Environmental Monitoring and Assessment Program-Surface Waters:

Field Operations and Methods for Measuring the Ecological Condition of Non-wadeable Rivers And Streams

Edited by

James M. Lazorchak[1], Brian H. Hill[1],
Daniel K. Averill[2], David V. Peck[3], and Donald J. Klemm[1]

[1]U.S. Environmental Protection Agency
Ecosystems Research Branch
Ecological Exposure Research Division
National Exposure Research Laboratory
Cincinnati, OH 45268

[2]Dynamac International Corp.
200 SW 35th St.
Corvallis, OR 97333

[3]U.S. Environmental Protection Agency
Regional Ecology Branch
Western Ecology Division
National Health and Environmental Effects Research Laboratory
Corvallis, OR 97333

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Section authors are listed below. Complete addresses for authors are provided in each section.

Section 1: J.M. Lazorchak[1], A.T. Herlihy[2], and D.K. Averill[3]

Section 2: J.M. Lazorchak[1], D.K. Averill[3], B. H. Hill[1], F. H. McCormick[1], A.T. Herlihy[2], P.A. Monaco[3], and M.R. Cappaert[4]

Section 3: A.T. Herlihy[2], J.M. Lazorchak[1], D.K. Averill[3], B. H. Hill[1], F. H. McCormick[1], D.J. Klemm[1], P.A. Monaco[3], and M.R. Cappaert[4]

Section 4: A.T. Herlihy[2] and J. M. Lazorchak[1]

Section 5: A.T. Herlihy[2] and C.W. Hendricks[5]

Section 6: P.R. Kaufmann[5]

Section 7: B.H. Hill[1] and A.T. Herlihy[2]

Section 8: B.H. Hill[1] and A.T. Herlihy[2]

Section 9: D.J. Klemm[1], J.M. Lazorchak[1], and D.V. Peck[5]

Section 10: F.H. McCormick[1] and R.M. Hughes[3]

Section 11: J.M. Lazorchak[1], F.H. McCormick[1], R.M. Hughes[3], and S.A. Peterson[5]

Section 12: A.T. Herlihy[2]

Section 13: J.M. Lazorchak[1] and D.K. Averill[3]

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[1]U.S. EPA, National Exposure Research Laboratory, Cincinnati, OH 45268.
[2]Department of Fisheries and Wildlife, Oregon State University, Corvallis, OR 97333.
[3]Dynamac International, Inc., Corvallis, OR 97333.
[4]OAO Corp., Corvallis, OR 97333.
[5]U.S. EPA, National Health and Environmental Effects Research Laboratory, Corvallis, OR 97333.

Abstract

The methods and instructions for field operations presented in this manual for surveys of non-wadeable streams and rivers were developed and tested based on 55 sample sites in the Mid-Atlantic region and 53 sites in an Oregon study during two years of pilot and demonstration projects (1997 and 1998). These projects were conducted under the sponsorship of the U.S. Environmental Protection Agency and its collaborators through the Environmental Monitoring and Assessment Program (EMAP). This program focuses on evaluating ecological conditions on regional and national scales. This document describes procedures for collecting data, samples, and information about biotic assemblages, environmental measures, or attributes of indicators of non-wadeable stream ecosystem condition. The procedures presented in this manual were developed based on standard or accepted methods, modified as necessary to adapt them to EMAP sampling requirements. They are intended for use in field studies sponsored by EMAP. In addition to methodology, additional information on data management, safety and health, and other logistical aspects is integrated into the procedures and overall operational scenario. Procedures are described for collecting field measurement data and/or acceptable index samples for several response and stressor indicators, including water chemistry, physical habitat, benthic macroinvertebrate assemblages, aquatic vertebrate assemblages, fish tissue contaminants, periphyton assemblages, and sediment community metabolism. The manual describes field implementation of these methods and the logistical foundation constructed during field projects. Flowcharts and other graphic aids provide overall summaries of specific field activities required to visit a river site and collect data for these indicators. Tables give step-by-step protocol instructions. These figures and tables can be extracted and bound separately to make a convenient quick field reference for field teams. The manual also includes example field data forms for recording measurements and observations made in the field and sample tracking information. Checklists of all supplies and equipment needed for each field task are included to help ensure that these materials are available when required.

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Acronyms, Abbreviations, and Measurement Units

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Acronyms and Abbreviations

AFDM	Ash-free dry mass
APA	Acid/Alkaline Phosphatase Activity
BPJ	Best Professional Judgment
BOD	Biological Oxygen Demand
CENR	(White House) Committee on the Environment and Natural Resources
CFR	Code of Federal Regulations
Dbh	Diameter at breast height
DC	Direct Current
DIC	Dissolved Inorganic Carbon
DLGs	Digital Line Graphs
DO	Dissolved oxygen
EERD	Ecological Exposure Research Division
EMAP	Environmental Monitoring and Assessment Program
EMAP-SW	Environmental Monitoring and Assessment Program-Surface Waters Resource Group

EPA	U.S. Environmental Protection Agency
ERB	Ecosystems Research Branch

Acronyms, Abbreviations, and Measurement Units (continued)

Acronyms and Abbreviations

GPS	Global Positioning System
ID	identification
LWD	Large Woody Debris
NAWQA	National Water-Quality Assessment Program
NERL	National Exposure Research Laboratory
NHEERL	National Health and Environmental Effects Research Laboratory
ORD	Office of Research and Development
OSHA	Occupational Safety and Health Administration
PFD	Personal Flotation Device
P-Hab	physical habitat
PVC	polyvinyl chloride
QA	quality assurance
QC	quality control
R-EMAP	Regional Environmental Monitoring and Assessment Program
SL	Standard length
SOP	Standard Operating Procedure
TL	Total length
USGS	United States Geological Survey
WED	Western Ecology Division

YOY	young of year
YSI	Yellow Springs Instrument system

Acronyms, Abbreviations, and Measurement Units (continued)

Measurement Units

amps	amperes
cm	centimeter
gal	gallon
ha	hectare
Hz	Hertz
in	inches
L	liter
m	meter
m2	square meters
mg/L	milligram per liter
mm	millimeter
m	micrometer
S/cm	microsiemens per centimeter
msec	millisecond
ppm	parts per million
psi	pounds per square inch
V	volts
VA	volt-ampere