

STATE OF OHIO
CREDIBLE DATA PROGRAM

Chapter 3745-4 of the ADMINISTRATIVE CODE

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Ohio Environmental Protection Agency
Division of Surface Water

TABLE OF CONTENTS

OAC Rule #	Rule Title	Effective Date
3745-4-01	Purpose and applicability	2/19/2018
3745-4-02	Definitions	3/1/2021
3745-4-03	Qualified data collectors	3/1/2021
3745-4-04	Level 1 data requirements and reporting.....	3/1/2021
3745-4-05	Level 2 data requirements and reporting	3/1/2021
	Appendix A. Guidelines for the preparation of level 2 project study plans	3/1/2021
	Appendix B. Guidelines for laboratory quality assurance plans	3/1/2021
3745-4-06	Level 3 data requirements and reporting.....	3/1/2021
	Appendix A. Guidelines for the preparation of level 3 project study plans	3/1/2021
	Appendix B. Guidelines for laboratory quality assurance Plans	3/1/2021

3745-4-01 Purpose and applicability.

- (A) The purpose of this chapter, credible data rules, is to establish criteria for three levels of credible data for a surface water quality monitoring and assessment program established by the director and to establish the necessary training and experience for persons to submit credible data, thereby increasing the information base upon which to enhance, improve and maintain water resource quality in Ohio. All data submitted under the credible data program that meet the specified requirements, shall be stored and made accessible to both the public and other state agencies in a computerized data base. Except as provided in paragraph (D) of this rule, persons collecting and submitting data to Ohio EPA for consideration as credible data must have status as a qualified data collector (QDC) as provided in rule 3745-4-03 of the Administrative Code.
- (B) Participation in this program is voluntary except for the requirement under section 6111.54 of the Revised Code that each state agency in possession of surface water quality data shall submit the data to Ohio EPA in a format designated by the director. No later than March thirty-first of each year, state agencies shall submit surface water quality data for the preceding year to Ohio EPA.
- (C) This chapter establishes requirements for study plan design, sample collection, analytical methods, data assessment, and quality assurance and quality control procedures that are associated with credible data at level 1, level 2 and level 3.
- (1) Level 1 data are collected and submitted to Ohio EPA for purposes of public awareness and educational activities. The specifications associated with level 1 data are commensurate with the training and methods associated with established science education programs and citizen monitoring programs.
- (2) Level 2 data are collected and submitted to Ohio EPA for the purposes of evaluating the effectiveness of pollution controls for point sources and nonpoint sources and initial screening of water quality problems to determine if additional study is needed. Level 2 data may also serve the purpose of public awareness and educational activities. The specifications associated with level 2 data are commensurate with a higher degree of training and more rigorous test methods than level 1.
- (3) Level 3 is the highest level of credible data that are used for a variety of regulatory purposes specified in section 6111.52 of the Revised Code, and may also serve those purposes associated with level 1 and level 2 data. The specifications associated with level 3 data are commensurate with the training, skills and test methods used by Ohio EPA and by other professional environmental organizations. These high standards are necessary to ensure that level 3 data are of the caliber necessary to make and defend regulatory and management decisions involving surface water resources in Ohio.
- (D) Data deemed credible by rule.

- (1) The data originating from studies conducted and samples collected by Ohio EPA, Ohio EPA's contractors, federal environmental agencies including the United States environmental protection agency, and other state environmental agencies shall be deemed credible at the appropriate level according to the specifications set forth in this chapter.
- (2) Unless the director identifies reasons why the data are not credible, data shall be considered credible for the submitted purposes if the data meet one or more of the following requirements:
- (a) Data were submitted pursuant to the requirements of a permit issued by a state agency including, but not limited to, compliance sampling results submitted pursuant to national pollutant discharge elimination system (NPDES) permits and compliance sampling results from licensed public water systems with surface water intakes conducted pursuant to Chapters 3745-81 and 3745-90 of the Administrative Code.
 - (b) Data were submitted pursuant to findings and orders issued by the director.
 - (c) Data were submitted pursuant to a court order.
- (E) Nothing in this chapter shall be construed as granting approval for the collection of any wildlife without obtaining a wild animal collecting permit from the chief of the division of wildlife, Ohio department of natural resources pursuant to section 1533.08 of the Revised Code and performing the duties specified in section 1533.09 of the Revised Code. The collection of federally listed endangered and threatened species is not authorized by this chapter.

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3745-4-02 Definitions.

As used in this chapter:

- (A) "Citizen monitoring program" means any organized citizen effort to collect surface water quality data using standardized sampling and testing protocols. The program shall provide an introduction to basic water quality principles and train participants in the use of field instrumentation, sample collection and preservation, and data recording techniques.
- (B) "Compelling reasons" as to why historical data are credible means that no more recent data exist, or more recent data alone are insufficient to establish water quality, or the director identifies other circumstances supporting the use of the historical data. Historical data shall be evaluated to ensure that more recent information does not indicate that the data are not representative of current conditions.
- (C) "Credible data" means scientifically valid chemical, physical, or biological water quality monitoring data concerning surface waters. This includes qualitative scoring of physical habitat characteristics and the sampling of fish, macroinvertebrates, and water quality, that have been collected by or submitted to the director and that comply with this chapter. Credible data may include historical data if the director identifies compelling reasons as to why the data are credible.
- (D) "Data quality objectives (DQOs)" means qualitative and quantitative statements derived from the DQO process that clarify study objectives, define the appropriate type of data, and specify tolerable levels of potential decision errors that will be used as the basis for establishing the quality and quantity of data needed to support decisions. The planning process for ensuring environmental data are the type, quality, and quantity needed for decision making is called the DQO process.
- (E) "Detection limit" means the lowest concentration of a target analyte that a given method or piece of equipment can reliably ascertain and report as greater than zero.
- (F) "Director" means the director of the Ohio environmental protection agency or an authorized representative.
- (G) "Educational monitoring program" means a surface water quality data collection program designed for education or public awareness purposes and associated with an accredited or school-sponsored science education program. The program must be consistent with national or state science content standards, provide an introduction to basic water quality principles and train participants in the use of field instrumentation, sample collection and preservation, and data recording techniques.
- (H) "Federal environmental agency," means an agency of the United States government, or a department, division, or program in an agency of the United States government, whose primary function includes protection, management, study or assessment of the environment, natural resources or ecological systems, including but not limited to, the following:

- (1) The United States environmental protection agency.
 - (2) The United States fish and wildlife service, the national park service, the office of surface mining, and the United States geological survey in the United States department of the interior.
 - (3) The United States army corps of engineers.
 - (4) The national oceanic and atmospheric administration in the United States department of commerce.
 - (5) The environmental management program in the United States department of energy.
 - (6) The forest service, the natural resources conservation service, and the agricultural research service in the United States department of agriculture.
 - (7) The Ohio river valley water sanitation commission (ORSANCO).
- (I) "Headwater habitat evaluation index" or "HHEI" means an assessment methodology of the principal physical and riparian stream habitat features in headwater streams.
- (J) "Historical data" means data that are more than five years old.
- (K) "Ohio EPA" means the Ohio environmental protection agency.
- (L) "Primary headwater habitat stream" means a surface water having a defined bed and bank, with either continuous or periodical flowing water, watershed area less than or equal to 1.0 square mile (two hundred fifty-nine hectare), and maximum depth of water pools equal to or less than forty centimeters.
- (M) "Project study plan" means a document describing the purpose of the data collection, the parameters or conditions that will be monitored, the methods of data collection and analysis, the identification of monitoring sites, a schedule for data collection and reporting, and how the data will be interpreted and presented.
- (N) "Quality assurance plan" or "quality assurance manual" means a document that details a laboratory's procedures to assure the accuracy and reproducibility of analytical results. A quality assurance plan includes information about laboratory personnel and their qualifications as well as laboratory equipment, methods, data management, and other specific procedures related to and including sample analysis.
- (O) "Qualified data collector" or "QDC" means an individual who meets the requirements established in paragraph (A) of rule 3745-4-03 of the Administrative Code.
- (P) "Qualitative habitat evaluation index" or "QHEI" means an assessment methodology of the principal physical and riparian stream habitat features that affect fish communities and other aquatic life.
- (Q) "State environmental agency," means an agency within the executive branch of the government

of the state of Ohio, or a department, division, or program in an agency within the executive branch of the government of the state of Ohio, whose primary function includes protection, management, study or assessment of the environment, natural resources or ecological systems, including but not limited to, the following:

- (1) The Ohio environmental protection agency.
- (2) The Ohio department of natural resources.
- (3) The bureau of environmental health in the division of prevention in the Ohio department of health.
- (4) The livestock environmental permitting program in the Ohio department of agriculture.
- (5) The bureau of underground storage tank regulations in the state fire marshal division of the Ohio department of commerce.
- (6) The office of environmental services in the Ohio department of transportation.

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3745-4-03 Qualified data collectors.

(A) Requirements to become a qualified data collector (QDC).

(1) Level 1 requirements.

- (a) An individual may obtain level 1 QDC status by documenting completion of a basic water quality monitoring program designed for public awareness and education. Successful completion of a level 1 training from a QDC trainer approved by the director shall result in automatic approval as a level 1 QDC if the trainee provides name and contact information at the training. Individuals automatically approved as level 1 QDCs shall be included on the list of approved QDCs on the credible data website at: <http://www.epa.ohio.gov/dsw/credibledata/index.aspx>.
- (b) The director shall determine the acceptability of the basic water quality monitoring training based on factors including, but not limited to, the following:
 - (i) Whether the training is affiliated with a national, state or local organization that actively encourages and supports surface water monitoring.
 - (ii) Whether the training is affiliated with a program that has maintained, or intends to maintain, data collection efforts spanning more than one year.
 - (iii) Confirmation that the training received by participants includes basic water quality principles, the use of field instrumentation, sample collection and preservation and data recording techniques.

(2) Level 2 requirements. Four categories of level 2 QDC status are available. Applicants may apply for one or more of the following in any combination:

(a) Stream habitat assessment.

- (i) The applicant shall demonstrate through education or experience a general knowledge of stream and riverine physical forms and habitat features. The director may develop training and testing for this knowledge.
- (ii) Within the past one year, the applicant shall have attended training and achieved a passing mark in stream habitat assessment "Qualitative Habitat Evaluation Index" (QHEI) testing offered by Ohio EPA or a person authorized pursuant to this chapter to provide such training.

(b) Primary headwater stream habitat assessment.

- (i) The applicant shall demonstrate through education or experience a general knowledge of stream and riverine physical forms and habitat features. The director may develop training and testing for this knowledge.
- (ii) Within the past one year, the applicant shall have attended training and achieved a passing mark in "Headwater Habitat Evaluation Index" (HHEI) testing offered by Ohio EPA or a person authorized pursuant to this chapter to provide such training.

(c) Benthic macroinvertebrate biology.

[Comment: The stream habitat and biocriteria training is strongly encouraged for QDCs in the level 2 macroinvertebrate specialty. The stream habitat and biocriteria training provides a broad-based understanding of how Ohio EPA uses biology to assess stream health.]

- (i) The applicant shall demonstrate through education or experience a general knowledge of stream and riverine or lake physical forms and habitat features. The director may develop training and testing for this knowledge.
- (ii) The applicant shall demonstrate through education or experience knowledge of and the ability to accurately use macroinvertebrate taxonomic references and dichotomous keys to identify midwestern aquatic macroinvertebrates to the level of family.
- (iii) Within one hundred eighty days prior to submission of a level 2 QDC application, the applicant shall have achieved a passing mark in a macroinvertebrate taxonomic identification examination administered by Ohio EPA or a person authorized under this chapter to administer such an examination.
- (iv) The applicant shall have college-level course credit in aquatic invertebrate zoology or practical experience in the identification of aquatic macroinvertebrates.
- (v) The applicant shall have completed and achieved passing marks in undergraduate core course work in limnology, aquatic biology, environmental sciences or a related discipline, or has two years of practical experience in environmental assessment work.
- (vi) The applicant shall have one year of practical experience involving work in developing water quality sampling and analysis plans, quality assurance plans, and data quality objectives processes. The director may develop testing for this knowledge.

(d) Chemical water quality assessment.

- (i) The applicant shall demonstrate through education or experience a general knowledge of stream and riverine or lake physical forms and habitat features. The director may develop training and testing for this knowledge.
- (ii) The applicant shall have completed and achieved passing marks in undergraduate core course work in a biological, chemical, microbiological, natural or physical science, or has two years of pertinent laboratory experience performing water quality testing and analysis, or has two years of pertinent experience in chemical or microbiological water quality data analysis, interpretation and report writing. The director may develop training and testing for this knowledge.
- (iii) The applicant shall have one year of practical experience involving work in developing chemical or microbiological surface water quality sampling and

analysis plans, quality assurance plans, and data quality objectives processes. The director may develop testing for this knowledge.

(iv) The applicant shall have one year of practical experience involving surface water quality sampling techniques and water quality sampling equipment. The director may develop testing for this knowledge.

(3) Level 3 requirements. Five categories of level 3 QDC status are available. Applicants may apply for one or more of the following in any combination:

(a) Primary headwater stream habitat assessment.

(i) The applicant shall demonstrate through education or experience a general knowledge of stream and riverine physical forms and habitat features. The director may develop training and testing for this knowledge.

(ii) Within the past one year, the applicant shall have attended training and achieved a passing mark in "Headwater Habitat Evaluation Index" (HHEI) testing offered by Ohio EPA or a person authorized pursuant to this chapter to provide such training.

(b) Fish community biology.

[Comment: Approval as a level 3 QDC in fish community biology requires training and testing in QHEI.]

(i) The applicant shall, within the past one year, have attended training to conduct fish assessments and habitat assessments and achieved a passing mark in a program offered by Ohio EPA or a person authorized under this chapter to administer such training.

(ii) The applicant shall satisfy the requirements of stream habitat assessment in paragraph (A)(2)(a)(ii) of this rule.

(iii) The applicant shall demonstrate knowledge of Ohio EPA electrofishing sampling protocols and data assessment procedures. This knowledge shall be tested under provisions in paragraph (A)(3)(b)(i) of this rule.

(iv) The applicant shall demonstrate knowledge of and the ability to accurately use fish taxonomic references and dichotomous keys to identify midwestern fish to the level of species. This knowledge shall be tested under provisions in paragraph (A)(3)(b)(i) of this rule.

(v) The applicant shall have college-level course credit in ichthyology or two years of experience in the identification of midwestern fish species.

(vi) The applicant shall have completed and achieved passing marks in undergraduate core course work in limnology, aquatic biology, environmental sciences or a related discipline, or has two years of practical experience in environmental assessment

work.

(vii) The applicant shall have two years of practical experience involving work in developing biological water quality sampling and analysis plans, quality assurance plans, and data quality objectives processes. The director may develop testing for this knowledge.

(viii) The applicant shall have two years of practical experience in using electrofishing sampling techniques.

(c) Benthic macroinvertebrate biology.

(i) The applicant shall demonstrate through education or experience a general knowledge of stream and riverine physical forms and habitat features. The director may develop training and testing for this knowledge.

(ii) The applicant shall, within the last two years, have attended training to conduct macroinvertebrate assessments and achieved a passing mark in a program offered by Ohio EPA or a person authorized under this chapter to administer such training.

(iii) The applicant shall have knowledge of Ohio EPA macroinvertebrate field sampling, laboratory analysis, and data assessment procedures. This knowledge shall be tested under provisions in paragraph (A)(3)(c)(i) of this rule.

(iv) The applicant shall have knowledge of and the ability to accurately use macroinvertebrate taxonomic references and dichotomous keys to identify midwestern aquatic macroinvertebrates to the level of taxonomy used by Ohio EPA. This knowledge shall be tested under provisions in paragraph (A)(3)(c)(i) of this rule.

(v) The applicant shall have college-level course credit in aquatic invertebrate zoology or two years of practical experience in the identification of aquatic macroinvertebrates.

(vi) The applicant shall have completed and achieved passing marks in undergraduate core course work in limnology, aquatic biology, environmental sciences or a related discipline, or has two years of practical experience in environmental assessment work.

(vii) The applicant shall have two years of practical experience involving work in developing biological water quality sampling and analysis plans, quality assurance plans, and data quality objectives processes. The director may develop testing for this knowledge.

(d) Stream salamander community assessment.

(i) The applicant shall have knowledge of Ohio EPA primary headwater assessment field sampling protocols and data assessment procedures.

- (ii) The applicant shall satisfy the requirements of stream habitat assessment in paragraph (A)(3)(a)(ii) of this rule.
 - (iii) The applicant shall have knowledge of and the ability to accurately use taxonomic references and dichotomous keys to identify larval and adult stream salamanders to the level of species.
 - (iv) Within the past two years, the applicant shall have attended training to conduct stream salamander assessments and achieved a passing mark in an equivalent training program offered by Ohio EPA or a person authorized under this chapter to administer such training.
 - (v) The applicant shall have college-level course credit in herpetology or two years experience in the identification of midwestern stream salamanders.
 - (vi) The applicant shall have completed and achieved passing marks in undergraduate core course work in limnology, aquatic biology, environmental sciences or a related discipline, or has two years of practical experience in environmental assessment work.
 - (vii) The applicant shall have two years of practical experience involving work in developing water quality sampling and analysis plans, quality assurance plans, and data quality objectives. The director may develop training and testing for this knowledge.
- (e) Chemical water quality assessment.
- (i) The applicant shall demonstrate through education or experience a general knowledge of stream and riverine or lake physical forms and habitat features. The director may develop training and testing for this knowledge.
 - (ii) The applicant shall have completed and achieved passing marks in undergraduate core course work in a biological, microbiological, chemical, natural or physical science, or has four years of pertinent laboratory experience performing water quality testing and analysis, or has four years of pertinent experience in chemical or microbiological water quality data analysis, interpretation and report writing. The director may develop training and testing for this knowledge.
 - (iii) The applicant shall have two years of practical experience involving work in developing chemical or microbiological surface water quality sampling and analysis plans, quality assurance plans, and data quality objectives processes. The director may develop testing for this knowledge.
 - (iv) The applicant shall have two years of practical experience involving surface water quality sampling techniques and water quality sampling equipment. The director may develop testing for this knowledge.
- (f) In lieu of the training set forth in paragraph (A)(3) of this rule, an applicant may serve a six-month apprenticeship under the mentorship of a level 3 QDC in the same specialty.

For level 3 fish and macroinvertebrate certification, field collection and taxonomic identification must be included as part of the apprenticeship. The QDC shall monitor, assess and document the apprentice and provide an interim and final written evaluation of the apprentice to the director. The director reserves the right to perform unannounced audits during the apprenticeship period. Accepting the apprenticeship as fulfillment of level 3 QDC qualifications shall be at the discretion of the director. If accepted, the applicant must take and pass the level 3 test for the specialty following the completion of the apprenticeship.

- (g) The director retains the discretion to certify an applicant as level 3 QDC based upon a demonstration by the applicant of a combination of equivalent education and experience to that set forth in paragraphs (A)(3)(a) to (A)(3)(f) of this rule, along with the applicant successfully passing a test to be administered by Ohio EPA concerning the specific specialties for which the applicant is requesting QDC status.

(B) Application and initial approvals.

- (1) An applicant seeking to become a QDC shall submit to the director a complete and current application on forms provided by the director. The application shall include documentation demonstrating that the applicant completed water quality monitoring training described in paragraph (A) of this rule. Applications must be submitted within the time limits provided in paragraph (A) of this rule. The director may grant a waiver extending the period during which the applicant must apply for QDC status if the applicant can document that extenuating circumstances prevented a timely submission. The director may require the applicant to furnish additional documentation pertaining to the application.
- (2) An applicant shall submit copies of official transcripts from the appropriate educational institution and official training certifications or alternate required documentation to verify that the applicant meets the educational and training requirements set forth in paragraph (A) of this rule.
- (3) The level 2 and level 3 applicants shall certify that all information submitted in support of the application is true, accurate, and complete and that the applicant 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. Failure to include the certification shall render the application incomplete.
- (4) Ohio EPA shall conduct a completeness review of the application and shall notify the applicant in the event the application is incomplete. Ohio EPA shall not consider an incomplete application and shall notify the applicant of the reasons the application is incomplete and of any additional information required for further consideration.
- (5) The director shall either approve or deny a complete application by sending a letter to the applicant. If the director denies the application, the director shall identify the deficiencies upon which the denial of the application is based.
- (6) The director shall maintain a list of approved, active QDCs. The active QDC list shall provide the organization with which the QDC is affiliated, the approval level and specialty, the

QDC number, and expiration date of the status. The current QDC list shall be displayed on the credible data web page at:

http://www.epa.ohio.gov/dsw/credibledata/current_QDCs.aspx.

(C) Expiration and renewals.

- (1) Status as level 1 QDC shall not expire and a renewal application is not required.
- (2) Status as a level 2 QDC shall automatically expire five years after the date of approval of the application unless the approval has been renewed.
- (3) Status as a level 3 QDC shall automatically expire two years after the date of approval of the application unless the approval has been renewed or a timely renewal application has been submitted in accordance with this rule. Notwithstanding the above, status as a level 3 QDC shall automatically be renewed for a period of three years without submission of an application, where the QDC has submitted data while in the status of a level 3 QDC and the director has determined the data to be level 3 data. The automatic renewal process can proceed on a rolling basis and each three-year renewal period shall be deemed effective beginning on the date the last sample was collected, or for taxonomic identification of benthic macroinvertebrates the date the last sample was processed, under the confines of an approved study plan. The data shall have been submitted to the agency.
- (4) Renewal applications. Except as provided in paragraph (C)(3) of this rule, an applicant seeking renewal of the applicant's status as a level 2 or level 3 QDC shall submit to the director a renewal application prior to the date of expiration of the applicant's status as a level 2 or level 3 QDC.

(a) Renewal application and requirements.

- (i) Renewal applications shall be on forms for that purpose available from Ohio EPA.
- (ii) The renewal application shall provide a means to re-submit the original application, if appropriate, or to update and amend the original application as necessary.
- (iii) Ohio EPA shall approve or deny the renewal application in accordance with the procedures set forth in paragraphs (B)(4) and (B)(5) of this rule.
- (iv) Renewal of level 2 QDC status is contingent upon the applicant's demonstration of active participation, in that specialty, in the credible data water quality monitoring program within the last two years. The director may develop and offer refresher QDC training. Successful completion of refresher training can substitute for active participation.
- (v) Renewal of level 3 QDC status is contingent upon the applicant's demonstration of active participation (at that level and in that specialty) in the credible data water quality monitoring program within the prior two years. The director may develop and offer refresher QDC training. Successful completion of refresher training can substitute for active participation.
- (vi) Active participation means that the QDC has participated in activities under this

program at the level and specialty of the applicant's QDC certification during the period the applicant's certification was valid including, for level 3 fish, macroinvertebrate, and salamander certification, field collection and taxonomic identification, and including the submission of data approved at the appropriate level, collected under an approved project study plan.

(b) Renewal grace period.

- (i) A QDC with expired level 2 status may submit a renewal application for a period of one year after the expiration date.
- (ii) A QDC with expired level 3 status may submit a renewal application for a period of three months after the expiration date.
- (iii) A QDC with expired status may submit data if the project was initiated prior to the expiration date, providing the QDC submits an approvable renewal application within the time periods indicated by paragraph (C)(4) of this rule.
- (iv) A QDC with a lapsed status extending beyond these time periods shall submit a full application as specified in paragraph (B) of this rule.

(D) Revocation.

- (1) The director may revoke an individual's status as a QDC upon finding that the QDC has taken any of the following actions:
 - (a) Fraudulently obtained or attempted to obtain QDC status or renewal thereof.
 - (b) Knowingly or negligently submitted misleading, inaccurate, or false data to Ohio EPA.
 - (c) Consistently failed to attain the necessary standards for study design, field collection methods, laboratory techniques, or quality assurance and quality control procedures for the collection of credible data under this chapter.
- (2) Upon making a finding under paragraph (D)(1) of this rule, the director shall first issue a proposed action revoking QDC status in accordance with Chapter 3745-49 of the Administrative Code.
- (3) The director shall notify the QDC of a proposed action under paragraph (D)(2) of this rule. The notice shall be by certified mail and shall set forth the period of ineligibility proposed by the director, the proposed effective date thereof, the reason therefor, and the procedure for appealing the action.
- (4) Revocation of QDC status shall state a period during which the individual shall not apply for such status. After the period of ineligibility has expired, the former QDC may apply for status as a QDC under this chapter.

(E) Trainers and testing.

- (1) An individual seeking to become a QDC trainer for level 1 credible data shall include with the application to become a level 1 QDC trainer, documentation demonstrating all of the following:
 - (a) The applicant has successfully completed training offered through an educational monitoring program or a citizen monitoring program designed specifically for teaching the technical and leadership skills to group leader candidates.
 - (b) The applicant has credentials establishing that the individual is a qualified instructor in an organization that operates or participates in an educational monitoring program or a citizen monitoring program.
 - (c) The applicant agrees to submit to Ohio EPA information provided by trainees seeking level 1 QDC status at the time of the level 1 training activity.
- (2) Training required for level 2 or level 3 QDC status shall be performed by Ohio EPA, Ohio EPA's contractors or a third-party trainer having qualifications as a subject matter expert.
 - (a) Qualification as a subject matter expert. A person interested in offering the training required for level 2 or level 3 QDC shall have the following qualifications:
 - (i) Technical competence in the pertinent subject matter.
 - (ii) Five or more years of practical experience performing the full set of skills required for the QDC level and specialty.
 - (iii) A post-secondary educational degree in a scientific field related to the specialty.
 - (iv) Documented experience in presenting technical training offered through classes, field trips, seminars, workshops or conferences.
 - (b) Third party trainer requirements. A person interested in offering training shall submit a written application to the director with the following information:
 - (i) A resume that documents technical competence, education and employment history.
 - (ii) A basic description of the expected training and testing services to be provided.
 - (iii) A detailed training content manual for the specialty offered.
 - (c) The director shall either approve or deny the application by sending a letter to the applicant. If the director denies the application, the director shall identify the deficiencies upon which the denial of the application is based.
- (3) Testing.
 - (a) Third party trainers may test level 2 QDCs provided the trainers coordinate with Ohio EPA on test content, scoring and test result notification.
 - (b) All level 3 QDC trainees shall be tested by Ohio EPA or Ohio EPA's contractors.

(F) Notwithstanding paragraph (E) of this rule, an individual, or an individual who works for an organization, contracted by Ohio EPA to conduct QDC training shall be an approved QDC trainer for the life of that contract. Trainers' qualifications shall be evaluated by Ohio EPA staff as part of the contract process.

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3745-4-04 Level 1 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 1 credible data shall be collected and submitted by level 1, level 2 or level 3 qualified data collectors (QDCs) approved by the director pursuant to rule 3745-4-03 of the Administrative Code. The director shall accept the data as level 1 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.
- (B) Data submitted by a QDC shall meet the following to be accepted as level 1 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 shall prepare and adhere to a project study plan.
 - (a) The QDC shall prepare and submit to the director for approval a project study plan using educational monitoring program guidance materials, citizen monitoring program guidance materials, or other valid resources.
 - (b) Upon completion of the plan review, the director shall send written notification of deficiencies in the plan, if any are found, to the QDC and provide the QDC a reasonable opportunity to address such deficiencies. If the deficiencies are not addressed, the director may disapprove the study plan.
 - (c) A plan submitted by a QDC 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.
 - (d) The director shall disapprove a site-specific plan that does not include the certification statement in paragraph (B)(3)(c) of this rule.
 - (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/quality control steps, that fit the objectives and purpose of the data collection project. All methods should be commensurate with the purposes of level 1 and the need for sufficient rigor and sensitivity to detect relatively large differences in water quality over time or from sampling site to sampling site. The QDC may select from parameters and test methods published by the director pursuant to paragraph (C) of this rule or similar parameters and test methods recommended by an educational or citizen monitoring program or reported in the scientific literature.
 - (3) Data reporting. QDCs choosing to submit data to Ohio EPA shall submit all collected data. Submission of data may be done at any time, but shall 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. The timeframe for submission of data may be extended at the director's discretion for good cause. The following shall be submitted:
 - (a) Level 1 sample data using the online credible data database, or in a pre-approved format acceptable to the director.
 - (b) 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.

(c) A 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.

(4) Data approval process. The director shall review data submissions to verify that they were submitted by a QDC, that appropriate test methods and quality control/quality assurance practices were used, and that the data reporting requirements are complete. The review shall 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. The director shall maintain a record of all submissions acceptable as level 1 data.

(C) Publication of appropriate test methods.

The director from time to time shall publish examples of appropriate level 1 test methods for commonly sampled parameters. These can be found online at:

https://epa.ohio.gov/dsw/credibledata/parameters_testing_methods.

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3745-4-05 Level 2 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 2 credible data shall be collected and submitted by level 2 or 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 2 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.
- (B) Data submitted by a QDC shall meet the following to be accepted as level 2 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 shall prepare and adhere to a project study plan.
 - (a) The QDC shall prepare and submit to the director for approval a project study plan using the guidelines presented in appendix A to 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.
 - (b) Upon completion of the plan review, the director shall send written notification of deficiencies in the plan, if any are found, to the QDC and provide the QDC a reasonable opportunity to address such deficiencies. If the deficiencies are not addressed, the director may disapprove the study plan.
 - (c) A plan submitted by a QDC (level 2 or 3) 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.
 - (d) The director shall disapprove a site-specific plan that does not include the certification statement in paragraph (B)(4)(e) of this rule.
 - (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 2 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 QDC may select from parameters and test methods published by the director pursuant to paragraph (C) of this rule or similar methods published in the scientific literature. Explicit approval of the specific methods employed shall occur when Ohio EPA reviews project study plans.
 - (3) All laboratories that perform analysis under a level 2 study plan shall implement a quality assurance program and shall document all elements of the program in a quality assurance manual (QAM) or quality assurance plan (QAP). Guidelines for the elements that should be addressed in the QAM or QAP are presented in appendix B to this rule.
 - (4) Data reporting. QDCs choosing to submit data to Ohio EPA shall submit all collected data. Submission of data may be done at any time, but shall 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. The timeframe for submission of data may be extended at the director's discretion for good cause. The following shall be submitted:

- (a) Level 2 sample data using the online credible data database, or in a pre-approved format acceptable to the director.
 - (b) Documentation demonstrating adherence to an approved project study plan.
 - (c) The results from all quality assurance and quality control samples collected during implementation of the approved project study plan using the online credible data database.
 - (d) 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.
 - (e) A 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 that were used to analyze any data collected pursuant to the approved project study plan. The QDC is responsible for providing this documentation in the form of a laboratory QAP that meets the content guidelines presented in appendix B to this rule.
- (6) Data approval process. The director shall review data submissions to verify that they were submitted by a QDC, that appropriate test methods and quality control 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. The director shall 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.

(C) Publication of acceptable methods.

The director from time to time shall publish examples of acceptable level 2 analytical methods for commonly sampled parameters. These can be found online at:

https://www.epa.state.oh.us/dsw/credibledata/parameters_testing_methods.

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3745-4-05 Appendix A Guidelines for the preparation of level 2 project study plans.

Persons preparing level 2 project study plans for the credible data surface water quality monitoring program should consult the following set of guidelines to ensure the adequacy of the project study plan. The director may conclude that the project study plan is deficient if the following information is missing and there is no other comparable justification for the technical and scientific adequacy of the project study plan:

- (1) The name and contact information (affiliation, qualified data collector number, address, electronic mail address, and phone number) for the qualified data collector designated as the project leader.
- (2) The names of any other persons expected to assist with sample collection, sample analysis, and data entry, including the individuals' status as qualified data collectors.
- (3) If persons who are not level 2 or level 3 qualified data collectors are expected to assist with sample collection, sample analysis, or data entry, the plan must include detailed procedures (e.g., training, testing, follow-ups) for the supervision of those persons who are not level 2 or level 3 qualified data collectors.
- (4) A clear statement of the objectives of the planned sampling activities, including data quality objectives, a precise delineation of the study areas, and the general types of data to be collected (e.g., chemical water quality, stream habitat, stream flow, biological).
- (5) A detailed description and maps of the overall sampling areas, including proposed sampling locations, HUC 8 number and name and the spatial relationship to specific point and nonpoint source issues (when applicable) that will be evaluated, and discussion of other factors that may influence water quality conditions within the study area.
- (6) A list of the sampling equipment to be used, including model numbers and manufacturers of field meters and probes and flow current meters.
- (7) A specific list of all parameters to be sampled and analyzed at each sampling location.
- (8) Identification of field collection and data assessment techniques for stream habitat and macroinvertebrate sampling and, for all chemical parameters sampled, identification of the sample collection methods, the field or laboratory analytical methods used, and the detection limits.
- (9) For all stream flow measurements, identification of the methods used.

- (10) A schedule of planned sampling activities, including the anticipated beginning and ending dates for sampling or alternatively, for ongoing sampling programs, the beginning and ending dates for the initial phase of sampling.
- (11) If a laboratory will be used for chemical or biological analyses, identify the laboratory and provide a contact name, address, electronic mail address, and phone number for the contact and all laboratory accreditations.
- (12) If applicable, a copy of an approved scientific collector's permit issued by the Ohio department of natural resources, division of wildlife.
- (13) A statement attesting that the qualified data collector acting as the lead project manager will maintain and make available to the director, for each sampling location, the name of the water body sampled, sampling location latitude and longitude, sampling location river mile where possible or practicable, general location information, the U.S. geological survey HUC 8 number and name, and the purpose for data collection at each sampling location.
- (14) A statement attesting that the qualified data collectors will maintain and make available to the director a digital photo catalog of all sampling locations, including photos of the specific sampling location, riparian zone adjacent to the sampling location, and general land use in the immediate vicinity of the sampling location.
- (15) A statement attesting that the qualified data collector acting as the lead project manager will provide to the director upon request two voucher specimens of each identified taxonomic family of macroinvertebrates that are collected at sampling locations. All voucher materials shall be kept for at least ten years.
- (16) In the event that the lead qualified data collector is not approved for all project data types, include a signed statement to attest that the qualified data collector for each additional data type or specialty is aware of their responsibilities for that data (including vouchers, photos, and site information as described in this appendix). This statement should specify the name of that particular study plan.
- (17) A certification from each qualified data collector working on the project attesting that the qualified data collector 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.

3745-4-05 Appendix B Guidelines for laboratory quality assurance plans.

All laboratories that perform analysis under a level 2 study plan shall implement a quality assurance program and shall document all elements of the program in a quality assurance manual (QAM) or quality assurance plan (QAP). The elements covered in the QAM or QAP should, at a minimum, include the following items:

- (1) Title page with authorization signatures and dates.
- (2) Table of contents.
- (3) Statement of quality assurance policy.
- (4) Laboratory organization and responsibility, including the following:
 - (a) Organizational tables.
 - (b) Position descriptions for all personnel.
 - (c) Training, education, and experience of laboratory personnel.
- (5) Data quality objectives for accuracy, precision, and reporting limits for each test, target analyte, and sample matrix.
- (6) Analytical methods variances.
- (7) Laboratory equipment and instrument lists.
- (8) Sample receipt and chain-of-custody procedures. This section should include procedures for the following:
 - (a) Receiving samples.
 - (b) Sample login.
 - (c) Sample security.
 - (d) Sample storage.
 - (e) Sample tracking.
 - (f) Sample disposal.
- (9) Laboratory standard operating procedures (SOPs) with dates of last revision. This section should include procedures for the following:

- (a) Glassware preparation.
 - (b) Sample preparation.
 - (c) Sample cleanup.
 - (d) Sample analysis.
 - (e) A description of quality control procedures that are required and followed for each method.
- (10) Calibration procedures. This section should describe the following:
- (a) The type of calibration used for each method.
 - (b) The criteria for acceptance or verification.
 - (c) The frequency of calibration.
- (11) Preventive maintenance and documentation. This section should describe the following:
- (a) The location of instrument manuals.
 - (b) The schedules for performance of routine equipment maintenance.
- (12) Internal quality control checks, frequency, and criteria for acceptability. This section may reference laboratory SOPs, and should include the frequency and acceptability of method detection limit (MDL) calculations.
- (13) Data reduction, review, and reporting. This section could include discussion of the process used to do data assessment, evaluation of data completeness, comparability, and trends.
- (14) Standard corrective action procedures for quality control failures.
- (15) External and internal audits, accreditations, and certifications. This section should list all laboratory accreditations and or certifications, and participation in inter and intra laboratory studies.
- (16) Document retention and control. In this section, the lab should discuss its document retention schedule, storage, and retrieval procedures, including procedures for review and approval of revised lab documents (i.e., QAP and SOPs).
- (17) Procedures for procurement and process control. This section should describe the laboratory's policy and procedures for the selection and purchasing of equipment and supplies it uses that affect the quality of the environmental tests and calibrations.

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.
- (B) Data submitted by a QDC shall 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 shall prepare and adhere to a project study plan.
 - (a) The QDC shall prepare and submit to the director for approval a project study plan using the guidelines presented in appendix A to this rule. The director may approve an alternative to the guidelines in appendix A to this rule upon a reasonable and scientifically supported demonstration by a QDC.
 - (b) Upon completion of the plan review, the director shall send written notification of deficiencies in the plan, if any are found, to the QDC and provide the QDC a reasonable opportunity to address such deficiencies. If the deficiencies are not addressed, the director may disapprove the study plan.
 - (c) A plan submitted by a level 3 QDC 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.
 - (d) The director shall disapprove a site-specific plan that does not include the certification statement in paragraph (B)(4)(f) of this rule.
 - (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.
 - (3) All laboratories that perform analysis under a level 3 study plan shall be accredited, successfully 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: 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 successfully 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 to this rule.
- (4) Data reporting. QDCs choosing to submit data to Ohio EPA shall submit all collected data. Submission of data may be done at any time, but shall 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. The timeframe for submission of data may be extended at the director's discretion for good cause. The following shall be submitted in hard copy or electronic format:
- (a) Habitat and chemistry sample data using the online credible data database, or in an acceptable format approved by the director.
 - (b) Fish and macroinvertebrate sample data on forms made available by the director, or on forms developed for the project if part of the approved project study plan.
 - (c) Documentation demonstrating adherence to an approved project study plan.
 - (d) Copies of the results from all quality assurance and quality control samples collected during implementation of the approved project study plan in the same manner as the data submitted in accordance with paragraph (B)(4)(a) or (B)(4)(b) of this rule.
 - (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.
 - (f) A 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. 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 to this rule.
- (6) Data approval process. The director shall review data submissions to verify that 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 shall 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 shall 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.

(7) Adherence to methods prescribed in Ohio's water quality standards. Analytical methods and procedures for matters relating to Ohio's water quality standards are listed in rule 3745-1-03 of the Administrative Code. Level 3 QDCs conducting studies designed to interpret, apply, or adopt standards shall use the methods, data collection, and data analysis requirements cited in rule 3745-1-03 of the Administrative Code.

(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. 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 shall have a degree of accuracy commensurate with the purpose for which the data will be used.

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) of this rule. Test methods published in updates to the publications listed in paragraphs (C)(1) to (C)(5) 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. 2019. "Surface Water Field Sampling Manual for water quality parameters and flows. Ohio Environmental Protection Agency, Division of Surface Water / Division of Environmental Services. Columbus, Ohio. 40 p."
- (b) Ohio EPA. 2019. "Inland Lakes Sampling Procedure Manual. Ohio Environmental Protection Agency, Division of Surface Water. Columbus, Ohio 23 p."
- (c) U.S. EPA. 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."
- (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."
- (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) U.S. EPA. 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."

(g) 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, chapters A1-A10, available online at: <http://pubs.water.usgs.gov/twri9A>.

(2) References for chemical and microbiological laboratory methods.

(a) Baird, R.B., Eaton, A.D., Rice, E.W., (editors). 2017. "Standard Methods for the Examination of Water and Wastewater: 23rd Edition. ISBN: 9781625762405. American Public Health Association. Washington, D.C."

(b) 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).

(c) U.S. EPA. 40 C.F.R. 136. July 1, 2017 edition.

(d) U.S. EPA. 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."

(e) U.S. EPA. 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."

(f) 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."

(g) 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.

(h) ASTM. 2016. "Annual Book of ASTM Standards, Water and Environmental Technology. Volume 11.01: Sampling and Flow Measurement; Inorganic Constituents. Volume 11.02. Organic Constituents. American Society for Testing and Materials International. West Conshohocken, PA."

(i) AOAC. 2016. "Official Methods of Analysis of AOAC INTERNATIONAL. 20th Edition. 2016. AOAC INTERNATIONAL. Gaithersburg, Maryland."

(j) Arar, J.E. and B.G. Collins (U.S. EPA). 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."

(k) Ohio EPA. 2016. "Ohio EPA Total (Extracellular and Intracellular) Microcystins - ADDA by ELISA Analytical Methodology. Ohio EPA DES 701.0. Version 2.2. November 2016. Ohio EPA Division of Environmental Services. Columbus, OH. 6 p."

(l) Ohio EPA. 2016. "Ohio EPA Extracellular Microcystins - ADDA by ELISA Analytical Methodology."

Ohio EPA DES 701.2. Version 1.0. May 2016. Ohio EPA Division of Environmental Services. Columbus, OH. 6 p."

- (m) Ohio EPA. 2016. "Ohio EPA Total (Extracellular and Intracellular) Saxitoxin by ELISA Analytical Methodology. Ohio EPA DES 702.0. Version 2.0. November 2016. Ohio EPA Division of Environmental Services. Columbus, OH. 6 p."
- (n) Ohio EPA. 2016. "Ohio EPA Extracellular Saxitoxin by ELISA Analytical Methodology. Ohio EPA DES 702.1. Version 1.0. November 2016. Ohio EPA Division of Environmental Services. Columbus, OH. 6 p."
- (o) Ohio EPA. 2016. "Ohio EPA Total (Extracellular and Intracellular) Cylindrospermopsin by ELISA Analytical Methodology. Ohio EPA DES 703.0. November 2016. Ohio EPA Division of Environmental Services. Columbus, OH. 6 p."
- (p) Ohio EPA. 2016. "Ohio EPA Quantitative Polymerase Chain Reaction (qPCR) for Determination of Cyanobacteria and Cyanotoxin-Producing Genes Analytical Methodology. Ohio EPA DES 705.0. Version 1.0. July 2016. Ohio EPA Division of Environmental Services. Columbus, OH. 7 p."
- (q) U.S. EPA. 1995. "Determination of Organic Compounds in Drinking Water by Liquid-Solid Extraction and Capillary Column Gas Chromatography/Mass Spectrometry. Method 525.2. Revision 2.0. 1995. United States Environmental Protection Agency, Office of Research and Development, National Exposure Research Laboratory. Cincinnati, OH. 60 p."

(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."
- (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."
- (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.
- (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."
- (e) "International Organization for Standardization (ISO)." 2010. Published standards found at 17.120.20. Flow in open channels.
- (f) ASTM. 2005. "Annual Book of ASTM Standards, Water and Environmental Technology, Volume 11.01: Sampling and Flow Measurement. American Society for Testing and Materials International." West Conshohocken, PA.

(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."

- (b) Ohio Environmental Protection Agency (Ohio EPA). 2006. Methods for assessing habitat in flowing waters: using qualitative habitat evaluation index (QHEI). Prepared by the Midwest Biodiversity Institute for the Division of Surface Water, Ecological Assessment Section, Columbus, OH. 23 pp.
- (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."
- (d) Ohio EPA. 2015. Biological criteria for the protection of aquatic life: volume III: standardized biological field sampling and laboratory methods for assessing fish and macroinvertebrate communities. Div. of Surface Water, Eco. Assess. Secti. Columbus, Ohio.
- (e) Ohio EPA. 2020. "Field Methods for Evaluating Primary Headwater Streams in Ohio. Version 4.1. Ohio EPA Division of Surface Water, Columbus, Ohio. 130 pp."
- (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."
- (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."

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

- (a) Ohio EPA. 2012. State of Ohio Cooperative Fish Tissue Monitoring Program Fish Collection Guidance Manual. Ohio Environmental Protection Agency, Division of Surface Water. Columbus Ohio. 21 p. This document is available on the web at <http://epa.ohio.gov/portals/35/fishadvisory/FishCollectionGuidanceManual12.pdf>.
- (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 <https://www.epa.gov/sites/production/files/2015-06/documents/volume1.pdf>.

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

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3745-4-06 Appendix A Guidelines for the preparation of level 3 project study plans.

Persons preparing level 3 project study plans for the credible data surface water quality monitoring program should consult the following set of guidelines to ensure the adequacy of the project study plan. This appendix is meant to serve as guidance in the preparation of study plans developed under rule 3745-4-06 of the Administrative Code and does not have the force of law. The director may conclude that the project study plan is deficient if the following information is missing and there is no other comparable justification for the technical and scientific adequacy of the project study plan:

- (1) A clear statement of the objectives of the planned activities, including data quality objectives and the types of data to be collected: chemical, stream habitat, fish, or macroinvertebrate.
- (2) A detailed explanation and description, including georeferencing, of the specific point and nonpoint source issues (when applicable) that will be evaluated and other sources that may influence ecological conditions within the study area.
- (3) A detailed explanation of parameter coverage within each data type (chemical, stream habitat, fish, and macroinvertebrate) for which sampling will be conducted at each sampling location.
- (4) Identification of field collection and data assessment techniques for stream habitat, fish, and macroinvertebrate sampling and, for all chemical parameters sampled, identification of the sample collection methods, the field or laboratory analytical methods used, and the detection limits.
- (5) For all stream flow measurements, identification of the methods used.
- (6) A detailed explanation and map or maps of planned sampling locations, including the name of the water body and each sampling location. For each sampling location the following information shall be included: sampling location latitude and longitude; sampling location river mile; general locational information; the U.S. geological survey HUC 8 number and name; and the purpose for data collection at each sampling location.
- (7) A detailed schedule of planned sampling activities or criteria for sampling conditions.
- (8) A written quality assurance and quality control (QA/QC) plan which adheres to the general quality assurance and quality control principles described in Ohio EPA's "Surface Water Field Sampling Manual for water quality parameters and flows."

- (9) A detailed explanation of all anticipated work products which will be submitted to the director for use by the director in consideration of the data as level 3 credible data. Examples of anticipated work products that shall be submitted to the director include, but are not limited to, the following: measured chemical, stream habitat, and biological data; beneficial use attainment statistics; biological index metrics and scores; water quality criteria exceedences; and stream habitat index metrics and scores.
- (10) A list of all qualified data collectors and other persons who will be involved with sample collection, sample analysis, and data entry along with specific procedures (e.g., training, testing, follow-ups) outlining how persons not qualified as level 3 data collectors will be trained and supervised to ensure the accuracy of their activities. The list shall include the name, qualified data collector number, address, electronic mail address, and phone number of all qualified data collectors and shall identify the qualified data collectors designated as the lead project managers.
- (11) If a contract laboratory will be used for chemical or biological analyses, identify the laboratory and provide a contact name, address, electronic mail address, and phone number for the contact.
- (12) If applicable, a copy of an approved scientific collector's permit issued by the Ohio department of natural resources, division of wildlife.
- (13) A statement certifying that a digital photo catalog of all sampling locations will be maintained for ten years including photos of the specific sampling location, riparian zone adjacent to the sampling location, and general land use in the immediate vicinity of the sampling location.
- (14) A statement certifying that the qualified data collector acting as the lead project manager will provide to the director upon request two voucher specimens of each taxa or species of fish and macroinvertebrates that are collected at sampling locations. If a specimen is too large to preserve, a large game species, or a legally protected species, diagnostic photographs or the preservation of specific diagnostic material from the specimen, where allowed, may be submitted in lieu of a complete specimen. All voucher materials shall be kept for at least ten years.
- (15) A statement attesting that the qualified data collector acting as the lead project manager will maintain and make available to the director, for each sampling location, the name of the water body sampled, the sampling location latitude and longitude, the sampling location river mile where possible or practicable, general location information, the USGS HUC 8 number and name, and the purpose for data collection at each sampling location.

- (16) In the event that the lead qualified data collector is not approved for all project data types, a signed statement to attest that the qualified data collector for each additional data type or specialty is aware of the qualified data collector's responsibilities for that data (including vouchers, photos, and site information as described in this appendix). This statement should specify the name of that particular project.
- (17) A statement from each qualified data collector working on the project certifying that the qualified data collector 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.

Except as provided in this appendix, level 3 project study plans that use biological assessment methods shall provide for the collection of both fish and macroinvertebrate data at all sampling locations. If the level 3 project study plan does not include provisions for the collection of both fish and macroinvertebrates at all sampling locations, the project study plan shall include a detailed explanation of the circumstances, issues, and complexities associated with the proposed sampling location which preclude the use of both organism groups. If circumstances during project execution result in the failure to collect both fish and macroinvertebrates, then an explanation should accompany the data submission. Such circumstances may include, but are not limited to, problems with access to the sampling location, vandalism, on-site equipment failure, and extremely high or low stream flows.

3745-4-06 Appendix B Guidelines for laboratory quality assurance plans.

All laboratories that perform analysis under a level 3 study plan shall implement a quality assurance program and shall document all elements of the program in a quality assurance manual (QAM) or quality assurance plan (QAP). The elements covered in the QAM or QAP should, at a minimum, include the following:

- (1) Title page with authorization signatures and dates.
- (2) Table of contents.
- (3) Statement of quality assurance policy.
- (4) Laboratory organization and responsibility, including the following:
 - (a) Organizational tables.
 - (b) Position descriptions for all personnel.
 - (c) Training, education, and experience of laboratory personnel.
 - (d) Training procedures.
 - (e) Description of records retained by the laboratory on employee training and performance.
- (5) Data quality objectives for accuracy, precision, and reporting limits for each test, target analyte, and sample matrix.
- (6) Analytical methods variances, including justifications for method steps deviating from published methods.
- (7) Laboratory equipment and instrument lists.
- (8) Sample receipt and chain-of-custody procedures. This section should include procedures for the following:
 - (a) Receiving samples.
 - (b) Sample login.
 - (c) Sample security.
 - (d) Sample storage.
 - (e) Sample tracking.

- (f) Sample disposal.
- (9) Laboratory standard operating procedures (SOPs) with dates of last revision. This section should include procedures for the following:
- (a) Glassware preparation.
 - (b) Sample preparation.
 - (c) Sample cleanup.
 - (d) Sample analysis.
 - (e) A description of quality control procedures that are required and followed for each method.
- (10) Calibration procedures. This section should describe the following:
- (a) The type of calibration used for each method.
 - (b) The criteria for acceptance or verification.
 - (c) The frequency of calibration.
- (11) Preventive maintenance and documentation. This section should describe the following:
- (a) The location of instrument manuals.
 - (b) Schedules for performance of routine equipment maintenance.
 - (c) Availability of instrument spare parts in the laboratory.
 - (d) Maintenance contracts in place.
- (12) Internal quality control checks, frequency, and criteria for acceptability. This section may reference laboratory SOPs, and should include the frequency and acceptability of method detection limit (MDL) calculations.
- (13) Data reduction, review, and reporting. This section could include discussion of the process used to do data assessment, evaluation of data completeness, comparability, and trends.
- (14) Standard corrective action procedures for quality control failures.

- (15) External and internal audits, accreditations, and certifications. This section should list all laboratory accreditations and certifications, and participation in inter and intra laboratory studies.
- (16) Reports to management. This section should describe the various types of reports and meetings and their frequencies with management.
- (17) Document retention and control. In this section, the lab should discuss its document retention schedule, storage, and retrieval procedures, including procedures for review and approval of revised lab documents (i.e., QAP and SOPs).
- (18) Procedures for procurement and process control. This section should describe the laboratory's policy and procedures for the selection and purchasing of equipment and supplies it uses that affect the quality of the environmental tests and calibrations.