

**And did we mention...?**

The following strategies were brought up in earlier chapters, but deserve more attention.

**Data on the Web**

The World Wide Web combines some of the better elements of print and electronic media. It provides access to the vast storage capacity of books and encyclopedias, one can navigate through this information with an ease that puts newspapers and magazines to shame, and (increasingly) there are visuals and audio comparable to TV and radio. These attributes make the Web a versatile data presentation tool. Graphs, photos and maps can all provide a casual browser with quick, comprehensible summaries of watershed conditions. Unobtrusive hyperlinks steer the serious researcher to detailed data sets that can even offer number crunching ability. Those who are interested in a particular piece of the data picture can pursue it further by clicking their way to pages that feature the subject.



**Example 8-10: Flags used as Web hot buttons.**

Let's look at an example from the Charles River Watershed Association (CRWA) that illustrates several of these points (CRWA's Web address is [www.crwa.org](http://www.crwa.org)). The first thing we like about their Web site is that they make their data easy to find. They announce their sampling results right near the top of their page, via a colorful icon of boating pennants and a hyperlink headline: "[Daily Water Quality Data.](#)"

For some reason, a lot of monitoring groups with Web sites either omit data reports entirely or bury them deep in some hard-to-find recess of a site. This sends a bad message—that the results aren't all that interesting. If you're going to announce your program, spend the extra hour it takes to make at least one representative data graph and post it! Otherwise you have people wondering "where's the beef?"

Clicking on the CRWA pennants or headlines brings the user to a second page which repeats the boating pennants display. But this time they are used not as attention-getters, but as data. Each pennant represents a sampling site and is either red or blue, depending on whether bacteria levels at the site pose potential health risks for boating on that day. The flags are a good choice for an icon, because they immediately place the data in an appropriate context by making one think of boating, which is the primary recreational use for the Charles. If someone wants to know whether to take the boat out that day, they get the information in a matter of seconds.

**Note**

Most of the graphics in this section were borrowed directly from the Web, which explains why the print quality is poor: screen resolution is much coarser than print.

For those with more curiosity, a click on any of the sampling sites reaches a third level which houses the real data—a table showing coliform counts for that site for the past week. Normally, tables are not the most attractive or readable way to present data, though at this level it works, because you would expect that the user who has reached this page has sufficient interest to benefit from that degree of detail. This page also contains narrative text that briefly describes the sampling procedures, the state standards, and steps river users might take to avoid contamination. CRWA also provides the data in downloadable Excel files—a handy option for those who want to do their own further analysis or compare different sites, different dates, etc.

CRWA also offers monthly summaries of water quality for the entire watershed. Another menu choice displays a watershed map with various reaches shown in different colors: blue for those meeting swimming standards, yellow to indicate unsafe swimming but within boating standards, and red for anything unsafe for both swimming and boating. This offers a nice visual image that is easily grasped. The Association has also produced this graphic in several different media: posters, slides and overheads, for use in a variety of forums. CRWA staff report that this display has been highly effective. Audiences from EPA to the news media to school children are surprised at the close correlation between rainfall and bacteria levels. Few were previously aware of the connection, at least not in this level of detail.

**Example 8-11: Water quality displayed by river reach.**  
(For technical tips on developing this map, see the Appendix)



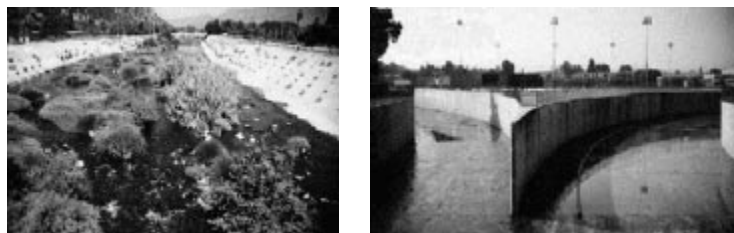
CRWA's Web pages were designed in a manner that matches well the way most people use the Web these days: starting with broad, visually attractive overviews and getting into greater detail as one gets deeper into a site.

One suggested enhancement might be to add a menu choice that lets the viewer learn more about the parameter: how bacteria survive in water systems, the health threats posed, or to get a comparison of different bacteria sampling methods. One easy way to do this is by adding a link to the *Volunteer Monitor's* fall 1998 newsletter, which includes two articles on bacteria testing, with additional references to other information sources ([www.epa.gov/volunteer/fall98/index.html](http://www.epa.gov/volunteer/fall98/index.html)).

### **Some other Web examples we like:**

#### **Virtual watershed tour**

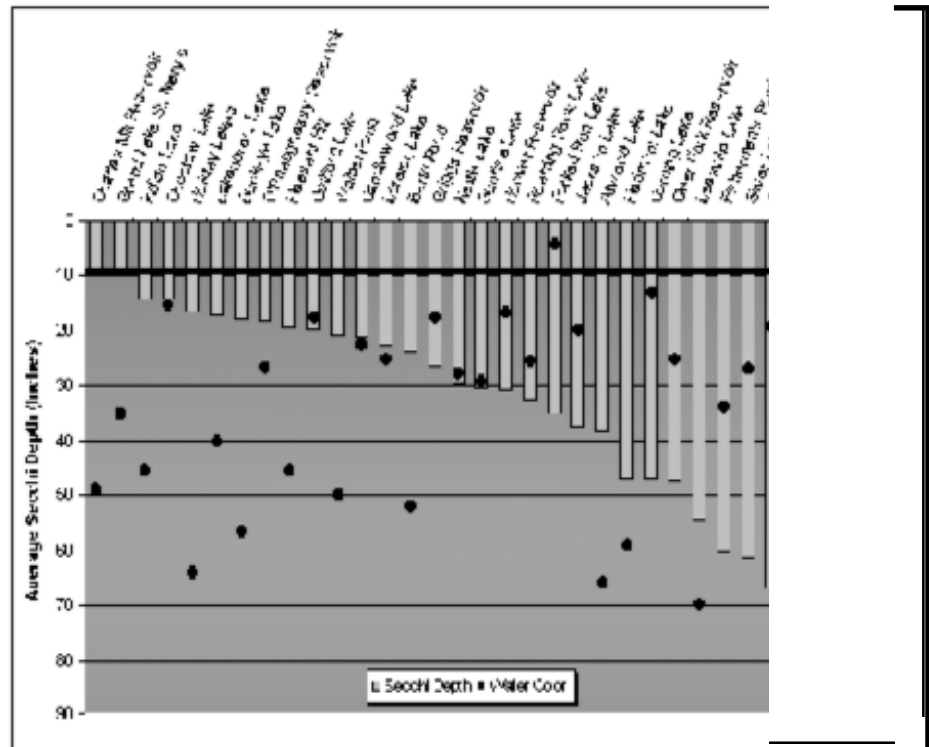
The Los Angeles River Tour ([www.lalc.k12.ca.us/target/units/river/tour/frogt.html](http://www.lalc.k12.ca.us/target/units/river/tour/frogt.html)) offers a computer trip through the Los Angeles watershed similar to the Farmington River Watershed model in Example 8-1. Their virtual tour uses pictures and text to take the browser to numerous spots along the river, with many optional digressions along the way that explore history, geology, frogs, floods, and bugs. One enhancement of such a tour would be to add data graphs or water quality reports at relevant stops on the tour. Web sites like this demonstrate what a powerful educational tool the Web can be. The straightforward story of your data can be complemented by contextual information of virtually any sort and level of complexity. Discourses on anything from the hydrologic cycle to river morphology to exotic invasive species can be offered, to be perused at the viewer's discretion.



**Example 8-12: Photographic habitat data from the Virtual Tour of the Los Angeles River.**

**Waterwatch Victoria** in Australia designed a fun—if somewhat fancy—interactive site: they lay down the basics for sound river habitat in a manual you can read online, then prompt visitors to select their region on a map. A picture of a stream somewhere in that region pops up and visitors are asked to enter their habitat assessment of the site in the online form. The visitors’ habitat ratings are compared to those of the Waterwatch experts, and if they are different, help is offered to better understand the issues. You can visit this site at [www.vic.waterwatch.org.au/landcare](http://www.vic.waterwatch.org.au/landcare).

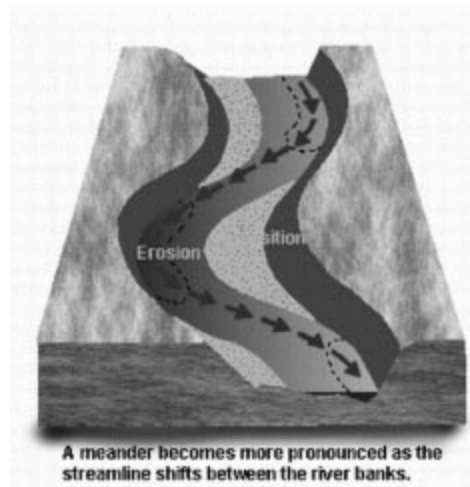
**Ohio CLAM** (Citizen Lake Awareness and Monitoring) This site starts out with some impressive color graphs that show water transparency (Secchi readings) and color data together; transparency is shown by bar graphs, color by points; both against a background that is shaded from brown to green from top to bottom of the graph. The graph is accompanied by several pages of text and additional charts that help the viewer interpret the data—in particular, how to use the color data to determine whether the Secchi readings are influenced primarily by algae or suspended sediment. View the Web version of the example shown below at: [www.olms.org/page13.html](http://www.olms.org/page13.html).



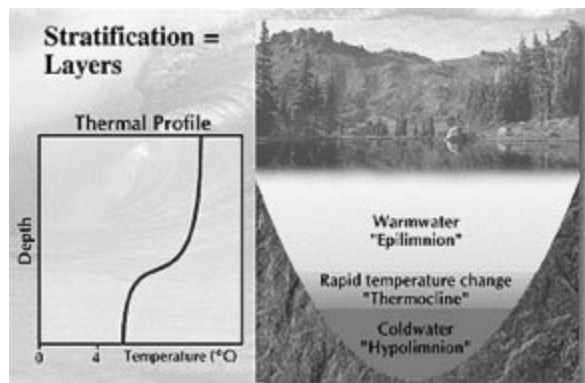
**Example 8-13: Transparency and color graph.**  
 (The background color goes from brown to green when viewed on the Web)

**Linking to external educational content**

For a good example of an educational site that a group might link to their own Web page, take a look at the "Canada's Aquatic Environments" site ([www.aquatic.uoguelph.ca](http://www.aquatic.uoguelph.ca)) from the University of Guelph, Ontario. They have a virtual encyclopedia of information about watersheds, rivers, lakes, wetlands, and oceans, with wonderful pictures and diagrams that illustrate the topics discussed in the text. These pages can be linked to your data to give viewers a quick lesson on influences and consequences of the data you are presenting.

**Example 8-14: Educational diagram displayed on the Web.**

(From "Canada's Aquatic Environments")

**Example 8-15: Web diagram of lake stratification.**

(From "Canada's Aquatic Environments")

**Washington Lake Book**

Another good example is the "Washington Lake Book: a Handbook for Lake Users" Web site ([www.wa.gov/ecology/wq/plants/lakes/book\\_contents.html](http://www.wa.gov/ecology/wq/plants/lakes/book_contents.html)), which contains a wealth of scientific, organizational, and fundraising information related to lakes and lake organizations. In addition to some great diagrams on lake ecology, there is an excellent on-line guide to aquatic plants; how to identify them, where and under what conditions they live, scientific and economic importance, and response to various management techniques.

**Getting your data on the Web**

This requires three things: getting a site, doing the design and editing work, and uploading files to a server. Internet providers sometimes donate a site location to non-profit organizations. Otherwise, you must acquire a site from a host, whether it's the university where you work or your local internet provider. To obtain a site, there is usually a set-up fee (\$10-\$50) and a monthly fee (around \$8-50, depending on how much disk space you require, and whether you open a personal or business account). Designing your own page is very easy once you obtain software such as Adobe PageMill (about \$50) or Netscape Composer (free), or it can be a bit more involved with software such as Macromedia's Dreamweaver (\$300). You can even make word processing documents such as MS Word into Web-readable material by saving them as HTML files. Including fancy graphics is a little more tricky, but adding photographs, spreadsheet graphs, or charts as Web images is no challenge.

**Props**

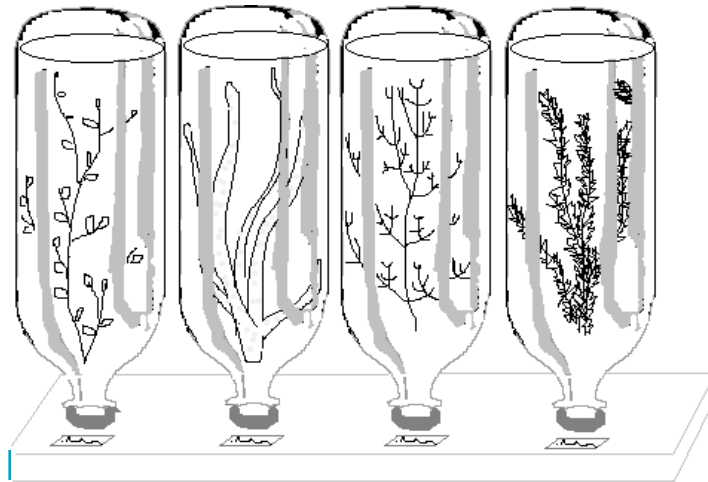
Sometimes, parts of the watershed itself become the data. In Chapter 5 we talked about using macroinvertebrates, plants, and rocks in data presentations. Some additional pointers on these:

**Aquatic plant display**

The UNH Lakes Lay Monitoring Program at the University of New Hampshire produced an exhibit that displays aquatic plants in clear plastic 2-liter soft drink bottles. Bottle labels are removed, the plants are placed top-down in the bottles, which are filled with water, sealed and set snugly in holes drilled into a wooden board (make sure the board is wide enough to handle the filled bottles without toppling). Four to six plants are displayed in a row. The submerged

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plants look much like they would while alive in the lake, making identification easier. These can be displayed along side maps showing distribution and concentration of the different species found in the lake. If the display is to be used for more than a day or two, you might want to replace the water with Isopropyl alcohol (store-bought rubbing alcohol). This will preserve the samples for a number of months, but after about a month, the greenness will begin to fade.



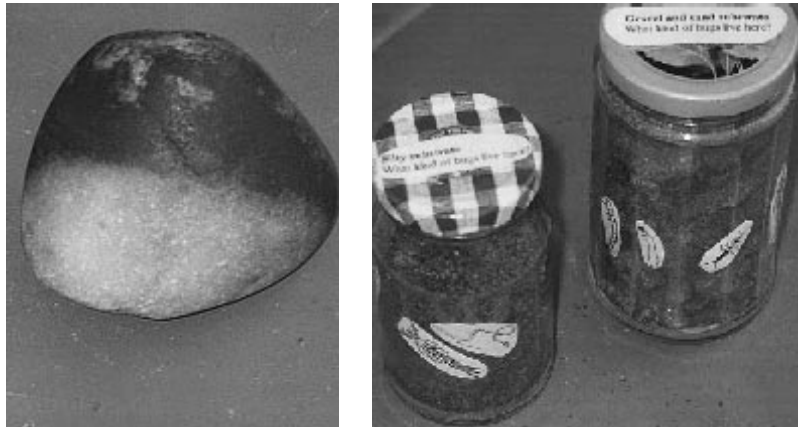
**Example 8-16: Recycle soda bottles to display aquatic plants.**

### **Embedded rocks**

We mentioned these in Chapter 5 as a way to educate people on the importance of substrate composition to macro-invertebrate and fish populations in streams. At the same time, you are reporting on stream habitat quality.

*How to prepare:* Simple—just go to the stream and gather several fist-sized rocks from the bottom. Get an assortment of those slightly to mostly buried in sand and silt. Usually, the part that has been buried will be lighter in color than the rest of the rock. This is because that part exposed to the current may have picked up some algae, which remains dark after it's dried. If you find that the dark/light line is not real clear, you can trace the line with a permanent marker to better illustrate the point.

*How to use:* Pass samples around to folks while giving a talk, or display several together (with varying degrees of embeddedness) and ask people to estimate the percent embeddedness. Then discuss the significance of the different levels. Alternatively, display graphs of theoretical (or actual) bug populations and ask people to match them with the different degrees of embeddedness.



**Example 8-17: Embedded rock and substrate jars.**

These are both good displays to use along with graphs of macroinvertebrate sample results and/or the bugquarium mentioned in Chapter 5. They are also both good as props to accompany a discussion of habitat requirements for spawning trout and other fish.

### **In conclusion**

There's no shortage of creative examples. We've presented a small sample, found within the boundaries of our own creativity and research capabilities. With all the creative minds out there in volunteer monitoring, the sky's the limit. If you want to reach the general public, especially folks who aren't beating down your door for data—who think they have no particular interest in the health of your water body—try some of these non-traditional outreach strategies. And share your successes with other monitoring groups. We are happy to be the clearinghouse. It is our intention to maintain and continually update this chapter as a growing collection of data presentation examples that you can adapt for your own presentation efforts. We plan to place this chapter, if not the whole manual, on the Web and add to it as new examples come in from folks like yourself. Watch for it on our Web site: [www.umass.edu/tei/mwwp](http://www.umass.edu/tei/mwwp). If you have a data presentation example or idea you'd like to share, please get in touch with us. With your help, we'll be able to offer a library of handy tools that help connect your data with your audiences.