

3745-4-06

Level 3 data requirements and reporting.

- (A) Except as provided by paragraph (D) of rule 3745-4-01 of the Administrative Code, all data submitted to the director for consideration as level 3 credible data shall be collected and submitted by level 3 qualified data collectors (QDCs) approved by the director pursuant to rule 3745-4-03 of the Administrative Code. Other persons trained and supervised by the QDC may assist with the collection of data. The director shall accept the data as level 3 credible data provided the requirements of this rule are met. The director shall have sole authority in determining whether data meet these requirements. Data reporting shall be in a format consistent with the requirements listed in this rule. Data submitted by a QDC determined to meet these requirements shall be included in a computerized database maintained by Ohio EPA and made available for sharing with other agencies and interested persons.
- (B) Data submitted by a QDC must meet the following minimum requirements to be accepted as level 3 credible data.
- (1) Adherence to a study plan. Persons submitting data to Ohio EPA as a QDC under section 6111.53 of the Revised Code must prepare and adhere to a project study plan or, alternatively, use a generic study plan as described in this paragraph.
- (a) The QDC shall prepare and submit to the director for approval a project study plan using the guidelines presented in appendix A of this rule. The director may approve an alternative to the guidelines in appendix A of this rule upon a reasonable and scientifically supported demonstration by a QDC. Upon completion of the plan review, the director shall send written notification of deficiencies in the plan, if any are found, to the QDC ~~thereby disapproving the plan for use in the credible data program~~ and provide the QDC a reasonable opportunity to address such deficiencies. If the deficiencies are not addressed, the director may disapprove the study plan. A plan submitted by a level 3 QDC ~~or qualified data collection organization~~ not disapproved within sixty days of the initial submittal or, where a notification of deficiency has been issued, within sixty days of any revised submittal, shall be considered to have been approved. The director will disapprove a site-specific plan that does not include the certification statement in paragraph ~~(B)(4)(f)~~ (B)(4)(e) of this rule.
- (b) Generic study plan. The director may from time to time make available generic study plans suitable for certain project objectives and utilizing appropriate methods. After such time that a generic study plan is available, the QDC may elect to collect data using the generic study plan appropriate to the data quality objectives for the specific study. The level 3 QDC shall submit to the director a notification of the level 3

QDC's intent to utilize a generic plan or generic plan component under this paragraph. The QDC is encouraged to submit the notification to the director at least ninety days prior to the first anticipated sampling activity. The QDC may submit credible data to the director in accordance with a generic plan without prior approval from the director.

[Comment: QDCs are encouraged to submit notification of intent to use generic study plans at least ninety days prior to sample collection to allow time for consultation with Ohio EPA. The objective of the consultation is to ensure that Ohio EPA and the QDC agree that the generic study plan is suitable for the project and the stated data quality objectives, thereby allowing the data generated to be deemed credible at the level intended by the QDC.]

- (2) Use of appropriate test methods. In preparing the project study plan, the QDC shall be responsible for selecting the appropriate field and laboratory methods, including quality assurance and quality control steps, that fit the objectives and purpose of the project. All methods should be commensurate with the purposes of level 3 and the need for sufficient rigor and sensitivity to detect relatively small differences in water quality over time or from sampling site to sampling site. The expectation and ability to utilize level 3 credible data in certain regulatory functions of Ohio EPA give rise to the requirement that all test methods for level 3 credible data be from one of the publications listed in paragraph (C) of this rule. Test methods published in updates to the publications listed in paragraph (C) of this rule may be used if approved by the director as part of a project study plan approval. Explicit approval of the specific methods employed in the study shall occur when Ohio EPA reviews project study plans or whenever Ohio EPA makes available a generic study plan.
- (3) All laboratories that perform analysis under a level 3 study plan must be accredited, participate in annual proficiency testing, and implement a quality assurance program as described in this paragraph.
 - (a) The QDC is responsible for ensuring that the laboratories used in generating level 3 credible data have current accreditations from one or more of the following organizations: ~~United States environmental protection agency; Ohio EPA voluntary action program;~~ national environmental laboratory accreditation program; American industrial hygiene association; international organization for standardization; or other governmental or private accrediting authorities that apply accreditation standards consistent with and equivalent to the organizations listed in this paragraph. An Ohio EPA laboratory audit, with all issues acceptably resolved, may be substituted for this

accreditation (based on availability and to be scheduled through the credible data program).

- (b) Laboratories analyzing level 3 data are required to participate in annual proficiency testing (PT) studies administered by providers that are accredited by the national institute of standards and technology (NIST) national voluntary laboratory accreditation program (NVLAP). The analyte list should encompass all parameters for which the laboratory analyzes level 3 data. Laboratories may limit the scope of PT studies to those analytes that are readily available from the NIST NVLAP accredited providers.
- (c) Laboratories analyzing level 3 data are required to implement a quality assurance program and document all elements of the program in a quality assurance manual (QAM) or quality assurance plan (QAP). Guidelines for these elements are presented in appendix B of this rule.
- (4) Data reporting. QDCs choosing to submit their data to Ohio EPA must submit all collected data. Submission of data may be done at any time, but must be done no later than one year after completion of the study identified in the project study plan. For ongoing sampling programs, data submission should begin no later than one year after the initial phase of study identified in the project study plan. ~~Additional data reporting requirements are~~The following shall be submitted:
- (a) Habitat and chemistry sample data using the online credible data database;
- ~~(a)(b) Wherever possible, a~~ A paper copy of all level 3 fish and macroinvertebrate sample data ~~shall be on forms made available by the director, but may be submitted~~or on forms developed for the project if part of the approved project study plan; ~~In lieu of a paper copy, data may be submitted electronically in a format mutually acceptable to the QDC and the director;~~
- ~~(b)(c) Submission of documentation~~Documentation demonstrating adherence to an approved project study plan, generic study plan, or generic plan component;
- ~~(e)(d)~~ Copies of the results from all quality assurance and quality control samples collected during implementation of the approved project study plan, generic study plan, or generic plan component in the same manner as the data submitted in accordance with paragraphs (B)(4)(a) or (B)(4)(b) of this rule;

- ~~(d) Documentation of the person's status as a level 3 QDC;~~
- (e) A certification that, to the best of the QDC's knowledge and belief, the data were collected in accordance with the procedures required by the approved project study plan, generic study plan, or generic plan component; and
- (f) A ~~certification that the persons conducting data collection have~~ signed statement from each QDC working on the project certifying that the QDC has not been convicted of or pleaded guilty to a violation of section 2911.21 of the Revised Code (criminal trespass) or a substantially similar municipal ordinance within the previous five years.
- (5) Reporting laboratory quality assurance and quality control plans. In addition to the information required by paragraph (B)(4) of this rule, the QDC, upon request of the director, shall provide quality assurance and quality control documentation for all laboratories which were used to analyze any data collected pursuant to the approved project study plan, generic study plan, or generic plan component. The QDC is responsible for providing this documentation in the form of a laboratory quality assurance plan which meets the content guidelines presented in appendix B of this rule.
- (6) Data approval process. The director shall review data submissions to verify that ~~they~~ the data submissions were submitted by a QDC, that appropriate test methods and quality control and quality assurance practices were used, and that the data reporting requirements are complete. The review will ensure that all components of the plan for the collection of data were followed. If substantial discrepancies are found, the director may decide not to approve the data, unless the QDC demonstrates to the satisfaction of the director that the discrepancy is valid and defensible for the purpose for which the data was collected. The director will provide written notification to the person submitting the data as to whether the data have been approved, and at what level the data qualify as credible data. The director shall approve or disapprove the data no later than one year from the submittal of such data to Ohio EPA.
- (C) Publications that provide acceptable level 3 test methods for the collection, analysis and interpretation of surface water quality monitoring data submitted under the credible data water quality monitoring program established pursuant to section 6111.53 of the Revised Code are presented in this paragraph. Most of these references are available on the web at <http://www.epa.ohio.gov/dsw/credibledata/references.aspx> or through public

libraries. The director may approve other level 3 methods as part of a project study plan approval. Any level 3 methods must have a degree of accuracy commensurate with the purpose for which the data will be used.~~The~~

The person submitting data as a level 3 QDC shall be responsible for the selection and proper execution of the test methods as described in paragraph ~~B(2)~~(B)(2) of this rule. Test methods published in updates to the publications listed in paragraphs (C)(1) to (C)(6) of this rule may be used if approved by the director. Where the published methods allow for alternative test procedures for chemical or physical parameters and the appropriate review authority has approved the alternative test method, the director may approve use of the alternative test procedure through the study plan approval. Where Ohio EPA has developed, applied and published new biological or habitat assessment methods, the director may approve the use of such methods through the study plan approval.

(1) References for water quality sampling procedures.

- (a) Ohio EPA. ~~2003~~ 2009. Manual of Ohio EPA Surveillance Methods and Quality Assurance Practices. Ohio Environmental Protection Agency, Division of Surface Water / Division of Environmental Services. Columbus, Ohio. ~~47~~ 41 p. This document is available on the web at <http://www.epa.state.oh.us/dsw/documents/Field%20Manual%2010-1-03.pdf> http://www.epa.ohio.gov/dsw/document_index/docindx.aspx.
- (b) Ohio EPA. 2010. Inland Lakes Sampling Procedure Manual. Ohio Environmental Protection Agency, Division of Surface Water. Columbus, Ohio 65 p. This document is available on the web at http://www.epa.ohio.gov/dsw/document_index/docindx.aspx.
- ~~(b)~~(c) USEPA. 1982. Handbook for Sampling and Sample Preservation of Water and Wastewater. EPA 600/4-82-029. United States Environmental Protection Agency. Environmental Monitoring and Support Laboratory. Cincinnati, Ohio. 418 p. This document is available on the web at <http://www.epa.gov/clariton/elhtml/pubtitleORD.html> by searching "600482029" at <http://nepis.epa.gov/EPA/html/Pubs/pubtitleORD.htm>.
- ~~(e)~~(d) Ohio EPA. 1998. Sampling Methods for Documentation of a Public Health Nuisance under OAC Rule 3745-1-04 (F) & (G). August 20, 1998. Ohio Environmental Protection Agency, Division of Surface Water. Columbus, Ohio. 7 p. This document is available on the web at <http://www.epa.state.oh.us/dsw/guidance/wqs3.pdf> <http://www.epa.ohio.gov/portals/35/guidance/wqs3.pdf>.

~~(d)~~(e) For the measurement of visibility using secchi disk depth when accompanied by measurements of total phosphorus and chlorophyll a, Lind, O. T. 1985. Handbook of common methods in limnology. Second edition. Kendal / Hunt Publishing Co., Dubuque, IA. 199 p.

(f) USEPA. 1997. Method 445.0. In vitro Determination of Chlorophyll a and Pheophytin a in Marine and Freshwater Algae by Fluorescence. Revision 1.2. September 1997. United States Environmental Protection Agency. National Exposure Research Laboratory Office of Research and Development. 22 p. This document is available on the web at http://www.epa.gov/nerlcwww/m445_0.pdf.

(2) References for chemical and microbiological laboratory methods.

(a) Eaton, A.D., L.S. Clesceri, E.W. Rice, A.E. Greenberg, M.A.H. Franson, (editors). 2005. Standard Methods for the Examination of Water and Wastewater: Centennial Edition. 21st Edition. ISBN: 0875530478. American Public Health Association. Washington, D.C. 1368 p. This document is available at many public libraries and on the web at <http://www.standardmethods.org/>.

(b) Clesceri, L.S., A.E. Greenberg, and A.D. Eaton, (editors). 1998. Standard Methods for the Examination of Water and Wastewater. 20th Edition. ISBN: 0875532357. American Public Health Association. Washington, D.C. 1325 p. This document is available at many public libraries and on the web at <http://www.standardmethods.org/>.

(c) APHA. 1995. Standard Methods for the Examination of Water and Wastewater. American Public Health Association. 19th Edition. American Public Health Association. Washington, D.C. This document is available at many public libraries and on the web at <http://www.standardmethods.org/>.

(d) APHA. 1992. Standard Methods for the Examination of Water and Wastewater. American Public Health Association. 18th Edition. American Public Health Association. Washington, D.C. This document is available at many public libraries and on the web at <http://www.standardmethods.org/>.

(e) Ohio EPA. 1998. Permit Guidance #5 - Reporting and Testing Guidance for Biomonitoring Required by the Ohio Environmental Protection Agency. Ohio Environmental Protection Agency, Division of Surface

Water. Columbus, Ohio. 31 p. (plus six attachments). This document is available on the web at <http://www.epa.state.oh.us/dsw/guidance/permit5.pdf>
<http://www.epa.ohio.gov/portals/35/guidance/permit5.pdf>.

- (f) USEPA. 40 C.F.R. 136. July 1, 2004 edition. This document is available on the web at <http://www.epa.gov/docs/epacfr40/chapt-1.info/>
http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&tpl=/ecfrbrowse/Title40/40cfr136_main_02.tpl.
- (g) USEPA. 1983. Methods for Chemical Analysis of Water and Wastes. U.S. Environmental Protection Agency. EPA 600/4-79-020. United States Environmental Protection Agency, Office of Research and Development, Environmental Monitoring and Support Laboratory. Cincinnati, Ohio. 552 p. This document is available on the web at <http://www.epa.gov/epahome/index/sources.htm>
<http://yosemite.epa.gov/water/owrcatalog.nsf/EPAtitle?OpenView&CartID=null> (search by title).
- (h) USEPA. 1978. Microbiological Methods for Monitoring the Environment, Water and Wastes . EPA-600/8-78/017. United States Environmental Protection Agency, Office of Research and Development, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio. 356 p. This document is available on the web at <http://www.epa.gov/epahome/index/sources.htm>.
- (i) Fishman, M. J. (editor). 1993. Methods of analysis by the U.S. Geological Survey National Water Quality Laboratory; determination of inorganic and organic constituents in water and fluvial sediments. Open File report 93-125. United States Department of the Interior, U. S. Geological Survey. Denver, CO. This document is available on the web at <http://infotrek.er.usgs.gov/pubs/>.
- (j) Stevens, H.H. et. al. 1975. Water temperature-influential factors, field measurements and data presentation. In: Techniques of Water-Resource Investigations, Book 1, Chapter D1. United States Department of the Interior, U.S. Geological Survey. Washington, D.C. This document is available on the web at <http://water.usgs.gov/pubs/twri/>.
- (k) ASTM. 2005. Annual Book of ASTM Standards, Water and Environmental Technology. ~~Section~~ Volume 11.01: Sampling and Flow Measurement; Inorganic Constituents. ~~Section~~ Volume 11.02. Organic Constituents. American Society for Testing and Materials International.

West Conshohocken, PA. This document is available on the web at <http://www.astm.org>.

- (l) AOAC. ~~2003~~ 2006. Official Methods of Analysis of AOAC INTERNATIONAL. ~~17th Edition, 2nd Revision.~~ 2003 18th Edition. 2006. AOAC INTERNATIONAL. Gaithersburg, Maryland. This document is available on the web at <http://www.aoac.org>.

(m) Arar, J.E. and B.G. Collins (USEPA). 1997. Method 445.0. In Vitro Determination of Chlorophyll a and Pheophytin a in Marine and Freshwater Algae by Fluorescence. Revision 1.2. September 1997. This document is available on the web at http://www.epa.gov/microbes/m445_0.pdf.

(3) References for stream flow measurement methods.

- (a) Rantz, S.E. et al. 1982. Measurement and computation of streamflow -- v. 1, Measurement of stage, and v. 2, Computation of discharge. U.S. Geological Survey Water-Supply Paper 2175. United States Department of Interior, U.S. Geological Survey. Washington D.C. 631 p. This document is available on the web at <http://infotrek.er.usgs.gov/pubs/>.
- (b) Lipscomb, S.W. 1995. Quality assurance plan for discharge measurements using broadband acoustic Doppler current profilers. U.S. Geological Survey Open File Report 95-701. 12 p. This document is available on the web at <http://infotrek.er.usgs.gov/pubs/>.
- (c) U.S. Geological Survey. 2005. Techniques of Water Resources Investigations Reports. Book 3: Applications of hydraulics, Section A: Surface-water techniques. (21 chapters). United States Department of Interior, U.S. Geological Survey. Washington D.C. This document is available on the web at <http://water.usgs.gov/pubs/twri/>.
- (d) Bureau of Reclamation. 1997 and 2001. Water Measurement Manual, Third Edition. United States Department of Interior, Bureau of Reclamation, Water Resources Research Laboratory. Denver, Colorado. This document is available on the web at http://www.usbr.gov/pmts/hydraulics_lab/pubs/wmm/index.htm.
- (e) International Organization for Standardization (ISO). ~~2005~~ 2010. Published standards found at 17.120.20. Flow in open channels. ~~This document is~~ These documents are available on the web at

<http://www.iso.org>
http://www.iso.org/iso/iso_catalogue/catalogue_ics/catalogue_ics_browse.htm?ICS1=17&ICS2=120&ICS3=20.

- (f) ASTM. 2005. Annual Book of ASTM Standards, Water and Environmental Technology, ~~Section~~ Volume 11.01: Sampling and Flow Measurement. American Society for Testing and Materials International. West Conshohocken, PA. This document is available on the web at <http://www.astm.org>.

(4) References for stream habitat measurement methods.

- (a) Rankin, E.T. 1989. The qualitative habitat evaluation index (QHEI): rationale, methods, and application. Div. Water Qual. Plan. & Assess., Ecol. Assess. Sect., Columbus, Ohio. This document is available on the web at <http://www.epa.state.oh.us/dsw/bioassess/BioCriteriaProtAqLife.html> <http://www.epa.ohio.gov/dsw/bioassess/BioCriteriaProtAqLife.aspx>.

- (b) Midwest Biodiversity Institute (for Ohio EPA, Division of Surface Water). 2006. Methods for assessing habitat in flowing waters using the qualitative habitat evaluation index (QHEI). 26 pp. This document is available on the web at <http://www.epa.ohio.gov/dsw/bioassess/BioCriteriaProtAqLife.aspx>.

- ~~(b)~~(c) Rankin, E. T. 1995. The use of habitat assessments in water resource management programs. pp. 181-208. In: W. Davis and T. Simon (eds.). Biological Assessment and Criteria: Tools for Water Resource Planning and Decision Making. Lewis Publishers. Boca Raton, FL. This document is available on the web at <http://www.crcpress.com/>.

- ~~(e)~~(d) Ohio EPA. 1989. Biological criteria for the protection of aquatic life: volume III: standardized biological field sampling and laboratory methods for assessing fish and macroinvertebrate communities. pp. V-4-18 to V-4-31. This document is available on the web at <http://www.epa.state.oh.us/dsw/bioassess/BioCriteriaProtAqLife.html> <http://www.epa.ohio.gov/dsw/bioassess/BioCriteriaProtAqLife.aspx>.

- (e) Ohio EPA. 2009. Field Evaluation Manual for Ohio's Primary Headwater Habitat Streams. 86 p. This document is available on the web at <http://www.epa.ohio.gov/dsw/wqs/headwaters/index.aspx>.

- (f) Ohio EPA. 2010. Methods of Assessing Habitat in Lake Erie Shoreline Waters Using the Qualitative Habitat Evaluation Index (QHEI)

Approach (Version 2.1). 35 p. Available on the web at <http://www.epa.state.oh.us/dsw/bioassess/BioCriteriaProtAqLife.aspx>.

- (g) Thoma, R. F. 2006. Development and Assessment of a Qualitative Habitat Evaluation Index For Application In Coastal Wetlands of the Great Lakes. pp. 171-194. In: T. P. Simon and P. M. Stewart (eds.). Coastal Wetlands of the Laurentian Great Lakes. Health Habitat and Indicators. AuthorHouse. Bloomington, IN. This document is available on the web at <http://www.crcpress.com/>.

~~(5)~~ References for sediment sampling and constituent testing.

- (a) ~~Ohio EPA. 2001. Sediment Sampling Guide and Methodologies. Second edition. Ohio Environmental Protection Agency. Columbus, Ohio. 35 p. This document is available on the web at <http://www.epa.state.oh.us/dsw/guidance/guidance.html>.~~
- (b) ~~Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, EPA Publication SW-846 [Third Edition (November 1986), as amended by Updates I (dated July 1992), II (dated September 1994), IIA (dated August 1993), IIB (dated January 1995), III (dated December 1996) and IIA (dated April 1998)]. This document is available on the web at <http://www.epa.gov/epaoswer/hazwaste/test/main.htm>.~~

~~(6)~~(5) References for fish tissue collection and contaminant testing.

- (a) ~~Ohio EPA. 2004~~ 2009. State of Ohio Cooperative Fish Tissue Monitoring Program Fish Collection Guidance Manual. Ohio Environmental Protection Agency, Division of Surface Water. Columbus Ohio. 20 p. This document is available on the web at <http://www.epa.state.oh.us/dsw/fishadvisory/FishCollectionGuidanceManual05.pdf> <http://www.epa.ohio.gov/dsw/fishadvisory/overview.aspx>.
- (b) USEPA. 2000. Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories. Volume 1, Fish Sampling and Analysis. Third edition. EPA 823/B-00-007. Office of Science and Technology, Office of Water, United States Environmental Protection Agency. Washington, D.C. This document is available on the web at <http://www.epa.gov/ost/fishadvice/volume1/index.html>.

~~(7)~~(6) References for fish and macroinvertebrate community measurement methods.

- (a) Ohio Environmental Protection Agency. 1987a. Biological criteria for the

protection of aquatic life: Volume I. The role of biological data in water quality assessment. Div. Water Qual. Monit. & Assess., Surface Water Section. Columbus, Ohio. This document is available on the web at <http://www.epa.state.oh.us/dsw/bioassess/BioCriteriaProtAqLife.html> <http://www.epa.ohio.gov/dsw/bioassess/BioCriteriaProtAqLife.aspx>.

- (b) Ohio Environmental Protection Agency. 1987b. Biological criteria for the protection of aquatic life: Volume II. Users manual for biological field assessment of Ohio surface waters. Div. Water Qual. Monit. & Assess., Surface Water Section. Columbus, Ohio. This document is available on the web at <http://www.epa.state.oh.us/dsw/bioassess/BioCriteriaProtAqLife.html> <http://www.epa.ohio.gov/dsw/bioassess/BioCriteriaProtAqLife.aspx>.
- (c) Ohio Environmental Protection Agency. 1989a. Addendum to Biological criteria for the protection of aquatic life: Volume II. Users manual for biological field assessment of Ohio surface waters. Div. Water Qual. Plan. & Assess., Ecological Assessment Section. Columbus, Ohio. This document is available on the web at <http://www.epa.state.oh.us/dsw/bioassess/BioCriteriaProtAqLife.html> <http://www.epa.ohio.gov/dsw/bioassess/BioCriteriaProtAqLife.aspx>.
- (d) Ohio Environmental Protection Agency. 1989b. Biological criteria for the protection of aquatic life: Volume III. Standardized biological field sampling and laboratory methods for assessing fish and macroinvertebrate communities. Div. Water Quality Plan. & Assess., Ecol. Assess. Sect. Columbus, Ohio. This document is available on the web at <http://www.epa.state.oh.us/dsw/bioassess/BioCriteriaProtAqLife.html> <http://www.epa.ohio.gov/dsw/bioassess/BioCriteriaProtAqLife.aspx>.
- (e) Ohio Environmental Protection Agency. 2008a. 2008 Updates to Biological Criteria for the Protection of Aquatic Life: Volume II and Volume II Addendum. Users Manual for Biological Field Assessment of Ohio Surface Waters. Division of Surface Water. Columbus, Ohio. 14 p. This document is available on the web at <http://www.epa.ohio.gov/dsw/bioassess/BioCriteriaProtAqLife.aspx>.
- (f) Ohio Environmental Protection Agency. 2008b. 2008 Updates to Biological Criteria for the Protection of Aquatic Life: Volume III. Standardized Biological Field Sampling and Laboratory Methods for Assessing Fish and Macroinvertebrate Communities. Division of Surface Water. Columbus, Ohio. 12 p. This document is available on the web at

<http://www.epa.ohio.gov/dsw/bioassess/BioCriteriaProtAqLife.aspx>.

(e)(g) DeShon, J.D. 1995. Development and application of the invertebrate community index (ICI). pp. 217-243. In: W.S. Davis and T. Simon (eds.). Biological Assessment and Criteria: Tools for Risk-based Planning and Decision Making. Lewis Publishers. Boca Raton, FL. This document is available on the web at <http://www.crcpress.com/>.

(h) Thoma, Roger. 1999. Biological Monitoring and an Index of Biotic Integrity for Lake Erie's Nearshore Waters. Chapter 16 in Assessing the Sustainability and Biological Integrity of Water Resources Using Fish Communities. Edited by Thomas P. Simon. 672 p. CRC Press. Boca Raton, FL. This document is available on the web at <http://www.crcpress.com/>.

(f)(i) Yoder, C.O. 1995. Policy issues and management applications for biological criteria. pp. 327-344. In: W. Davis and T. Simon (eds.). Biological Assessment and Criteria: Tools for Water Resource Planning and Decision Making. Lewis Publishers. Boca Raton, FL. This document is available on the web at <http://www.crcpress.com/>.

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