IDAH$_2$O Quality Assurance Project Plan

22 October 2012

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Prepared for:
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22 October 2012

Approved by:

University of Idaho Extension IDAH$_2$O Program Coordinator Quality Assurance Manager	Ashley McFarland	Date
EPA EPA Project Manager	Jayne Carlin	Date
EPA EPA Quality Assurance Officer	Ginna Grepo-Grove	Date
University of Idaho Coeur d'Alene Laboratory Manager	Marie Pengilly	Date

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A3. Distribution List

Each person and/or agency on the following distribution list will receive a copy of the final approved Quality Assurance Project Plan for the IDAH$_2$O Master Water Steward Program as well as any subsequent revisions. The most recent approved plan will also be posted to the IDAH$_2$O website.

Table 1. Distribution list for the IDAH$_2$O Quality Assurance Project Plan

Name	Title	Address	E-Mail
Ashley McFarland	IDAH$_2$O Program Coordinator	1031 North Academic Way #242 Coeur d'Alene, Idaho 83814	amcfarland@uidaho.edu
Jayne Carlin	EPA Project Officer	US EPA, Region 10 1200 6th Avenue, Suite 900 (OWW-134) Seattle, WA 98101-3140	carlin.jayne@epa.gov

A4. Project/Task Organization

The IDAH$_2$O Master Water Steward program is funded through various grants acquired to support maintenance and expansion. Grant support is also utilized to fund the half-time program assistant. The program coordinator position is entirely funded through University of Idaho Extension as an Area Extension Educator position. University of Idaho Extension and the University of Idaho Coeur d'Alene Center also fund an operations and travel expense account for the coordinator position.

The program coordinator provides oversight and management for the assistant and an advisory board supports guidance of the overall mission. Duties of each role are outlined below. In addition to the project partners below, the program receives technical support from Idaho Department of Environmental Quality's surface water program.

Table 2. Project personnel

Staff	Title	Responsibilities
Ashley McFarland	IDAH$_2$O Program Coordinator, Quality Assurance Manager	• Manage the IDAH$_2$O Master Water Steward program • Conduct marketing and program outreach • Conduct IDAH$_2$O certification workshops • Facilitate continuing education opportunities for IDAH$_2$O volunteers • Obtain external funding to support the program • Oversee program budget, revenue and expenditures • Supervise IDAH$_2$O staff, including the program assistant • Facilitate snapshot events • Host annual meeting • Report and publish volunteer data • Conduct duplicate sampling
Marie Pengilly	IDAH$_2$O Program Assistant, Laboratory Manager	• Perform clerical duties associated with the IDAH$_2$O Master Water Steward program • Prepares Quality Assurance for data collected under the QAPP

		• Manage data uploads to the HIS and web mapping application • Manage correspondence to and from IDAH$_2$O volunteers • Assist with IDAH$_2$O certification workshop scheduling and logistics • Supervise IDAH$_2$O interns and volunteer staff • Maintain the volunteer database • Develop promotional pieces for the program • Maintain the IDAH$_2$O website • Perform analysis on snapshot samples and duplicate samples • Maintain and calibrate laboratory equipment
Jayne Carlin	EPA Project Manager	• Review QAPP
Ginna Grepo-Grove	EPA Quality Assurance Officer	• Review QAPP
	IDAH$_2$O Advisory Board	• Represent organization or agency at all advisory board meetings • Provide feedback and expertise to discussions regarding program changes and expansion • Review IDAH$_2$O curriculum • Serve as a spokesperson for the IDAH$_2$O Master Water Steward program • Recruit volunteers for the IDAH$_2$O Master Water Steward program • Participate and volunteer at IDAH$_2$O snapshots and educational events
	IDAH$_2$O Master Water Steward Volunteers	• Completion of the IDAH$_2$O Master Water Steward workshop • Completion of 8 monitoring activities each year • Cooperate with IDAH$_2$O program staff, cooperating agencies and organizations

A5. Problem Definition/Background

Maintaining water quality integrity in the state of Idaho is necessary to ensure a safe water source for drinking, recreating and to support fisheries and wildlife. Through education and outreach, citizens gain a better understanding of their interaction with the land and learn how to best preserve resources. Water monitoring is an integral tool in this outreach.

The primary goals of the IDAH$_2$O program are: (1) Increasing citizen knowledge on water quality issues, (2) Promote volunteer monitoring on Idaho streams and (3) Enhance watershed stewardship. IDAH$_2$O was developed into a 'Master' program to make use of a highly successful Extension model. IDAH$_2$O volunteers receive training and in return, conduct monitoring in Idaho watersheds. Standard monitoring assessments conducted by volunteers analyze habitat, physical, chemical and biological

conditions of the water, channel and riparian area, and are all conducted in the field with provided water monitoring kits. Specific parameters; Nitrate-N, Total Phosphorus, Total Coliform and *E. coli* are analyzed through Snapshot Events, which are supported through the IDAH$_2$O program. Snapshots require volunteers to collect water samples that are analyzed in the University of Idaho Coeur d'Alene Lab. This Quality Assurance Project Plan covers water quality data collected from the standard IDAH$_2$O program and IDAH$_2$O sponsored Snapshot Events.

IDAH$_2$O data may be used to:

- Establish baseline conditions for determining stream health based on chemical, physical, biological and habitat parameters
- Analyze trends in water quality parameters over time
- Identify water bodies in need of more detailed monitoring
- Assess the health of a watershed and target areas within a watershed in need of water quality improvement
- Assist local watershed councils and partners in making environmental management decisions in their local and regional watersheds
- Enlist community involvement in their local watershed
- Prioritize areas in a watershed for Best Management Practices (BMPs)

The objective of IDAH$_2$O is to promote better coordination within citizens and agencies on water resource matters and in turn promote stewardship within Idaho watersheds which will ultimately lead to improved water quality.

Currently, there are 58 registered monitoring sites in the IDAH$_2$O program (Appendix A).

A6. Project/Task Description

Certified IDAH$_2$O volunteers are encouraged to select a stream site or sites that they agree to conduct regular monitoring on. They are encouraged to select sites that are accessible and that will collect the type of data they need to answer any questions they have on water quality issues or concerns. Guidance from and coordination by program staff occurs to ensure sites are not monitored too closely together to eliminate duplication of effort. All proposed sites are reviewed by IDAH$_2$O staff. Wadable streams are the target waterbody for this program, although larger river systems and standing water (wetlands, bays and lakes) are also permitted. Volunteers are encouraged to perform three different assessments at their monitoring sites throughout the years. These assessments and the parameters tested are listed below. Field data collection sheets are included in Appendix B.

Stream Habitat Assessment – conducted annually

- Flow presence
- Stream habitat type
- Streambed substrate

- Pebble count survey
- Embeddedness
- Streambank type
- Channel shape
- Streambank condition
- Canopy cover
- Riparian zone width
- Riparian zone plant cover
- Stream sinuosity
- Adjacent land use
- Microhabitats
- Human use activities
- Evidence of human use activities

Physical/Chemical Assessment – conducted monthly

- Flow presence
- Weather
- Water color
- Water odor
- Air temperature
- Precipitation
- Transparency
- pH
- Dissolved oxygen
- Chloride
- Water temperature
- Stream width
- Maximum stream depth
- Stream Flow
- Stream depth along transect

- Stream velocity along transect

Biological Assessment – conducted no more than three times/year

- Flow presence
- Presence of benthic macroinvertebrate species
- Collection time
- Collection nets
- Stream reach length
- Microhabitats surveyed
- Stream habitat type
- Aquatic plant cover of streambed
- Algae cover of streambed

Water Quality Snapshots

Twice a year, water quality snapshots will be conducted (spring and fall) to analyze parameters, not easily measured in the field. Master Water Steward volunteers will have the opportunity to collect grab samples at their registered monitoring sites and have them analyzed at the University of Idaho Coeur d'Alene Center Water Lab. Parameters tested include Nitrate-N, Total Phosphorus, Total Coliform and *E. coli.* Chain of custody forms (Appendix B) are used to insure appropriate handling of these samples. All samples must be collected and returned to the lab within eight hours. Results from the snapshot are posted within seven days and are sent to participating volunteers and the advisory board. Results are also posted on our website. Participation in these snapshots is voluntary and a small fee is charged to cover expenses in the lab.

Evaluation of results

1. Stream Habitat Assessment: changes over time will be evaluated to track major natural or artificial alterations in the riparian area and in-channel habitat. Because this assessment is only conducted on an annual basis, tracking these changes will take time for volunteers. They are encouraged to assess habitat conditions more frequently if major events occur at the monitoring location such as flooding or land development.
2. Physical/Chemical Assessment: these parameters will be evaluated against state water quality standards to ensure the appropriate levels are being met; however these results will not be used for the determination of impairment.
3. Biological Assessment: results from benthic macroinvertebrate surveys will be used to educate volunteers about the potential status of their water quality depending on the types of species they collect. These findings will be cross-referenced with physical and chemical assessments to determine whether or not the water quality levels are supporting the appropriate species.

4. Water Quality Snapshots: these parameters will be evaluated against state water quality standards to ensure the appropriate levels are being met; however these results will not be used for the determination of impairment.

Each year, annual monitoring reports will be sent to all certified volunteers that submitted data from registered monitoring sites. These reports will provide an overview by IDAH$_2$O staff of the results and to discuss with the volunteer if other monitoring strategies should be employed. Also, results will be discussed to determine whether or not further inquiry is needed into any apparent water quality issues.

Table 3. Timeline

Major Tasks	***J***	***F***	***M***	***A***	***M***	***J***	***J***	***A***	***S***	***O***	***N***	***D***
Volunteer recruitment and training						*X*	*X*	*X*	*X*			
Habitat Assessments (suggested month)					*X*							
Chemical/Physical Assessments (safety-dependent)	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*
Biological Assessments (no more than)			*X*				*X*			*X*		
Water Quality Snapshots					*X*					*X*		
Continuing education seminars									*X*	*X*		
Annual meeting											*X*	
Data processing, monitoring reports	*X*											*X*

Volunteers are encouraged to only sample when weather conditions permit them to safely do so. Inclement weather is to be expected, which will result in occasional missing data.

A7. Data Quality Objectives for Measurement Data

The following data quality objectives are preliminary and are subject to revision.

Precision

Precision refers to the degree of variability in replicate measurements. Precision for laboratory analysis of samples will be evaluated through laboratory reporting of relative percent differences (RPDs) in duplicate sample analysis. RPD is calculated as follows:

RPD = (O-D) / ((0+D)/2) x 100, where O = original and D = duplicate

For this project an initial precision goal of 15 percent will be established for water chemistry analyses. The program coordinator will conduct the same precision calculations on duplicate field measurements and record the findings on the field data sheets for each station.

Accuracy

Accuracy is a measure of confidence that describes how close an analytical measurement is to its "true" value, or the combination of high precision and low bias. Potential bias in the program procedures will be minimized through appropriate site selection and strict adherence to the QAPP. Because the "true" value of a field sample cannot be known, the primary tool for assessing accuracy of laboratory analysis will be the percent recovery of matrix spikes and control standards run against the field sample. Percent recovery is calculated as follows:

%R for matrix spikes = ((SSR – SR)/SA) x 100

Where SSR = spiked sample result, SR = sample result, and SA = spike amount added

%R for control standards = (FC/TC) x 100

Where FC = found concentration and TC = true concentration

Measurement Range

Measurement range is the range of reliable readings of an instrument or measuring device, as specified by the manufacturer. Laboratory measurement ranges are specified by the laboratory in accordance with the manufacturers of the analytical equipment. The measurement range is shown in parenthesis in Table 3.

Table 4. Precision, accuracy and measurement range for the IDAH$_2$O quantitative assessment parameters.

Parameter	***Precision***	***Accuracy***	***Measurement Range***
Physical Properties			
Air temperature	*± 40%*	*n/a**	*0-60°C*
Water temperature	*± 40%*	*n/a**	*0-60°C*
Transparency tube	*± 40%*	*± 40%*	*0-60 cm*
Pebble count	*± 40%*	*± 40%*	*Variable quantity*
Secchi disk depth	*± 40%*	*n/a**	*0-30 m*
Stream width	*± 40%*	*n/a**	*0-30 ft*
Maximum stream depth	*± 40%*	*n/a**	*0-30 ft*
Stream depth along transect	*± 40%*	*n/a**	*0-30 ft*
Stream velocity along transect	*± 40%*	*n/a**	*0-30*
Field Chemistry			
Dissolved Oxygen	*± 40%*	n/a**	*1-12 mg/L*
Chloride	*± 40%*	n/a**	*<25 – 650 mg/L*
pH	*± 40%*	n/a**	*4-9*

Lab Chemistry

*Total Phosphorus****	*± 40% field duplicates* *± 20% lab process*	*± 40% field duplicates* *± 25% lab process*	*0.05 – 1.50 mg/L*
*Nitrate – N****	*+ 40% field duplicates* *+ 20% lab process*	*± 40% field duplicates* *± 25% lab process*	*0.23 – 13.50 mg/L*
*Total Coliform****	*± 40% field duplicates* *+ 20% lab process*	*± 40% field duplicates* *± 25% lab process*	*0 – 2419.6 MPN/100 mL*
*E. coli****	*± 40% field duplicates* *+ 20% lab process*	*± 40% field duplicates* *± 25% lab process*	*0 – 2419.6 MPN/100 mL*

*No accuracy quality control measurements for these parameters

**Accuracy measured during field audit performed by IDAH$_2$O personnel once a year

****Snapshot parameters analyzed at the University of Idaho Coeur d'Alene Center Water Lab within 8 hours of collection.*

Field Quality Control

A duplicate assessment will be conducted on a random sample of 10% of the monitoring sites each year. These will be listed in a Memo (Annual Duplicate Sampling Schedule) and will be sent to the distribution list. During each snapshot monitoring event, quality control will be monitored by submitting a field duplicate from 10% of the participating monitoring sites along with a lab blank.

Duplicate samples – One duplicate sample per event is taken for each analyte and submitted as a quality check on sampling and laboratory analysis. Duplicate samples should be taken simultaneously and handled with the same procedures as the original.

Blank samples – One blank sample per event is taken for each analyte and submitted as a quality check on field procedures and equipment. Blank samples should be taken using the same equipment and methods as the originals with deionized water provided by the laboratory.

Representativeness

Volunteers in the IDAH$_2$O program are instructed to choose monitoring sites that are representative of the stream reach they are trying to analyze. A specific habitat type is not required, but instead should reflect the dominant habitat type in that reach. It should be noted, however, there are limitations to this due to access variability. On a statewide scale, those streams represented in this program largely reflect the location of the volunteer pool. For those that monitor on open water, they are encouraged

to choose the deepest point. If monitoring occurs instead off of a dock, it is noted in the monitoring comments. IDAH$_2$O staff are available to volunteers seeking assistance on site selection.

Comparability

All IDAH$_2$O volunteers are trained using the same methods by IDAH$_2$O staff outlined in the IDAH$_2$O Handbook and QAPP.

Completeness

Due to the volunteer driven nature of the IDAH$_2$O program, completeness is difficult to quantify. The various water quality assessments listed in the *Project Description* notes the intended frequency of these events. However, due to site access, volunteer availability and other factors, monitoring may not occur at this rate.

A8. Training Requirements and Certification

Training protocol

IDAH$_2$O volunteers attend an 8-hour workshop, led by IDAH$_2$O staff, to become certified in the program. This workshop is split into two modules; one indoors going over basic water quality concepts and one outdoors held at a nearby stream site to train volunteers on monitoring methodology. The first module covers topics including:

- Program development and goals
- Code of Ethics
- Master Water Steward responsibilities
- Watersheds
- Water cycle
- Data use
- TMDL process
- Safety
- Beneficial uses
- Pollution sources
- Developing monitoring plans
- Conducting a watershed inventory
- Determining coordinates at your stream site
- Data entry
- QA/QC – Review of the QAPP

- Overview of monitoring assessments

Upon completion of the first module, volunteers visit a stream site with IDAH$_2$O staff to use the equipment they will be provided to conduct the various water assessments. An overview of safety and site selection is also provided. Volunteers perform a complete habitat, chemical, physical and biological assessment during this training. They are also instructed on how to capture grab samples for Snapshot Events. After completion of the 8-hour workshop, attendees are certified Master Water Stewards. They are entered into the IDAH$_2$O volunteer database with a volunteer monitor ID, and they are given an 'active' status once they register a monitoring site and have submitted assessment data. All volunteers are encouraged to monitor in teams with other certified volunteers. This insures that monitoring is conducted in the manner which they were trained.

Advanced training

Additional training opportunities are offered to IDAH$_2$O volunteers once certified. These trainings include topics such as aquatic invasive plants and advanced benthic macroinvertebrate identification. Training opportunities are developed based on requests from the volunteers and the availability of instructors and vary each year. Refresher courses are also provided to any volunteer/s that may want additional supervision to ensure proper monitoring methodology is followed. Any advanced training and refresher courses will also be recorded in the IDAH$_2$O volunteer database.

Instructor Education and Experience

Ashley McFarland, the lead instructor and program coordinator, is the Area Water Quality Extension Educator for University of Idaho Extension in northern Idaho. She holds an M.S. degree in Environmental Science and Water Resources from Iowa State University. Her thesis work comprised of conducting watershed scale assessments to identify pollution sources and to propose best management practices to address water quality impairments. Through her work she supervised over thirty adult volunteers in the IOWATER Volunteer Monitoring Program. McFarland also holds a B.A. in Political Science and Environmental Studies and has over ten years working with and conducting education and outreach on water quality issues.

A9. Documentation and Records

IDAH$_2$O volunteers complete field assessment forms on-site at the time of monitoring (Appendix A). Each form requests basic information, such as monitor name and identification number, site description and identification number, time and date. Those present at the assessment not certified in the IDAH$_2$O program should also be listed and indicated whether or not they are adults or youth. When the assessment is completed, IDAH$_2$O volunteers are instructed to access the online submission forms available on the IDAH$_2$O website. Links to these forms are also sent to volunteers once certified. Volunteers must utilize their identification number, along with the site identification number to enter data.

The online data forms utilize the Google Docs™ open source software. The online forms mirror the field forms volunteers used in their monitoring. Once data is submitted online, volunteers are asked to keep

their field forms in their personal file for up to one year, in case there is any question about data submitted online. All data submitted in the Google Docs™ forms are automatically transferred into an Excel spreadsheet that is managed by the IDAH$_2$O program staff and can no longer be edited by the volunteers. A brief check of the data, to insure appropriate values and completed fields, is conducted before the data is migrated into a hydrologic information server (HIS), which hosts the data indefinitely and can be uploaded and manipulated by various platforms.

Data collected through Snapshot Sampling events will be reported by the University of Idaho Coeur d'Alene Center Water Lab by program staff within one week of sampling. Data will be reported to both the participating volunteers and to the website. Data will also be loaded into the HIS.

By 2013, the IDAH$_2$O program will host a web mapping service that will spatially display the data collected by IDAH$_2$O volunteers, both in the field and through snapshot sampling events. This application, hosted on the IDAH$_2$O website will pull data from the HIS that will be updated with monitoring data weekly. The public will be able to access this information and have the ability to download data and create maps of selected water quality parameters.

Quality Assurance Review Process

The primary mechanism though which project data quality objectives will be met is prevention. Planning and design of the project, documented instructions and procedures, and use of qualified and experienced personnel as outlined in this QAPP are expected to prevent most problems associated with data quality or quantity. An assessment by program staff of this monitoring program will be used to identify any problems with the project data and trigger response actions to help refine the procedures outlined in this QAPP, if necessary, for future use.

Quality Assurance Response Actions

After completion of the annual duplicate sampling, a Memo will be sent to the distribution list (Analysis of Duplicate Sampling) from program staff outlining any monitoring sites or parameters not meeting data quality objectives. In the case of these violations, data will be removed from the data management system. Duplicate sampling efforts will also be reported in the year-end data report sent to the distribution list, advisory board and volunteers.

Data Validation

Data will be reviewed by program staff to check for calculation and transformation errors, measurements within calibration range, and data entry errors. Various computer software programs, including Microsoft Excel may be used to assist in the data review process to help identify potentially erroneous data.

Quality Assurance Project Plan Implementation

This QAPP is to be distributed to all personnel and organizations listed on the distribution list by program staff. All personnel involved in the QAPP approval of the IDAH$_2$O Program are to sign and date the Approval section of this document and return to the IDAH$_2$O Project Coordinator. By signing the approval section, the signatory agrees that's he/she has read and understands his or her role in the

program, and will adhere to all sections of this QAPP. Additionally, all personnel involved in the project should retain or have access to the current version of this QAPP.

B1. Sampling Process Design

Sampling process and design will adhere to the IDAH$_2$O Handbook, pages 1-13

B2. Sampling Methods

Sampling methods will adhere to the IDAH$_2$O Handbook, pages 19-50

B3. Sample Handling and Custody

The only samples collected in the IDAH$_2$O program are through the Snapshot Sampling Events. Sterilized sample bottles are provided to volunteers. Volunteers are given an 8-hour time frame to collect their sample and to return it to the UI Coeur d'Alene Laboratory. All samples must be brought to the lab in a cooler with ice. Any sample received by the lab violating sample delivery requirements are discarded, including those that were not returned within 8 hours. Samples are stored in a refrigerator at the lab until processed. A chain of custody form is provided and must be submitted with the sample (Appendix C).

B4. Analytical Methods

Nitrate Nitrogen and total Phosphorus tests will be performed at the University of Idaho Coeur d'Alene Laboratory using Hach TNT Chemistries methodology. Total coliform and *E. coli* will be performed at the University of Idaho Coeur d'Alene Laboratory using IDEXX Colilert with Quanti Tray 2000 methodology.

B5. Quality Control

See QAPP A6, A7, A9

B6. Instrument/Equipment Testing, Inspection and Maintenance

Field equipment is maintained by volunteers. Expired dissolved oxygen ampoules and pH strips are exchanged for current testing equipment through an equipment resupply request. The IDAH$_2$O quality assurance manager will inspect volunteer field equipment during annual duplicate sampling.

The Laboratory Manager will conduct annual inspection and maintenance on the Snapshot Sampling Event equipment in the lab.

B7. Instrument/Equipment Calibration and Frequency

Field and laboratory instruments and equipment will be calibrated daily before use.

B8. Inspection/Acceptance of Supplies and Consumables

Field equipment is maintained by volunteers. Expired dissolved oxygen ampoules and pH strips are exchanged for current testing equipment through an equipment resupply request. The IDAH2O quality assurance manager will inspect volunteer field equipment during annual duplicate sampling.

B9. Non-direct Measurements

Not applicable

B10. Data Management

See IDAH$_2$O Handbook, pages 51-67

C1. Assessments and Response Actions

See QAPP A6, A7, A9

C2. Reports to Management

See QAPP A6, A7, A9

References

Iowa Department of Natural Resources. *IOWATER Volunteer Water Quality Monitoring Quality Assurance Project Plan: QA/WM/01-02.* 2010.

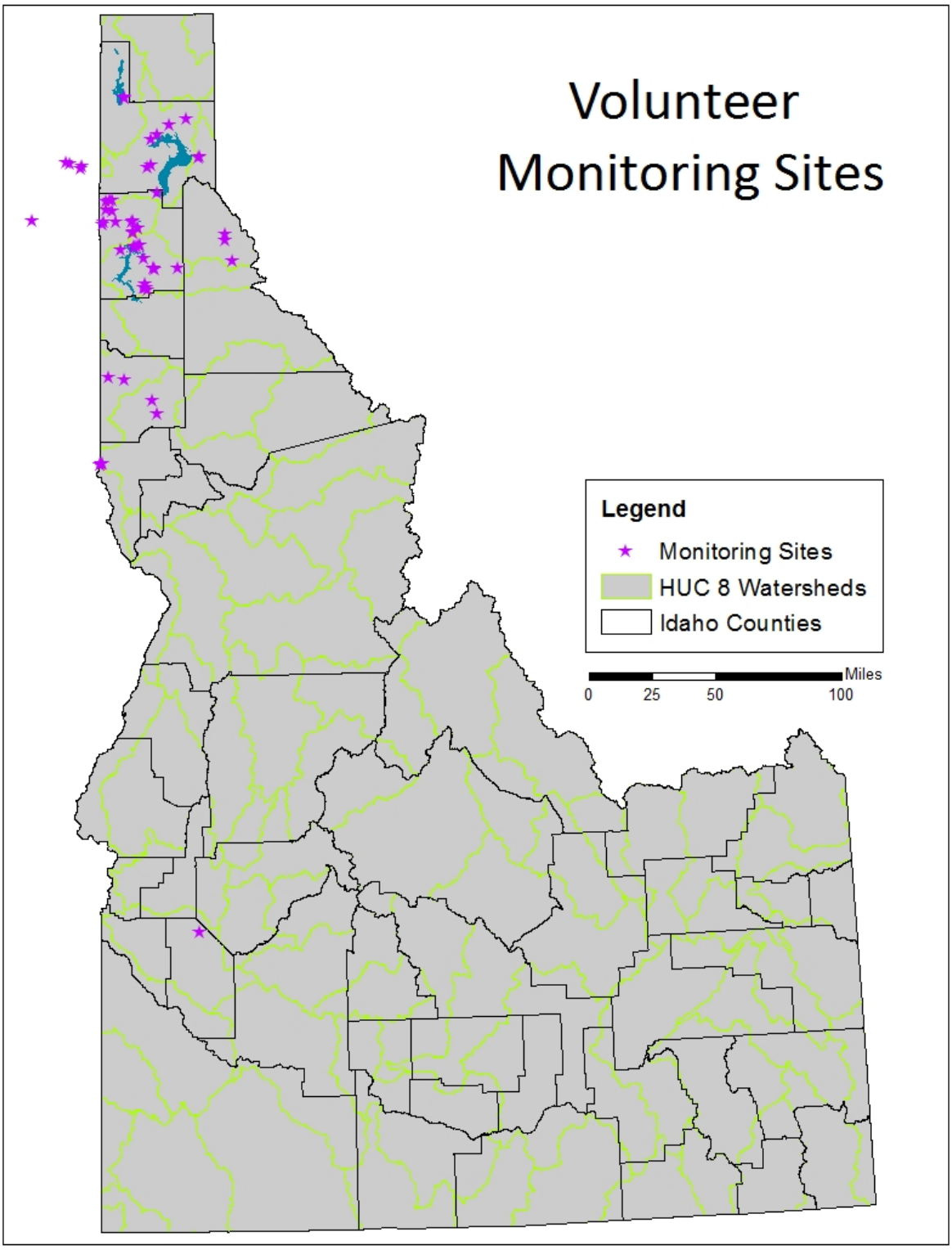
McFarland, A.A. *IDAH$_2$O Master Water Steward Program Curriculum.* University of Idaho. College of Agriculture and Life Sciences, Education Communications. 2012 (in review).

Murdoch, T., M. Cheo, K. O'Laughlin. *Streamkeeper's Field Guide: Watershed Inventory and Stream Monitoring Methods.* Everett: Adopt a Stream Foundation. 1996.

US EPA. *EPA Requirements for Quality Assurance Project Plans: EPA QA/R-5.* Office of Environmental Information. EPA/240/B-01/003. 2001.

Appendix A.

Volunteer Monitoring Sites



Appendix B.

Field Data Forms

Habitat Assessment

*** Recommended frequency – yearly ***
*** Photographic documentation is recommended and strongly encouraged ***

Date _____ **Time** _____

IDAH$_2$O Monitor # _____ **# of Adults** (*including you*) _____

Site Number _____ **# of under 18** _____

Other Volunteers Involved _____

Site Description _____

_____

_____

Was the stream dry when it was monitored? Yes _____ No _____

Stream Habitat Type (*at transect – check one*): Riffle _____ Run _____ Pool _____ Glide _____

Streambed Substrate (at *transect – estimate percentages – **100% total***)

_____ % Bedrock – large sheets of stone.
_____ % Boulder – stones larger than 10 inches in diameter
_____ % Cobble – stones with a diameter between 2.5 and 10 inches
_____ % Gravel – 0.1 to 2 inch diameter
_____ % Sand – smaller than 0.1 inches
_____ % Mud/Silt – dirt or soil deposited on bottom of the stream
_____ % Other – organic material like leaf litter, tree limbs, etc.

Embeddedness (% substrate embeddedness): _____ %

Pebble Count Survey (Wolman 1954) (at *transect*)

Size class	**Dimension**	**In wetted**	**Out wetted**
Silt/Clay	0 – 1 mm	_____	_____
Sand	1.1 – 2.5 mm	_____	_____
Very fine pebble	2.51 – 6 mm	_____	_____
Pebble	6.1 – 15 mm	_____	_____
Coarse pebble	15.1 – 31 mm	_____	_____
Very coarse pebble	31.1 – 64 mm	_____	_____
Small cobble	64.1 – 128 mm	_____	_____
Large cobble	128.1 – 256 mm	_____	_____

Small boulder	256.1 – 512 mm	_____	_____	
Medium boulder	512.1 – 1024 mm	_____	_____	
Large boulder	1024 mm and larger	_____	_____	**TOTAL** _____

Stream Banks (*at transect – check all that apply*)

Left Bank (*facing upstream*)

_____Cut Bank – Eroding

_____Cut Bank – Vegetated

_____Sloping Bank

_____Sand/Gravel Bar

_____Rip/Rap

_____Constructed Bank (i.e., drainage ditch)

_____Other: _____

Right Bank (*facing upstream*)

_____Cut Bank – Eroding

_____Cut Bank – Vegetated

_____Sloping Bank

_____Sand/Gravel Bar

_____Rip/Rap

_____Constructed Bank (i.e., drainage ditch)

_____Other: _____

Channel Shape (*at transect*): Trapezoidal _____ Rectangular _____ Inverse trapezoidal _____

Bank Condition (*at transect*): Cover stable ___ Uncovered stable ___ Cover unstable ___ Uncovered unstable ___

Canopy Cover (*over transect – check one*): 0-25% _____ 25-50% _____ 50-75% _____ 75-100% _____

Densiometer (*#* of grid intersections obstructed by vegetation): _____

Riparian Zone Width (*at transect – check one for each bank*)

Left Bank (*facing upstream*)

_____0 – 5 meters

_____5 – 25 meters

_____Over 25 meters

Right Bank (*facing upstream*)

_____0 – 5 meters

_____5 – 25 meters

_____Over 25 meters

Riparian Zone Plant Cover (*at transect – estimate percentage of each*)

Left Bank (facing upstream)

_____% Trees

_____% Shrubs / Low Trees

_____% Grass / Low Plants

_____% Exposed Soil

_____% Other (rip rap, concrete, etc.)

100% TOTAL

Right Bank (facing upstream)

_____% Trees

_____% Shrubs / Low Trees

_____% Grass / Low Plants

_____% Exposed Soil

_____% Other (rip rap, concrete, etc.)

100% TOTAL

(Note—begin assessing stream reach beyond stream transect)

Stream Sinuosity *(along stream reach):* Low _____ Moderate _____ High ____ Braided ____

Adjacent Land Use (*along stream reach – check all that apply*)

_____Row Crop _____Industrial _____Prairie

_____Pasture _____Timber _____Park

_____Urban _____Wetland _____Playground

_____Campground _____Steep Slopes _____Animal Feeding

_____Boating Accesses _____Stairs/Walkway _____Operations/Lots

_____Nature Trails _____Rural Residential _____Other _____

_____Fence _____Conservation Lands

Microhabitats (*check all present in stream reach*)

_____Algae Mats _____Leaf Packs

_____Large organic debris _____Rocks

_____Root Wads _____Weed Beds

_____Fallen Trees _____Undercut Banks

_____Silt/Muck _____Rip Rap

_____Sand _____Overhanging Vegetation

_____ Junk (tires, garbage, etc.) _____Other (*describe*)

Human Use Activities (*along stream reach – check all that apply*)

Please check activities you've participated in or witnessed at this site.

_____Swimming _____Canoeing/Kayaking _____Hunting/Trapping

_____Tubing _____Boating _____Fishing

_____Water Skiing _____Wading _____Kids Playing

_____Wind Surfing _____Rafting _____Other _____

Evidence of Human Use (*along stream reach – check all that apply*)

Please check evidence of human use you've witnessed at this site.

_____Streamside Roads _____ATV/ORV Tracks _____Fishing Tackle

_____Footprints or Paths _____Rope Swings _____Evidence of Play

_____Dock/Platform _____Camping Sites _____Other _____

_____Livestock Watering _____Fire Pit/Ring

Record all other land use practices that potentially could affect the stream.

_____

_____

_____

_____

Are there any noxious weeds present? _____

_____

Chemical/Physical Assessment

*** Recommended frequency – sample monthly <u>at transect</u> ***

Date _____ **Time** _____

IDAH$_2$O Monitor # _____ **# of Adults** (*including you*) _____

Site Number _____ **# of under 18** _____

Other Volunteers Involved _____

Was the stream dry when it was monitored? Yes _____ No _____

Weather (*check all that apply*)

Sunny _____Partly Sunny _____ Cloudy _____ Rain/Snow _____ Windy _____ Calm _____

Water Color (*check all that apply*)

Clear _____ Brown _____ Green _____ Oily _____ Reddish _____ Blackish _____ Milky _____ Gray _____

Water Odor (*check all that apply*)

None _____ Sewage/Manure _____ Rotten Eggs _____ Petroleum _____ Musky _____

Air Temperature _____ °Fahrenheit **Precipitation** _____ inches over the last 24 hours

Transparency (*record whole numbers only – no tenths*) _____ centimeters

pH Expiration date on bottom of bottle _____ *check one* – 4 _____ 5 _____ 6 _____ 7 _____ 8 _____ 9 _____

Dissolved Oxygen (*mg/L***)** Expiration date on back of color comparator _____

check one – 1 ___ 2 ___ 3 ___ 4 ___ 5 ___ 6 ___ 8 ___ 10 ___ 12 ___

Chloride Expiration date on bottom of bottle _____

_____ mg/L **–** *Convert Quantab Units to mg/L using the chart provided on the bottle*

Water Temperature _____ °Fahrenheit **Stream Width** ___.____ meters

Maximum Stream Depth (*along your transect*) **Stream Flow** (*along your transect*)

___._____ meters **_____** high **_____** normal **_____** low **_____** not sure

Stream Depth (*in meters*)

1st Spot ___._____	6th Spot ___._____	11th Spot ___._____
2nd Spot ___._____	7th Spot ___._____	12th Spot ___._____
3rd Spot ___._____	8h Spot ___._____	13th Spot ___._____
4th Spot ___._____	9th Spot ___._____	14th Spot ___._____
5th Spot ___._____	10th Spot ___._____	15th Spot ___._____

Stream Velocity (*in seconds*)

1st Spot _____	6th Spot _____	11th Spot _____
2nd Spot _____	7th Spot _____	12th Spot _____
3rd Spot _____	8th Spot _____	13th Spot _____
4th Spot _____	9th Spot _____	14th Spot _____
5th Spot _____	10th Spot _____	15th Spot _____

Other Stream Assessment Observations and Notes

Biological Assessment

*** Recommended frequency – no more than three times/year (Spring, Summer and Fall) ***

Date _____ **Time** _____

IDAH$_2$O Monitor #_____ **# of Adults** (*including you*) _____

Site Number _____ **# of under 18** _____

Other Volunteers Involved _____

Was the stream dry when it was monitored? Yes _____ No _____

Were Benthic Macroinvertebrates Found? (*If yes, please check those benthics found. If no, please provide any relevant comments in the "Other Assessment Observations and Notes" section at the end of this form – why do you think critters are not present here?*)

Benthic Macroinvertebrates (*check all found*)

High Quality Group
(*pollution intolerant*)
___ Caddisfly
___ Dobsonfly
___ Mayfly
___ Riffle Beetle
___ Snail (not pouch)
___ Stonefly
___ Water Penny Beetle

Middle Quality Group
(*somewhat pollution tolerant*)
___ Alderfly
___ Backswimmer
___ Crane Fly
___ Crawdad
___ Crawling Water Beetle
___ Damselfly
___ Dragonfly
___ Giant Water Bug
___ Limpet
___ Mussels/Clams
___ Orbsnail
___ Predaceous Diving Beetle
___ Scud
___ Sowbug
___ Water Boatman
___ Water Mite
___ Water Scorpion
___ Water Strider
___ Whirligig Beetle

Low Quality Group
(*pollution tolerant*)
___ Aquatic Worm
___ Black Fly
___ Bloodworm
___ Flatworm
___ Leech
___ Midge Fly
___ Mosquito
___ Pouch Snail
___ Rat-tailed Maggot
___ Water Scavenger Beetle
___ Other _____
(no tolerance group assigned)

Benthic Macroinvertebrate Collection Time (*check one*)

0 – 15 min. _____ 15 – 30 min. _____ 30 – 45 min. _____ More than 45 min. _____

Collection Nets (*How many nets are you using to collect critters?*)

1 _____ 2 _____ 3 _____ 4 _____ 5 _____ 6+_____

Stream Reach Length (*How far along the stream did you search?*)

_____ 0 – 25 meters _____ 25 – 50 meters _____ 50 – 75 meters _____ 75 – 100 meters _____ 100+ meters

Microhabitats (*check all present in stream reach, check if sampled*)

Algae Mats	Present __	Sampled __	**Leaf Packs**	Present __	Sampled __
Logjams	Present __	Sampled __	**Rocks**	Present __	Sampled __
Root Wads	Present __	Sampled __	**Weed Beds**	Present __	Sampled __
Fallen Trees	Present __	Sampled __	**Undercut Banks**	Present __	Sampled __
Silt/Muck	Present __	Sampled __	**Rip Rap**	Present __	Sampled __
Sand	Present __	Sampled __	**Overhanging Vegetation**		
Junk (*tires, garbage, etc.*)				Present __	Sampled __
	Present __	Sampled __			
Other (*describe*)	Present __	Sampled __			

Stream Habitat Type (*check all types sampled in stream reach*)

Riffle _____ Run _____ Glide _____ Pool _____

Aquatic Plant Cover of Streambed (*at transect – check one*)

0 – 25% _____ 25 – 50% _____ 50 – 75% _____ 75 – 100% _____

Algae Cover of Stream Streambed (*at transect – check one*)

0 – 25% _____ 25 – 50% _____ 50 – 75% _____ 75 – 100% _____

Other Assessment Observations and Notes

_____

_____

_____

_____

Are there any fish or sign of fish present? _____

_____

Standing Water Assessment

*** Recommended frequency – monthly from ice-out to freeze-over ***

Date _____ **Time** _____

IDAH$_2$O Monitor #_____ **# of Adults** (*including you*) _____

Site Number _____ **# of under 18** _____

Other Volunteers Involved _____

PHYSICAL ASSESSMENT

Weather (*check all that apply*)

Sunny _____Partly Sunny _____ Cloudy _____ Rain/Snow _____ Windy _____ Calm _____

Air Temperature _____ °Fahrenheit **Precipitation** _____ inches over the last 24 hours

Wind Direction (*check one*)

____ Not applicable
____ North
____ South
____ East
____ West
____ Northeast
____ Northwest
____ Southeast
____ Southwest

Wind Speed (*check one*)____

Calm (0-5 mph, felt on face, leaves rustle)
____ Breezy (sustained 5-15 mph, small branches move)
____ Gusty (gust over 15 mph, small trees sway occasionally)
____ Strong (sustained over 15 mph, small trees sway continuously, waves form)

Site Location ____ Open Water ____ Shore or Dock

Secchi Disc Depth ____.____ meters

OR Transparency Tube _____ cm (*record whole numbers only – no tenths*)

Water Temperature ____ °Fahrenheit

Water Level (*check one*) Above Normal ____ Normal ____ Below Normal ____

If lake is not at normal level, and you have means to measure, please specify:

inches above _____ or below _____ normal

Water Odor (*check all that apply*)

None ____ Sewage/Manure ____ Rotten Eggs ____ Petroleum ____ Fishy ____

CHEMICAL ASSESSMENT

IMPORTANT: Use point sampling technique!

pH Expiration date on bottom of bottle_____ *check one* – 4 _____ 5 _____ 6 _____ 7 _____ 8 _____ 9 _____

Dissolved Oxygen (*mg/L***)** Expiration date on back of color comparator _____

check one – 1 ___ 2 ___ 3 ___ 4 ___ 5 ___ 6 ___ 8 ___ 10 ___ 12 ___

Chloride Expiration date on bottom of bottle _____

_____ mg/L **–** *Convert Quantab Units to mg/L using the chart provided on the bottle*

BIOLOGICAL ASSESSMENT

Water Color – Is there an obvious algal bloom? (algal mats present, water appears green or scummy)

_____ No _____ Yes (*if yes, please submit a photo record*)

BENTHIC MACROINVERTEBRATE ASSESSMENT – Use the Biological Assessment Form to record benthic data.

HABITAT ASSESSMENT

*** Conduct only once per year, preferably in July, or if a major land use change occurs ***

Describe Lake Banks _____

_____

Describe Adjacent Land Use _____

_____

Other Observations and Notes _____

_____

Appendix C.

Chain of Custody Form

IDAH$_2$O Snapshot

Chain of Custody

Report to: IDAH$_2$O: Master Water Stewards
1031 N. Academic Way
Coeur d'Alene, ID 83814

Invoice:
Make checks payable to UI Bursar
$10/sample

State of Sample Origination: Idaho

	IDAH$_2$O Site ID #	Sampling Location	Date of Sampling	Time of Sampling	Comments
1					
2					
3					
4					
5					

Sample(s) Taken by: _____

Sampler(s) Signature: _____

Relinquished by:	Date	Time	Received By:	Date	Time

Payment: Cash: _____ / Check# _____ Received by: _____

Appendix D.

Commitment to Comply with IDAH$_2$O Training Methodologies and Quality Assurance Practices

Commitment to Comply with IDAH$_2$O Training Methodologies and Quality Assurance Practices

(signature required before start of training)

_____ _____

volunteer name *workshop location/date*

When conducting water quality monitoring as a certified Master Water Steward for the IDAH$_2$O program, I agree to:

- Maintain an interest and stay current on water quality issues,
- Conduct all monitoring as outlined by the methodologies in the IDAH$_2$O handbook,
- Adhere to the IDAH$_2$O code of ethics,
- Maintain positive working relationships with landowners and program partners, and
- Follow quality assurance guidelines as outlined in the IDAH$_2$O Quality Assurance Project Plan.

Signature of this form signifies the volunteer has reviewed and agrees to comply with the IDAH$_2$O handbook and Quality Assurance Project Plan.

_____ _____

signature *date*