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Outside Data and Quality Assurance Requirements

*Guidance for outside entities on
collecting water monitoring data*



South Carolina Department of Health
and Environmental Control

Bureau of Water

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Outside Agency Data and Quality Assurance Requirements

This guidance is intended as an outline of the different uses the South Carolina Department of Health and Environmental Control may make of data collected by entities outside of the Department and the data quality assurance requirements associated with those uses.

Types of Monitoring Data and Uses

- Monitoring data can be used to determine compliance or non-compliance with standards, for regulatory support and decision making, as well as non-regulatory purposes (e.g., public education and informational) purposes.
- The South Carolina Department of Health and Environmental Control (DHEC, or the Department) monitoring resources are first allocated to the base ambient monitoring network (including the random network sites) used for statewide water quality assessments, §303(d) listings of impaired waters, TMDL development, and other regulatory purposes.
- Other “targeted” monitoring is conducted as resources allow, for example, to monitor progress of Total Maximum Daily Load (TMDL) implementation or the impact of a point source discharge.
- Targeted water quality monitoring sites, established for both regulatory and non-regulatory purposes, are useful because they produce a more robust monitoring network.
- Water quality can then be evaluated in areas not covered by the Department’s base ambient program.
- Targeted monitoring may also assist in the evaluation of the impacts from specific land-based activities.

Depending on the intended use of the resulting data, monitoring can take two primary forms: regulatory and non-regulatory.

- Monitoring data collected by entities outside the Department can be used for non-regulatory purposes or, if meeting the data quality assurance standards outlined in this document, may be used for regulatory purposes.
- Data for which a Quality Assurance Project Plan (QAPP) has been approved that satisfy the requirements to determine compliance with established water quality standards may be incorporated in conjunction with Department data to make water quality evaluations and regulatory decisions.
- Non-regulatory data can be helpful for purposes such as public education, targeting waters for further study, or collection of information for TMDLs.

Non-Regulatory Monitoring

An entity outside the Department may wish to learn more about the water quality of a specific waterbody not currently addressed by the base ambient monitoring network. This information would help them better understand local water quality.

- The Department may be available to provide advice in the development of study objectives and direction to guidance regarding proper sample collection procedures, certified laboratories, sampling strategies, etc., as resources permit.
- The cost of the sample collection and laboratory analyses would be provided by the outside organization.
- Entities undertaking the monitoring activity are responsible for organizing, housing, and interpreting their data.
- Should monitoring by these organizations suggest potential violations of state water quality standards, this information can be provided to the Department and may be used to help prioritize future investigatory or standards compliance sampling by the Department.

Non-regulatory data can be used to:

- Establish baseline conditions for determining stream health based on chemical, physical, biological, and habitat parameters
- Analyze trends in water quality parameters over time

- Screen waterbodies for water quality problems
- Identify water bodies in need of more detailed monitoring
- Assess the overall health of a watershed and target specific areas within a watershed in need of water quality improvement
- Assist local watershed councils and partners in making environmental management decisions in their local and regional watersheds
- Enlist community involvement in their local watershed
- Prioritize areas in a watershed for Best Management Practices (BMPs)
- Assess BMP/remediation project performance
- Identify potential pollution sources
- Provide educational opportunities

Regulatory Monitoring

Regulatory monitoring encompasses the generation of water quality data equivalent with Department data to be used by DHEC to determine compliance with established water quality standards, e.g. §303(d) list of impaired waters, determination of National Pollution Discharge Elimination System (NPDES) permit limits, enforcement actions, etc.

As stated in *R. 61-68 Water Classifications & Standards*, section E. GENERAL RULES AND STANDARDS APPLICABLE TO ALL WATERS, item 17, “Tests or analytical methods to determine compliance or non-compliance with standards shall be made in accordance with methods and procedures approved by the Department and the EPA. In making any tests or applying analytical methods to determine compliance or non-compliance with water quality standards, representative samples shall be collected in accordance with methods and procedures approved by the Department and the EPA.”

Regulatory data can be used for:

- Ambient water quality monitoring for §303(d) listing
- Determination of NPDES permit limits
- Pollution event documentation
- Water pollution enforcement actions
- Documentation of water quality restoration or improvement
- TMDL development

All data submitted with the intention of incorporation with Department data to make water quality evaluations to determine compliance with established water quality standards and any data collected as part of a project receiving federal

funds from EPA require a DHEC pre-approved written Quality Assurance Project Plan (QAPP) completed in accordance with the DHEC Office of Quality Assurance *Guidance Document for Preparing Quality Assurance Project Plans*, September 2008, Office of Quality Assurance.

Quality Assurance Requirements

Depending on the intended use of the data, e.g. non-regulatory, information only, or to determine compliance with established water quality standards or other regulatory uses, all reports and data submitted to the Department must be accompanied by either an appropriate written study design or a pre-approved QAPP.

- If the parameters and sites that will be studied are already listed on a facility's permit, a QAPP may not be required.
- If this study is not covered under a permit, then it is considered non-routine work and a QAPP must be developed and approved prior to the start of the study.

Regardless of the type of monitoring, a written study plan or approved QAPP should include at a minimum:

Introduction & Study Objectives

- 1) The organization conducting or coordinating the project should be named and an official liaison with DHEC identified. Contact information including telephone and facsimile numbers, mailing address and e-mail should be provided. In addition, a listing of individuals and organizations participating in the project should be included.
- 2) Background information detailing the need for the study must be discussed. This should include water quality concerns in the study area, the current §303(d) listing status, and water classification pursuant to R. 61-69, *Classified Waters* of the waterbodies to be monitored.
- 3) The objective(s) of the project and the intended use of the resulting data must be identified. This could include documentation of general water quality conditions, identification of pollutant sources (point or

non-point), long-term stream monitoring, stakeholder involvement in watershed protection, or generating water quality data equivalent with Department data to be used by DHEC to determine compliance with established water quality standards, or other regulatory uses.

Sampling Plan

1) The location of the study area must be delineated.

- ✓ This must include county/city jurisdictions and the river basin or watershed and waterbodies to be sampled, by name.
- ✓ Sampling sites must be identified by general narrative and specific location (e.g. GPS coordinates).
- ✓ The inclusion of sampling site maps is also required; the preferred scale is that used on United States Geological Survey (USGS) 1:24,000 topographic quadrangle maps or other equally detailed map source.

Important Notes:

It is imperative that all data and information submitted to DHEC for consideration include sufficient information regarding the sample collection locations.

Outside sources of data and information that fail to adequately identify sample site locations cannot be used.

2) The sampling parameters to be monitored during the study must be identified. If different parameter suites are to be analyzed at different sites or site groups, these must be defined.

- ✓ Parameters should also be differentiated between those that are to be measured in the field, those that will be analyzed in a laboratory by project personnel and those that will be tested by an outside "contract" or commercial laboratory.
- ✓ The sample collection, preparation, and analytical method and the Method Detection Limit (MDL), and the lab Practical Quantitation Limit (PQL) should be identified.

3) Sampling schedules must be discussed in a qualitative manner (these will be largely determined by the parameters analyzed and EPA approved assessment and listing methodology). Special scheduling considerations for individual parameters should be addressed (e.g. holding times, etc.).

4) Personnel and required material resources available should be discussed realistically so as to indicate they are sufficient to perform the planned sampling schedule.

- ✓ In addition to project field personnel, other necessary resources such as vehicles, sample bottles and preservatives, field instruments and standards should be provided for in the plan.

The QA/QC plan or QAPP is the critical component to a monitoring program that makes the generated data valuable, functional and useable.

- Because of the significance associated with §303(d)-listed waters, it is important that any determination of a water quality standard violation be based on scientifically sound sample collection and laboratory analysis methods and data of documented quality.
- A QA/QC plan or approved QAPP tells the data user the quality level and intended use of the generated data, and how “good” the data is. The data user can then decide to use the data for a specific purpose or not.
- For use to determine compliance with established water quality standards, including §303(d) assessment and listing decisions, a QAPP must have received written approval by the DHEC Office of Quality Assurance prior to the start of sample collection.

S.C. DHEC QA Policy

“It is the quality assurance policy of the Department that there be sufficient QA activities conducted to demonstrate that all environmental data generated, processed, or used will be scientifically valid, legally defensible, and of known and acceptable precision and accuracy. It is also the Department policy that documented precision and accuracy information be made available upon request for all reported data. Data shall be complete, representative, and comparable. The quality of all data generated by and for SCDHEC shall meet or exceed all Department and Environmental Protection Agency requirements.” (Quality

Management Plan For the South Carolina Department Of Health and Environmental Control, July, 2008,
<http://www.scdhec.gov/environment/envserv/docs/QMPJuly2008.pdf>).

Quality Assurance Project Plan

The following list highlights some important items that must be addressed. Refer to the Guidance Document For Preparing Quality Assurance Project Plans for Environmental Monitoring Projects/Studies, September 2008, available from the DHEC Office of Quality Assurance's home page, <http://www.scdhec.gov/environment/envserv/qaguidance.htm>, for the for the DHEC policy on QAPPs, the complete list of all requirements for each Class of QAPP, and some examples.

- 1) Statements to the effect that the requirements of the *Quality Management Plan For the South Carolina Department Of Health and Environmental Control* (QMP) and *Title 40 of the Code of Federal Regulations, Part 136* will be adhered to must be included in all Quality Assurance Project Plans.
- 2) **The project provisions for field quality assurance must be comprehensively addressed.** This shall include the following topics:
 - a. Sample collection technique (by parameter) and sample representativeness
 - b. Considerations for proper sample containers, required preservatives, refrigeration/ storage and adherence to holding time limitations
 - c. Field instrument calibration, quality assurance measures on meter and probe response; analytical duplicates, standards and record keeping
 - d. Sampling personnel training in all applicable procedures
- 3) **Laboratory Certification:** The QMP requires that a DHEC Office of Environmental Laboratory Certification Certified Laboratory perform laboratory analyses.
 - a. For analyses conducted by a DHEC Certified Laboratory, the laboratory must be identified and their certification number and expiration date must be provided. The laboratory must be certified for the media and specific analyses it is expected to perform. The

plan must include a statement that the certified laboratory will perform all Quality Assurance/Quality Control measures required by DHEC's Office of Environmental Laboratory Certification on samples analyzed for the study.

- b. For all laboratories, the Quality Assurance/Quality Control measures required by specific methods referenced in *40 CFR Part 136* must be implemented (or applicable conditions required in specific NPDES permit requirements), and a statement to that effect must be included in the plan. The analytical method and MDL, and lab PQL as defined in *R. 61-68 Water Classifications & Standards* should be identified. The plan shall also state that adequate records on analytical procedures ("bench sheets") and the Quality Assurance/Quality Control measures shall be maintained to document their proper implementation and performance, and that the records shall remain on file and available for review for a minimum of three years.

Data Requirements and Representativeness

Any determination of a water quality standard exceedance for §303(d) listing decisions must be based on sound methods and data. Assessments based on the comparison of numeric criteria with long-term water quality data typically meet this principle. Chemical assessments based on single, one-time grab samples generally do not.

Biological surveys measure the integrated response to long-term conditions and by their nature are representative of a wide range of influences: chemical, physical, and habitat.

Single, one-time biological surveys conducted to assess support of designated aquatic life uses are generally acceptable because the biological data integrates water quality over the long-term.

Sufficient evidence must be presented for both chemical and biological data to indicate that the data are representative of general conditions at the sampling locations.

Chemical Data

Data Age	Data must be less than 5 years old relative to the end of the assessment date range, unless it can be demonstrated that data is representative of current conditions.
Chemical Parameters	Only those chemical parameters for which a criterion has been established can be considered. Applicable water quality criteria vary depending on the waterbody being considered. State standards and criteria can be found in R61-68 and R61-69
Minimum number of sampling sites	Number and distribution of sampling sites will be dependent on the objectives and intended uses of the resulting data.
Sampling duration and frequency	Sample collection must include representative seasonal variation. Samples targeting specific exceptional conditions must be clearly identified.
Required data analysis to determine if samples document impairment of water use	To be performed by DHEC staff using procedures found in the EPA approved Assessment and Listing Methodology.

Bacteriological Data

Data Age	Data must be less than 5 years old relative to the end of the assessment date range, unless it can be demonstrated that data is representative of current conditions.
Minimum number of sampling sites	Number and distribution of sampling sites will be dependent on the objectives and intended uses of the resulting data.
Sampling duration and frequency	Sample collection must include representative seasonal variation. Samples targeting specific exceptional conditions must be clearly identified.
Required data analysis to determine if samples document impairment of water use	To be performed by DHEC staff using procedures found in the EPA approved Assessment and Listing Methodology.

Macroinvertebrate Community Data

The current Macroinvertebrate protocols found in the *EQC Environmental Investigations Standard Operating Procedures and Quality Assurance Manual* (2008) include the Index of Biological Integrity for Wadeable Streams.

Data Age	Data must be less than 5 years old relative to the end of the assessment date range, unless it can be demonstrated that data is representative of current conditions.
Minimum number of sampling sites	Number and distribution of sampling sites will be dependent on the objectives and intended uses of the resulting data.
Sampling duration	Single one-time samples are acceptable
Acceptable data	Macroinvertebrates must be identified to the lowest practical taxonomic level.
Required data analysis to determine if samples document impairment of water use	To be performed by DHEC staff using procedures found in <i>EQC Environmental Investigations Standard Operating Procedures and Quality Assurance Manual</i>

Chlorophyll a Data

The current protocols for collection and analysis of Chlorophyll *a* are found in the *EQC Environmental Investigations Standard Operating Procedures and Quality Assurance Manual* (2006 Edition).

Data Age	Data must be less than 5 years old relative to the end of the assessment date range, unless it can be demonstrated that data is representative of current conditions.
Minimum number of sampling sites	Number and distribution of sampling sites will be dependent on the objectives and intended uses of the resulting data.
Sampling duration and frequency	Sample collection must include representative seasonal variation. Samples targeting specific exceptional conditions must be clearly identified.
Required data analysis to determine if samples document impairment of water use	To be performed by DHEC staff using procedures found in the EPA approved Assessment and Listing Methodology

Data Submittal Format

- Data must be submitted in an electronic format compatible with DHEC applications, either as a spreadsheet or database, and shall include a site location description, longitude/latitude of location, as well as date and time of individual sample collection.
- Any analytical results targeting exceptional or atypical conditions, e.g., wastewater treatment plant failures, overflowing manholes, spills, unpermitted discharges, rain and stormwater events, extreme drought, etc., must be clearly identified.
- Data that meets the data quality assurance requirements provided in this document and is collected in accordance with a pre-approved QAPP may be used to determine compliance with established water quality standards and incorporated in conjunction with Department data to make water quality evaluations and regulatory decisions. Data not meeting the requirements may be helpful for other purposes such as public education, targeting waters for further study, or assisting in collecting information for TMDLs.

Monitoring Partnerships

Monitoring Partnerships may be established to implement targeted monitoring above and beyond the Department's base ambient network.

- These Partnerships can be between the Department and local governments, academia, wastewater permit holders, environmental organizations, other governmental agencies, industry, water suppliers, or other stakeholders involved in watershed management.
- Outside monitoring data collected through these Partnerships can be used for non-regulatory purposes or, if meeting the data quality assurance standards outlined in this document and collected in accordance with an approved QAPP, may be used to determine compliance with established water quality standards or other regulatory uses.

Non-Regulatory Partnerships

Non-Regulatory Partnerships involve an entity outside the Department that desires to learn more about the water quality of a specific waterbody not currently addressed by the base ambient network.

- This information can be used to help better understand local water quality.
- The Department may be available to provide advice in the development of study objectives and direction to guidance regarding proper sample collection procedures, certified laboratories, sampling strategies, etc., as resources permit.
- The cost of the sample collection and laboratory analyses would be provided by the outside organization.
- Entities undertaking the monitoring activity are responsible for organizing, housing, and interpreting their data.

There are several organizations across the state currently monitoring water quality using this model. Should monitoring by these organizations suggest potential violations of state water quality standards, this information can be provided to the Department and may be used to help prioritize future investigatory or regulatory sampling by the Department.

Regulatory Partnerships

Regulatory Partnerships can take two forms:

- Where water quality data, equivalent with Department data, is directly provided to the Department by a **single partner** for evaluation; and
 - 1) In this type of partnership the outside entity obtains prior approval from the Department, then follows the quality assurance and data requirements outlined in this document including the development of a QAPP to be approved by the Department.
 - 2) Once this approval is obtained, the data provided can be incorporated in conjunction with Department data to make water quality evaluations and regulatory decisions.
 - 3) The purpose is to collect water quality data beyond the scope of the Department's base ambient monitoring network.
 - 4) The cost for all sample collection and analysis is paid for by the outside entity.
- Where multiple outside entities enter into a **"monitoring coalition"** partnership with the Department to provide water quality data to all partners, including the Department.

A monitoring coalition, on the other hand, is collaboration between the Department and outside entities interested in a specific watershed.

- The purpose is to collect water quality data of mutual benefit to the partners beyond the scope of the Department's base ambient monitoring network.
- In this case, it is generally more efficient for the partners to provide the financing to a single contractor, hired for the purpose of conducting this additional monitoring, in accordance with the necessary quality assurance requirements outlined in this document including the development of a QAPP to be approved by the Department.

- A formal agreement between the partners in the coalition and the Department would be established outlining the roles, responsibilities, and cost allocation of the monitoring.
- These data can be incorporated in conjunction with Department data for water quality evaluations and to make regulatory decisions.