



## From the Trenches – Tips and Tools for Effective Presentations

Stimulating community interest and action to protect and improve water resources is a goal of many volunteer water monitoring programs. By its very nature, water quality monitoring data is complex, encompassing multiple sites over long periods of time, under variable weather conditions. Thus, monitoring programs often spend a significant amount of time and effort helping decision makers, stakeholders and the general public to better understand the condition of local waterbodies based on volunteer-generated data. Presenting complex water quality information in an effective, relevant way is essential for their success.

Some seasoned volunteer monitoring programs have been addressing this challenge for over thirty years, while others are just getting their feet wet, bringing a fresh perspective. Collectively, they have a vast breadth of knowledge about developing and presenting data effectively and have created numerous resources which serve as examples to others. The Volunteer Monitor Newsletter (Volume 7(1), Spring 1995) (<http://www.epa.gov/owow/monitoring/volunteer/newsletter/volmon07no1.pdf>) focused on “Managing and Presenting Your Data” and categorized these data presentation tools into several categories. Building upon that resource, this tip sheet groups these tools and materials into six categories. For each category, specific examples and websites links are provided from volunteer monitoring colleagues based on both their successes and their debacles with effective data presentation. This module includes a compilation of lists of presentation resources assembled by Jo Latimore (Michigan Clean Water Corps) the New England Volunteer Monitoring Focus Area and from volunteer monitoring listserv discussions.

### Posters and Displays

#### Buzzards Bay Water Quality

(<http://www.savebuzzardsbay.org/bayinfo/publications/documents/health-index-summary-map.pdf>) This poster of the Buzzards Bay (MA) Baywatchers Program compiles data collected between 1992 and 2005. It utilizes the group’s “Bay Health Index” to assess the nutrient related health of each of the Bay’s major harbors and coves, and ranks health as poor/eutrophic, fair, or good to excellent.

#### Baywatchers III – Nutrient-Related Health of Buzzards Bay Embayments

([http://www.savebuzzardsbay.org/bayinfo/documents/Baywatchers\\_III.pdf](http://www.savebuzzardsbay.org/bayinfo/documents/Baywatchers_III.pdf)) This poster combines the Buzzards Bay Baywatchers Program’s Bay Health Index, photos and data to effectively display data results from 1992-2001.

#### Wet/Dry Mapping of the San Pedro River

([http://www.srn.arizona.edu/nemo/review/wd\\_SanPedro\\_AllYears24x30.pdf](http://www.srn.arizona.edu/nemo/review/wd_SanPedro_AllYears24x30.pdf)) This University of Arizona NEMO Program poster uses maps, pie charts and color coding to show data results of percent wet and dry periods in the San Pedro River over an eight year period.

#### Assessing Stream Health: Stream Bugs Tell the Story

(<http://www.usawaterquality.org/volunteer/Special/EPAListserv/Clallum/BIBIV3halfsize.JPG>) This poster, developed by Ed Chadd and Adar Feller with Streamkeepers of Clallam County (WA) explains the meaning of a Benthic Index of Biological Integrity (B-IBI) and why it is important. Images and color are used to clarify the meaning for viewers of the poster.

## Case Studies: Peabody Creek

(<http://www.usawaterquality.org/volunteer/Special/EPAListserv/Clallum/Peabody.JPG>), Bell Creek (<http://www.usawaterquality.org/volunteer/Special/EPAListserv/Clallum/Bell.JPG>), and Salt Creek (<http://www.usawaterquality.org/volunteer/Special/EPAListserv/Clallum/Salt.JPG>). These posters are case studies from the Streamkeepers of Clallum County (WA) program. They explain watershed-process concepts, and help community members to have a better understanding of how watersheds work and how they are affected by human uses of the land.

## Oral/PowerPoint Presentations/Slideshows

### Presenting Your Monitoring Data

([http://www.micorps.net/conference2007\\_proceedings](http://www.micorps.net/conference2007_proceedings)). This slide show by Jo Latimore of Michigan Clean Water Corps explains how to present monitoring data to various audiences and how to use the information to retain volunteers and educate community members.

### Reporting Data to the Public

(<http://www.federalresourcecenter.org/frc/Tab%2015-%20NM%20Public%20data%20presentation.ppt>). This presentation focuses on state health information reporting requirements, but includes some very amusing cartoons as well as questions to ask to help focus how you report your data to different audiences.

### Optimization of a Large-scale Water Quality Monitoring Network

([http://acwi.gov/monitoring/ppt/durham0706/nwqmc\\_nhmeeting\\_pmb.ppt](http://acwi.gov/monitoring/ppt/durham0706/nwqmc_nhmeeting_pmb.ppt)). This was developed for a meeting of the National Water Quality Monitoring Council. It includes a description of the statistical methods used and the rationale for selection of those methods for interpreting monitoring data from a number of sources.

### Effective Data Presentation - Making Figures and Tables

(<http://www.utsa.edu/mbrs/pages/resources/lectures/tblfigs082006.ppt>). This professional development presentation provides detailed information on what should and shouldn't be included in tables and figures in order to make them quickly and easily understandable.

Section VI: Bringing RAP [Rapid Assessment Procedures] to the decision-making realm: Effective communication and use (<http://www.unu.edu/Unupress/food2/UIN08E/uin08e17.htm>). Another public health focused resource; the presentations on this website apply communication principles to effective dissemination of results from research.

## Maps, graphs, and databases

A number of programs have developed online databases to store and retrieve volunteer-generated data. An extensive list of these databases is included in our guidebook module called "Planning Your Program's Data Management System" (<http://www.usawaterquality.org/volunteer/Outreach/Databases.pdf>). One model example of this type of data presentation tool was developed by the Buzzards Bay Baywatchers Program. They developed an aesthetically pleasing, easy to use website that includes interactive mapping capabilities, monitoring site photos, maps, and graphed data results (<http://savebuzzardsbay.org/baywatchers/>). Other examples include:

### Loudoun Watershed Watch

([www.loudounwatershedwatch.org](http://www.loudounwatershedwatch.org)). This site has downloadable Excel files with data summarizing benthic and bacteria monitoring efforts. The Excel charts include quality ratings for all sites. The program also has interactive macroinvertebrate mapping ([http://www.loudounwatershedwatch.org/site\\_map\\_hover.htm](http://www.loudounwatershedwatch.org/site_map_hover.htm)).

MiCorps, Michigan's Clean Water Corps (<http://www.micorps.net/data/view/search/>).

This program maintains an online database accessible for searching or entering data for both lakes and streams.

Wisconsin's Water Action Volunteers Stream Monitoring Program Database

(<http://www.uwex.edu/erc/wavdb/>). This site includes graphing capabilities to compare a site's results over time or to compare results between multiple monitoring locations.

Alabama Water Watch online database (<https://aww.auburn.edu/>).

This database includes real-time graphing of some results.

Stream Health According to Biological Indicators

(<http://www.usawaterquality.org/volunteer/Special/EPAListserv/Clallum/bugratings98to06.JPG>). This map from Streamkeepers of Clallum County (WA) uses biological monitoring data to distinguish stream health at sites across the county, breaking results into five water quality health rating categories.

## Reports

Annual reports are a valuable data presentation tool. Not only can these reports be provided to volunteers, community members and other stakeholders, but they can be used to support oral results presentations made by volunteer monitoring program staff or volunteers. Most programs prepare reports to provide to volunteers, some of these are linked from here:

The Charles River Watershed Association (MA) annual reports, color-coded maps, parameter explanations and site descriptions ([http://www.crw.org/water\\_quality/monthly/monthly.html](http://www.crw.org/water_quality/monthly/monthly.html))

Minnesota Pollution Control Agency Citizen Stream-Monitoring Program single page data summaries (<http://www.pca.state.mn.us/water/csmp-reports.html#reports>)

The Lakes of Missouri Volunteer Program annual report (<http://www.lmvp.org/Data/2006/index.htm>)

The Friends of the Rouge (MI) winter stonefly search results ([http://www.therouge.org/Programs/PI/Benthic\\_Monitoring.htm](http://www.therouge.org/Programs/PI/Benthic_Monitoring.htm))

The Huron River Watershed Council (MI) annual reports with maps (<http://www.hrwc.org/1publications.htm>)

MiCorps: Michigan's Clean Water Corps annual reports (<http://www.micorps.net/>)

Russian River (CA) First Flush Stormwater Monitoring Summary Report (<http://www.swrcb.ca.gov/rwqcb1/down/russriv/062703RRFFFinalsmall.pdf>)

Streamkeepers of Clallum County's State of the Waters of Clallum County, 2004 ([http://www.clallam.net/streamkeepers/html/state\\_of\\_the\\_waters.htm](http://www.clallam.net/streamkeepers/html/state_of_the_waters.htm)). In this report each stream within the county was described using available data. It includes implications for humans and wildlife, categorical water quality ratings, maps, photos, and recommendations for protecting/improving water quality. The report now serves as a template for the group to follow and improve upon in future years.

The University of Delaware Citizen Monitoring Program reports and site maps (<http://citizen-monitoring.udel.edu/reports.shtml>)

Wisconsin's Citizen-based Water Monitoring Network Level 2 Stream Monitoring Reports  
(<http://watermonitoring.uwex.edu/level2/reports.html>)

Wisconsin's Citizen Lakes Monitoring Network Annual Lake Reports  
(<http://www.dnr.state.wi.us/org/water/fhp/lakes/Selfhelp/Reports/reportsselectcounty.asp>)

A few programs, such as the Blue Thumb Program in Oklahoma and the Alliance for Aquatic Resource Monitoring (ALLARM) in Pennsylvania, have opted to instruct their volunteers how to analyze data and prepare data summary reports. Many of the Blue Thumb reports are available at ([http://www.ok.gov/okcc/Agency\\_Divisions/Water\\_Quality\\_Division/WQ\\_Blue\\_Thumb/BT\\_Volunteer\\_Monitoring\\_/BT\\_Data\\_Interpretations/](http://www.ok.gov/okcc/Agency_Divisions/Water_Quality_Division/WQ_Blue_Thumb/BT_Volunteer_Monitoring_/BT_Data_Interpretations/)). More information about the ALLARM program is available at: (<http://alpha.dickinson.edu/storg/allarm/technical%20support/tech%20support.htm>)

### **Using Metrics and Indices**

Jerry Schoen from the New England Volunteer Monitoring Focus Area's Massachusetts Water Watch Partnership developed a list of references for developing metrics and indices to help make sense of water quality data that are collected.

Measuring Biological Condition, Protecting Biological Integrity by James R. Karr, University of Washington, Seattle. From Principles of Conservation Biology. 3rd Edition. Bloom, Meffe and Carroll. 2006

Multimetric Indices to Prepare and Analyze Data  
(<http://www.epa.gov/bioindicators/html/multimetric.html>) This EPA site includes five steps describing the importance of biological indices.

Developing Metrics and Indices of Biological Integrity  
(<http://www.epa.gov/waterscience/criteria/wetlands/6Metrics.pdf>) – Natural Resources Conservation Service, Wetland Science Institute, Billy M. Teels; Oregon State University, Paul Adamus

Methods for Evaluating Wetland Condition: Developing Metrics and Indexes of Biological Integrity. U.S. EPA. 2002. Office of Water, U.S. Environmental Protection Agency, Washington, DC. EPA-822-R-02-016.

Four Phases for Evaluating Indicators  
(<http://www.epa.gov/bioindicators/html/evaluate.html>)

Evaluation Guidelines For Ecological Indicators  
([http://www.epa.gov/emap/html/pubs/docs/resdocs/ecol\\_ind.pdf](http://www.epa.gov/emap/html/pubs/docs/resdocs/ecol_ind.pdf)) EPA 2000. Laura E. Jackson, Janis C. Kurtz, William S. Fisher

Development of a Biological Index and Classification System for Wisconsin Wetlands Using Macroinvertebrates and Plants. Final Report to EPA Region V, Wetland Grant#CD985491-01-0. January 2000. Richard Lillie, Wisconsin DNR.  
(<http://www.dnr.state.wi.us/org/water/fhp/wetlands/documents/WetlandBioIndexInvertebratesPlantsText.pdf>)

Great North American Secchi Dip In Web Site (<http://dipin.kent.edu/tsi.htm>)

River Network - Living Waters manual (<http://www2.rivernetwork.org/index.cfm>)

## Guidance Materials

There are a number of resources available to help with organization of and presentation of data results. These resources are a source of valuable information that can help you focus on important topics related to making the best possible presentation. These include:

- Ready, Set, Present! – (<http://www.umass.edu/tei/mwwp/datapresmanual.html>) Massachusetts Water Watch Partnership data presentation manual that provides advice on data presentation including layout, graphs, charts, maps, oral presentations, and interactive displays.
- The Volunteer Monitor Newsletter, including Volume 7(1): Spring 1995, Managing and Presenting Your Data; Volume 6(2): Fall 1994, Displaying Secchi Data; and Volume 17(1): Winter 2005, Data Documentation and Interpretation
- Eleanor Ely's "Writing to Be Read" workshop (<http://writingtoberead.wordpress.com>) which is designed to provide guidance to environmental professionals for successful writing and presentations.
- Water Words That Work (<http://waterwordsthatwork.com/>) serves to help improve environmentalists' writing and speaking skills so they can better take action to protect and improve natural resources.
- Data Interpretation Manual for Volunteer Monitors – (<http://www.umass.edu/tei/mwwp/acrobat/data%20interp%202002.pdf>) The manual is an expansion of an earlier data interpretation handbook written by Geoff Dates of the River Network and Jerry Schoen. It focuses on data interpretation issues typically confronted by lake monitoring groups, but it has some utility for groups monitoring streams, wetlands and coastal areas.
- Washington State Department of Ecology: River and Stream Monitoring Water Quality Index – ([http://www.ecy.wa.gov/programs/eap/fw\\_riv/docs/WQIOverview.html](http://www.ecy.wa.gov/programs/eap/fw_riv/docs/WQIOverview.html)) This site includes a general discussion of the use and development of water quality indices and has links to a spreadsheet template for calculating an index.
- Illustrating Your Data – (<http://imrl.usu.edu/Water/topic20/yourdata.htm>) Materials from a University of Utah-developed workshop. Questions to ask to help decide which form(s) of data illustration best suits your purpose. Suggested chart and graph types are provided.
- Lake Monitoring - Presenting Monitoring Results – (<http://www.waterquality.de/hartmut.willmitzer/RESULTS.HTM>) This comprehensive website, based in Germany but with English versions of its pages, provides a wealth of information on water issues, including an extensive overview of presenting lake water quality data.
- Unit VI: Module 27 - Educating Decision Makers: Introduction and Presentation Skills – ([http://waterontheweb.org/curricula/ws/unit\\_06/U6mod27.html](http://waterontheweb.org/curricula/ws/unit_06/U6mod27.html)) Water on the Web (WOW) helps college and high school students understand and solve real-world environmental problems using advanced technology. WOW is a complete package containing two sets of curricula, data from many lakes and rivers nationwide, extensive online primers, data interpretation and Geographic Information System Tools, and additional supporting materials.
- Charting in Microsoft Excel – (<http://peltiertech.com/Excel/Charts/index.html>) Created by Peltier Technical Services, Inc, this website provides tutorials on formatting Excel charts, including customized or charts not already included in the Excel chart types. Numerous examples are

provided to help guide you in chart selection, and step by step directions make it easy to get started.

## Other Resources

The Extreme Presentation(tm) Blog – (<http://extremepresentation.typepad.com/blog/>). The focus of this blog is to provide information and links to allow for “Extremely effective communication of complex information”.

Water Quality Signs (<http://www.savebuzzardsbay.org/bayinfo/publications/waterquality-signs.htm>) Buzzards Bay Baywatchers Water Quality Monitoring Program (MA) developed signs which show results of water monitoring at 127 beaches, bridges, and boat ramps.

Data Summary Brochures (<http://watermonitoring.uwex.edu/wav/monitoring/databaseResults.html> see “past reports”) – Wisconsin’s Water Action Volunteers Program produced data summary brochures as a succinct way of sharing data results with citizen monitors and community members.

Expert Color Choices for Presenting Data (<http://www.stonesc.com/pubs/Expert%20Color%20Choices.pdf>) This publication provides a useful overview of the principles of color selection to help enhance and clarify visual presentations (including PowerPoints, posters, maps and brochures).

Best Visual Presentation – Observations from the Award Committee (<http://www.airweb.org/page.asp?page=748> - 62k) This document from the Association for Institutional Research highlights examples of effective presentation techniques while explaining why they work.

## Tips

The experience of preparing and presenting data results can create both valuable resources for in-house use and for sharing, and stories of success. Such preparations and presentations also lead to accounts of misfortune and words of caution which, when passed along to others, can help minimize future data presentation fiascos. The following tips were shared with that intention by Ed Chadd and Adar Feller from the Streamkeepers of Clallam County (WA).

- Think of data presentations as a story. Start out by saying, "What's the story of this creek? What's the story we're trying to tell?" So we started with watershed-assessment documents, plus what we collectively knew about the creeks. Then we looked at the data and whether it supported the story. Then we decided which data to focus on and how to present it. In the process, we certainly became familiar with our data gaps!
- The basic elements of an education/outreach activity are:
  - a. A message
  - b. An audience
  - c. A delivery mechanism
- It's okay to present something that's not conclusive and say that it's not conclusive. That's science.
- Colored dots on maps are good, but too many maps can be overwhelming in a display.
- You can probably present one or two other concepts along with a basic dot on a map. See Monitoring Sites in Clallum County’s Water Resource Database map as an example

(<http://www.usawaterquality.org/volunteer/Special/EPAListserv/Clallum/ccwrsk.JPG>).  
Monitoring sites, client sponsorship of the sites, and restoration project monitoring are all shown on the map.

- Figure out when you need to be comprehensive, and when you just want to focus down on a few salient data findings.
- Multiple presentational graphics are good: We've tried integrating text, maps, photos, charts, tables, and graphs.
- Photos are important, so that people can see what the landscape impacts look like, then look at what the data tells about the results of those impacts.
- Headings and subheadings are critical. Get across whatever basic message you want to convey in the big letters, so that someone just passing by the booth will at least see those important points (and hopefully be drawn in enough to want to take a look)!
- Callout text of various types really helps make graphs meaningful.
- A good report-production team needs to have people with the following skills/knowledge: watershed ecology, the available data, statistical analysis, graphing, GIS, pedagogy, page layout, and word smithing. If you're lucky, some people will have several of these! We needed a basic team of 3 people.
- The review process is critical. We showed drafts to our advisory board, our volunteer data-analysis team, and our education/outreach team. We got lots of feedback and went through many, many drafts. As frustrating as it often was, the posters just kept getting better.
- For graphs and maps, you've got to check the color-production of the printers and projectors you'll be using. We found, for example, that with our projector, our orange and yellow dots were indistinguishable, and with our plotter, one of our color orthophotos didn't show the land-cover features we were trying to show, so we had to take our poster file somewhere else to get printed.

Please send us your favorite resources and examples to be included in an upcoming guide book module and on our national facilitation web site.

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