



2011 Call for Applications Volunteer Monitoring Support Program

Background

The Montana Department of Environmental Quality's (DEQ) Watershed Protection Section has allocated approximately \$15,000 of funding under the federal Clean Water Act Section 319 to assist local volunteer monitoring (VM) groups in their efforts to protect and restore surface and groundwater.

Scope

DEQ seeks applications for VM groups needing financial assistance with laboratory sample analysis costs associated with scheduled or planned water quality monitoring projects. Eligible applicants include local watershed groups, 319 grantees, conservation districts, water quality districts, 501(c)(3) organizations, school systems, county extension services, county governments, etc. DEQ will assist VM groups by funding several types of routine laboratory analyses. Please note that this program does not provide funding for any operational costs such as writing monitoring plans, travel, or field equipment.

Funding Details

Beginning on June 20, 2011, applications will be accepted on an ongoing basis. Please note that because there is not an application deadline, funds will be awarded to successful applicants on a first come-first serve basis. With approximately \$15,000 available, awards will be made for up to \$2,000 in laboratory analyses costs per project for a one year period. Successful applicants will be notified of their funding award within two weeks of application submittal. For those groups that provide their own funding beyond DEQ's contribution, the state's negotiated lab analysis rates will continue to apply until expiration of the one-year period. DEQ has a contract in place with a laboratory for performing requested chemical/physical sample analyses. Please refer to the attached VM suite table for the list of available chemical and physical analyses. Funding may also be provided for taxonomic analysis of aquatic macroinvertebrate and diatom communities. Please contact the DEQ project manager for further information about biological monitoring.

Terms and Conditions

Upon notice of award, applicants will have a one-year time period to use the funds. A VM group must have a DEQ-approved Sampling and Analysis Plan (SAP) prior to submitting samples to the contracted laboratory. Funding may be awarded to groups under an existing project SAP. **For groups without an existing SAP, one should be developed within 90 days after an applicant is notified that their application has been approved in order to secure the project funding award.** Analytical results will be sent directly from the lab to the VM group as well as to Montana State University's Watercourse program for upload into both the Volunteer Water Monitoring database and DEQ's eWQX database.

Assessment Focus for Volunteer Monitoring Projects

For the purposes of this program, monitoring is defined as *the collection of field data using a consistent sampling methodology that is guided by a pre-established data collection plan*. In this regard, water quality monitoring is a tool used to gather information necessary to answer questions about water quality. A monitoring effort *should* therefore be a component of an *assessment project* whose purpose is to answer pre-defined questions. The components of a VM project should include:

- 1) **Project goals** (broad purpose of the project)
- 2) **Project objectives** (a specific monitoring question to be answered)
- 3) **Defining participant roles and responsibilities** (who will perform each project task)
- 4) **A review of existing data** of relevance to the project objectives (identifying information or information gaps that may guide the current assessment or partially answer the questions of interest).
- 5) **A sampling and analysis plan (SAP)** which includes:
 - A) **The quality assurance and control requirements** (determining the appropriate sample collection methods for the selected parameters, and determining appropriate lab analysis procedures; establishing data quality objectives)
 - B) **The study design** (sampling design-when and where to sample to gather information in order to answer the assessment questions; determining how the data will be analyzed; establishing decision criteria for making conclusions about the assessment questions) . The assessment questions determine how the study needs to be designed.
- 6) **Data management and data analysis** (establishing a reliable system for storing the data; performing quantitative analysis of the data)
- 7) **Reporting the results** (communicating the methods used, the data analysis results, and conclusions pertaining to the assessment questions)

All sample collection procedures and laboratory analyses funded through the VM support program must meet DEQ's quality assurance and quality control (QA/QC) requirements located at: <http://deq.mt.gov/wqinfo/qaprogram/sops.mcp.x>. The SAP is the tool used to ensure that QA/QC requirements will be met. In addition to the quality assurance and control measures, the second component of the SAP is the study design. A statistically valid study design (defined previously) is often necessary for using quantitative data to infer cause and effect relationships and make valid assessment conclusions. DEQ will review the study design and provide comments and recommendations. However, it is the sole responsibility of the applicant to develop a study design that will appropriately address the assessment questions. In this regard, a scientifically valid study design is not a requirement for receiving DEQ approval of a SAP. DEQ cannot ensure that a VM effort will develop and implement a study design that is scientifically appropriate for addressing each assessment question. Therefore, DEQ approval of a VM SAP does not constitute an endorsement that the study design is valid for addressing the assessment questions. As noted above, regardless of the study design details, sample collection procedures and laboratory analyses funded through this program must be in accordance with DEQ's QA/QC requirements.

DEQ encourages VM groups to develop projects having one main goal and narrowly defined assessment questions. DEQ cautions VM groups against either undertaking a project involving multiple goals and assessment questions or undertaking “baseline” data collection without specifying assessment questions to be addressed.

DEQ recognizes that the level of technical rigor necessary for an individual monitoring effort varies according to the goals and objectives of each VM project. In this regard, the VM support program is open to VM groups at all levels of technical capability. Prior to applying for lab analysis support funding, DEQ encourages volunteer monitoring groups to consider how well the technical knowledge, skills, and experience of the VM group aligns with the scientific complexity of the project objectives. The following categories provide general guidelines for developing VM project goals based on the technical experience of the applicant:

Category I projects

Typical goals include, but are not limited to: community awareness/education; building VM group technical capacity through experiential training; screening for water quality degradation; collecting data for official government agency use under the guidance of a natural resource professional. *This type of project is appropriate for applicants that have minimal prior experience with (or do not have a technical consultant with experience) developing and implementing all components of a water quality assessment project (described on page two).* Prior experience is defined as experience developing and implementing a project that is analogous to the one for which funding is being sought. Assessment questions may be as simple as “*how are nutrients measured in a stream?*” (e.g. an education or training project) or as complex as “*are land management activities a likely source of elevated nutrient levels in a stream?*” (i.e. a screening project).

Category II projects

Typical goals involve the evaluation of cause and effect relationships such as: evaluating the effectiveness of watershed restoration projects; evaluating long-term water quality trends in relation to aspects of land use management (which includes collecting baseline data); collecting data for official agency use in evaluating water quality standards attainment, developing TMDLs, or evaluating TMDL target attainment. *This type of project is appropriate for applicants that have prior experience (or a technical consultant with experience) designing and implementing assessment projects based on statistical principles.* Associated assessment questions are typically more complex such as: “*Was the implementation of riparian management plans for livestock grazing successful at reducing the amount of fine sediment within fish spawning habitat?*”

Application Criteria

Complete applications are those that meet the criteria described in this “Call for Applications” and provide all the information requested in the **attached application form**. The decision to award funds to a VM project will be based on the following considerations, as addressed in the application form:

1. Does the application identify a narrowly focused project goal?
2. Does the application identify a specific question about water quality that the monitoring will be used to address?
3. Has the applicant identified existing sources of relevant data and has the applicability of the data to the current project been considered?
4. Do the proposed monitoring parameters focus upon the identified monitoring question(s)?
5. Does the VM group have an existing SAP, or, does the applicant have a commitment to developing/implementing a SAP?
6. Does the applicant have commitment from volunteers to fulfill the requirements of the SAP?
7. Is the existing or planned level of field training in accordance with the planned monitoring effort?
8. Does the applicant identify how the subsequent laboratory results will be analyzed in order to address the study questions?
9. Does the applicant have the appropriate experience and/or technical assistance for the type of project for which funding is requested?
10. How will the results of the project be used?

An example of how a proposed VM project could address the considerations above:

1. The goal of the project is to perform a screening assessment that will be used to determine if copper concentrations in Smith Creek below the abandoned Copper King mine site are a potential cause of water quality degradation.
2. The questions to be addressed by the project are: 1) Do copper concentrations exceed the State of Montana’s chronic or acute numeric water quality standards? 2) Are there indications that the aquatic macroinvertebrate community is degraded below the mine site?
3. USGS data for total recoverable copper in Smith Creek is available from 1971-1976, but was collected 10 miles downstream of the mine site, below the confluence of a major tributary; this data cannot be used to address potential copper problems in the area of concern.
4. The proposed monitoring parameters are: 1) total recoverable and dissolved copper concentrations; 2) water hardness; 3) copper concentrations in streambed sediment; 4) macroinvertebrate community samples analyzed to assess the number and kinds of organism present.
5. The VM group does not have an existing SAP. The plan is to develop a SAP that will be implemented to compare samples collected from above and below the mine site, during both spring run-off and baseflow seasons during a one year period. The VM group plans on consulting with a water quality specialist to determine the appropriate timing, quantity, and location of sampling events.
6. The VM group has a commitment from four local residents to complete the necessary monitoring for a one year period.
7. The VM group will make arrangements for a training session with water quality specialists in order to ensure the proper sampling collection procedures are followed.

8. The VM group will consult with a water quality specialist as necessary to identify the appropriate methods for analyzing the metals data; the VM group will also consult with Montana State University professors of toxicology and aquatic ecology to determine if the macroinvertebrate community shows signs of potential metals affects.
9. The volunteers have not conducted previous investigations involving metals monitoring and will seek technical assistance from water quality specialists and MSU professors in designing and implementing the assessment project.
10. The results will be communicated to local residents at a watershed group meeting and provided to MT DEQ's Water Quality Protection Bureau for use in assessing beneficial use support for Smith Creek.

Additional Requirements

Recipients are required to submit a final report summarizing the activities and outcomes supported by the grant. The final report should include information on: the goals and objectives of the monitoring effort; the preliminary findings of the assessment; an evaluation of whether the goals and objectives were met; the number of people participating; feedback from participants, etc. Successful applicants will be required to complete the project per the approved SAP and submit the final report within normal DEQ contract terms.

Important notes for the 2011-2012 VM support program:

1. Energy Laboratories, Inc. has been selected as the service provider for lab analyses under this call for applications. The lab will ship coolers and sample supplies to the VM group free of charge. The cost of shipping samples to the laboratory will be covered by DEQ. Samples may also be hand delivered to the laboratory in either Billings or Helena.
2. VM groups are responsible for providing their own biological sampling supplies.
3. In previous years, VM groups were responsible for uploading their data into DEQ's eWQX database. This year, the lab will send results to the VM group as well as to MSU's Watercourse program. MSU Watercourse will upload the data into their volunteer monitoring database as well as DEQ's eWQX database.

For more information about the Volunteer Monitoring Support Program, please contact:

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TABLE 1: VM Analytical Procedures Parameter	Preferred Method	Alternate Method	Req. Report Limit ug/L	Lab MDL Study Result (2009)	Lab Routine Reporting Limit or PQL	Reporting Approach ²	Holding Time Days	Bottle	Preservative	Price
Water Sample - Common Ions and Physical Parameters										
Total Suspended Solids (TSS)	EPA 160.2	A2540 D	4000	2550	4000	Standard	7	1000 ml HDPE	≤6°C	8
Total Dissolved Solids (TDS)	EPA 160.1	A2540 C	4000	2800	4000	Standard	7			8
Alkalinity (Bicarb., Carb.)	EPA 310.2/A2320 B	A2320 B	1000	600	1000	Standard	14			7
Sulfate	EPA 300.0	A4110 B	50	113	1000	Standard	28			7
Chloride	EPA 300.0		50	70	1000	Standard	28			7
Dissolved Organic Carbon (DOC)	A 5310 B	A 5310C		30	100	Standard	28	125ml Glass	Filt. 0.45 um, H ₂ SO ₄ , ≤6°C	25 S
Sulfide	A 4500-S2 D			40	40	Standard	7	250 ml HDPE	Zinc Acetate + NaOH to pH >9, ≤6°C	35 S
Water Sample - Nutrients										
Total Persulfate Nitrogen (TPN)	A 4500-N C	A4500-N B	50	30	50	Standard	30	250ml HDPE	≤6°C	15
Dissolved Orthophosphate as P	EPA 365.1	A4500-P F	1	1	1	Standard	2	125ml HDPE	Filt. 0.45 um, ≤6°C	10
Total Phosphorus as P	EPA 365.1	A4500-P F	5	0.9	5	Standard	28	500ml HDPE	H ₂ SO ₄ , ≤6°C	10
Nitrate-Nitrite as N	EPA 353.2	A4500-NO ₃ F	10	5	10	Standard				10
Total Ammonia as N	EPA 350.1	A4500-NH ₃ B,C,D,E,or G	50	10	50	Standard				10
Water Sample - Dissolved Metals (0.45 um filtered)										
Aluminum	EPA 200.7	EPA 200.8	30	0.3	30	Standard	180	250 ml HDPE	HNO ₃	7
Cadmium	EPA 200.8		0.08	0.01	0.08	Standard				7
Chromium	EPA 200.8	EPA 200.7	1	0.06	1	Standard				7
Copper	EPA 200.8	EPA 200.7	1	0.03	1	Standard				7
Iron	EPA 200.7	EPA 200.8	50	0.2	50	Standard				7
Lead	EPA 200.8		0.5	0.01	0.5	Standard				7
Silver	EPA 200.8	EPA 200.7	0.5	0.03	0.5	Standard				7
Zinc	EPA 200.7	EPA 200.8	10	0.3	10	Standard				7
Antimony	EPA 200.8		3	0.007	3	Standard				7
Barium	EPA 200.7	EPA 200.8	5	0.03	5	Standard				7
Beryllium	EPA 200.7	EPA 200.8	1	0.02	1	Standard				7
Boron	EPA 200.7	EPA 200.8	10	0.08	10	Standard				7
Manganese	EPA 200.7	EPA 200.8	5	0.01	5	Standard				7
Nickel	EPA 200.7	EPA 200.8	10	0.05	10	Standard				7
Thallium	EPA 200.8		0.2	0.007	0.2	Standard				7
Uranium, Natural	EPA 200.8		30	0.008	1	Standard				7
Chromium VI	EPA 218.6	A 3500-Cr B	10	5	10	Standard				2

Water Sample - Total Recoverable Metals										Price
Total Recoverable Metals Digestion	EPA 200.2		N/A							10
Arsenic	EPA 200.8		3	0.05	0.5	Standard				7
Cadmium	EPA 200.8		0.08	0.02	0.08	Standard				7
Calcium	EPA 200.7	EPA 200.8	1000	0.04	1000	Standard				7
Chromium	EPA 200.8	EPA 200.7	1	0.06	1	Standard				7
Copper	EPA 200.8	EPA 200.7	1	0.4	1	Standard				7
Iron	EPA 200.7	EPA 200.8	50	0.6	50	Standard				7
Lead	EPA 200.8		0.5	0.02	0.5	Standard				7
Magnesium	EPA 200.7		1000	3	1000	Standard				7
Potassium	EPA 200.7	EPA 200.8	1000	65	1000	Standard				7
Selenium	EPA 200.8	EPA 200.8	1	0.2	1	Standard				7
Silver	EPA 200.8	EPA 200.7/200.9	0.5	0.06	0.5	Standard	180	500 ml HDPE	HNO ₃	7
Sodium	EPA 200.7	EPA 200.8	1000	40	1000	Standard				7
Zinc	EPA 200.7	EPA 200.8	10	0.3	10	Standard				7
Antimony	EPA 200.8		3	0.3	3	Standard				7
Barium	EPA 200.7	EPA 200.8	5	0.09	5	Standard				7
Beryllium	EPA 200.7	EPA 200.8	1	0.02	1	Standard				7
Boron	EPA 200.7	EPA 200.8	10	0.1	10	Standard				7
Manganese	EPA 200.7	EPA 200.8	5	0.06	5	Standard				7
Nickel	EPA 200.7	EPA 200.8	10	0.2	10	Standard				7
Thallium	EPA 200.8		0.2	0.02	0.2	Standard				7
Uranium, Natural	EPA 200.8		30	0.02	30	Standard				7
Water Sample - Total										Price
Mercury	EPA 245.1		0.05	0.01	0.05	Standard	28	HDPE, Glass	HNO ₃	7
Mercury, Ultra low level	EPA 245.7		0.005	0.001	0.005	Standard	28	100mL Glass	0.5 ml 12N HCl	35 S
Mercury, Ultra low level	EPA 1631		0.005	NA	NA		90	100mL Glass	0.5 ml 12N HCl	
Water Sample – Organics										Price
Total Extractable Petroleum Hydrocarbons (TEPH)	EPA 8015 m		1000	300	300	Standard	14	2 x 1L Amber	HCl, ≤6°C	55
Total Volatile Hydrocarbons (TVH)	EPA 8015 m	EPA 8015 B	10	6	10	J Value	7	3 x 40ml VOA	HCl, ≤6°C	55
Water Sample - Calculated Results										Price
Total Hardness as CaCO ₃	A2340 B (Calc)	EPA 130.1	1000	NA	1000	Standard				0
Sodium Absorbtion Ratio (SAR)	Calc									0

Parameter	Preferred Method	Alternate Method	Req. Report Limit mg/kg (dry weight)	Lab MDL Study Result (2009)	Lab Routine Reporting Limit or PQL	Reporting Approach ²	Holding Time Days	Bottle	Preservative	Price
Sediment Sample - Total Recoverable Metals										
<i>Total Recoverable Metals Digestion</i>	EPA 200.2		N/A				180	500ml HDPE Widemouth		15
Arsenic	EPA 200.8	EPA 200.9	1	0.005	1	Standard				7
Cadmium	EPA 200.8	EPA 200.9	0.2	0.002	0.2	Standard				7
Chromium	EPA 200.8	EPA 200.7	9	0.006	5	Standard				7
Copper	EPA 200.8	EPA 200.7	15	0.04	5	Standard				7
Iron	EPA 200.7	EPA 200.8	10,000	0.06	5	Standard				7
Lead	EPA 200.8	EPA 200.9	5	0.002	5	Standard				7
Zinc	EPA 200.7	EPA 200.8	20	0.03	5	Standard				7
Mercury	EPA 7471B	EPA 7471A	0.05	0.001	0.05	Standard				28

Parameter	Preferred Method	Alternate Method	Req. Report Limit mg/m ²	Lab MDL Study Result (2009)	Lab Routine Reporting Limit or PQL	Reporting Approach ²	Holding Time Days	Bottle	Preservative	Price
Substrate Sample - Chlorophyll-a										
Chlorophyll-a (benthic) ⁴	A 10200 H				0.1	Standard	21(pH≥7) or ASAP(pH<7)	Filter	Freeze	45
Ash Free Dry Weight (AFDW)	A 10300 C (5)				0.1	Standard				20
Water Sample - Chlorophyll-a										
Chlorophyll-a (phytoplankton) ⁴	A 10200 H				0.1	Standard	21(pH≥7) or ASAP(pH<7)	Filter	Freeze	45

¹Reporting approach can be: Standard (if Reporting Limit or PQL meet or exceed Required Report Limit), MDL Report (reporting results to MDL, unqualified), or "J" value Report (reporting results between Reporting Limit or PQL and MDL with "J" qualifiers)

²Refer to SOP WQP BWQM-011v5 for sample preparation and analysis details. (URL below)
<http://deq.mt.gov/wqinfo/qaprogram/sops.mcp>