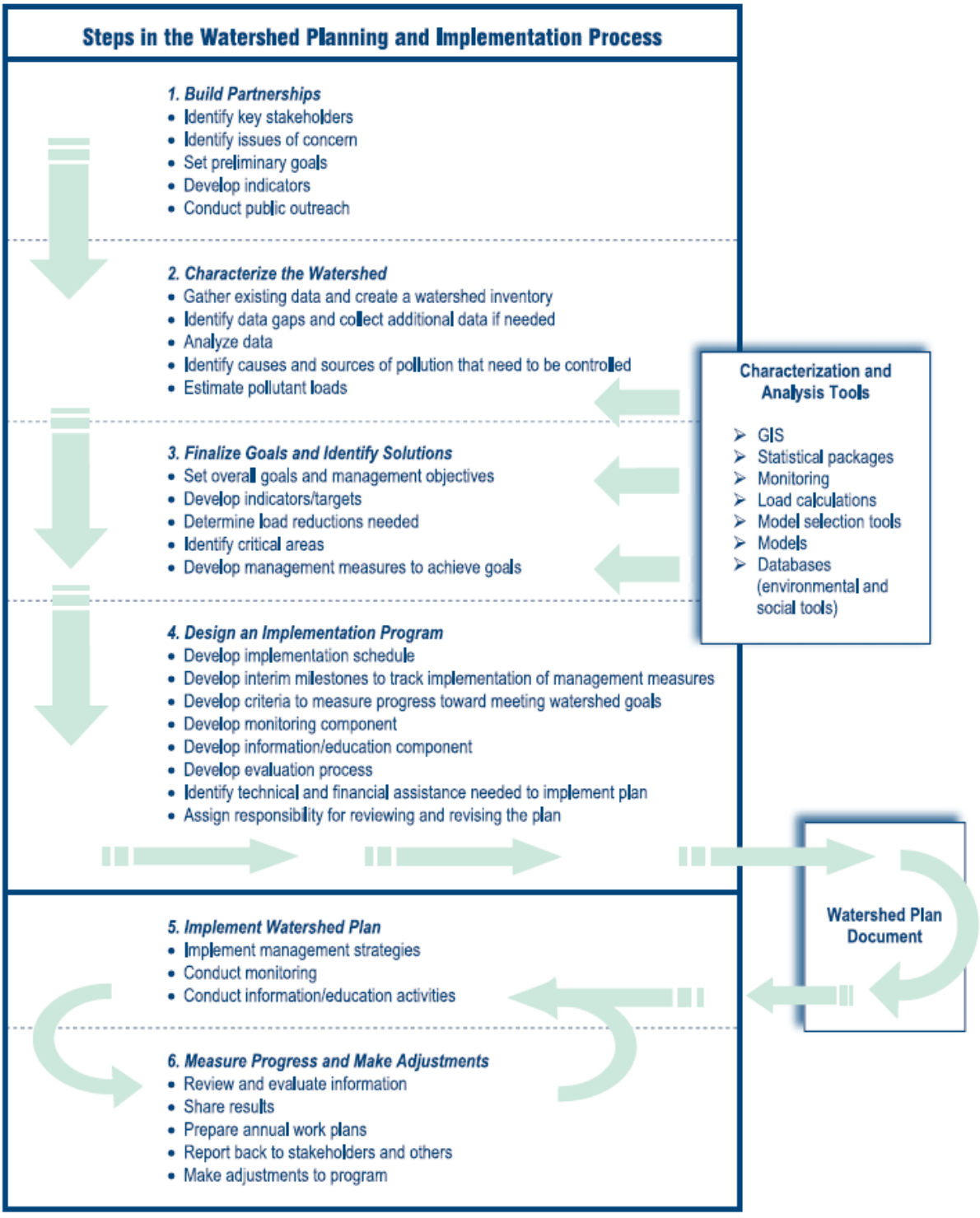
Before beginning work on a watershed based plan, consider what resources already exist and what questions remain to be answered. An example task list for developing a watershed based plan is included in the Appendix Section. (WBP Example Tasks and Timeline)

4.1 EPA'S NINE MINIMUM ELEMENTS FOR WATERSHED BASED PLANS

In order to meet EPA approval standards, all WBPs must include nine elements:

1. Identification of causes of impairment and pollutant sources or groups of similar sources that need to be controlled to achieve needed load reductions, and any other goals identified in the watershed based plan.
2. An estimate of the load reductions expected from management measures.
3. A description of the nonpoint source management measures that will need to be implemented to achieve load reductions, and a description of the critical areas in which those measures will be needed to implement this plan.
4. Estimate of the amounts of technical and financial assistance needed and/or the sources and authorities that will be relied upon to implement the plan.
5. An information and education component used to enhance public understanding of the project and encourage their early and continued participation in selection, designing, and implementing the nonpoint source management measures that will be implemented.
6. A schedule for implementing the nonpoint source management measures identified in this plan that is reasonably expeditious.
7. A description of interim measureable milestones for determining whether nonpoint source management measures or other control actions are being implemented.
8. A set of criteria that can be used to determine whether loading reductions are being achieved over time and substantial progress is being made toward attaining water quality standards.
9. A monitoring component to evaluate the effectiveness of the implementation efforts over time, measured against the criteria established under item 8, above.

4-1 Watershed Based Planning Framework Info-graphic (US EPA 841-B-08-002, March 2008)



Note: Watershed project stakeholders can be identified by thinking of any individual or organization that can be negatively or positively impacted by the project.

4.2 COMPLETING A WATERSHED ASSESSMENT

Often, the first step in developing a watershed based plan, or in implementing a watershed project, is to research and review the existing data. For AMD projects, this includes geo-spatial (GIS) and water quality datasets. Spatial datasets can include the locations of abandoned mine sites, AMD sources, coal seam extents, stream locations, and landowner parcel boundaries. Water quality datasets may include physio-chemical (Temperature, pH, Conductivity, Iron, etc.) or biological parameters (benthic or fish surveys) from federal, state and private organizations.

4.3 REVIEWING EXISTING DATA

GOVERNMENT AGENCIES AND ORGANIZATIONS TO CONSULT

- U.S. Environmental Protection Agency
- WV Department of Environmental Protection
    - Division of Water and Waste Management
        - Office of Abandoned Mine Land and Reclamation
        - Watershed Improvement Branch
        - Watershed Assessment Branch
    - Division of Land Restoration
        - Office of Special Reclamation
    - Division of Mining and Reclamation
- WV Division of Natural Resources
- Universities
    - West Virginia University
        - Water Research Institute and individual researchers
        - West Virginia GIS Technical Center
- Watershed Groups and Non-profit Organizations with similar missions

SPATIAL DATA TO REVIEW

- Abandoned Mine Lands
    - A 1996 inventory of abandoned mine lands is available from the WV State GIS Data Clearinghouse on the West Virginia GIS Technical Center
    - More current data (points, lines, and polygons) are available from contacting WV DEP OAMLR GIS specialists. Data may be requested periodically because the AML data is updated frequently.
- Resources found on the WV DEP GIS Resources TAGIS
    - LIDAR high resolution elevation data (http://tagis.dep.wv.gov/home/?q=node/6)
    - Mining Permits
        - Points and summary data of all permit locations where bonds have been revoked, released, or are currently active can be downloaded and viewed either in a GIS or by using the TAGIS Excel Data Viewer online tool.
    - Geology (1968 State Survey)
    - TAGIS Online Applications include the Mining Data Explorer and Oil & Gas Permit Locations
    - County Parcel Data for some counties. Counties with high growth and development rates will continually update parcel data which may not be reflected in the downloaded version.
- WV Geological & Economic Survey

    - Coal Bed Mapping Project Maps
        - Can download underground and surface coal mining data by coal seam from the WV Geological & Economic Survey's website
        - Remember that state-wide or regional coal contour maps are modelled and do not show local rolls, dips, or faults in the coal seam that may be present at a given site. These local mine features, if known, may only be displayed on mine maps.
- Many, but not all, of these resources are available from the WV GIS Technical Center's website. Other resources found on the WV GIS Technical Center website include:
    - Land use/Landcover of West Virginia (2011) which includes specific post mining landcover categories
    - WV 2011 Census data
- USGS website
    - National Hydrography Dataset
- Parcel/Landowner Data
    - Contact the county tax assessor's office
    - For Preston County parcel information can be browsed online: http://www.landmarkgeospatial.com/preston/

Note: If GIS and other computer skills are not strength for a watershed group, understanding the data available to review can help ensure that partners and consultants are using all of the best available data.

WATER QUALITY DATA

In addition to a watershed group's own monitoring data, water quality data may be obtained from WV DEP, US EPA, or WVU researchers.

WV DEP Watershed Assessment Branch maintains a database of water quality data for watersheds in West Virginia that is used to develop TMDLs. Individual offices with WV DEP may have separate spreadsheets of data, or separate databases used for other purposes. For example, WV DEP Office of Special Reclamation maintains a database for recording NPDES sampling results for bond forfeiture sites. It may be possible to ask a partner within DEP to share data, or the data could be obtained using a Freedom of Information Act (FOIA) request online.

The U.S. EPA may have water quality data stored in its STORET/WQX Data Warehouse for your watershed. If university researchers have studied the watershed, then it may be possible to contact the researchers directly to access the data.

HISTORICAL MINING INFORMATION RESOURCES

The WV Geologic and Economic Survey website maintains a Mine Information Database System that contains records of every mine map available to the WV GES. Information concerning coal seams, mine names, company names, counties, and quadrangles are available for query in the database. (http://www.wvgs.wvnet.edu/www/coal/MIDS_Index.htm)

Searching for mine maps between the years 1935 to 1942 may show maps for abandoned mines that were mapped by engineers and cartographers employed to inventory coal mines by the Works Progress Administration during that time period. Look for Document IDs that start with the numbers "904---". The maps can show the mine name, date it was sealed, and the number of mine openings present at the time.

For mines mapped during the 1940s to 1960s, the WV Geological and Economic Survey may have maps stored the Mine Information Database System, but documentation was not required during that time and is not guaranteed. It can be helpful to remember that often the six digit Document ID number used in the WV GES Mine Information database is the same as mine map reference numbers used by other agencies such as U.S. OSMRE and WV DEP. Therefore, when you find a six-digit mine map number when reviewing permit files, or by browsing other databases by WV DEP or WV GES, you can search for the mine map directly by entering the number as the Document ID in the WV GES Mine Information Database System.

Viewing historic USGS topographic maps can also give an indication of surface mine locations. Topo maps created between the 1950s and 1970s show surface mine extents. These mines will not have permits associated with them and they can be assumed to be abandoned since they would have been active prior to the passing of SMCRA in 1977. Historical USGS maps from the early 1900s will show railroads and mining camps that indicate the location and general timeframe of when a mine or mined area could have be active. One way to browse USGS topo maps online is by using The National Map Viewer (http://viewer.nationalmap.gov/viewer/).

WVU researchers cataloged tax records of mines by county summing the tonnage recorded as sold by year for the years 1883 to 1976. This information can give an indication about when the mine was active and how much coal was produced. The Excel spreadsheet of this data is saved in the Appendix Section. (Mine_Data_Historic_Production in tons by year)

The U.S. Office of Surface Mining Reclamation and Enforcement maintains the Abandoned Mine Land Inventory System (AMLIS) online (http://amlis.osmre.gov/Default.aspx). The website allows users to browse on a map and click on point locations of documented AML locations. Recording the AML ID # from this page is a good start to identifying known AMLs in a certain area. The ID number can then be used to search for related documents within AMLIS, or by contacting WV DEP OAMLR personnel.

Mine permit numbers gathered from mapping or historic documents should be available online to DEP personnel using a WV DEP internal database. However, mine permit documents for 1999 and prior are stored in physical file warehouses. To obtain these files, a Freedom of Information Act request can be submitted to DEP online for a small fee. Reviewing the files and area maps of actively permitted or completed mines after 1977 may have useful information regarding adjacent mines and assessments for pre-law mines. Reviewing all of the mines in an area may show boundaries of other mines, even when detailed mine maps for those mines do not exist. In addition, permit documents for mines after 1977 may show water quality data for pre-law mines in the area.

ITEMS TO CONSIDER WHEN REVIEWING COAL MINING DATA

- Coal Seam
  - type
  - location and elevation
  - outcrop location and elevation
  - seam thickness
- Coal Mine
  - strike and dip
  - extent of known mine workings (including acreage)
  - estimated mine pool elevation
- Local Soil
  - soil type

- estimated amount of overburden to access coal seam

This information can be gathered from the mapping resources listed in the previous section and may help inform alternatives to treatment. For example, diverting water from entering a mine, or draining a mine pool, if possible, can eliminate or reduce some sources of acid mine drainage. Also consider how construction activities at a site may affect the mine.

Tip: Some have assumed that 0.5 gal/acre/minute of mine drainage is produced for below drainage mines within 100ft of surface.

4.4 COLLECT ADDITIONAL DATA

START WITH LANDOWNERS

After reviewing the existing data, it is a good idea to spend some time focusing on connecting with landowners within the watershed. Talking with landowners early in the planning process is an important opportunity to make landowners partners instead of obstacles. Often landowners have intimate knowledge of their property and can help identify pollution sources and mining history. More importantly, watershed groups need permission from landowners to access private property to find and monitor pollution sources. Without this permission, landowners, especially in rural areas, can become alarmed and may even greet visitors with hostility. It is useful to know early in the planning process if a landowner is opposed to restoration activities, or is likely to be uncooperative in the future. However, landowners are typically interested to see the results of any water sampling. They may also have questions about the watershed that groups can help answer. At the very least, landowners should be provided with the data collected on their property with an accompanying map and explanation of the results. See the section below on landowners for more information.

COLLECT WATER QUALITY DATA

After reviewing the existing data and reaching out to important landowners, a next step is to create a monitoring and reconnaissance plan to fill any important data gaps. This may include watershed driving tours and individual site visits to confirm important features such as abandoned mine lands and major pollution sources. Activities may include identifying and staking monitoring sites, capturing descriptive photographs, assessing available construction space and monitoring water quality. An example monitoring plan is included in the Appendix Section of this guide.

Exploring the watershed by walking sections of streams (AKA “stream walk”) can help identify sources. Begin walking at the bottom of the watershed and systematically continue upstream towards the headwaters. For acid mine drainage, a field pH and conductivity meter can be used to detect changes in water chemistry as new tributaries or sources enter the stream.

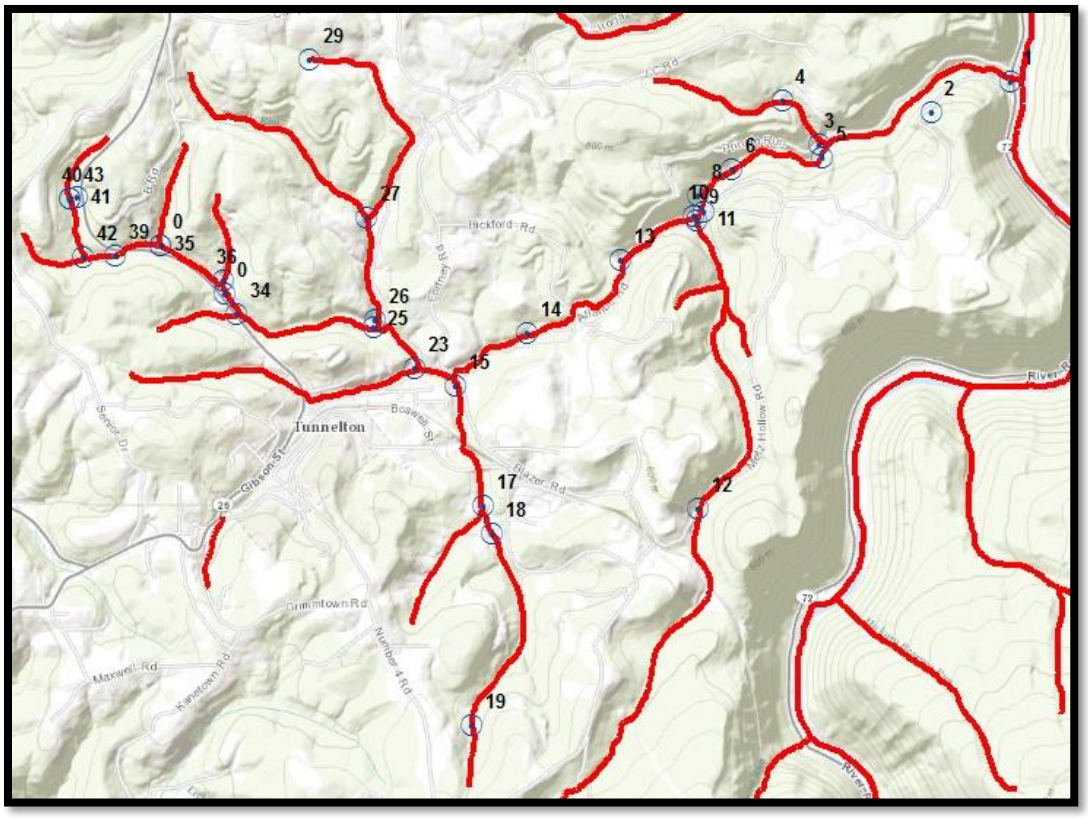
Another monitoring strategy that can be useful in assessing a watershed is to plan to sample upstream and downstream of all confluences, and at all major sources in the watershed in a single day. Care must be taken to make sure downstream sampling is done where streams are fully mixed below a confluence. It is also important that this sampling is done in a short time period so that the data represent the same flow conditions. The best period to plan a sampling blitz is during low flow conditions where mine drainage pollution is typically most concentrated in the watershed (Late Summer: July - September). Another useful time to plan a sampling blitz is during the late spring (May – June) after high surface water flows have decreased, but groundwater and mine water discharges are still high. Sampling during these times will help to characterize the worst case conditions for mine pollution in the watershed.

The goal of this exercise is to obtain an accurate snapshot of the general location and magnitude of all pollution sources. This strategy can be a good first step to get an initial understanding of the pollution sources in the watershed, before beginning to target individual tributaries or sources.

Tips for Planning a Watershed Sampling Blitz

1. **Identify sampling regions and sample locations**. This can be done in Google Maps or Google Earth or a GIS mapping software like ESRI ArcMap. Start by looking for public access points where streams cross under, or next to roads.
2. **Name the sampling locations.** This step may seem obvious – but it is important that you carefully label your sampling locations. Choose a site naming convention, document it, and stick with it. Consider if these locations have existed under other names in the past from previous WV DEP monitoring, for example.
3. **Visit sampling points to confirm accessibility**. This may require approaching landowners to ask for permission to sample on their land. Be prepared to explain your goals, the extent of your investigation, who will be coming to their property and when. If possible, label and stake sampling locations, and be sure to take pictures.
4. **Plan a sampling strategy.** If the sampling area is too large to be covered by one team of monitors, divide the locations into sub-groups that can be feasibly visited by a single team in one day. If many different monitors are involved, descriptive maps including driving directions and photographs are helpful. Having the locations clearly marked with brightly painted wooden stakes will also help.
5. **Coordinate the monitoring help.** Call on existing volunteers, or connections in partnering organizations who may have a shared interest in the data. Schedule one or two days that work best for the group. Explain what is expected from the volunteers, sampling methods, and make sure all of the necessary sampling equipment is available.
6. **Prepare monitoring supplies.** In order to reduce error caused by having multiple teams of monitors, prepare as much as possible. This includes providing food and water, pre-labeled bottles, monitoring procedure guides, spare equipment and supplies, data record sheets, etc.
7. **Compile and analyze the data.** A good first step is to calculate pollutant loads and display them on a map. Displaying the pollutant loads of each sample location in terms of a percentage of the mouth of the watershed may also be informative. Ex: (Iron Load in tributary ÷ Iron Load at Mouth) x 100 = Percentage of Iron at the Mouth that the tributary contributes. Calculated pollutant loads should also be compared against any developed TMDLs in order to begin identifying and prioritizing restoration goals.
8. **Thank your volunteers and share your findings.** Volunteers and landowners will be interested to see the results.

4-1 Example map of sampling blitz site locations in the Pringle Run watershed



For specific recommendations regarding monitoring parameters and procedures, see sections below in this document and the example field procedures in the Appendix Section. A version of FOC's water quality database is included in the Appendix Section as an example.

5 CHOOSING A PROJECT SITE

5.1 SITE ASSESSMENT

It is important to thoroughly assess whether or not a potential project site is a good candidate for the construction and ongoing maintenance of a watershed project. Ideal sites have adequate space for construction, are easily accessible, have supportive and cooperative landowners, and have pollutant loads that can be adequately treated and maintained by using available technologies and resources. A site should not be selected unless all of the above criteria are adequately addressed, otherwise the long-term success of the project may be jeopardized.

When assessing a potential project site, all available data should be reviewed to determine how likely the project is to be successful. Walk the site, preferably with the landowner, while identifying and geo-referencing all key physical features such as high walls, portals, and seeps. Take photographs, establish monitoring locations and collect samples to calculate pollutant loads. Consider any spatial limitations. For example, is there enough room for project infrastructure *and* for the construction process? Consult an experienced partner or engineer if you are unsure. Research any existing site information mentioned

above, including watershed group databases and the WV DEP Office of Abandoned Mine Lands and Reclamation's records such as their Project Area Descriptions (PADs).

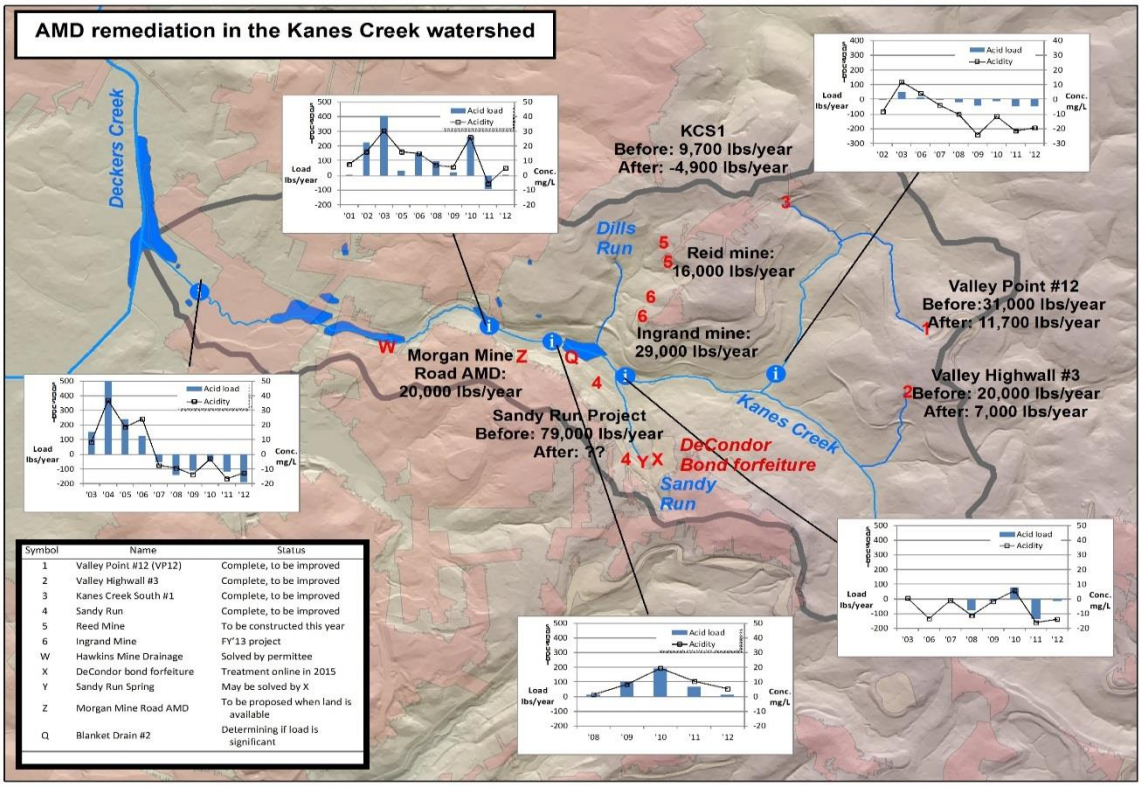
5.2 MONITORING

Extensive water quality monitoring is important at all stages of project development and implementation. Targeted monitoring will help with the identification of a final project location, selection of the appropriate best management practices (BMP) for treatment, and tracking of changes in water quality at the site and in the watershed resulting from BMPs. Water monitoring results are the primary indicator of success and can be one of the most important tools for communicating with granting agencies, landowners and the broader community. After completing initial watershed assessments, begin monitoring at individual sites that may be good candidates for restoration projects.

WHERE

At each potential site, at least three locations will need to be monitored, including (1) directly at the pollutant source, (2) downstream of the source at a location that will remain unchanged before and after project installation, and (3) at the mouth of the closest TMDL subwatershed. To assess individual treatment features within a project, more sampling locations may be necessary. For example, to assess the function of limestone beds within a project, sampling locations should be established at the influent and effluent of each limestone bed.

5-1 Example Summary Map of Monitoring Results (M. Christ, 2014)



Remember that water quality monitoring takes time and resources, and becomes most valuable when collected on a regular basis over an appropriate period of time. For these reasons, it is important to document exact sampling locations and be consistent with where you sample. Sample sites should be uniquely labeled according to a consistent naming convention, and geo-referenced with latitude and longitude. When collecting GPS coordinates, always note the coordinate system used by the GPS unit.

Use a consistent and clear naming convention, but do not rely on the site name to contain all locational information. Long site names are subject to evolution because words can become rearranged or abbreviated. This becomes a problem when trying to query all data for a single site. A preferred alternative is to use a concise site name, alongside a separate, longer site description. The site name can be an alpha-numeric code or a semi-descriptive concatenation of the established stream name and a geographic landmark.

5-1 Example of site names and site descriptions from FOC water quality database

NewSiteDescription	NewSiteName	Project
Big Bear LSB System In	BB SI	Big Bear
Big Bear LSB System Out	BB SO	Big Bear
Beaver Creek at Centenery Road	Beaver Centenery	Big Bear
Beaver Creek below Big Bear Dam	Beaver ds Dam	Big Bear
Big Bear Fountain	BB Fountain	Big Bear
Big Bear Lake In	BB Lake In	Big Bear
Big Bear Lake Out	BB Lake Out	Big Bear
Big Bear Seep Pipe Outlet in Spillway	BB Seep Out	Big Bear
Big Bear Spillway above System Out	BB Spillway	Big Bear

Tip: Monitoring maps created in GIS or Google Earth alongside written directions are helpful tools for documenting sampling site locations. For short term use, it is also helpful to physically stake monitoring sites.

WHEN

Monitoring should be conducted at the three locations described above at minimum of every 3 months (quarterly) for at least one year prior to the development of a project proposal. Additional samples should be collected during low flow periods and after large rain events. OSM-WCAP funding requires 12 sample events before a proposal will be considered. The goal of pre-implementation sampling is to understand as much as possible the flow variation and seasonal pollutant loads for a project site.

Routine sampling typically continues during project implementation prior to construction. After construction, at least one additional sampling site will be needed to assess the performance of the project. In addition to the 3 locations sampled prior to construction, the effluent of the system should be sampled to help determine the efficacy of the project. Routine post-construction sampling also helps inform project maintenance activities and educates partners.

WHAT

Water quality monitoring should consist of data collected directly in the field as well as from analysis of grab samples by a third party laboratory. When monitoring acid mine drainage, for example, field parameters include: flow, pH, conductivity, water temperature, dissolved oxygen, total dissolved solids, and oxidation-reduction potential (ORP). Raw, filtered and acidified grab samples are collected and sent to a lab for analysis of total and dissolved metals (Al, Ca, Fe, Mg, Mn), hot acidity, sulfate, and total alkalinity. Depending on the type of pollution and watershed project planned, it may be necessary to

monitor additional or different parameters. An example procedure for water monitoring is provided in the Appendix Section. (FOC_FieldWork_SOP)

In addition to the water quality parameters, it is also important to note the date, time, sample location, and personnel conducting the monitoring, as well as any observations about the site such as a sulfur smell, wetland areas, and signs of human use.

Further research beyond water quality monitoring may be necessary to understand an abandoned mine site. For example, knowing information about the coal seam and soil can help evaluate treatment options for a site.

For additional comments on monitoring watershed projects review the document prepared by the West Virginia Department of Environmental Protection titled, "Operation and Maintenance of Passive Acid Mine Drainage Treatment Systems: A Framework for Watershed Groups" (2014) in Appendix Section. (OM Manual)

5.3 ANALYSIS

Monitoring data should be used to characterize the seasonal differences in flow and pollutant concentrations at the site prior to planning a watershed restoration project. Graphs of sampling results displayed in a time-series plot showing the results over time can help identify patterns related to seasons or flow events. Once the flows, concentrations, and calculated loads are described, the feasibility of the project can be evaluated. Pollutant loads should be calculated and achievable reductions in pollutant loads should be compared to TMDL required reductions. Watershed groups may choose to consult a water quality specialist to assist in these analyses. Water quality specialists could be partners within the WV DEP, hired consultants, or researchers at West Virginia University.

To calculate a pollution load in tons per year, multiply the concentration in milligrams per liter by the flow in gallons per minute by a conversion factor below:

$$Pollutant\ Load\ [tons/year] = Pollutant\ Concentration\ \left[\frac{mg}{L}\right] \times Flow\ \left[\frac{gal}{min}\right] \times 0.0022\ \left[\frac{tons \times \min \times L}{mg \times gal \times year}\right]$$

When sampling for acid mine drainage, the hot acidity measurement reported from the lab can be compared to the calculated acidity derived in the following equation (enter metal concentrations in mg/l).

$$Calculated\ Acidity\ [\frac{mg}{L} CaCO_3] = 50 \times \left[\left(\frac{2 \times Fe^{2+}}{56}\right) + \left(\frac{3 \times Fe^{3+}}{56}\right) + \left(\frac{3 \times Al^{3+}}{27}\right) + \left(\frac{2 \times Mn^{3+}}{55}\right) + 1000 \times 10^{-pH}\right]$$

Remember that Net Acidity reported in milligrams per liter as calcium carbonate is calculated by subtracting the alkalinity from the acidity. Labs should report a negative value for acidity when alkalinity is greater than acidity.

$$Net\ Acidity\ \left[\frac{mg}{L}\ as\ CaCO_3\right] = Acidity\ [\frac{mg}{L}] - Alkalinity\ [\frac{mg}{L}]$$

To help compare potential project sites, it may be helpful to create a database of information.

5-2 Example database for comparing potential watershed restoration project sites

Site Name	AML PAD #	GPS	Landowner Contact	Description	Availability	Space Constraints	Access	Map

After all of the information is collected and analyzed, consider the necessary monetary and technologic resources that would be required to treat a project site. Attempt to estimate what type of restoration is possible within these constraints and evaluate the cost-benefit analysis of implementing the project.

Seek out information about other projects with similar pollution levels where restoration has been attempted. **Do not rely completely on the advice of a single consultant, researcher, or partner. Rather, seek the advice of multiple experienced experts**. Some resources exist to help predict the risk of failure of passive treatment features based on pollution concentrations. For example, Brent Means with the U.S. Office of Surface Mining developed the risk matrix below.

5-3 Passive treatment risk analysis matrix (B. Means)

Risk Analysis Matrix				
Summation of Fe and Al Concentration	Design Flow Rate for each treatment cell			
	< 25 gpm	≥ 25 < 50 gpm	≥ 50 < 100 gpm	≥ 100 < 200 gpm
< 5 mg/L	Low	Low	Low	Low
≥ 5 but < 15 mg/L	Low	Medium	Medium	Medium
≥ 15 < 25 mg/L	Low	Medium	Medium	Medium
≥ 25 < 50 mg/L	Medium	Medium	Medium	High
≥ 50 mg/L	High*	High*	High	High
Summation of Fe and Al Concentration	Design Flow Rate for each treatment cell			
	≥ 200 < 400 gpm	≥ 400 < 800 gpm	≥ 800 < 1600 gpm	≥ 1600 gpm
< 5 mg/L	Medium	Medium	Medium	High
≥ 5 but < 15 mg/L	Medium	High	High	High
≥ 15 < 25 mg/L	High	High	High	High
≥ 25 < 50 mg/L	High	High	High	High
≥ 50 mg/L	High	High	High	High

An outline of common problems and solutions for AMD projects in the Appendix Section (AMD Problem Solution Table).

6 LANDOWNERS

Landowners are key partners on all watershed projects. They volunteer the use of their land for the installation of projects, as well as provide important information about the land's history and existing conditions. In some cases, landowners can also provide support for operations and maintenance activities. They may also direct you to other supporters or resources in the community. As such, it is important to develop a respectful relationship with landowners, to maintain open lines of communication, and to attempt to address any of their concerns.

IDENTIFY LANDOWNERS

Ways to Identify Landowners

- Look around area for neighbors or community members that may have information
- Look for contact information on “No Trespassing” signs
- Search parcel information online or at the county courthouse

Parcel identification information is available at the county courthouse, and may also be available online. Parcel information may include a home address for the owner, or it may not. If the owner’s address is not included with the parcel information, it may be included with the records for tax payments. Local phone books can be used to find phone numbers of landowners. If neither an address nor phone number can be found, family members or owners of neighboring parcels may be consulted.

Online and even courthouse parcel maps may not be precise. It might be necessary to review the deed and plat if available to accurately determine boundaries, or to review the boundaries with the landowner. Keep in mind that separate surveyors can draw two different plat maps for the same parcel and landownership disputes may have to be decided in court. For this reason, it is best to have the agreement of both landowners when working near a property line.

Landowner Identification Resources

- http://webmap.preston.mtncad.com/
- Virtualcourthouse.com
- Phone Book
- www.yellowpages.com or www.whitepages.com
- Mountaineer Area Phone Book

LANDOWNER COMMUNICATION

Contacting and communicating with landowners can be a difficult task. Landowners can be hard to reach because they are busy and do not have time or interest in responding to letters or phone calls. This does not mean that they would not want to support a watershed project. Treat landowners as professionals and keep a record of your communication. There is no single best way to engage landowners.

When working with landowners, it is important to trust your judgment. Landowners who are highly demanding, or who make threats may seriously jeopardize the long term success of the project. Landowners who actively use the property may be more demanding than those whose property is only used occasionally for hunting, for example.

Multiple people may own the land. If someone is listed on the deed as an owner, that person will have to sign the Right-of-Entry as well. Parcels owned by a number of heirs may require extensive, complicated, and repetitive negotiations.

INITIATING CONTACT

1. Send an informational letter describing your organization and why you are interested in their land
2. Within two weeks, follow up with a phone call
3. If you cannot reach them by mail or by phone, plan a house visit
4. If they live in a different state, try to find a relative that may know them

THE FIRST MEETING

When first meeting with a landowner, provide information about what your organization does, and how the landowner might be an important partner in that mission. Bring a brochure or other outreach materials to leave with them. Discuss why their land is a priority for restoration, and what that restoration might look like throughout the entire life cycle of the project. Share any previous experience you have with similar projects and any concerns. Find out how the property is currently being used, the history of the land, whether the landowner would be willing to permit access for monitoring, and how they feel about a possible watershed project. Schedule a follow up meeting to walk the property together and discuss potential treatment structure sizes and placement. Staking out the likely size of the project is a good way to visualize the impact of the project on the landowner's property. You may also want to escort the landowner to a similar completed project, and show examples of engineering plans.

Be sure to also share the benefits to the landowner of partnering with your organization. These may include: improved water quality, better access to the property and better on-site water management such as culverts, channels, and captured seeps, installed gates, clearing and grubbing.

TIPS:

- Record all contact information; this should be stored in a landowner contact database.
- Give landowner a Landowner Handbook with your contact information as further contact information to follow up with questions.
- Provide an example of a Right of Entry agreement.
- Record all communication including dates and times of phone calls and notes on what was discussed.
- If necessary, follow up each meeting with a letter describing what happened at the meeting and outlining the outcome of decisions or talking points.
- Discuss the short term follow up plan, which should occur within two to four weeks.
- It is a good idea to check in with landowners once per year with a letter thanking them for their support. Occasional phone calls with project updates help the landowner remain informed about the progress of the project.

RIGHT OF ENTRY AGREEMENT

The Right of Entry (ROE) agreement is a formal agreement between the organization and the landowner which establishes the terms under which the organization may access the property. The agreement is required to receive OSM WCAP funding. The ROE can be recorded at the county courthouse with the property deed, however, typically if landowners change their mind and do not want the organization on their property, actions would have to be defended in court. In general, watershed organizations do not have time or resources to pursue legal recourse with landowners. The ROE is typically not executed until a final design or final conceptual design has been prepared that clearly outlines the project footprint.

However, landowners should be notified of the eventual ROE requirement early on during the planning stage. An example ROE should be provided for them to review well before a signature is required.

It is important to establish and maintain a positive and respectful relationship with landowners. One way to get to know them is to spend time with them on their property. If the relationship between the volunteer landowner and the organization degrades, the project success could be seriously jeopardized or halted.

In the event it is not possible to enter into an agreement with a landowner during one project cycle, set up a plan for keeping in touch with the landowner. Put them on your organization's Holiday Card list and continue to engage them with future projects in mind.

In Appendix Section: Example Landowner Letter; Right of Entry Agreement; and Landowner Handbook.

7 PROJECT PLANNING

7.1 CONCEPTUAL DESIGN

There are many resources available to help with this process, many of which can be consulted for free. When developing a conceptual design, it is important to consider multiple alternative treatment technologies. **Any proposed design should have a detailed justification as well as a prediction of the specific improvements that should result from implementation.**

Conceptual designs should be developed by someone who is knowledgeable about the type of project you are planning. For acid mine drainage projects, consider meeting with water remediation specialists within the WV DEP's Office of Special Reclamation, Watershed Assessment Branch and the Watershed Improvement Branch. Specialists at West Virginia University may also be willing to discuss conceptual designs. Qualified engineers may also provide conceptual designs as a donation to organizations. An example conceptual design showing expected water quality improvements is provided in the Appendix Section.

Additional Resources

AMD Calculation Software: AMDTreat 5.0 (http://amd.osmre.gov/) developed and maintained by U.S. Office of Surface Mining Reclamation and Enforcement, updated in 2015.

Book: Acid Mine Drainage Control and Treatment compiled by Skousen J.G., Ziemkiewicz P.F. in 1995.

Guide: Global Acid Rock Drainage Guide (http://www.gardguide.com/index.php?title=Main_Page) can be read online or downloaded as PDF updated in 2014. (Appendix Section)

Note: During this phase, it may become apparent that the proposed project cannot achieve the desired outcome. If this is the case, re-assess alternative projects and locations before moving forward.

7.2 PARTNERS

A stakeholder is any individual or organization that could be positively or negatively impacted by the project. Stakeholders can also have positive or negative influence on the success of a project. Partners could be considered stakeholders that have a shared interest in achieving the goals of the project. Below is a list of common partners for watershed projects:

- Funding agencies (grant administration and technical staff)

    - WV DEP
    - US OSMRE
    - US EPA
    - Private Foundations
- Landowners and community members
    - Including landowners downstream of the project that may benefit from living near an improved stream
- Local government
    - County Commissions
    - County Parks and Recreation Committees
- Other local organizations
    - WV Army National Guard
    - Local schools
    - Trout Unlimited
    - 4H Club
    - Volunteer Fire Department
- Local colleges and universities
    - Student service projects can be planned to help maintain watershed projects

7.3 PROPOSAL DEVELOPMENT

The WV DEP Watershed Improvement Branch offers grants for watershed projects through its 319 Nonpoint Source Program. In 2015, WV DEP published a document entitled, "Guidance for Developing and Submitting 319 Watershed Project Proposals" (Appendix Section). A link to this document for download, as well as the online tutorial for developing a proposal is found on the WV DEP's website:

http://www.dep.wv.gov/WWE/Programs/nonptsource/Pages/Grants.aspx

In addition, example 319 proposals and a word document template is provided in the Appendix Section.

The US Office of Surface Mining Reclamation and Enforcement offers funding for watershed projects through a Watershed Cooperative Agreement Program. Review Part 6 "Watershed Cooperative Agreement Program" of the US OSMRE Federal Assistance Manual for details regarding WCAP proposal requirements.

http://www.osmre.gov/lrg/fam/toc.shtm

Keep in mind that these guidance documents are updated periodically.

8 FUNDING

Developing a realistic budget for implementing a watershed project can be a challenging task. The budget for a project is often constrained by available funding rather than the projected expenses for implementing a quality project. For example, funds for performing geo-technical surveys of a mine site to better understand a pollution source in order to develop the best treatment design are often left out from a project budget. Such additional expenses can reduce the amount available in the budget for construction below a point where the project can be successful within a single granting cycle.

The following items typically comprise a watershed project budget:

- Personnel costs – hourly or salary wages and benefits for watershed group staff
- Equipment and supplies – monitoring equipment, calibration solution, camera, etc.
- Travel – typically reimbursed per mile driven from project monitoring, meetings, and construction oversight, etc.
- Lab Fees – third party analysis of grab samples
- Construction – often the largest budget line item
- Engineering – engineering services for the design, permitting, and inspection of construction
- Organizational operating costs – office rent, insurance, utilities, and non-project staff labor

8.1 EPA 319 PROGRAM GRANTS (FEDERAL)

Instructions for proposing a 319 watershed project budget are reviewed in the 2015 WV DEP document entitled, "Guidance for Developing and Submitting 319 Watershed Project Proposals" (Appendix Section). A link to this document for download, as well as the online tutorial for developing a proposal can be found on WV DEP's website:

http://www.dep.wv.gov/WWE/Programs/nonptsource/Pages/Grants.aspx

There are three types of program grants available through Federal EPA 319 funds; Nonpoint-Source Program Grants, Watershed Project Grants, and Additional Grant Opportunities (AGOs). EPA 319 grants may be used exclusively for projects addressing nonpoint source water quality problems. Generally, proposals are due on June 1st, and awards are received by the following spring or early summer. The granting period then lasts 4 years, with three years for project implementation which must be complete by September 30th of the final year. For example, Fiscal Year 2015 funds, for which applications are due in June, 2014, are generally awarded in June, 2015, and must be spent by September of 2018.

All EPA 319 grants are reimbursable grants, meaning that funds are dispersed after expenses have been incurred by the grantee. EPA grants cannot support greater than 60% of the total project budget. There is a 10% cap on administrative costs (operating costs), and a 20% cap on non-implementation costs for the 319 grant. Budget line items are separated by implementation costs and non-implementation costs. Implementation costs are expenditures related directly to the implementation of the project. Non-implementation expenses may be organizational operating costs or other activities that are not associated with the direct implementation of the project, but further the goals of the nonpoint source program, such as watershed monitoring.

Example proposals and an example budget template are provided in the Appendix Section.

Nonpoint Source Program Grants:

- Purpose: supports program staff, operating costs, Nonpoint Source programs
- Proposal Due Date: June 1

Watershed Project Grants:

- Purpose: supports implementation costs for watershed projects
- Restrictions:
  - targeted stream must be on 303(d) list and have or be a part of a TMDL report
  - project must fit within the scope of a watershed based plan that has been approved by WVDEP and US EPA

- Proposal Due Date: June 1

Additional Grant Opportunities (AGOs):

- Purpose: support smaller watershed projects
- Timeline: variable; announcement occur as monies are available

GENERAL PROPOSAL FORMATTING

1. Cover page, must include: lead contact information, HUC information, pollutant loads and budget summaries
2. Project Summary
3. Background: watershed information and location, nonpoint source problems and sources, type of project, lead agency and partner roles and responsibilities
4. Goals and Objectives
5. Project Description: project plan, partner involvement, education and outreach
6. Maintenance of Effort
7. Outreach
8. Monitoring
9. Milestone Schedule
10. Budget

MATCH REQUIREMENTS

EPA grants require the grantee to procure a cost-share to match a portion (40% of the total project budget) of federal funded dollars. Match requirements can be satisfied via recipient contributions, third party in-kind contributions, or program income. For detailed information describing EPA 319 program funding match requirements, information can be found on their website regarding grant management: http://www.epa.gov/region03/grants/grants.htm#matching.

To be considered match, contributions must meet the following criteria:

EPA Match Requirements:

1. Verifiable, i.e., well documented
2. Necessary and reasonable
3. Identified in the approved budget listed in the grant agreement
4. Allowable and acceptable under OMB Cost Principles
5. Not used as match for another Federal Grant

Acceptable Sources of Match:

- Volunteer scientific advising from scientists, engineers, professors, and state employees (ex. WVU, WV DNR)
- OSM WCAP
- Camp Dawson Natural Resource Program
- Donated laboratory analyses
- Private cash donations (ex. Trout Unlimited)
- Private or state grants (ex. Stream Partners, Appalachian Stewardship Foundation)
- Other private volunteers/consultants (ex. Cheat Canyon Management Services)
- Organizational operating costs and donated supplies and software

Unacceptable Sources of Match:

- Costs charged to another Federal grant
- Funds received from another Federal grant (unless authorized by Federal law; eg. WCAP funds may be used to match a 319 program grant)
- Costs financed by program income unless authorized by EPA at the time of the grant award
- Services or property financed by income earned by contractors under the assistance agreement (the profit an engineer, construction contractor, or laboratory makes from the contracted work may not be counted as match).

REPORTING

Grant recipients must submit two semi-annual progress reports for the duration of the grant period for any EPA 319 program grant funding. Grant reports must include narrative describing activities, progress, difficulties, results, load reductions and a map, a completed milestone schedule for the reporting period, and updated budget.

EPA 319 Grant Reporting Periods:

- Reporting period 1: Oct. 1 – March 31; Report due May 1
- Reporting period 2: April 1 – Sept. 30; Report due November 1
- Final Report: Due upon project completion, 30 days after grant period end date

An example report is provided in the Appendix Section.

8.2 WCAPS

The US Office of Surface Mining Reclamation and Enforcement offers funding for watershed projects through a Watershed Cooperative Agreement Program. Review Part 6 "Watershed Cooperative Agreement Program" of the US OSMRE Federal Assistance Manual for details regarding WCAP proposal requirements.

http://www.osmre.gov/lrg/fam/toc.shtm

Although applications are accepted on a rolling basis, WCAP grants are typically awarded near the end of the Federal fiscal year.

WCAP GRANT GUIDELINES

In general, a WCAP grant amount must be 28-33% of the total project budget. There are ways for WCAP to pay for 40% of project, but all other match options must be exhausted and there are a lot of hoops to jump through and it takes longer for approval.

The checklist for WCAP applications is an excellent preparation to-do list for the project even if WCAP funds are not involved (http://www.osmre.gov/lrg/fam/6-200.pdf see section 6-200-40; (Appendix Section).

5.3 OTHER POSSIBLE FUNDING SOURCES

- West Virginia Stream Restoration Fund
- West Virginia In-Lieu Fee Program
- US Army Corps of Engineers Section 206 Program

- Appalachian Stewardship Foundation
- Major Organizational Donors
- Industrial Company Foundations/Giving Programs
- County Granting Programs

9 PERMITTING

OVERVIEW

Brief descriptions of environmental permits commonly required for watershed projects are provided below. Keep in mind that the permitting processes can change according to government agency leadership, current regulatory practices and documentation systems (paper vs. online), and changes in the law. Also remember to include permit application and annual renewal fees when estimating the project budget.

Often, permitting can be included in the scope of work of the project engineer, although the responsibility for obtaining the correct permits may remain with the watershed group implementing the project. Watershed groups should consult with experienced engineers and partnering government agencies regarding permitting. Check agency websites for the most current requirements and permitting forms. In addition to checking current agency websites and speaking with agency personnel, another resource is the "West Virginia Stream Disturbance Permitting Requirements" prepared by the West Virginia Watershed Network in 2007 (Appendix Section).

The information here should be used to gain a general understanding, but more detailed knowledge of the current permitting requirements should be sought for each watershed project. While an effort was made to provide useful information in this guide, the authors make no claim to accuracy or completeness.

U.S. ARMY CORPS OF ENGINEERS SECTION 404 PERMIT

APPROVAL TIME ESTIMATE: 6 – 24 MONTHS

Section 404 of the Clean Water Act establishes a program to regulate the discharge of fill material, or sediment, into rivers, streams, and wetlands. Permits are reviewed by the U.S. Army Corps of Engineers (USACE). Northern West Virginia is regulated by the Pittsburgh District while southern WV is regulated by the Huntington District. Many watershed projects will perform earth disturbing activities near rivers, streams, and/or wetlands. Once a conceptual design of the project has been drafted, groups should contact the USACE to submit a pre-application for a permit and schedule a field visit by a USACE representative to review the project site (Appendix Section). The USACE will make a "Jurisdictional Determination", sometimes abbreviated "J.D." in which the agency will decide whether or not the waters present at the project site fall under the regulation, or jurisdiction, of the USACE. If the project is determined not to impact regulated waters, the USACE will provide a letter (a "J.D. Letter") confirming that no 404 permit is required for the project. This letter is important to prove to other regulatory and funding agencies that the USACE has been consulted. A J.D. Letter can also be provided to confirm that waters are regulated.

If the USACE requires a specific 404 permit, mitigation may or may not be required for the project. Because mitigation can be expensive and time-consuming especially for small watershed projects implemented by watershed groups, projects may be modified so as to avoid wetlands and other waters that may require a mitigation. The USACE may allow the watershed improvement project to be counted as mitigation.

Note: The USACE can cause major delays for a project. Because of the agency's large size and scope of activity, it can be difficult to communicate with USACE personnel. It may take weeks or months (or longer) to receive responses from the USACE regarding a project. Persistent follow up by e-mail, phone, or in-person communication may improve responsiveness. In addition, some permitting decisions are subject to the interpretation of the law by the current agency leadership. Therefore a project that requires wetland mitigation one year, may not be required in future years.

W.V. DEPARTMENT OF ENVIRONMENTAL PROTECTION SECTION 401 PERMIT

APPROVAL TIME ESTIMATE: 2 – 3 MONTHS

Section 401 of the Clean Water Act requires states to issue a certification to federal agencies that a project will not violate state water quality standards or stream designated uses. For example, if a 404 permit is required, the USACE may request that a 401 certification from the WV DEP Division of Water and Waste Management be issued before a 404 permit can be granted.

W.V. DIVISION OF NATURAL RESOURCES PUBLIC LANDS CORPORATION PERMIT (STREAM ACTIVITY PERMIT)

APPROVAL TIME ESTIMATE: 1 – 2 MONTHS

The West Virginia Division of Natural Resources (WVDNR) issues Stream Activity permits when a project is expected to require working or placing equipment in a stream. Common activities requiring this permit include the installation of culverts and re-channelizing streams. Most watershed projects will require this permit because most projects work with channels, culverts, and/or next to streams.

The permit application will require a description of the project, a review of other required permits, and a map of the project area. An example Stream Activity permit is provided in the Appendix Section.

W.V. DEPARTMENT OF ENVIRONMENTAL PROTECTION NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM STORM WATER CONSTRUCTION PERMITS

APPROVAL TIME ESTIMATE: 1 – 4 MONTHS DEPENDING ON PROJECT SIZE

The National Pollutant Discharge Elimination System (NPDES) Stormwater Program regulates stormwater discharges from construction activities. Discharges from a watershed project site under construction is considered a point-source of pollution to the U.S. Environmental Protection Agency. Construction activities include clearing, grading, and excavating that disturb 1 acre or more. Projects proposing to disturb less than 1 acre do not require a permit, however, groups remain responsible for appropriately preventing or managing any pollution discharges that may occur from the construction activities. The WV DEP implements the state's construction stormwater permit program.

For projects that propose to disturb between 1 and 3 acres and do not discharge in a Tier 3.0 stream, a Notice of Intent (NOI) is required to apply for a WV/NPDES Water Pollution Control Permit (General Permit). In West Virginia the application can be completed using an online form. Among other things, the permit requires a description of the work, a USGS topographic map, and a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP is typically provided by the engineer as a part of the engineering plans that shows the erosion and sediment control practices and features to be used during construction.

For construction projects that are proposed to disturb 3 acres or more, a Site Registration Application is required to apply for the WV/NPDES Water Pollution Control Permit (General Permit). The Site

Registration Application form can also be completed online, however, more detailed information is required.

Most projects proposed by watershed groups disturb less than 3 acres. Watershed groups that are proposing projects that disturb 3 acres or more typically have hired an engineering firm capable of providing all details required for the stormwater permit application. Detailed instructions for completing construction stormwater permits are provided on the WV DEP website.

Once watershed groups have obtained a stormwater construction permit, they must renew the permit or terminate the permit once construction is complete and revegetation has been established by issuing a Notice of Termination (NOT). Permit applications ($300) and annual renewal fees ($150) apply and should be included in the project budget.

If a contractor does not comply with the sediment and erosion control plans, and they do not respond to requests for improvement, the project owner can call the state inspector. The inspector will usually cite the party that is financially benefiting from the activity, even if the owner is the holder of the permit. Typically, the contractor is named on the permit.

W.V. DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS DRIVEWAY ENCROACHMENT PERMIT (CONSTRUCTION ENTRANCE PERMIT)

APPROVAL TIME ESTIMATE: 1 – 3 MO. DEPENDING ON REQUIREMENTS/SEASON

The W.V. Department of Transportation Division of Highways requires permits for new driveway or approaches that adjoin or intersect state highways. The permit authorizes driveway installation according to DOH specifications for overall highway safety. The permit requires that proper roadway drainage is established and that efficient movement of traffic is maintained. There is no application fee, and the application form “MM-109” can be found on the DOT website or obtained from a local highway administrator’s office. Permits are generally granted for legitimate purposes of gaining access to private property. This permit is required for watershed projects that propose to create new access roads from existing state highways. Approval times may vary by season and depend on regional highway construction and maintenance schedules that occupy inspectors’ time.

FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) PERMIT FOR FLOODPLAIN DEVELOPMENT – WEST VIRGINIA DIVISION OF HOMELAND SECURITY AND EMERGENCY MANAGEMENT

APPROVAL TIME ESTIMATE: 1 – 3 MONTHS DEPENDING ON REQUIREMENTS

Communities that are at risk of flooding participate in the National Floodplain Insurance Program and must issue permits for development proposed to occur within known flooding zones. The definition of “development” includes common construction activities such as excavation. Therefore, most stream restoration projects require a permit from the county or community permit officer. Permit requirements may vary. More information can be found on the WV Division of Homeland Security and Emergency Management website.

NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) REQUIREMENTS

APPROVAL TIME ESTIMATE: 1 – 3 MONTHS DEPENDING ON REQUIREMENTS

If federal funds are used for a watershed construction project, the requirements of the National Environmental Policy Act may apply. Personnel from the federal agency such as the EPA or the Office or

Surface Mining may be required to prepare an environmental assessment of the project. The assessment may require the following consultations before funding can be used for the project:

Endangered Species Act Section 7 Consultation

A letter describing the project with a map (including latitude and longitude) should be sent to the WV DNR Natural Heritage Program. DNR personnel will provide a letter indicating whether or not threatened or endangered species are known to be in the project area.

National Historic Preservation Act Section 106 Consultation

A letter describing the project with a map (including latitude and longitude) should be sent to the WV Division of Culture and History's State Historic Preservation Officer (SHPO). A letter in response will be sent commenting on whether or not historical architectural or archaeological resources exist within the proposed project area.

Regional Planning and Development Council Consultation

A letter describing the project with a map (including latitude and longitude) should be sent to the Regional Planning and Development Council Executive Director. A letter of support of the project will be sent in response to certify that the intergovernmental review process has been met under Executive Order 12372.

Note: Persistent follow up regarding these consultations will decrease the response time. Do not expect responses to come automatically without a follow up phone call or e-mail.

10 PROCUREMENT

Procurement of contracted services should be directed by internal procurement procedures which should be developed to ensure compliance with applicable Federal standards. These procurement procedures should be based on the Code of Federal Regulations (CFR) Title 43 Public Lands: Interior, Part 12.76: Administrative and Audit Requirement and Cost Principles for Assistance Programs – Procurement. For an example procurement procedures document, see Appendix Section.

In general, it is important that the buyer (contract owner) has a clear understanding of the project and the specific tasks that are to be completed by a vendor (contractor, consultant, or seller). A detailed work-breakdown structure, or hierarchal task list, is helpful in identifying and communicating the needed services to potential vendors. It is the buyer's responsibility to ensure that the vendor understands the services to be completed, and that all items are clearly included in the contract.

10.1 QUALIFICATIONS BASED PROCUREMENT

Architecture, engineering, and legal services can be contracted through a qualifications based procurement process. This allows organizations to select the most appropriate firm based on the qualifications of personnel, the quality of proposal, past experience, and a number of other criteria deemed relevant to project success. At least three proposals should be obtained and evaluated before a contract can be executed through this process.

REQUEST FOR QUALIFICATIONS

Organizations should maintain a roster of qualified architectural, engineering, and legal firms for procurement purposes. A Request for Qualifications (Appendix Section) can be publically advertised in order to receive Statements of Qualifications from interested firms. Submissions should be evaluated according to standardized criteria, and filed for review by funding agencies. FOC allows firms to submit statements of qualifications at any time.

REQUEST FOR PROPOSALS

A detailed request for proposals (RFP) should be made available to all qualified firms. The RFP should include a brief summary of the contracted work, guidelines for proposal submission, a thorough description of the project including background information such as water quality data and mapping, a detailed outline of the project scope, the project timeline, a description of proposal evaluation and selection procedures, and terms and conditions. See (Appendix Section) for an example RFP.

The outline of the project scope should include all tasks and work products that are to be completed by the consultant. It may be beneficial to discuss your project with partners that have completed similar projects to be sure that all parts of the project scope are included in the RFP.

CHOOSING A CONSULTANT

Submitted proposals should be carefully reviewed and evaluated according to a standardized rubric that reflects the needs of the project. The rubric [Example in Appendix Section] should also include any additional qualities important to the organization, such as timeliness, or proximity to project site. Three people should review the proposals and complete the rubric. These evaluators may be organization staff, board members, or other key project partners. It may be necessary to obtain further information before choosing a firm. This can be done through phone, or in-person interviews or by requesting examples of past work products.

Once the highest qualified firm is chosen, the price may be negotiated to provide fair and reasonable compensation and to maximize contract value with respect to cost and other factors. If an acceptable price cannot be negotiated, begin discussions with the next best qualified firm. The final award should be made to the most qualified, responsible firm whose proposal is most advantageous to the program with price, prior experience, and other factors considered.

When choosing an engineering consultant, consider strongly the previous experience in AMD remediation, and attempt to engage the selected engineer as early in the project life-cycle as possible. A qualified engineer can offer assistance throughout the project process including monitoring, landowner negotiations, conceptual design, etc. Be sure to clearly indicate what the engineer is asked to deliver as work products in the contract. Work products may include site characterization report, treatment feasibility assessment, conceptual designs and any required justification for any proposed conceptual designs.

EXECUTING AND ADMINISTERING THE CONTRACT

Once a consultant has been selected and an acceptable price has been negotiated, the consultant and organization will sign an agreement that outlines the work to be completed and the price. The agreement may reference standard terms and conditions. Once the agreement is executed, it is the buyer's responsibility to make sure the consultant performs according to the agreement. The

organization should maintain frequent communication with the consultant to inquire about progress, results, and deadlines for work products.

For example, many engineering firms often have other projects they may deem a higher priority than your project. This may delay work on your project. Organizations should communicate the importance of their project to the engineer and encourage the consultant to remain on schedule.

During the course of the work, it may become necessary to revise the scope of work that an engineer will complete and an adjustment in contract price may become necessary. This could occur, for example, if an engineer is asked to design an additional portion or phase of the project not initially included in the contract scope. An amendment to the contract outlining the change in price and scope should be drafted and signed by the organization and the consulting firm. This document can be referred to as a Change Order.

10.2 PROCUREMENT BY SEALED BIDS

The sealed bid procurement method is generally used for purchases greater than a certain expected price (example: $10,000 - $25,000) where the procurement lends itself to a fixed-price contract, and the selection of the bidder can be made principally on the basis of price. Construction contracts are generally secured through a sealed bid process.

The following criteria must be met in order to execute a sealed bid procurement [(d)(2)(ii)]:

A. The invitation for bids must be publically advertised and bids shall be solicited from an adequate number of known suppliers, providing them sufficient time to submit bids prior to the advertised bid-opening date;
B. The invitation for bids should include any specifications and pertinent attachments, and define items of services in order for the bidder to properly respond;
C. All bids should be publically opened at the time and place described in the invitation for bids;
D. A firm fixed-price contract award should be made in writing to the lower responsive, responsible and qualified bidder. Where specified in bidding documents, factors such as discounts, and transportation cost shall be considered in determining which bid is lowest. Payment discounts will only be used to determine the low bid when prior experience indicates that such discounts are usually taken advantage of; and
E. Any or all bids may be rejected at the sole discretion of the owner.

Note: If a bidder is rejected, written documentation to justify why the bidder is rejected is advised. All bids may be rejected if all bids are too expensive.

PREPARATION OF BIDDING DOCUMENTS

Bidding documents for construction projects may be prepared by the engineer, and include a project manual detailing bidding and contract requirements, general requirements that describe a summary of the work, technical specifications, and general terms and conditions. Organizations may also create their own bidding documents and project manuals. Review and thoroughly understand bid documents before proceeding with the bidding procedure.

Additional Tips for Bid Documents

- Use the Supplementary Conditions section to override specific General Conditions and Terms and to address specific items or anticipated issues.
- If “As-Built” plans are required, they may be defined as a bid item.
- Payment and progress measurement methods must be clearly defined.
- Quality Control costs should not exceed 3% of the total job.
- Mobilizations costs may be limited to 5% of the total bid.
- Excavation estimated to be less than 2,000 cubic yards is typically bid as a lump sum. Larger amounts of excavation are usually measured by a pre- and post-construction survey.

Interested contractors will obtain bidding documents directly from the engineer for a small fee ($40-60) before the mandatory pre-bid meeting, as stipulated in the public bid invitation. See Appendix Section for example bidding documents.

Typical Construction Project Schedule Overview
(2-4 months of bidding procedure + 3 months of construction)

- Invitation to Bid Advertisement – Publish twice during a 2-4 week period in newspaper
- Mandatory Pre-Bid Meeting – schedule for at least 1 to 2 weeks after the last public advertisement
- Questions Due – 1 - 2 weeks after pre-bid meeting (answer questions by distributing an addendum within 1 week of receiving all questions)
- Bids Due/Bid Opening – 1-2 weeks after Questions are answered with Addendum
- Deliver Notice of Award – within 60 days of Bid Opening
- Execute Standard Form of Agreement – within 2 weeks after Notice of Award is delivered
- Deliver Notice to Proceed – Any time up to 2 weeks before the Construction Start Date; Typically 4-6 weeks are allowed after execution of Agreement before the Construction Start Date
- Construction Start – May be defined in contract
- Substantial Completion – May be defined in Contract; Typically 2-3 months after Construction Start depending on size of project and season
- Final Completion – Typically 15 - 30 days after substantial completion.

INVITATION TO BID

A public invitation to bid (Appendix Section) should be published preceding the pre-bid meeting. Publication should include: at least two legal advertisements in a local newspaper. Sundays and Wednesdays are two days that receive the most readership. In addition, the ad may be published on an organizational website and distributed to known local contractors by e-mail or fax.

The public invitation to bid should include:

- General description of the project scope;
- Directions on how to obtain bidding documents from engineer, including date available, location, price, and acceptable payment methods;
- Mandatory pre-bid meeting information, including location, time, and date; and,
- Time, date, and location where sealed bids should be delivered.

Note: Do not discuss project details not included in the public bid advertisement, with any media outlets or potentials bidders. After the pre-bid meeting, all questions should be directed to the engineer, who will distribute written questions and responses to all bid document holders through addenda to the contract documents.

PRE-BID MEETING

The pre-bid meeting is the owner's opportunity to communicate all project details, expectations, and requirements relating to construction of the project. Topics discussed in the pre-bid meeting become a part of the contract once the meeting minutes are issued as an addendum to the contract. However, once bids have been submitted, any changes to the contract are generally accomplished through a change order which is subject to an adjustment in contract price.

Detailed meeting minutes (Appendix Section) that explain any such discussion should be recorded and distributed to all attendees. The minutes should also include answers to any questions asked at the pre-bid meeting, to ensure that all potential bidders have access to the same information prior to bid preparation.

Often, contracts provided by a consultant will contain standard contract language. Be sure to mention and document any changes to standard contract language for the project. For example, watershed groups, which have to obtain reimbursement from funders *before* they can issue payment checks, may not be able to pay invoices within the usual 30-day period. If the payment time is extended, that should be mentioned during the pre-bid and documented in the meeting minutes as an addendum.

The pre-bid meeting should be held 2-4 weeks before the submission date for sealed bids. The pre-bid meeting should include a review of important contractual items, a summary of the project scope and details, and a project site visit. Because the pre-bid meeting is mandatory for bid submission, a sign in sheet (Appendix Section) should be used to track attendees.

The project engineer should be present at the pre-bid meeting, and often conducts the meeting. The engineer is the expert regarding the project plans and specifications and should be able to answer technical questions. Be sure to communicate with the engineer to establish the meeting agenda (Appendix Section).

Pre-Bid Meeting - Materials

- Agenda
- Sign in Sheet
- Bid Documents
- Directions to Project Site

PUBLIC BID OPENING

All bids must remain sealed until the time of the public opening, identified in the invitation to bid. At that time, the owner should open all of the submitted bids at a disclosed location, and publically read the results. Some bidders may want to call in to listen to the meeting over the phone. Others may attend the meeting in person. Attendance is not mandatory but the results should be distributed by e-mail or fax as soon as possible.

In general, there should be 3 people present to witness the bid opening. Each person should record the results as they are read from the bids. Be sure to record that bidders have fulfilled all requirements before accepting the bid. For example, typically bidders must provide proof of licensure, insurance, and a bid bond. An example bid opening record sheet is provided in the Appendix Section.

Once the bids have been received, accepted, and opened, the owner should tabulate itemized bid prices and check for unbalanced bids. Remember that mobilization and quality assurance costs should be a small percentage of the total bid cost. The project engineer and funders may review the tabulations to ensure they are reasonable. If any questions arise, seek clarification from the bidder. If there are major discrepancies or mistakes are found, the owner may ask the bidder if they would like to withdraw their bid. However, bidders CANNOT submit revisions.

SELECTION AND EXECUTION OF CONTRACT

Once the lowest qualified bidder is identified for selection, publish the final tabulation on the website and e-mail it to all bidders. The owner should send a Notice of Award letter (Appendix Section) to the selected contractor and ask for a signed contract/agreement from selected contractor. Execute and distribute copies of the contract to the contractor, engineer, and owner.

After the agreement is executed, there may be items required of the contractor before a Notice To Proceed can be issued. For example, the contract may require the Project Superintendent to be present at a Pre-construction Meeting to review the contract terms, plans, and project site. In addition, organizations may require of the contractor:

- Proof of insurance showing the organization and project engineers as additional insured,
- Receipt of Performance and Payment Bond for 100% of the contract price,
- Submission of a Construction Schedule subject to the approval of the Project Engineer,
- Proof of a final check for utilities on the project site.

After these items are complete, a Notice to Proceed may be delivered that specifies the date construction may begin. Unless a start date is already specified in the contract, organizations may choose a start date that best suits their ability to oversee the work.
Note: It is good practice to maintain communication with the project landowners throughout the procurement process to the extent the landowner wishes to be informed.

11 ENGINEERING

The project engineer should provide detailed and thorough plans and specification to guide all aspects of the construction process. The engineer should not simply approve a conceptual design and provide a cost estimate. Ambiguous engineering plans can cause contractor's bids to be unrealistic which will cause problems either with the overall quality of the project and/or the cost of the work. Changes to the project during construction may be incorporated into expensive change orders, and watershed groups are often unable to procure additional funds on short notice. For these reasons, careful and experienced engineering for the project is a key component for project success.

Design Considerations:

- Include design elements to allow for future maintenance, such as a bypass channels for water
- There should be a clearly defined system in and system out, that can be monitored to determine project success; include flow measurement pipes at each treatment module in a system
- Maintain an access point to the project site after the project for maintenance and monitoring
- Understand how landowners use the property and what their expectations are for continued use
- Provide a designated area for excess fill or unsuitable material disposal
- Provide a method of disposal acceptable to the landowner for any removed trees
- Identify key milestones that require inspection
- Design with long-term project maintenance in mind

There should be multiple reviews of the engineering plans that include input from the project landowners, funding agencies, as well as other experienced partners. It is a good idea to imagine the construction process when reviewing the plans and consult a trusted contractor for comments.

Phases of Engineering

- Procurement of Engineer
- Site Characterization (water quality monitoring and mapping)
- Proposed Conceptual Designs
- Final Design Draft
- Permitting
- Final Design
- Creation or Finalizing of Bid Documents

Soil test pits may be completed during the site characterization to better inform the design of features requiring excavation. The soil type can determine whether additional fill material or liners will need to be installed on the property. It is also good to know if bedrock is present.

12 CONSTRUCTION

12.1 PRE-CONSTRUCTION

PRE-CONSTRUCTIONG MEETING

The purpose of the pre-construction meeting is to allow for the owner, engineer, contractor, funders, and landowners to meet and establish lines of communication to be used throughout the project. During the meeting, the project plans, specifications, and contract details should be reviewed. The meeting often includes a visit to the project site. The pre-construction meeting should be scheduled 4 to 2 weeks prior to the start of construction.

This is the last opportunity to address issues and potential problems before construction starts. While the contractor should be familiar with all parts of the plans and specifications, the group should walk through the entire project and discuss expectations, potential changes, potential problems, etc. Effort should be made to completely resolve any discrepancies between what the owner wants and what the contractor is planning.

Pre-Construction Meeting – Materials

- Sign-In Sheet
- Pre-Construction Conference Check List
- List of Pertinent Contact Information
- Bid Documents including Contract/Agreement
- Project Plans
- Project Specifications
- Agenda

Note: It is important that the contractor's primary superintendent for the project is present at the meeting. Discussing project details with a representative of the contractor that will not be present during construction increases the likelihood of miscommunication and problems. In addition, holding a pre-construction meeting greater than 1 month before the start of construction may also increase the likelihood of miscommunication.

PREPARATION FOR CONSTRUCTION OVERSIGHT

Successful management of a construction project requires adequate inspection during construction. The inspector should have a detailed and thorough understanding of the project including the design plans, specifications, construction methods, timeline, and required equipment.

When questions arise, consider asking more experienced partners before asking "simple" questions to the contractor. You may use the project engineer, experienced project funders, or partnering state agencies as resources. Asking "simple" questions to the contractor may give an impression that the contractor may be able to cut scope or omit details in the work that you will not notice.

To Do:

- Study the project plans, specifications, and contract forms
- Understand progress measurement methods and payment applications
- Walk the site with the plans and a tape measure
- Research and understand relevant construction methods and equipment
- Identify important construction milestones that require inspection

Tips for Understanding the Plans

- Read each word and follow each line on the plans
- Color code the plans with highlighters
- Compare project plans with project specifications
- Write bid items and unit prices directly on project plans
- Ask engineer any questions about the plans, lines, or symbols you don't understand

Note: It may take many hours of preparation to adequately prepare to inspect a construction project, especially for inexperienced inspectors.

DON'T FORGET: Before construction begins, don't forget to install a NPDES Stormwater Permit sign at the entrance to the project site in a place visible to the public in accordance with the permit requirements.

12.2 CONSTRUCTION OVERSIGHT

Good construction oversight is critical to the successful implementation of the project. It is the owner's responsibility to assure that all contracted work is completed according to the contract, and ideally, satisfies the owner's expectations.

The inspector should be present for as much of the construction process as possible. Observing between 80%-100% of construction days is ideal. During inspection visits, the inspector should walk through the entire project site, take wide-frame and up-close photographs, and record detailed notes. Walking around the perimeter of the site to check erosion and sediment control features is a good way to start each inspection visit.

In most contracts, the role of the inspector is primarily observation. It is not the inspector's responsibility to guide or directly influence the contractor's or subcontractor's employees. Rather, inspectors should accurately and thoroughly document the methods and results of the work being done. Any problems that you foresee should be documented and discussed with the project engineer and contractor. In general, the earlier problems are noticed and addressed the less the problem may cost the project in time and money.

Do not be intimidated by urgent sounding threats and questions from the contractor. Generally, the more urgent a problem appears the more time and consideration that decision merits. If you are in a situation where you feel pressure to provide a response, a good tactic is to defer to someone who is not present – like the engineer. Step away, make a call, and consider your options. In most contracts, the owner has three business days to officially respond to written requests for information (RFI) from the contractor. However, in most cases, issues may be resolved in the field after adequate discussion.

Construction Oversight – Materials

- WV DOT Standard Specifications for Roads and Bridges Manual
- WV DEP Erosion and Sediment Control Best Management Practices Manual
- Project Plans
- Tape measure
- Highlighter
- Camera and Video Camera

Although all roles, responsibilities and required interactions between the inspector and contractor are outlined in the contract documents, it is most important to foster a positive relationship between the inspector and the contractor. The relationship should focus on mutual respect, reasonable behavior, and problem solving. Maintaining this relationship can help to work through inevitable problems during construction. If the relationship degrades, do not "take it personally". In other words, do not get upset about things that the contractor says or does because you think their remarks or behavior is directed at you in particular. Stay focused on the project and make decisions to find a solution to issues through negotiations and compromise. However difficult, maintain communications. If communications break down, more serious legal actions may be the only option left to resolve an issue.

DOCUMENTATION

It is a good idea to document as much of the construction process as possible by doing the following:

- Keep a project photo album
  - Capture before/during/after construction pictures
  - Take wide-angle shots
  - Annotate the photographs about what is happening, when, and where
- Collect and file all receipts, delivery tickets, and other submittals
- Collect and file the contractor's weekly reports, daily activity summaries, and weekly quantity summaries. These may be completed by the foreman in the field.
- Keep records of dates, times, and content of all communications including face to face, phone, and e-mails. Print important e-mails or save them as PDF files.

TIPS & TRICKS

- Be present for as much of construction as possible.
- Know the construction timeline, and be present during critical milestones, such as any activity that may be eventually be buried.

- Do not inform the contractor the times of inspection visits. Visit at different times of day, and do not fall into a predictable routine.
- Check that all materials meet specifications; take measurements by hand and verify quantities of supplier deliveries.
- Request to see material quality test results. For example, calcium carbonate content of greater than 80% may be verified by a laboratory.
- Document as much as possible in case a dispute would require such documentation.
- You may advise the contractor to submit a formal Request for Information (RFI) to the project engineer if a question arises that cannot be answered in the field.

12.3 ADMINISTERING THE CONSTRUCTION CONTRACT

Often construction costs comprise the largest portions of project funding grants. It is important to keep a detailed records of the construction costs and available funding. An example construction contract cost tracking spreadsheet is provided in the Appendix Section.

After a contract is executed there may be times when the contract may be changed or adjusted in response to the progress of the project. The only way a contract may be changed is through a formal change process. Typically, contracts will use a Change Order form to initiate a change. At minimum, the contract owner and contractor will sign the Change Order form detailing the change in contract terms. If required in the contract, the project engineer, project funders, or others may also sign the Change Order form. An example of a Change Order form is provided in the "Project Manual Template" in the Appendix Section.

Written notice between the owner and the contractor may be required at some point. Discussed above, the Notice to Proceed provides final confirmation that the contractor may start construction on a certain date. Other reasons for providing notice may be if the contractor has breached the contract, or if the owner wishes to formally terminate the contract. These are serious actions and are rarely necessary, but formal written notice is the required form of communication.

Once the project is constructed and is functional according to its intended use, the owner may deliver a Certificate of Substantial Completion. This letter assures the contractor that the work has been inspected and the owner considers the work functional. At this stage, there still may be other work to complete, such as stoning an access road or seeding and mulching. These items will be completed prior to final project completion. A written punch list may be drafted by the inspector and engineer near completion that outlines specific items required before the owner considers the project complete.

In general, a contractor will submit an application for payment. The payment application form may be provided as part of the contract documents. The application should correspond to the work completed and any materials stored relating to the project. Each application should include a retainage of funds (typically 10%) that is withheld from each payment until the project is complete. The owner should review the payment application for accuracy and present it to the engineer for review and approval. Once the application is approved and recommended for payment, watershed groups will request reimbursement of the expenditure from the funders. The request and disbursement of funds can take 2 to 6 weeks depending on the funding agency, grant, and time of year. Therefore, it is important to request funds as soon as possible after an application for payment has been received.

After the project is complete, the contractor may provide a final payment application for the remaining retainage. Make sure that no outstanding work or tasks remain prior to paying the final invoice. Once a

contractor has been paid, it can be difficult to arrange for any remaining work to be completed. Usually, contracts will require the contractor to guarantee the work for a 1 year period. For example, if a pond doesn't hold water 1 month after completion, then the contract may be required to fix the pond at no cost to the owner.

When closing the contract, make sure to update any notes or tracking spreadsheets, document lessons learned, and check in with all stakeholders about the project. For example, make a point to ask the contractor, landowners, engineers, funders, and others what they thought went well and what went wrong during the project. This information may help you administer the next construction contract more smoothly.

13 PROJECT ADMINISTRATION

It is important to try to maintain detailed records of all aspects of your projects. Because watershed projects can last multiple years, accurate and complete records can help facilitate staff transitions mid-project and help ensure proper maintenance is continued many years after project implementation. There are many more organizational structures that can be used other than what is described below in this guide.

CENTRAL PROJECT FILES

A central project file includes information and records documenting project proposals, feasibility assessments and other planning documents, landowner information, permitting, and general project notes.

It is a good idea to store this information both physically and electronically to the extent reasonable. It is a good idea to establish a data management procedure to ensure proper handling of all important organizational records. This can be important when managing state and federal grants that may have document retention and audit requirements.

For electronic files, it may be helpful to create a template file structure that includes folders for anticipated items. For paper files, a color scheme to be repeated on the different projects may be helpful.

GRANT FILES (INCOMING FUNDS)

In addition to organizing information by project, it is also important to maintain a files related to all incoming or outgoing funds associated with the project. Grants and subcontracts are legal documents outlining the use of money. The administration and documentation these funds should be taken seriously.

Grant files should contain the grant proposal, budget, final agreement, project and financial reports, invoicing and draw down records, and any miscellaneous notes relevant to the administration of the grant. **If a document does not pertain to the management of the grant funds, it should go in the central project file.** Maintaining electronic grant files that are backed up either periodically onto physical storage discs or are backed up onto an offsite server will increase security.

CONTRACTOR FILES (OUTGOING FUNDS)

Contractor files should contain all records regarding the procurement, final agreements, invoicing and payment and correspondence with contractors. It is also a good idea to store any meeting notes and copies of correspondence with the contractor in this file as well.

Note: Although it can be difficult to remember, it is important to keep up with this documentation. Strive to keep files updated to the point that a new person could spend some time reviewing the files and understand the project's current status and progress.

14 OPERATIONS & MAINTENANCE

Operations and maintenance of watershed projects are an important part of long term project success. Often passive acid mine drainage treatment projects work well within the first 12 to 36 months. However, after this "honeymoon" period, effective treatment can become compromised by:

- clogging from sediment, sludge, algae or leaves,
- scaling of limestone
- damage from fallen trees or erosion
- failure of control valves from improper installation or freeze thaw cycles
- etc.

Passive treatment of net acidic waters requires routine maintenance.

For a comprehensive review of project inspection, operations and maintenance, see a document prepared in 2014 by the West Virginia Department of Environmental Protection titled, "Operation and Maintenance of Passive Acid Mine Drainage Treatment Systems: A Framework for Watershed Groups" (Appendix Section).

14.1 APPENDIX SECTION

There are a large number of resources available in the appendix section. These resources are too numerous and the files are too large to include in this document. **These resources are available upon request**.

1. Introduction
2. Watershed planning
3. Choosing a project site
4. Landowners
5. Project planning
6. Funding
7. Permitting
8. Procurement
9. Engineering
10. Construction
11. Project Administration
12. Operation and Maintenance

To receive the Watershed Implementation Guide and the appendices submit your request to the NPS Coordinator (timothy.d.craddock@wv.gov). Your subject line must include: WPIG + Appendix Section. In the body of the Email include your contact information (Email, phone number and mailing address). WVDEP's Watershed Improvement Branch will mail one CD-ROM and/or flash drive to the address provided.

Notes:

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