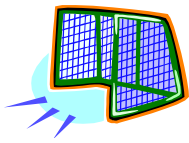


Short-course Basics



▶ *Short-course Goal*

This short-course is designed to provide individuals and community representatives with new skills and information on water quality and monitoring.

After attending this short-course individuals and community representatives will have the knowledge and resources to provide leadership in water quality assessment and monitoring and share basic information about these issues with others in their local communities.

▶ *Short-course Objectives*

The Pacific Northwest Water Quality & Monitoring Short-course is designed to teach individual and community representatives about:

1. Water issues that impact citizens at the community (watershed) level;
2. Commitment to protecting water resources by local empowerment;
3. Monitoring biological, physical, and chemical aspects of surface water quality;
4. Developing and/or supporting a local volunteer monitoring workgroup complete with a monitoring project; and
5. Providing links to existing water monitoring and/or assessment programs in their community, region, and state.



▶ *Target Audience*

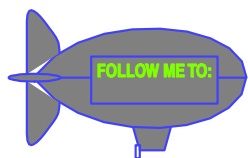
Individuals, community representatives, teachers, and non-formal educators who are interested in water quality and monitoring. Those interested in initiating elements of water assessment, protection, or monitoring processes with other community members. Those addressing natural resource planning and water issues in watersheds.

▶ *Water Quality & Monitoring Journal*

As learners progress through the short-course participants will express their thoughts, views, feelings, and reactions. Participants are encouraged to provide verbal, symbolic, or pictorial reactions. There are specific assignments to complete for each part of the Water Quality & Monitoring Journal.

▶ *Training Materials*

The short-course presenter materials are a tool for individuals who wish to introduce their community to water quality assessment and monitoring processes. The participant materials should be copied and provided to each short-course attendee. To obtain copies of this booklet, call 208-885-7025, e-mail bmahler@uidaho.edu or, go to the web site: <http://www.uidaho.edu/~bmahler/>.



▶ *How to Use this Guidebook*

Table of Symbols — A variety of symbols are used throughout the short-course guide to bring attention to specific information, suggestions, reminders, and discussion points that may be used by the presenters and participants.

Lesson Plans — Each part begins with a lesson plan that lists the topics to be presented, training materials needed (overheads and handouts), and the estimated delivery time.

Overheads and Background Material — Each part has overheads for that section with background information that may be used by the short-course presenter to supplement the information presented on the overhead and in the participant materials. A complete set of overheads may be found in Appendix A.

Handouts — A series of handouts has been developed to supplement specific sections of the short-course by organizers at each site. Presenters may also have copies or supplemental material to assist attendees and/or prompt discussions on a particular subject. Place these materials in Appendix E that is tabbed as Handouts.



► *Adapting Training Materials*

The short-course training module is a guide. The most successful programs are ones that adapt to the needs of the participants. It is critical that state-specific information be included. For more information contact the agency or organization in your state that is responsible for developing and implementing your state's water quality and monitoring programs.

All parts of this short-course do not have to be presented together. The presenter must choose which components of water quality and monitoring are most interesting and valuable to the audience, especially when the presenter does not have time to present the entire short-course. In other cases, the presenter may need to add situation-specific materials to their short-course and explore certain topics in-depth.

Symbols



▶ *Short-course Participants*

This material is written specifically for short-course participants and highlights an opportunity for their involvement in the water quality and monitoring process.



▶ *Discussion Points*

When you see this icon, take a moment to stop and pose a question to the group. Participants are more likely to remember and apply the information presented if they have a chance to discuss it, ask questions, and get an idea of how they can take action in their own community.



▶ *Major Points to Remember*

Just like it says, this icon identifies information that you and the short-course participants may want to tack up and remember as you get more involved in water quality and monitoring.



▶ *Journal and Evaluation*

When you see this icon, you will need to respond in your own words in your journal to the posed question or activity. This journal is for your use and is considered private unless you agree to share its contents with your group. It is designed to stimulate reflection and thought that you can go back to after the short-course is complete. It is also a location to record collected data. It may also be a useful reference when you complete the program evaluation.



▶ *Additional Activities*

These are ideas that short-course organizers can use to add to the program. Selected web sites, activities, and resource use ideas are presented for each part of the program.



► *Ideas for Water Quality and Monitoring Action*

For each part, considerations are presented for the Learn, Plan, and Act process. A few suggestions and ideas for action are provided to stimulate discussion among attendees.



► *Links and References*

Need more information or help? Here are some great web sites and references for you to check out! They have been selected to help you learn more about water quality and monitoring in the Pacific Northwest.



► *Short-course Presenters*

This material is written specifically for you, the short-course presenter, and contains information, activities, and background material that you may use to supplement the participant materials.



► *Tips for Short-course Presenters*

These tips will help you prepare for the short-course by identifying areas where an expert's perspective or state-specific material may be a valuable supplement to the short-course.



► *Optional Training Materials*

Handouts have been developed to supplement specific sections of the short-course. The presenter may make copies of the handouts and distribute them along with the participant materials or hand them out as topics are discussed.

Learning Objectives

Introduction

- ▶ Overview and understand general short-course objectives, symbols, and how to use the guide.
- ▶ Understand the Learn-Plan-Act process for approaching water concerns and issues.



Part 1: Water, Watersheds, and Beneficial Uses of Water

- ▶ Understand water, watersheds, and the beneficial uses of water.
- ▶ Identify key contacts in communities that should be involved in water quality, assessment, and protection processes.



Part 2: Ground, Drinking, and Surface Water

- ▶ Address key local water concerns and issues.
- ▶ Identify the primary sources and issues surrounding drinking water and ground water.
- ▶ Identify the types of standards associated with drinking and ground water.
- ▶ Understand key terms explaining how and why we monitor.



Part 3: Nine Key Indicators of Surface Water Quality

- ▶ Recognize the key indicators of surface water quality.
- ▶ Identify how water quality indices can be used in monitoring efforts.
- ▶ Identify key parameters of water chemistry and components of water chemistry testing kits.



Part 4: Experience Surface Water Quality Monitoring and Safety in the Field

- ▶ Identify the three major components of surface water quality assessment for streams, ponds, lakes, or estuaries.
- ▶ Conduct physical, chemical, and biological water habitat assessments.



Part 5: Spread the Word!

- ▶ Recognize opportunities and responsibilities for public involvement within the water quality and monitoring process.
- ▶ Increase public awareness of water issues that impact citizens and their communities related to:
 - Observing and measuring water resources.
 - Using developed scientific screening tools and collection methods so that regional and trend comparisons can be made.
- ▶ Encourage citizen commitment to protect water resources and educate individuals about aquatic ecology.
- ▶ Empower citizens to protect their water supply.
- ▶ Encourage the adoption of Best Management Practices (BMPs) to protect or improve the quality of water resources related to:
 - Total maximum daily loads (TMDLs)
 - Wellhead protection/drinking water
 - Animal water management
 - Nutrient management
 - Pesticide management
 - Irrigation and sediment management
 - Enhancing water use effectiveness
 - Drinking water

Partnership Goal

A goal of this program is to expand PNW water quality and monitoring by adding “new” partners and working with existing partners in disseminating this natural resource issues investigation model. Further disseminating this model and learning framework can positively impact adults and youth managing their own and their community water environments in the Pacific Northwest.

General Workshop Tips



The Room

Make sure you have a room that will accommodate the number of participants you have. To maximize the participants' experience, limit the amount of participants to no greater than twenty. A group of that size can still interact freely and share ideas without overwhelming the workshop presenter.

The Lighting

A well-lit room tends to create a more interactive atmosphere. A dark room with an overhead projector shining up front is too much like a classroom or a lecture hall. Keep the lights on so participants can see each other, see you, and see special guests. Participants should still be able to see the overheads. If they cannot see the overheads, dim the lights a touch and remind them that they have copies of the overheads in their participant materials.

The Temperature

Nothing is worse than a room that is too hot or too cold. Make sure you have a room where you control the temperature. If not, work with the facility managers to make the room comfortable for workshop participants.

The Logistics

Add to the comfort level of the participants by letting them know the location and availability of restrooms, drinking fountains, telephones, and perhaps even a fax machine, smoking area, or vending machines. Also make sure the participants know the length of the workshop and, if any breaks are scheduled, their frequency and length.



The Discussions

Key to the success is to remind all participants that the purpose of the short-course is education, not advocacy of a particular belief or value. Before encouraging discussions remind all attendees that respect, responsibility, and safety for all their fellow learners is expected. Respond to the needs of the workshop participants by supporting the discussion of topics they find interesting. Here the short-course presenter serves as a facilitator by encouraging and leading the discussion, rather than dictating it. If one participant seems to be driving the discussion, draw other participants into the discussion by asking them to share their insights and experiences.

If a participant leads the group away from the topic at hand, recognize their interest and take time to revisit their topic at a later time. For example, you might say, “You must feel strongly about this issue and I can understand why you feel strongly; however, it is outside the scope of this discussion. Let’s write this issue down and revisit it when we have finished the current topic.”

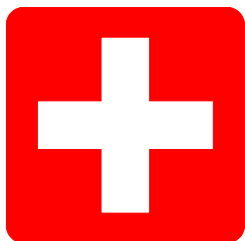
The Experts

Invite special guests as experts to supplement the material presented. When participants have specific questions, refer to the experts. Help the experts focus on the question and make sure the participants understand and are comfortable with the answer, even though they may not agree with it.

Short-course participants will appreciate the straightforward approach and presentation of the material; it reinforces the idea that water quality and monitoring is something they can and should get involved with. Having the expert available to “fill in the gaps” adds a great deal to the content, but the expert should not necessarily lead the discussion.

The Field

Select field demonstration sites that are safe, with good access for the types of learners you will have in your program. Consider the purpose of the program and expected outcomes of your water quality and monitoring effort. If a site might be controversial, it would be best to find alternate locations (streams, lakes, or ponds) that will foster learning. For streams it is great if a 500 meter reach can be identified with several sections that can be divided equally between short-course subgroups on the field day. For ponds or lakes, locations with bridges, docks, boat ramps, or a boat can improve the quality and validity of the demonstration. Safety should be the first priority in the field site selection. Remember to gain access permission if participants will be crossing private, tribal, and/or secured government properties.



Safety

Expect that the short-course will be fun and safe. Please review the provided safety suggestions in this program guide and the “safe use” guidelines in the field water quality kits. Be sure all have read or reviewed them before engaging in an activity! A first aid kit needs to be available for use in the field portion of the program.

Pre Short-course Activities

At the beginning of this course attendees were asked to complete a pre-test to determine what they already knew and the best direction to take each short-course group. This information will remain confidential and only general trends and average numbers will be used to measure growth in awareness and understanding as a result of this effort.

All those who actually participate in the short-course should be provided a post-test to complete and return to their local extension faculty. The purpose of the pre/post tests are threefold:

- 1. to help planners do the best job possible of meeting the learning needs of each participant;**
- 2. to introduce learners to water quality ideas and concepts that would be, or were presented in the short-course; and**
- 3. to gauge learners knowledge and awareness levels of water, water issues, monitoring skills, and surface water quality before and after the learning experience.**

Post Short-course Activities

At the end of the program attendees will complete a post-test and be awarded certificates. A follow-up workshop or meeting is expected to be prepared for each site the short-course is presented. Local organizers and presenters will plan these supplemental learning efforts based upon post-test responses, identified monitoring opportunities, and water issues in each community. Each potential group monitoring project provides for level 2 completion certificates.

Completion Certificates, Continuing Education Credits

All the attendees who complete the 15-hour short-course will be awarded a certificate of completion from the local sponsoring partners and cooperators. A certificate template can be found in Appendix D. Second level certification for completion (minimum of 30 hours) of an actual community based water quality or monitoring project is highly recommended. Continuing education, PDUs, and/or college credit can often be arranged in advance with local short-course sponsors.

7. Indicate which water monitoring techniques you feel confident in doing:

- Monitor/Test for coliform bacteria
- Monitor/Test for nutrients (nitrates and phosphorus)
- Monitor/Test for dissolved oxygen (DO)
- Monitor/Test for alkalinity
- Monitor/Test for lead, iron, or sulfate
- Monitor/Test for pH
- Monitor/Test for turbidity
- Monitor/Test for total dissolved solids (TDS)
- Monitor/Test for hardness
- Monitor/Identify macroinvertebrates (insects, leeches, etc.) in streams
- Monitor/Identify physical stream, river, or lake characteristics
- Monitor/Identify aquatic plants and animals

Please answer each of the following questions by circling the most appropriate answer:

8. Which source supplies your home tap water?
a) Water department b) Private well c) Other system d) Don't know
9. Does this water originate from?
a) Surface water (rivers, lakes, and streams) b) Groundwater (wells) c) Both d) Don't know
10. Do you regularly use bottled water for drinking?
a) Yes b) No
11. Do you regularly use a water purifier (other than a water softener)?
a) Yes b) No c) Don't know
12. If you regularly use bottled water or a water purifier, why do you do so? (circle all that apply)
a) Safer, better for my health b) Tastes better c) Odor free
d) Free of chemicals and contaminants e) Don't know
f) Other (please specify): _____
13. What do you consider to be the most serious health risks in drinking water?
a) Fluoride b) Bacteria/microscopic organisms c) Lead d) Nitrates e) Radionuclides f) Toxic chemicals
g) Don't know h) Other (please specify): _____

Please continue

-
14. Compared with other places in your county is your home/community more or less vulnerable to contamination of its groundwater?
a) More b) Less c) About the same d) Don't know
15. What do you think are the most common causes of water pollution or water quality problems in your community? (circle all that apply)
a) Leaking underground tanks b) Chemical spills c) Inadequate septic systems d) Poorly designed waste disposal systems e) Agricultural chemicals or fertilizers f) Use and disposal of household and yard wastes g) Road construction and urban development h) Ag or natural resource harvesting or tillage i) E.coli problems j) Other (please specify):
16. What three characteristics of a water body are examined during a monitoring effort or assessment?
a) Physical, chemical, and biological b) Municipal, commercial, and recreational c) Environmental effects, water body use, and substrate d) Volume, velocity and flow, source e) Don't know

Please indicate whether you believe the following statements to be true or false by circling your answer.

17. Groundwater is the water that fills the natural open spaces in soils and underground rock in much the same way as water fills a sponge.
a) True b) False c) Don't know
18. Four key indicators of surface water quality are sediment, nutrients, toxic substances, and organic wastes.
a) True b) False c) Don't know
19. BOD is the total measure of oxygen consumed by fish in a stream, lake, pond, or estuary.
a) True b) False c) Don't know
20. Water quality monitors should always sample with a qualified partner or team for the purpose of safety and quality of data.
a) True b) False c) Don't know
21. Water is the only substance found on earth naturally in three forms (solid, liquid, and gas).
a) True b) False c) Don't know
22. For more information about drinking water source assessment, protection, and water quality monitoring, one can contact EPA, State Departments of Health, and other cooperating USDA agencies.
a) True b) False c) Don't know
23. The maximum contaminant level is the highest level allowed by law of a particular contaminant in drinking water delivered to users of a public water supply system.
a) True b) False c) Don't know

24. The hydrologic cycle is a process where water moves through the environment.
a) True b) False c) Don't know
25. A typical water project or watershed plan will include community objectives, a detailed resource list of management systems, water quality data, and potential sources of financial assistance.
a) True b) False c) Don't know
26. The expression Total Maximum Daily Load (TMDL) is a measure of the amount of pollution a body of water can receive without adversely affecting aquatic health and human health.
a) True b) False c) Don't know
27. What is your age group?
a) < 18 b) 18-29 c) 30-44 d) 45-64 e) 65+
28. What is your gender?
a) male b) female
29. Where do you live?
a) City or town / Urban area
b) Unincorporated area near city or town / Suburban
c) Rural area

30. Other Comments:

Thank you for completing this evaluation!

5. Please indicate your experience in this short-course and its purposes. Circle **1** if you believe it was most important to **6** if it was least important to your successful completion of this learning experience.

Most Least
Important Important

- 1 2 3 4 5 6 Sessions were active “hands-on” learning.
- 1 2 3 4 5 6 It provided “in-depth” technical strategies for water quality monitoring.
- 1 2 3 4 5 6 It created an awareness of water quality issues.
- 1 2 3 4 5 6 Taught me how to monitor water quality in water resources.
- 1 2 3 4 5 6 Increased my understanding of water and water quality.
- 1 2 3 4 5 6 Design sessions that used “lecture/discussion” learning.
- 1 2 3 4 5 6 Provided models for community water quality monitoring action.
- 1 2 3 4 5 6 Design sessions addressed planning & zoning water quality issues.
- 1 2 3 4 5 6 Follow-up sessions are planned into the learning experience.
- 1 2 3 4 5 6 Provided a “resource notebook” to support my learning.
- 1 2 3 4 5 6 Provided a “web site” to support learning.
- 1 2 3 4 5 6 Taught me how to know if my drinking water is safe.

6. Please identify other methods, resources, or materials that would have helped you to practically apply this learning experience to your daily life or community:

7. Indicate which water monitoring techniques you feel confident in doing:

- Monitor/Test for coliform bacteria
- Monitor/Test for nutrients (nitrates and phosphorus)
- Monitor/Test for dissolved oxygen (DO)
- Monitor/Test for alkalinity
- Monitor/Test for lead, iron, or sulfate
- Monitor/Test for pH
- Monitor/Test for turbidity
- Monitor/Test for total dissolved solids (TDS)
- Monitor/Test for hardness
- Monitor/Identify macroinvertebrates (insects, leeches, etc.) in streams
- Monitor/Identify physical stream, river, or lake characteristics
- Monitor/Identify aquatic plants and animals

Please answer each of the following questions by circling the most appropriate answer:

8. Based on the Federal Safe Drinking Water Act, the US EPA and your state have established drinking water standards for 20+ health-related contaminants. What is the purpose of these standards?
a) Water department b) Private well c) Other system d) Don't know
9. What do you consider to be the most serious health risks in drinking water?
a) Fluoride b) Bacteria/microscopic organisms c) Lead d) Nitrates e) Radionuclides f) Toxic chemicals
g) Don't know h) Other (please specify): _____
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Please continue

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a) male b) female
25. Where do you live?
a) City or town / Urban area
b) Unincorporated area near city or town / Suburban
c) Rural area

Evaluation of Water Quality and Monitoring Short-course Program

26. Please indicate your experience with this short-course and its purposes. Circle **1** if you strongly agree to **6** if you strongly disagree with each statement.

Agree	Disagree	
1 2 3 4 5 6		This short-course was beneficial to me and I will use it in my profession (natural resource manager, rancher, irrigator, environmental activist, teacher, community organizer, etc.).
1 2 3 4 5 6		The materials that I received will be used in organizing my or a group water monitoring effort.
1 2 3 4 5 6		The material presented in the classroom was at an appropriate level.
1 2 3 4 5 6		The material presented in the field was at an appropriate level.
1 2 3 4 5 6		The short-course overall was a good learning experience that I will share with others in my community.
1 2 3 4 5 6		The amount of time spent completing this short-course was appropriate.
1 2 3 4 5 6		I am more technically competent to discuss water resource issues because of this short-course.
1 2 3 4 5 6		I would recommend this program to my neighbors, friends, and colleagues.

27. Other Comments about this short-course that you believe would be helpful to its delivery, development, or application:

Thank you for completing this evaluation!



Links and References

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Porter E. and Mahler, R. (1996) Water Testing CIS 873, University of Idaho, College of Agriculture, Agricultural Communications Center, Moscow, ID. 4 pages.

Pretest, Introduction To Water Quality Training Program (1999) USDA, Natural Resources Conservation Service (http://www.ftw.nrcs.usda.gov/iris/water_qual/netinfo.html).

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