

---

# Chapter 8: Conclusions

**T***he purpose of this training manual is to discuss sampling and monitoring techniques for *E. coli* and to highlight the test kits that are reliable, economical and usable by volunteers. However, it is important to keep in mind that bacteria monitoring is only one component of water quality monitoring, and that *E. coli* data alone do not indicate the ecological health of your stream. They do, however, provide valuable information that can be used in concert with other monitoring data to help assess overall ecosystem health.*

Volunteer time is valuable, and the remarkable power of your efforts is your positive impact on the environment and the enthusiasm and commitment of your teams. By using standardized sampling and analysis procedures along with acceptable test kits, the *E. coli* data you collect as a volunteer can be very useful and utilized in various watershed programs. The bacteria monitoring data you collect and disseminate will help determine baseline conditions, provide continued data on your stream, and assist in assessing future water quality trends. It can help build partnerships with agencies and other groups from the local to federal level.

By remaining vigilant in your monitoring efforts, water quality problems can often be targeted and addressed before they become major.

## Notes

# Chapter 9: Resources for Further Information

## Internet sites

**Center for Disease Control's** information on the pathogenic *E. coli* 0157:H7  
[www.cdc.gov/ncidod/dbmd/diseaseinfo/escherichiacoli\\_g.htm](http://www.cdc.gov/ncidod/dbmd/diseaseinfo/escherichiacoli_g.htm)

The **Center for Watershed Protection** provides local governments, activists, and watershed organizations around the country with the technical tools for protecting our streams, lakes and rivers.  
[www.cwp.org/](http://www.cwp.org/)

**Volunteer Water Quality Monitoring National Facilitation Project** is designed to expand and strengthen the capacity of existing Extension volunteer monitoring programs and support development of new groups. [www.usawaterquality.org/volunteer/](http://www.usawaterquality.org/volunteer/)

**Building Capacity of *E. coli* Monitoring By Volunteers: A Multi-State Effort** is the web site that complements this training manual. [www.uwex.edu/ces/csreesvolmon/EColi/index.html](http://www.uwex.edu/ces/csreesvolmon/EColi/index.html)

EPA: **Microbiology** homepage: [www.epa.gov/nerlcwww/](http://www.epa.gov/nerlcwww/)

EPA: **National Newsletter of Volunteer Water Quality Monitoring**  
[www.epa.gov/owow/monitoring/volunteer/issues.htm](http://www.epa.gov/owow/monitoring/volunteer/issues.htm)

EPA: **STORET** (short for STOrage and RETrieval) is a repository for water quality, biological, and physical data. [www.epa.gov/storet/](http://www.epa.gov/storet/)

EPA: The **Volunteer Monitor's Guide To Quality Assurance Project Plans**  
[www.epa.gov/owow/monitoring/volunteer/qappcovr.htm](http://www.epa.gov/owow/monitoring/volunteer/qappcovr.htm)

Michigan State University's **Digital Watershed**: Type in any address and obtain an aerial photograph as well as data on the watershed. [www.iwr.msu.edu/dw](http://www.iwr.msu.edu/dw)

Purdue University's **stream delineation** site: Pick your stream from an interactive map. Click on a portion of the stream and the tool delineates the watershed of the stream from that point to upstream.  
[pasture.ecn.purdue.edu/~watergen/owls/htmls/select\\_your\\_state.htm](http://pasture.ecn.purdue.edu/~watergen/owls/htmls/select_your_state.htm)

U.S. Geological Survey's **Water Science Glossary** of Terms.  
[ga.water.usgs.gov/edu/dictionary.html](http://ga.water.usgs.gov/edu/dictionary.html)

**Water Resources of the United States** (U.S. Geological Survey) Access to water-resources data.  
[water.usgs.gov/](http://water.usgs.gov/)

## Volunteer stream monitoring manuals

Volunteer Stream Monitoring: A Methods Manual, US Environmental Protection Agency  
[www.epa.gov/volunteer/stream/stream.pdf](http://www.epa.gov/volunteer/stream/stream.pdf)

Volunteer Stream Monitoring Training Manual, Hoosier Riverwatch, Indiana Department of Natural Resources - <http://www.in.gov/dnr/riverwatch/trainingmanual/>

Volunteer Surface Water Monitoring Guide, Minnesota Pollution Control Agency  
<http://www.pca.state.mn.us/water/monitoring-guide.html>

Vermont Citizen's Guide to Bacteria Monitoring in Vermont Waters, Department of Environmental Conservation - [http://www.anr.state.vt.us/dec//waterq/lakes/docs/lp\\_citbactmonguide.pdf](http://www.anr.state.vt.us/dec//waterq/lakes/docs/lp_citbactmonguide.pdf)

Washington State's Department of Ecology, A Citizen's Guide to Understanding and Monitoring Lakes and Streams - <http://www.ecy.wa.gov/programs/wq/plants/management/joysmanual/>

Watershed Watch (University of Rhode Island) - <http://www.uri.edu/ce/wq/ww/Manuals.htm>

Wisconsin Water Action Volunteers Citizen Stream Monitoring  
<http://watermonitoring.uwex.edu/wav/monitoring/methods.html>

Other Guides to Volunteer Monitoring can be found on the National Volunteer Monitoring website at:  
<http://www.uwex.edu/ces/csreesvolmon/links.html>

## Watershed and stream management guides

**A Beginner's Guide to Water Management - Bacteria**, University of Florida  
[edis.ifas.ufl.edu/FA103](http://edis.ifas.ufl.edu/FA103)

**Developing a Watershed Plan for Water Quality: An Introductory Guide** (Michigan)  
[www.deq.state.mi.us/documents/deq-swq-nps-Watershe.pdf](http://www.deq.state.mi.us/documents/deq-swq-nps-Watershe.pdf)

**Getting to Know Your Local Watershed - A Guide for Watershed Partnerships**  
[www.ctic.purdue.edu/KYW/Brochures/GetToKnow.html](http://www.ctic.purdue.edu/KYW/Brochures/GetToKnow.html)

**Indiana Watershed Planning Guide** from the Indiana Department of Environmental Management, August 2003. <http://www.in.gov/idem/catalog/documents/water/iwpg.pdf>

Michigan Department of Environmental Quality's **Stormwater Management Guidebook**  
[http://www.deq.state.mi.us/documents/deq-water-sw-links-SW\\_Management\\_Guidebook.pdf](http://www.deq.state.mi.us/documents/deq-water-sw-links-SW_Management_Guidebook.pdf)

**Minnesota Shoreland Management** Resource Guide - [www.shorelandmanagement.org/quick/](http://www.shorelandmanagement.org/quick/)

Ohio **Stream Management Guide** fact sheets - [www.dnr.state.oh.us/water/pubs/fs\\_st/streamfs.htm](http://www.dnr.state.oh.us/water/pubs/fs_st/streamfs.htm)

**Rapid Watershed Planning Handbook: A Comprehensive Guide for Managing Urbanizing Watersheds**. 1999. Center for Watershed Protection. Ellicott City, MD

U.S. Geological Survey: **National Field Manual** for the collection of water-quality data  
[water.usgs.gov/owq/FieldManual/](http://water.usgs.gov/owq/FieldManual/)

Wisconsin Department of Natural Resources **Runoff Management**  
<http://www.dnr.state.wi.us/runoff/about.htm>

---

# Chapter 10: References

- Frenzel, S.A. and C.S. Couvillion (2002) Fecal-indicator bacteria in streams along a gradient of residential development. *Journal of the American Water Resources Association*. 38:265-273.
- Niemi, R.M. and J.S. Niemi (1991) Bacterial pollution of waters in pristine and agricultural lands. *Journal of Environmental Quality*. 20:620-627.
- Overdevest, C., C. Huyck Orr, and K. Stepenuck (2004) Volunteer stream monitoring and local participation in natural resource issues. *Human Ecology Review*. Vol. 11(2): 177-185.
- USDA Natural Resources Conservation Service photo gallery  
<http://photogallery.nrcs.usda.gov>
- USEPA (1986) Ambient Water Quality Criteria for Bacteria EPA 440/5-84-002. Office of Water. Regulations and Standards. Criteria and Standards Division. January 1986.
- USEPA (1996) The Volunteer Monitor's Guide To Quality Assurance Project Plans.  
(<http://www.epa.gov/owow/monitoring/volunteer/qappcovr.htm>) EPA 841-B-96-003. Office of Wetlands, Oceans and Watersheds. September 1996.
- USEPA (1997) Volunteer Stream Monitoring: A Methods Manual.  
([www.epa.gov/OWOW/monitoring/volunteer/stream](http://www.epa.gov/OWOW/monitoring/volunteer/stream)) EPA 841-B-97-003. Office of Water. November 1997.
- USEPA (2002a). Water Quality Conditions in the United States: 2000 National Water Quality Inventory. EPA-841-R-02-001. August 2002.
- USEPA (2002b). Implementation Guidance for Ambient Water Quality Criteria for Bacteria (Draft). May 2002 ([www.epa.gov/waterscience/standards/bacteria/bacteria.pdf](http://www.epa.gov/waterscience/standards/bacteria/bacteria.pdf)).
- United States Geological Survey (2004). National field manual for the collection of water-quality data: U.S. Geological Survey Techniques of Water-Resources Investigations, book 9, chaps. A1-A9  
<http://pubs.usgs.gov/twri>

