



USGS Water-Quality Information

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USGS scientists deploy [SPMD and POCIS samplers](#) to collect waterborne contaminants in Manoa Stream on [Oahu, Hawaii](#).

Noteworthy

Press Releases

- ◆ [USGS Assessment of Brackish Water Could Help Nation Stretch Limited Freshwater Supplies](#)
- ◆ [First-of-its-kind Interactive Map Brings Together 40 Years of Water-Quality Data](#)
- ◆ [20 Years Researching Harmful Algal Blooms Supports Sustainable Water Supply in Wichita](#)
- ◆ [The Quality of the Nation's Groundwater: Progress on a National Survey \(1/19/2017\)](#)

National Field Manual for the Collection of Water-Quality Data (NFM)

Techniques and Methods

Book 9

Handbooks for Water-Resources Investigations



Announcements

- Fact Sheet: [USGS Water-Quality Sampling - Standard Protocols and Procedures \[1.0 MB PDF\]](#)
- New Series for NFM—[Starting in 2017, transitioning from Techniques of Water-Resources Investigations to Techniques and Methods \[32 KB PDF\]](#)
- [USGS Technical Policy Memorandums](#) that relate to the NFM.
- [Comments and Errata](#)
- How to [cite](#) the *National Field Manual*. (Citation information is for the online manual and its individually updated chapters. All versions of the NFM that were published previously in a printed format have been superseded by the online manual. All previous versions are available as archive files from each chapter's Web page.)
- E-mail nfm-owq@usgs.gov to request information or make comments.

National Field Manual Table of Contents

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[A0. National Field Manual for the Collection of Water-Quality Data](#)

[A1. Preparations for Water Sampling \(Version 2.0, 1/2005\)](#)

[A2. Selection of Equipment for Water Sampling \(Version 3.1, 4/2014\)](#)

[A3. Cleaning of Equipment for Water Sampling \(Version 2.0, 4/2004\)](#)

[A4. Collection of Water Samples \(Version 2.0, 9/2006\)](#)

Featured Science:

- ◆ Spatial variability of harmful algal blooms in Milford Lake, Kansas, July and August 2015
- ◆ Why Monitor Water Quality? [1.7MB PDF]

[Past featured science...](#)

Water Quality Data**Today's Water Conditions**

Get continuous real-time water-quality measurements from [Water-Quality Watch](#) maps.

**Water Quality Portal (WQP)**

Get current and historical USGS and EPA water-quality data at the [WQP](#).

BioData

Get stream ecosystem aquatic bioassessment data from [BioData](#).

For More Data

[View a complete list of USGS water-quality data resources.](#)

USGS in Your Area

USGS Water Science Centers are located in each state.

[A5. Processing of Water Samples, Version 2.2 \(9/2004\)](#), includes sections below:

[5.2.1.A "Capsule- and Disk-Filter Procedure" \(Version 3.0, 3/2016, 311 KB PDF\)](#).

[5.3.2 "Instructions for Field Use of Spike Solutions for Organic-Analyte Samples" \(Version 1.0, 6/2009, 103 KB PDF\)](#).

[5.6.1.F, "Wastewater, Pharmaceutical, and Antibiotic Compounds" \(Version 1.1, 4/2003, 984 KB PDF\)](#).

[5.6.4.A, "Arsenic Speciation" \(Version 2.1, 10/2012\) \(332 KB PDF\)](#).

[5.6.4.B, "Low-level Mercury" \(Version 1.0, 10/2004, 542KB PDF\)](#).

The following guidance will replace section 5.2.2.B of chapter 5, version 2.2, when the revision of chapter 5 has been completed; see the August 15, 2014, post in http://water.usgs.gov/owq/FieldManual/mastererrata.html#Chapter_5 for clarification.

[5.2.2.B, "Syringe-Filter Procedure for Processing Samples for Analysis of Organic Compounds by DAI LC-MS/MS" \(dated 8/2014\) \(489 KB PDF\)](#).

A6. Field Measurements

[6.0 General Information and Guidelines \(Version 2.0, 10/2008\)](#).

[6.1 Temperature \(Version 2, 3/2006\)](#).

[6.2 Dissolved Oxygen \(Version 3.0, 9/2013\)](#).

[6.3 Specific Electrical Conductance \(Version 1.2, 8/2005\)](#).

[6.4 pH \(Version 2.0, 10/2008\)](#).

[6.5 Reduction-Oxidation Potential-Electrode Method \(Version 1.2, 9/2005\)](#).

[6.6 Alkalinity and Acid Neutralizing Capacity \(Version 4, 9/2012\)](#).

[6.7 Turbidity \(Version 2.1, 9/2005\)](#).

[6.8 Use of Multiparameter Instruments for Routine Field Measurements \(Version 1.1, 3/2012\)](#).

A7. Biological Indicators

[7.0. Five-day Biochemical Oxygen Demand \(11/2003\)](#).

[7.1. Fecal Indicator Bacteria \(Version 2.1, 5/2014\)](#).

[7.2. Fecal Indicator Viruses \(11/2003\)](#).

[7.3. Protozoan Pathogens \(11/2003\)](#).

[7.4. Algal Biomass Indicators \(Version 1.0, 8/2007\)](#).

[7.5 Cyanobacteria in lakes and reservoirs: toxin and taste-and-odor sampling guidelines \(Version 1.0, 9/2008\)](#).



[A8. Bottom-Material Samples \(Version 1.1, 6/2005\).](#)

A9. Superseded by the USGS handbook on "[Safety and Health for Field Operations](#)" (USGS 2014)

[A10. Lakes and Reservoirs: Guidelines for Study Design and Sampling](#)

Citation Information for the *National Field Manual*

Chapter updates and revisions are ongoing and are summarized on the [Comments and Errata](#) page. Archived editions or versions of chapters or chapter sections are available from the chapter links above.

Citation for the complete manual:

U.S. Geological Survey, variously dated, National field manual for the collection of water-quality data: U.S. Geological Survey Techniques of Water-Resources Investigations, book 9, chaps. A1-A10, available online at <http://pubs.water.usgs.gov/twri9A>.

Citation for each chapter:

A0

U.S. Geological Survey, 2018, General introduction for the "National Field Manual for the Collection of Water-Quality Data": U.S. Geological Survey Techniques and Methods, book 9, chap. A0, 4 p., <https://doi.org/10.3133/tm9A0>.

A1

Wilde, F.D., 2005, Preparations for water sampling: U.S. Geological Survey Techniques of Water-Resources Investigations, book 9, chap. A1, January 2005, accessed [date viewed], at <http://pubs.water.usgs.gov/twri9A1/>. (Supply the date you viewed the chapter online; for example, May 31, 2011.)

A2

Wilde, F.D., Sandstrom, M.W., and Skrobialowski, S.C., 2014, Selection of equipment for water sampling (ver. 3.1): U.S. Geological Survey Techniques of Water-Resources Investigations, book 9, chap. A2, April 2014, accessed [date viewed], at <http://pubs.water.usgs.gov/twri9A2/>. (Supply the date you viewed the chapter online; for example, May 31, 2011.)

A3

Wilde, F.D., ed., 2004, Cleaning of Equipment for water sampling (ver. 2.0): U.S. Geological Survey Techniques of Water-Resources Investigations, book 9, chap. A3, April 2004, accessed [date viewed], at <http://pubs.water.usgs.gov/twri9A3/>. (Supply the date you viewed the chapter online; for example, May 31, 2011.)

A4

U.S. Geological Survey, 2006, Collection of water samples (ver. 2.0): U.S. Geological Survey Techniques of Water-Resources Investigations, book 9, chap. A4, September 2006, accessed [date viewed], at <http://pubs.water.usgs.gov/twri9A4/>. (Supply the date you viewed the chapter online; for example, May 31, 2011.)

A5

Wilde, F.D., Radtke, D.B., Gibs, Jacob, and Iwatsubo, R.T., eds., 2004 with updates through 2009, Processing of water samples (ver. 2.2): U.S. Geological Survey Techniques of Water-Resources Investigations, book 9, chap. A5, April 2004, accessed [date viewed], at <http://pubs.water.usgs.gov/twri9A5/>. (Supply the date you viewed the chapter online; for example, May 31, 2011.)

A6

Wilde, F.D., ed., variously dated, Field measurements: U.S. Geological Survey Techniques of Water-Resources Investigations, book 9, chap. A6, with sec. 6.0–6.8, accessed [date viewed], at <http://pubs.water.usgs.gov/twri9A6/>. (Supply the date you viewed the chapter online; for example, May 31, 2011. Chapter sections are cited by author and date.)

Example of citation for a section:

Rounds, S.A., 2006, Alkalinity and acid neutralizing capacity (ver. 3.0): U.S. Geological Survey Techniques of Water-Resources Investigations, book 9, chap. A6., sec. 6.6, July 2006, accessed [date viewed], from <http://pubs.water.usgs.gov/twri9A6/>. (Supply the date you viewed the chapter online; for example, May 31, 2011.)

A7

U.S. Geological Survey, variously dated, Biological indicators: U.S. Geological Survey Techniques of Water-Resources Investigations, book 9, chap. A7, with sec. 7.0–7.5 accessed [date viewed], at <http://pubs.water.usgs.gov/twri9A7/>. (Supply the date you viewed the chapter online; for example, May 31, 2011. Chapter sections are cited by author and date.)

Example of citation for a section:

Myers, D.N., Stoeckel, D.M., Bushon, R.N., Francy, D.S., and Brady, A.M.G., 2014, Fecal indicator bacteria (ver. 2.1): U.S. Geological Survey Techniques of Water-Resources Investigations, book 9, chap. A7, sec. 7.1, May 2014, accessed [date viewed], from <http://pubs.water.usgs.gov/twri9A7/>. (Supply the date you viewed the chapter online; for example, May 13, 2014. Chapter sections are cited by author and date.)

A8

Radtke, D.B., 2005, Bottom-material samples (ver. 1.1): U.S. Geological Survey Techniques of Water-Resources Investigations, book 9, chap. A8, June 2005, accessed [date viewed], at <http://pubs.water.usgs.gov/twri9A8/>. (Supply the date you viewed the chapter online; for example, May 31, 2011.)

A9

Lane, S.L., and Fay, R.G., 1997, Safety in field activities: U.S. Geological Survey Techniques of Water-Resources Investigations, book 9, chap. A9, October 1997, accessed [date viewed], at <http://pubs.water.usgs.gov/twri9A9/>. (Supply the date you viewed the chapter online; for example, May 31, 2011.)

A10

Green, W.R., Robertson, D.M., and Wilde, F.D., 2015, Lakes and Reservoirs: Guidelines for Study Design and Sampling: U.S. Geological Survey Techniques of Water-Resources Investigations, book 9, chap. A10, September 2015, accessed [date viewed], at http://water.usgs.gov/owq/FieldManual/Chapter10/Ch10_contents.html. Supply the date you viewed the chapter online; for example, October 8, 2015.

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Page Last Modified: Tuesday, 05-Jun-2018 08:31:02 EDT