QUALITY ASSURANCE PROJECT PLAN
FOR
WATER QUALITY MANAGEMENT PROGRAMS

2021

Surface Water Quality Bureau
New Mexico Environment Department

Approved: November 20, 2021

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GROUP A. PROJECT MANAGEMENT

A1. Title and Approval Page

QUALITY ASSURANCE PROJECT PLAN

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New Mexico Environment Department

APPROVAL PAGE

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Chief, Water Division, Assistance Program Branch, State and Tribal Programs Section, EPA Region 6 — Date

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A2. Table of Contents

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Abbreviations and Acronyms

ASTM	American Society for Testing and Materials
ATTAINS	Assessment, Total Maximum Daily Load (TMDL) Tracking and Implementation System
BMP	Best Management Practices
CFR	Code of Federal Regulations
CWA	Clean Water Act
DO	Dissolved Oxygen
DQI	Data Quality Indicator
DQO	Data Quality Objectives
FSP	Field Sampling Plan
E. coli	Escherichia coli
EUA	Existing Use Analysis
GIS	Geographic Information System
GRTS	Grant Reporting and Tracking System
GWQB	Ground Water Quality Bureau
ID	Identification
MASS	Monitoring Assessment and Standards Section
MDL	Method Detection Limit
MRL	Method Reporting Level
MQO	Measurement Quality Objectives
MST	Microbial Source Tracking
µmhos/cm	Micromhos per centimeter
NM	New Mexico
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NMSA	New Mexico Statutes Annotated
NPDES	National Pollutant Discharge Elimination System
NPS	Nonpoint Source
PSRS	Point Source Regulation Section
QA	Quality Assurance
QAO	SWQB Quality Assurance Officer
QAPP	Quality Assurance Project Plan
QC	Quality Control
QMP	Quality Management Program
RID	Request Identification
RPD	Relative Percent Difference
SDL	Sample Detection Limit
SLD	Scientific Laboratory Division
SQUID	New Mexico's Surface Water Quality Information Database
SOP	Standard Operating Procedure
SPRT	Standards, Planning and Reporting Team
STORET	Storage and Retrieval System
SWQB	Surface Water Quality Bureau
TMDL	Total Maximum Daily Load
UAA	Use Attainability Analysis

EPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
WDAS	U.S EPA Water Division, Assistance Programs Branch, State and Tribal Programs Section
WPS	Watershed Protection Section
WQA	Water Quality Act
WQS	Water Quality Standards
WQCC	Water Quality Control Commission
WQX	Water Quality Exchange

This document was prepared in accordance with U.S. Environmental Protection Agency (EPA) Guidance for Quality Assurance Project Plans (EPA 2002a) and the EPA Requirements for Quality Assurance Project Plans (EPA 2001). The Surface Water Quality Bureau's (SWQB) Standard Operating Procedures are incorporated in the SWQB's Quality Assurance Project Plan (QAPP) by reference.

A3. Distribution List

The SWQB's Quality Assurance Officer (QAO) will provide a copy of the approved Quality Assurance Project Plan (QAPP) to the EPA Region 6 Project Officer and the SWQB Chief (contact information shown below). The QAO will ensure that a copy of the approved QAPP is available on the SWQB webpage.

All individuals (i.e., SWQB personnel, contractors, interns, volunteers, or other NMED staff) working under this QAPP will provide the QAO a written or electronic statement to verify and acknowledge access to the QAPP and responsibility to comply with the requirements of the QAPP. The QAO will be responsible for maintaining hard copy and/or electronic copies of all signed acknowledgement statements.

EPA: Kara Alexander, Project Officer (alexander.kara@epa.gov) WDAS, EPA Region 6 1201 Elm Street, Suite 500 Dallas, TX 75202-2733 Telephone: (214) 665-7312 FAX: (214) 665-6490
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A4. Project/Task Organization

All project activities covered by this QAPP are performed by NMED SWQB personnel and individuals conducting work for the Bureau (e.g., contractors, interns, volunteers, or other NMED staff). The organization and responsibilities of key individuals are discussed below. The management structure of the NMED-SWQB is shown in Figure 1, while the organizational structure of the various sections and Teams are illustrated in Figure 2. The majority of SWQB personnel have responsibilities that include environmental data collection and analysis. Their responsibilities, the data acquisition types required to achieve these responsibilities, and resulting work products are summarized in Table 1.

Quality Assurance Officer (QAO)-For the purposes of Quality Assurance (QA), the QAO reports to the SWQB Bureau Chief. The QAO is responsible for updating and maintaining the SWQB QAPP for Water Quality Management Programs.

Program Managers-The SWQB is organized into three (3) technical sections: the Point Source Regulation Section (PSRS), the Monitoring, Assessment, and Standards Section (MASS), and the Watershed Protection Section (WPS). Each section (i.e., PSRS, MASS, and WPS) is led by a Program Manager. Program Managers report to the SWQB Chief and are responsible for verifying that all applicable activities of these sections and teams comply with the provisions of this QAPP and all associated Standard Operating Procedures (SOP).

SWQB Personnel-The PSRS, MASS, and WPS staff report to their respective Program Manager. All SWQB personnel within these sections who collect environmental data must do so in accordance with this QAPP. SWQB personnel collecting data are responsible for implementing the methods and procedures described in this QAPP, and must be familiar with and follow the provisions of this QAPP.

Project Manager(s)- SWQB personnel who coordinate and manage specific projects report to their respective supervisor and Program Manager and are responsible for verifying that all data collection, storage, and management activities related to the project comply with the provisions of this plan and any applicable SOPs. Project Manager(s) include individuals leading routine water quality monitoring surveys, special water quality projects, NPDES compliance monitoring, Clean Water Act (CWA) §319 monitoring, Effectiveness Monitoring and CWA §104(b)(3) Wetlands Program monitoring.

SWQB Financial and Administrative Section- Does not collect environmental data and do not conduct projects activities that result in the collection, production and/or use of environmental information, metrics or data. The Bureau Financial Manager reports to the Water Protection Division Financial Manager and is responsible for verifying that all applicable activities of these sections and teams comply with the provisions of this QAPP and all associated Standard Operating Procedures (SOP).

Non-SWQB Individuals working under this QAPP- On occasion individuals not directly employed with the SWQB (e.g. contractors, volunteers, interns, other NMED staff) collect environmental data for the Bureau.

Individuals working under the direct supervision of SWQB staff (volunteers and interns) must be familiar with and follow the applicable provisions of this QAPP and associated SOPs. These individuals report and provide data to the SWQB staff they are working directly under.

For those projects in which an individual is working under a contract for the SWQB but does not have a project-specific QAPP, the QAO must provide review and approval of the quality assurances covered under

the project's proposed workplan prior to data collection to ensure QA/QC requirements are consistent with the Bureau's quality assurance requirements. These individuals report and provide data to the appropriate Project Manager(s).

Non-SWQB individuals (e.g. contractors and cooperators) may also collect environmental data for the Bureau under a project-specific QAPP. These individuals must provide sufficient QA/QC information to ensure the data meet the Bureau's QA/QC requirements and adhere to the project-specific QAPP along with any applicable SOPs. These individuals also report and provide data to the appropriate Project Manager(s).

Laboratory Analytical Analyses

The majority of environmental data collected by the SWQB are analyzed by NM Department of Health Scientific Laboratory Division (SLD) and other contract laboratories. Each analytical laboratory must provide QA/QC information and conform to the specifications and requirements of this QAPP. Each contract laboratory will be provided with a copy of this QAPP and will report and provide data to the appropriate Project Manager and QAO.

Figure 1. Management Structure of the NMED-SWQB

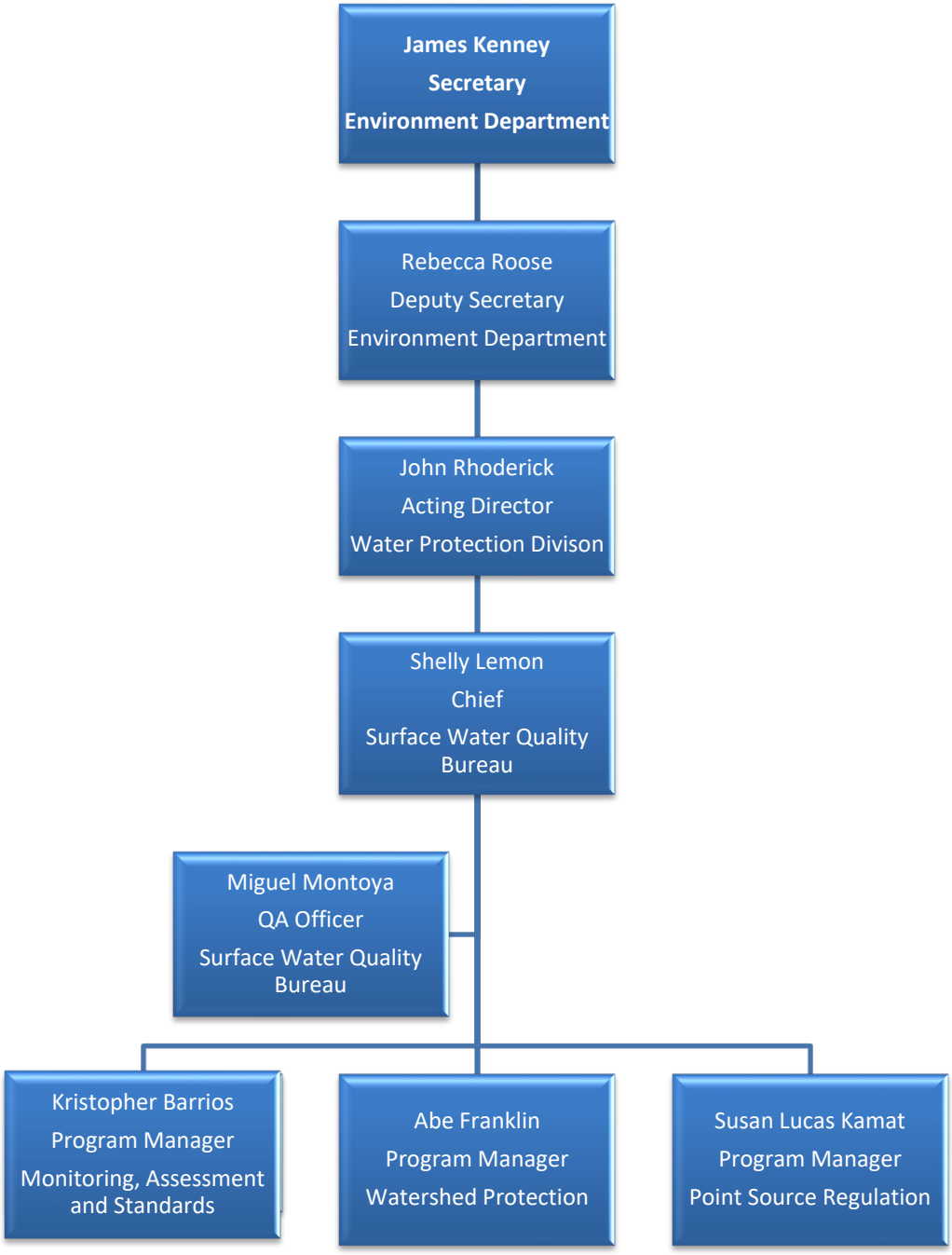

Figure 2. Surface Water Quality Bureau Organizational Chart

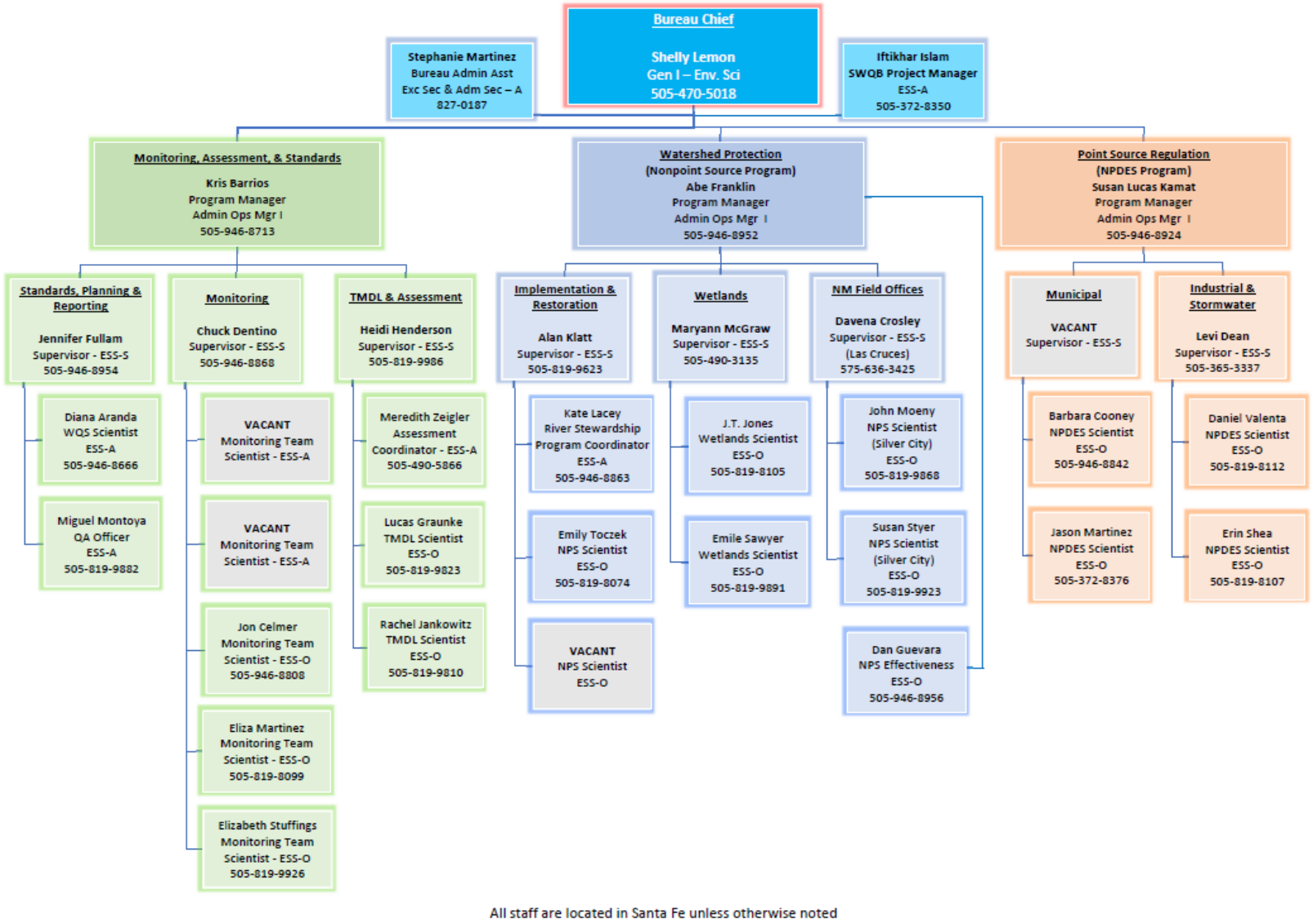

Table 1. Summary of SWQB Responsibilities

Organizational Unit	Responsibilities	Data Acquisition Types Required to Achieve Team Responsibilities[1]	Product Created by the Team
Point Source Regulation Section (PSRS)	Administers the State's responsibilities for the National Pollutant Discharge Elimination System (NPDES) program in NM and Applies Ground and Surface Water Protection Regulations under the State Water Quality Act to point source discharges		
Industrial & Stormwater Team and Municipal Team	• Plans and obtains water quality data for Discharge Monitoring from Point Sources • Conducts data collection for Discharge Monitoring from Point Sources, as needed • Serves as lead for data collection, under Team's purview as identified in Table 2 • Conducts data collection for Incident Response Monitoring, as needed • Reviews environmental assessments and environmental impact statements • Inspects public and private facilities in NM for federal NPDES permit and State compliance issues • Inspects water, wastewater, stormwater facilities in NM for federal NPDES permit and State compliance issues • Investigates potential illicit discharges in response to complaints, spills, and incident reports • Enforces state regulations under the Water Quality Act, as warranted • Reviews CWA §402 permits and certifies federal NPDES permits under CWA §401 for the State NM • Compiles Non-direct Measurement data for use in compliance evaluations and certifications • Develops SOPs for activities associated with the Team	NPDES Permit Compliance Evaluation Ambient Surface Water Quality Monitoring Discharge Monitoring from Point Source Discharges Monitoring for Enforcement Purposes Incident Response Monitoring Watershed Protection Projects Independent Studies Non-direct Measurement Data Modeling	Inspection Reports Enforcement Actions CWA §401 Certifications of NPDES Permits SOPs
Organizational Unit	**Responsibilities**	**Data Acquisition Types Required to Achieve Team Responsibilities[1]**	**Product Created by the Team**
Monitoring, Assessment, and Standards Section (MASS)	Acquires, integrates, analyzes and summarizes surface water quality data for NM		

Monitoring Team	• Conducts the *Planning Process* for Ambient Surface Water Quality Monitoring in coordination with all Teams, prior to data collection
	• Serve as lead for data collection, under Team's purview, as identified in Table 2
	• Conducts Ambient Surface Water Quality Monitoring (chemical, physical, biological and continuous) in New Mexico for various Clean Water Act and Water Quality act activities. The monitoring includes the collection of:
	  ○ Chemical data collection for field characteristics, nutrients, metals, bacteria, organics, radionuclides, common ions and cyanide, including conventional, nonconventional, and toxic pollutants
	  ○ Physical data collection for habitat, geomorphology, streamflow and hydrology
	  ○ Biological data collection for algae/periphyton, phytoplankton, benthic macroinvertebrates, fish community and fish tissue
	  ○ Continuous data collection for temperature, pH, specific conductance, dissolved oxygen, and turbidity.
	• Develops fish consumption advisories
	• Conducts data collection using the Hydrology Protocol Survey for confirmation of WQS classifications
	• Conducts data collection for Discharge Monitoring from Point Sources, in coordination with the Industrial & Stormwater Team and Municipal Team
	• Conducts data collection for Monitoring for Enforcement Purposes, as needed
	• Conducts data collection for Incident Response Monitoring, as needed
		• Ambient Surface Water Quality Monitoring
		• Discharge Monitoring from Point Source Discharges
		• Monitoring for Enforcement Purposes
		• Incident Response Monitoring
		• Hydrology Protocol Surveys
		• Watershed Protection Projects
		• Independent Studies
		• Non-direct Measurement Data
		• Modeling
			• Field Sampling Plans (FSPs)
			• Monitoring Survey Reports
			• Fish Consumption Advisories
			• White Papers or Special Reports
			• V&V Worksheets
			• Standard Operating Procedures (SOPs)

[1] See Table 2 for information regarding Team Lead responsible for each Data Acquisition Type.

	• Verifies and validates chemical, physical, biological and continuous data collected by the Team. The Team, on occasion, may verify and validate data collected by other SWQB sections and or external entities • Conducts the *Planning Process* for Independent Studies completed by the Team, prior to data collection • Conducts data collection for Independent Studies • Uses Non-direct Measurements to aid in environmental data collection activities • Utilizes Modeling, as needed. • Develops SOPs for activities associated with the Team • Assists TMDL and Assessment Team with the assessment of chemical, physical, and biological and continuous data for use attainment determinations		
TMDL and Assessment Team	• Coordinates TMDL activities for NM • Develops TMDLs for NM • Develops Watershed-based TMDLs or TMDL Alternatives, in coordination with WPS • Serves as lead for data collection, under the Team's purview, as identified in Table 2 • Informs the Monitoring Team of data needs for assessment of WQS and TMDL development during the *Planning Process* for Ambient Surface Water Quality Monitoring • Assesses chemical, physical, biological and continuous data for use attainment determinations • Develops the 303(d)/305(b) Integrated Report and List • Maintains and updates the Comprehensive Assessment and Listing Methodology (CALM) • Manages CWA 604(b) water quality management planning projects • Develops project-specific QAPPs for projects conducted with CWA 604(b) funds • Conducts data collection for Incident Response Monitoring, as needed • Conducts the *Planning Process* for Independent Studies completed by the Team, prior to data collection • Conducts data collection for Independent Studies • Uses Non-direct Measurements in the development of TMDLs, TMDL Alternatives, and Watershed-based TMDLs • Uses Modeling in the development of TMDLs, TMDL-Alternatives and Watershed-based TMDLs • Develops SOPs for activities associated with the Team • Assists the Monitoring Team with Ambient Surface Water Quality Monitoring	• Ambient Surface Water Quality Monitoring • Discharge Monitoring from Point Source Discharges • Monitoring for Enforcement Purposes • Incident Response Monitoring • Watershed Protection Projects • Independent Studies • Non-direct Measurement Data • Modeling	• TMDLs • TMDL Alternatives • Watershed-based TMDLS • 303(d)/305(b) Integrated Report and List • CALM • Project-specific QAPPs • Project Summary Reports • FSPs • SOPs

Standards Planning & Reporting Team (SPRT)	• Maintains, refines, and develops the State of NM Standards for Interstate and Intrastate Surface Waters (20.6.4 NMAC)
	• Serves as lead for data collection, under the Team's purview, as identified in Table 2
	• Develops technical analyses for use in existing use, designated use and site-specific criteria amendments of surface waters of the State
	• Analyzes third-party analyses for proposed amendments to surface water quality standards
	• Informs the Monitoring Team of data needs for surface water quality standards development and revision during the *Planning Process* for Ambient Surface Water Quality Monitoring
	• Conducts data collection for Incident Response Monitoring, as needed
	• Maintains and updates the Statewide Water Quality Management Plan and Continuing Planning Process (WQMP/CPP)
	• Maintains and updates SWQB quality assurance and planning documents such as:
	  ○ SWQB's Quality Management Plan (QMP)
	  ○ SWQB's Quality Assurance Project Plan (QAPP)
	  ○ SWQB's SOPs
	• Conducts the *Planning Process* for Independent Studies completed by the Team, prior to data collection
	• Conducts data collection for Independent Studies
	• Performs quality assurance and project development support for the SWQB
	• Develops SOPs for activities associated with the Team
	• Assists the Monitoring Team with Ambient Surface Water Quality Monitoring
		• Ambient Surface Water Quality Monitoring
		• Discharge Monitoring from Point Source Discharges
		• Monitoring for Enforcement Purposes
		• Incident Response Monitoring
		• Hydrology Protocol Surveys
		• Watershed Protection Projects
		• Independent Studies
		• Non-direct Measurement Data
		• Modeling
			• Use Attainability Analysis (UAA) workplans
			• UAAs
			• Existing Use Analyses (EUAs)
			• Site-Specific Criteria
			• Outstanding National Resource Waters (ONRW) Nominations
			• Numeric Criteria
			• Narrative Criteria
			• Water Quality Standards (WQS)
			• WQMP/CPP
			• QMP
			• SWQB QAPP
			• FSPs
			• SOPs

Organizational Unit	Responsibilities	Data Acquisition Types Required to Achieve Team Responsibilities[2]	Product Created by the Team
Watershed Protection Section (WPS)	Fund watershed stakeholder groups and watershed restoration projects and implements best management practices (BMPs) for the prevention/reduction of nonpoint source pollution.		
NPS Implementation and Restoration Team and NPS NM Field Office Team	• Conduct the *Planning Process* for WBP, TMDL Alternatives, and Watershed-based TMDLs completed by the WPS, in coordination with the TMDL and Assessment Team, as needed, prior to data collection • Serves as lead for data collection, under Team's purview, as identified in Table 2 • Oversight of restoration projects • Develops project-specific QAPPs for projects conducted with CWA 319 funds • Implements BMPs to prevent/reduce nonpoint source pollution • Conducts Effectiveness Monitoring as needed for watershed protecting projects in coordination with Effectiveness Monitoring Team • Reviews CWA §404 permits and drafts certifications of federal dredge and fill permits under CWA §401 for the State of NM. • Enforces state regulations under the Water Quality Act, as warranted • Reviews environmental assessments and environmental impact statements • Reviews proposed mining and milling projects and close-out plans to assist GWQB with NM Mining Act and Superfund • Conducts data collection for Incident Response Monitoring, as needed • Conducts the *Planning Process* for Independent studies completed by the Team, prior to data collection • Conducts data collection for Independent Studies • Develops SOPs for activities associated with the Team • Assists the Monitoring Team with Ambient Surface Water Quality Monitoring	• Ambient Surface Water Quality Monitoring • Discharge Monitoring from Point Source Discharges • Monitoring for Enforcement Purposes • Incident Response Monitoring • Watershed Protection Projects • Effectiveness Monitoring • Independent Studies • Non-direct Measurement Data • Modeling	• Watershed Based Plans • TMDL Alternatives • Watershed-based TMDLs • Draft CWA §401 Certifications of Dredge and Fill permits • NPS Management Plan • NPS Annual Reports • Clearing the Waters newsletter • Project-specific QAPPs • FSPs • Project Summary Reports • SOPs
Effectiveness Monitoring Team	• Conducts the *Planning Process* for Effectiveness Monitoring in coordination with WPS Teams, prior to data collection • Serves as lead for data collection, under Team's purview, as identified in Table 2 • Conduct Effectiveness Monitoring for watershed protecting projects implemented with CWA funds • Conduct data collection for Incident Response Monitoring, as needed • Compiles Non-direct Measurements to aid in data collection for Effectiveness Monitoring • Uses Modeling as needed for Effectiveness Monitoring • Develops SOPs for activities associated with the Team • Verifies and validates chemical, physical, biological and continuous data collected by the Team. • Assists the Monitoring Team with Ambient Surface Water Quality Monitoring	• Ambient Surface Water Quality Monitoring • Watershed Protection Projects • Effectiveness Monitoring • Non-direct Measurement Data • Modeling	• FSPs • EPA success stories • NPS Management plan • NPS Annual Reports • Clearing the Waters newsletter • Project Summary Reports • SOPs • V&V Worksheets
Wetlands Team	• Conduct the *Planning Process* for WAPs completed by the Wetlands Team, prior to data collection • Serves as lead for data collection, under Team's purview, as identified in Table 2 • Manages Wetlands Program • Oversight of watershed and wetlands restoration projects • Develops project-specific QAPPs for projects being conducted with CWA 104(b) funds • Maps and classifies Wetlands in NM • Develops the NMRAM for Wetland subclasses in NM • Works with SPRT to develop more extensive Wetlands WQS • Reviews environmental assessments and environmental impact statements • Conducts data collection for Incident Response Monitoring, as needed • Conducts the *Planning Process* for Independent Studies completed by the Team, prior to data collection • Conducts data collection for Independent Studies • Uses Non-direct Measurements for the development of WAPs and NMRAMs	• Ambient Surface Water Quality Monitoring • Monitoring for Enforcement Purposes • Discharge Monitoring from Point Source Discharges • Incident Response Monitoring • Watershed Protection Projects • Effectiveness Monitoring • Non-Direct Measurement Data	• Wetland Action Plans • NPS Management Plan • NPS Annual Report • Clearing the Waters newsletter • NMRAM • Project-specific QAPPs • Project Summary Reports • FSPs • SOPs

[2] See Table 2 for information regarding Team Lead responsible for each Data Acquisition Type.

	• Develops SOPs for activities associated with the Team • Assists the Monitoring Team with Ambient Surface Water Quality Monitoring	• Independent Studies • Modeling	

A5. Problem Definition/Background

BACKGROUND

Section 101(a) of the federal Clean Water Act (CWA) states that "The objective of this Act is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." The State of New Mexico Standards for Interstate and Intrastate Surface Waters (20.6.4 NMAC) restates the objective of the CWA and goes on to say that the waters include "those in New Mexico." In conformance with the CWA §§104(b), 106, 201, 205(j), 301(b), 303, 305(b), 314, 319(h), 401(a) and 604(b), the NM Water Quality Act (WQA; §§ 74-6-1 et seq., NMSA 1978) and 20.6.4 NMAC, a main goal of the SWQB data collection efforts generate and provide information to the public, the NMED and the EPA that can be used to restore and maintain the integrity of surface waters of the State of New Mexico. As such, the SWQB receives grants under the CWA to conduct water quality monitoring to achieve this goal.

PROBLEM DEFINITION

Due to the dynamic nature of natural systems, the integrity or condition of New Mexico's surface waters may not always be known due to a lack of information or because of changing conditions. For example, the location of degraded waters and/or the level of degradation or contamination may not be known or may change as a result of human activities or natural occurrences (e.g., floods, droughts, wildfires, etc.). In other cases, standards for evaluating the condition of surface waters may change.

To address these problems, the SWQB collects chemical, physical, biological, and continuous data to evaluate the condition of the State's surface waters, determine where degraded waters occur, and gauge the effectiveness of restoration projects and permit limits and conditions.

A6. Project/Task Description

The SWQB collects, analyzes and uses data from waters of the State on a structured, rotating basis to identify where water quality problems exist, prioritize protection and restoration projects, and guide NPDES permitting, and WQS revisions. There are several areas of focus that routinely involve data collection, management and analysis. Data acquisition types, their objectives and application, general data collection frequency and schedule, and Team lead for data acquisition types are described in Table 2. For information regarding specific methods utilized for each type of data acquisition see the Data Generation and Acquisition Section of this QAPP.

Table 2. SWQB Environmental Monitoring Types and Strategy Details

Data Acquisition Type	Objectives and Application	General Data Collection Frequency and Schedule	Team Lead for Data Acquisition Type
NPDES Permit Compliance Inspections	NPDES Compliance Evaluation Inspection – Collection and evaluation of data, including self-monitoring reports as well as a review of a permitted facility's records and a visual examination of the treatment facility, effluent, and receiving waters. The results of which may lead to enforcement action.	Year-round as needed	Industrial & Stormwater Team and Municipal Team
	NPDES Offsite Compliance Inspection -- Collection and evaluation of data, including self-monitoring reports as well as a review of a permitted facility's records and photographs of the treatment facility, effluent, and receiving waters. The results of which may lead to enforcement action.	Year-round as needed	Industrial & Stormwater Team and Municipal Team
	NPDES Compliance Sampling Inspection – Incorporates all components of a Compliance Evaluation Inspection and adds to it the collection of effluent samples and verification of flow measurements to determine effluent quality and permit compliance. Samples of the receiving stream above and below the outfall are also collected in some instances to evaluate the chemical impact of the effluent on the stream.	Year-round as needed	Industrial & Stormwater Team and Municipal Team
	NPDES Performance Audit Inspection - Evaluation of permittee's sampling, laboratory and record-keeping procedures.	Year-round as needed	Industrial & Stormwater Team and Municipal Team
	NPDES Reconnaissance Inspection - An abbreviated Compliance Evaluation Inspection often used to determine the general status of a facility or to focus on only one aspect of compliance, such as effluent quality, without performing a complete review.	Year-round as needed	Industrial & Stormwater Team and Municipal Team
Ambient Surface Water Quality Monitoring	Physical, chemical, biological and continuous data collected for Ambient Surface Water Quality Monitoring may be used to 1) evaluate known or suspected influences on water quality (both natural and anthropogenic), 2) identify the condition of unassessed waterbodies, 3) provide information for TMDLs (or TMDL alternatives), standards development or revision, UAAs, development or revision of listing methodologies, and/or 4) assess against the State's WQS in development of the Integrated Report and List. • Targeted Monitoring - Collection and evaluation of physical, chemical, biological and continuous parameters from specified locations utilizing a rotational basin schedule. • Fixed-Station Monitoring - The repeated long-term sampling or measurement of physical, chemical, biological and continuous water quality parameters at representative locations to determine the waterbody's characteristics and temporal trends. Fixed-station monitoring may be done over a specified location for a particular period of time or be conducted on a rotating basin survey schedule.	Routine monitoring is conducted on a rotational basin schedule with intensive surveys conducted over a two-year period for each basin so surveyed waters are evaluated within an eight to ten-year period. Sampling is conducted annually from Spring to Fall (March-November)	Monitoring Team*
	• Probabilistic Monitoring – Unbiased statistical survey of waterbodies to determine general water quality condition at a watershed or state-wide scale. Data collection includes physical, chemical and biological parameters.	Probabilistic monitoring is watershed-based and focuses on sampling within a specific watershed(s). Watershed selection is dependent of the targeted monitoring conducted for the rotational water quality survey. Monitoring occurs yearly,	Monitoring Team*

		during the biomonitoring index period from August 15th through November 15th.	
Discharge Monitoring from Point Sources	Monitoring conducted in discharged effluent from a Point Source or on a surface waterbody in close proximity to a Point Source. The monitoring is used to determine pollutant concentration of effluent discharged to surface waters of the state and is used to inform Total Maximum Daily Loads (TMDLs), evaluate compliance with the limits and conditions specified in the State of NM Standards for Interstate and Intrastate Surface Waters (20.6.4 NMAC) or applicable permits, and determine permit limitations and load reductions necessary to meet WQS. The results from monitoring may be used to conduct antidegradation analyses and evaluate a discharge's reasonable potential to cause or contribute to an impairment, or applicable permits to establish permit limits that protect surface waters of the state. The information is also used to determine the magnitude, extent and severity of impact to designated or existing uses.	Year-round, as needed	Monitoring Team*
Monitoring for Enforcement Purposes	Collection and evaluation of environmental data from sites selected based upon known or suspected influences on water quality (both natural and anthropogenic) to determine whether pollutant concentrations in a waterbody are in compliance with the limits and conditions specified in the State of NM Standards for Interstate and Intrastate Surface Waters (20.6.4 NMAC). This type of monitoring is similar to Targeted Monitoring with modified procedures pertaining to number of samples collected and chain of custody requirements for the purposes of considering enforcement action.	Year-round, as needed	Monitoring Team* Industrial & Stormwater Team and Municipal Team
Incident Response Monitoring	Monitoring conducted in response to a known or suspected unpermitted release, discharge or spill to a surface water body. Also includes monitoring conducted in response to a unpermitted release, discharge, or spill to a surface water body as reported as part of sanitary sewer overflow, 7-day release, 15-day release, and final release reports The information is used to determine the magnitude, extent and severity of impact to designated or existing uses. Monitoring may continue, as needed, to inform incident and recovery management, and requirement of corrective actions.	Year-round, as needed	All Teams
Hydrology Protocol Survey	The collection and evaluation of hydrological, geomorphic and biological indicators of the persistence of water and is organized into two levels of evaluations. The Level 1 Evaluation is required for the expedited UAA process described in 20.6.4.15.C NMAC. Hydrology Protocol surveys may also be used to determine the appropriate application of WQS and confirm WQS classification.	Late Spring and Fall, outside of summer monsoons and winter precipitation and snowmelt	Standards Planning & Reporting Team** Monitoring Team (Must be trained)
SWQB Watershed Protection Projects	The SWQB's collection and evaluation of biological, chemical, physical (including geologic, streamflow, soils and vegetation) data to evaluate watershed conditions used for developing watershed based plans, partitioning out potential sources and causes of impairment, rapid assessments of wetlands and potential use for assessment against the State's WQS.	Spring to Fall, yearly (March-November)	Watershed Implementation, Restoration Team and NM Field Office Team Effectiveness Monitoring Team Wetlands Team
Effectiveness Monitoring	Collection and evaluation of environmental data to monitor and model changes in physical, chemical, biological, and continuous data associated with nonpoint source pollution control projects for the purpose of assessing the projects overall effectiveness in reducing nonpoint sources and improving water quality. Data collected for this purpose may also have potential use for assessment against the State's WQS. Sampling design typically consists of upstream/downstream locations to be sampled before and after project implementation.	Spring to Fall, yearly (March-November)	Effectiveness Monitoring Team***

Independent Studies	Collection and evaluation of environmental data (direct and indirect) to monitor and/or model various independent studies pertaining to the goals and objectives of the SWQB. Conducted by SWQB personnel.	Dependent on scope of work and goals of study	All Teams
Non-direct Measurements	Environmental data obtained from existing data sources or not directly measured or generated by the SWQB. See section B9, Non-direct Measurements of this QAPP for more information.	Year-round, as needed	All Teams
Modeling[3]	Modeling conducted by the SWQB using environmental data from either non-direct measurements or direct measurement that produce a product that aids in environmental decision making.	Year-round, as needed	All Teams

*Includes SWQB personnel from other Teams that are accompanied or trained by an experienced Monitoring Team member, Monitoring Team Supervisor or the MASS Program Manager. An "experienced" Monitoring Team member is detailed in the SWQB QAPP and applicable SOPs. Generally, for the Monitoring Team "experienced" is at least one year of field data collection or until such a time that the MASS Program Manager or Monitoring Team Supervisor determines that the individual can carry out data collection activities in accordance with this QAPP and applicable SOPs.

** Includes MASS Program Manager and SWQB personnel from other Teams that are trained by either the MASS Program Manager or the SPRT Team Supervisor.

***Includes personnel from the WPS that have signed applicable SOPs for data collection.

[3] The EPA Quality System defined in EPA Order 5360.1 A2 *Policy and Program Requirements for the Mandatory Agency-wide Quality System* (EPA 2000d), was designed and structured for data collection activities. However, because modeling can also produce data that will be used in decision making, quality issues are also relevant for these data (modeling inputs and outputs). Quality assurance of input data and parameter values are important to model quality. Because the input data are likely be obtained from other non-direct measurements, data quality procedures for non-direct measurement should be followed https://www.epa.gov/quality/guidance-quality-assurance-project-plans-modeling-epa-qag-5m.

Table 3 SWQB Environmental Monitoring Summary for Waterbodies Sampled

Objective	Question or Decision	Decision Criteria	Products/Outcomes
Assess designated use attainment for the Integrated Report and provide information to the public on the condition of surface water	Surface waters of the state are meeting WQS criteria?	WQS as interpreted by the Assessment Protocols	303(d)/305(b) Integrated Report and List
Determine whether ambient monitoring activities meet the programmatic needs of the SWQB.	Did the survey meet the objectives of the approved Field Sampling Plan?	Description of monitoring locations and activities in the Field Sampling Plan	Monitoring Survey Report
Develop NPDES permit limits	What are the maximum concentrations of pollutants that can be discharged and meet the requirements of the WQS?	WQS and receiving water assimilative capacity	401 Certification NPDES Permit Limits
Determine if an unauthorized discharge impacted water quality	Did an unauthorized discharge cause a violation of the WQS?	WQS or immediate threat to human health	Enforcement Actions (Compliance Order or Civil Action)
Evaluate compliance with NPDES permit limits	Does the effluent quality meet the NPDES permit requirements?	NPDES permit limits	Inspection Reports Enforcement Action
Develop load and waste load allocations for TMDLs	What is the maximum pollutant load a waterbody can receive and meet the requirements of the WQS?	WQS and receiving water assimilative capacity	TMDL Plans TMDL alternatives NPDES Permit Limits
Develop or refine WQS	Are existing uses appropriate for the waterbody?	Data support a petition to the WQCC to revise WQS	UAA Workplans UAAs (including those using the Hydrology Protocol) Amendments to NM WQS
Develop wetlands standards	What are the appropriate criteria for wetlands?	Data support a petition to the WQCC to incorporate wetland specific WQS	Amendments to NM WQS
Determine probable sources and nonpoint source mitigation measures	What are the probable sources of impairment and what are the potential mitigation measures to control nonpoint sources?	WQS as interpreted by the Assessment Protocols Best management practices	Watershed Based Plan Wetland Action Plan
Evaluate effectiveness of restoration and mitigation measures implemented to control nonpoint sources	Have watershed restoration activities and mitigation measures improved water quality?	WQS as interpreted by the Assessment Protocols Data show improved water quality	Project Summary Reports Success Stories NPS Annual Report
Respond to citizen complaints, fish kills, spills and emergencies	Is the water or effluent quality a hazard to human or environmental health?	WQS, data and site investigation	Public communication Enforcement Actions Fish Consumption Advisories
General education and public outreach	Is the general public being informed on SWQB water quality issues	Information is disseminated to the public through the product outcomes	White paper Special Reports Clearing the Waters newsletter Monitoring Survey Report Integrated Report

A7. Quality Objectives and Criteria for Measurement Data

The establishment of quality objectives ensures that the SWQB makes decisions relating to water quality management that are:

- consistent with the mission, goals and objectives of the NMED and SWQB;
- based on proper application of federal and state regulations, policy and guidance;
- based on all available pertinent information;
- based on a thorough understanding of the information; and
- based on accurate information.

Data Quality Objectives (DQOs) are statements about how certain the decision-maker wants to be about the decision that will be made based on the data. For data collected under this QAPP to support the decisions listed in Table 3, the Data Quality Indicators (DQIs) identified in Table 4 must be of sufficient quality to provide a high level of confidence in the resulting decisions.

Measurement Quality Objectives (MQOs) are statements about how good the measurements need to be in order to be useful as inputs to the decision process. MQOs are often expressed as statements about the acceptable values of Data Quality Indicators (DQIs) and include measures such as percent recovery, percent relative standard deviation and minimum detection level (MDL). Acceptable values for these objectives are provided in Appendix B: Analytical Methods and Detection Limits, and in the procedures identified in SWQB SOP 15.0 Data Verification and Validation. For more information regarding the DQIs for individual parameters, see the referenced analytical method for chemical analytes and the relevant SOP for physical, chemical, biological, and continuous monitoring.

Table 4. Data Quality Indicators

DQI's	**Determination Methodologies**
Precision	The degree of variation in repeated measurements of the same quantity of a parameter are minimized by assuring samples are taken in a consistent and repeatable manner as described in the applicable SWQB SOP.
Bias	Much of the environmental sampling conducted under this QAPP compares water quality of particular waterbodies on a temporal scale to which the potential systematic bias of a measurement or the process to which it is collected may cause errors in one direction. This is minimized, to the extent possible, by training staff on repeated sampling procedures in accordance with established SOPs and as prescribed in a Field Sampling Plans or other project sample designs, auditing of those processes as needed and documentation through field notes and applicable revisions to SOPs.
Accuracy	The degree of correctness with which a measurement reflects the true value of the parameter being assessed is enhanced through routine calibration practices as prescribed under the applicable SOP and the use of equipment with a range of accuracy within the decision criteria. Acceptable levels of accuracy are specified in the SOPs, are verified through evaluation of routine duplicate, spiked, and field blank sampling, as appropriate.
Representativeness	The measure of the degree to which data accurately and precisely represent variations at a sampling point is assessed through the sample design process and selection of methods based on the question or decision being monitored

	by considering the spatial and temporal scale of the waterbody being evaluated.
Comparability	Understanding and documenting the extent and magnitude of error in a dataset is important in being able to assess if the dataset is comparable. Documentation of the instruments used, the applicable SOPs used and any field notes along with comparisons to field blanks, spiked samples and duplicate samples will provide the information for a dataset to determine its comparability. Comparability is assessed through the sample design process and selection of methods.
Completeness	In order to ensure confidence of the dataset for use in the decision it is intended for, the percent of validated samples collected for a particular dataset from the number that were planned should not be below 90%. This percentage is calculated based on the required number of samples.
Sensitivity	Sensitivity is the ability to discern the detection of a parameter within a sample set from null in order to meet the decision criteria and is based on the method being used in regard to the sensitivity of the instrument, potential interferences with other parameters, training to collect and analyze the sample, as well as the processes needed to calibrate within an acceptable range.

Projects that use modeling are required to meet project quality objectives. Objectives will be met by following the criteria detailed in the Quality Control Section of this QAPP, which includes acceptance and rejection criteria so that environmental decisions based on model outputs are defensible and useable.

A8. Special Training/Certifications

Proper training of field personnel represents a critical aspect of meeting the data quality objectives in order to fulfill the goals of this QAPP. All SWQB staff that collect environmental data under this QAPP must have sufficient training and experience. Additionally, all non-SWQB individuals (e.g. volunteers or interns) and newly hired SWQB personnel must be accompanied by experienced staff when collecting samples or field measurements until such a time that the Project Manager (if applicable), Supervisor, or Program Manager determines that the individual can carry out data collection activities in accordance with this QAPP and any applicable SOPs. Copies of all applicable training records are maintained in the SWQB's Personnel files. Specific requirements prior to conducting field work under this QAPP include:

- All individuals conducting work under this QAPP must be familiar with the Statewide Water Quality Management Plan (WQMP) and Continuing Planning Process (CPP).

- All individuals conducting work under this QAPP must read the SWQB's Quality Management Plan (QMP) and sign an acknowledgment form before conducting any data collection, compilation, management, or analysis activities. The QAO will provide these and other applicable documents to all new staff.

- All individuals conducting work under this QAPP must read the applicable SOPs and sign acknowledgment forms prior to conducting any data collection, compilation, management, or analysis activities. Supervisors will provide these and other applicable documents to all new staff. The Project Manager must verify that staff participating in data collection activities have read the relevant SOPs and signed the acknowledgment forms.

- All SWQB personnel conducting work under this QAPP are required to complete and maintain their Defensive Driving certification through the National Safety Council Defensive Driving Council. All SWQB personnel are responsible for keeping this certificate on their persons when operating or while in a State Vehicle as well as providing a copy of their certificate to their supervisor, the SWQB vehicle coordinator and the NMED Human Resources Bureau.

- All individuals conducting work under this QAPP must read and provide written acknowledgment of understanding of the job hazards identified under the SWQB's Job Hazard Analyses (JHA).

- All individuals conducting work under this QAPP must undergo laboratory safety training by the SWQB's Laboratory Safety Officer and be familiar with and provide written acknowledgment of understanding of the SWQB's Chemical Hygiene Plan (CHP). No individual shall be allowed in the SWQB laboratory without training and acknowledgment of the SWQB's CHP or under the presence of at least one (1) trained SWQB staff.

- Personnel in the PSRS are required to receive NPDES inspector training, obtain EPA credentials and be familiar with this QAPP and EPA's NPDES Compliance Inspection Manual (EPA 2017). All new PSRS personnel must be accompanied on NPDES inspections by experienced inspection officers until the Program Manager or direct Supervisor determines that the staff person is appropriately trained and qualified to conduct an inspection, deal with compliance issues, and write an inspection report.

- Additional training may be required to conduct specific aspects of an individual's job duties, either in the field or in an office setting. These training events may be provided upon request of the individual, as resources allow, or as directed by the State Personnel Office, NMED Secretary, Deputy Secretary, Human Resources Bureau, Water Protection Division Director, SWQB Chief, Program Manager, Project Manager, or Supervisor.

A9. Documentation and Records

GENERAL DOCUMENTATION REQUIREMENTS.

This QAPP and referenced procedures include methods related to the collection, processing, analysis, reporting, and tracking of environmental data. This QAPP is updated, at a minimum, tri-annually and is made available by the QAO, on the SWQB webpage, to those responsible for collecting, processing, and analyzing data in accordance with SWQB procedures. When changes affect the scope, implementation, or outcome assessment, this QAPP will be revised to keep project information current.

Documentation of data generated from projects covered by this QAPP must be of sufficient quality to withstand challenges to their validity, accuracy, and legibility. To meet this objective, data are recorded in standardized formats and in accordance with prescribed procedures. The documentation of all environmental data collection activities must meet the following minimum requirements:

- Data and associated information must be documented directly, promptly, and legibly by the observer onto established SWQB forms or in designated field logbooks. All reported data must be uniquely traceable to the raw data. Data reduction, correction, or transformation changes must be documented, dated, and initialed.

- All original data records include, as appropriate, a description of the data collected, units of measurement, station or location identification (if applicable), name or initials of the person collecting the data, date and time of collection, and as applicable, the unique sample identification (Laboratory Request Identification [RID] number).

- Any changes to the original (raw data) entry must not obscure the original entry. The reason for the change must be documented, and the change must be initialed and dated by the person making the change and approved by the Program Manager.

Tables 5 and 6 summarize how each section within the SWQB manages records. Other specific documentation requirements are discussed below and throughout this QAPP and the most current NMED/SWQB SOPs.

Detailed descriptions and additional information on Surface Water Programs administered by the SWQB can be found in the Statewide Water Quality Management Plan (WQMP) and Continuing Planning Process (CPP) and other water quality planning related documents available on the Bureau's website at https://www.env.nm.gov/surface-water-quality/wqmp-cpp/.

Documentation of the Sampling Design and the Planning Process

Each project taken on by the SWQB has a *Planning Process* (NMED/SWQB 2021). The *Planning Process* can be documented through project-specific FSPs, Sample and Analysis Plans (SAPs) or project-specific QAPPs. FSPs and SAPs must be approved by the applicable Program Manager and the QAO. Project-specific QAPPs must be approved by the applicable Program Manager, QAO and EPA Region 6. Each Project Manager is responsible for ensuring that the planning process is documented.

Documentation of Data Collection (Field and Inspection) Activities

Records are maintained for each data collection activity to ensure that samples and data are traceable and defensible. SWQB personnel must document field data and observations electronically or in hard copy on established SWQB forms or in designated field logbooks to provide a secure record of field activities, observations, and measurements during sampling. At a minimum, these records will document the date, time, field staff, location, and parameters measured along with any other information required by the applicable SOP for the work performed. Field observations and measurements not collected using SOP forms must be recorded using a field logbook. Entries in field logbooks cannot be erased nor have pages removed. Mistakes must be stricken with one line and initialed by the data recorder. Field observations collected in electronic format shall be completed in the field and preserved in a format to prevent unmarked entry or corrections. Completion of appropriate field documentation and forms for each sample is the responsibility of the designated data recorder. Verification of field documentation must be completed by staff not party to the data collection. Field forms and documentation are then uploaded or filed in the appropriate designated record location.

Documentation of Data Analysis and Modeling

Upon verification and validation of data, data sets may be copied and used to evaluate the decision criteria and develop the output as described in detail in Table 3. These outputs may include the use of the data in models or evaluation of data through functions commonly found in spreadsheets. Documentation of how manipulations were conducted, assumptions made, and the results of such actions on the data shall be documented in the output reports.

Documentation of Analytical (Laboratory) Activities

Documentation of all water quality samples to be analyzed by an external laboratory is critical for tracking data and evaluating the success of any activity. Each analytical laboratory is required to provide the SWQB with a current QAPP (or equivalent) and must meet the requirements specified in this QAPP and EPA regulations. Documentation may include, but is not limited to, the following:

- Calibration and maintenance records for all instruments and equipment involved in the collection of environmental data;
- Records of preparation of calibration standards, spiking solutions, and dosing solutions such that each unique preparation can be tracked to the original (neat) material;
- Lot numbers for all standards, stock solutions, reagents, and solvents;
- Records of all sample processing or preparation for testing such that it is traceable to sample receipt records;
- All sample analyses request forms and results of analyses (all rejected data must be accompanied by explanations of the failure and the corrective action);
- All data reduction/transformation formulas such that reported data can be reproduced from the raw data;
- Analytical laboratory custody records;
- Laboratory analysis results with quality assurance reports, appropriate data condition qualifiers, and quantitated values for detection condition; and
- Definitions of analytical qualifiers.

MANAGEMENT AND LOCATION OF RECORDS BY MONITORING TYPE

Records include a compilation of all documentation identified above and are managed in slightly varying ways depending on the objectives of the activity and program creating the record. They are described in detail for each as follows:

NPDES Permit Compliance Inspections

In addition to the documentation of the planning process, field collection activities, and analytical activities identified above, the records for NPDES Compliance Inspections include: inspection records, photo-documentation, non-transient correspondence, records with the Permittee(s), and any other relevant supporting documentation not considered confidential or subject to attorney-client privilege.

These records are held in hard copy with the assigned SWQB Compliance Officer (Project Manager) and/or in electronic format on a secured area within the PSRS on the SWQB's server where routine backup mechanisms are employed.

Ambient Water Quality Monitoring

In addition to the documentation of the *Planning Process*, water quality survey project files maintained by MASS for water quality surveys include numerous and diverse documents and records. The Project Manager maintains project files; however, the files are used by numerous staff within the section for various purposes. Hard copies of all water quality surveys and special projects are maintained in three-ring binders as follows:

Label each binder on the spine and front cover with the following information:

Survey Title
Survey Year(s)
[Binder X of X]
Hydrologic Unit Code/Watershed

Create tab dividers with labels for the sections listed below and place all associated documents and records in the applicable section of the binder in the same order as listed below:

- Introductory Information
    - Map(s) of the survey area
    - Field Sampling Plan
- Background Information
    - Reconnaissance Information
    - Access information (if not in database)
    - Supplemental information pertinent to the survey (land-use, land activities, BMPs, etc.)
- Chemical Data
    - Field Forms
    - Analytical Laboratory submittal forms – date stamped copies (in lieu of chain of custody)
    - Flow field forms and flow calculation worksheets
- Physical Habitat Data
    - Habitat Field Sheets
- Long-Term Deployment (Continuous data)
    - Sonde deployment/retrieval field sheets, thermograph deployment/retrieval field sheets, DO Logger deployment/retrieval field sheets and conductivity logger deployment/retrieval field sheets.
- Biological Data
    - Macroinvertebrates - Benthic macroinvertebrate collection forms
    - Periphyton/Chlorophyll collection forms
    - Phytoplankton and/or diatom collection forms
    - Fish collection forms
- External Data (paper or CD form)

The storage location for calibration, calibration verification, and accuracy temperature records (hard copy) for sondes and data loggers are detailed in SWQB SOPs.

Upon completion of verification and validation of a project, the forms and associated attachments are provided to the QAO for review. Final verification and validation documents are filed with the QAO. These records (the Verification and Validation Worksheets) are also held in electronic format on a secured area within the MASS folders on the SWQB's server where routine backup mechanisms are employed.

Discharge Monitoring from Point Sources

In addition to the documentation of the *Planning Process*, field collection activities, and analytical activities identified above, the records for Discharge Monitoring from Point Sources could include inspection records, photo-documentation, non-transient correspondence records with the responsible party, and any other relevant supporting documentation not considered confidential or subject to attorney-client privilege. These records are held in hard copy with Ambient Water Quality Monitoring

records and in electronic format on a secured area within the MASS on the SWQB's server where routine backup mechanisms are employed.

Monitoring for Enforcement Purposes

In addition to the documentation of the *Planning Process*, field collection activities and analytical activities identified above, the records for compliance monitoring for enforcement purposes will include inspection records, photo-documentation, non-transient correspondence records with the responsible party, and any other relevant supporting documentation not considered confidential or subject to attorney-client privilege. These records are held in hard copy with the assigned SWQB Compliance Officer and in electronic format on a secured area within the PSRS on the SWQB's server where routine backup mechanisms are employed. NMED's Office of General Counsel will also have records of the enforcement action (e.g., notice of noncompliance, notice of violation, administrative order of consent, or civil action).

Incident Response Monitoring

Field collection activities and analytical activities identified above will be included in project records. The records for Incident Response monitoring may include inspection records, photo-documentation, non-transient correspondence records, and any other relevant supporting documentation not considered confidential or subject to attorney-client privilege. These records are held in hard copy with the assigned SWQB Project Manager and in electronic format on a secured area within the SWQB's server where routine backup mechanisms are employed. NMED's Office of General Counsel may also have records of the enforcement action (e.g., notice of noncompliance, notice of violation, administrative order of consent, or civil action).

Hydrology Protocol Surveys

The documentation and records generated for hydrology protocols are maintained with the Standards, Planning and Reporting Team under the MASS program. These surveys are used to develop hydrology protocol UAAs, as applicable, and may become part of the administrative record pending the result of the survey warranting a standards revision in accordance with the Department's WQMP/CPP. Records are held in hard copy with the Water Quality Standards Team Supervisor and in electronic format on the SWQB's server where routine backup mechanisms are employed.

SWQB Watershed Protection Projects

The records affiliated with WPS projects conducted by the SWQB are maintained with the individual SWQB Project Manager. Hard copy records can be located in the individual Project Manger's office, and electronic records within a secured area of the WPS folders on the SWQB's server where routine backup mechanisms are employed. WPS projects completed in house, that require data collection, will document of the *Planning Process* through FSPs. SWQB WPS Project Managers also maintain records for those projects implemented by outside entities for WPS, which must have their own project-specific QAPP, if funded with federal funds. Project records created by outside entities funded with CWA funds are maintained according to project-specific QAPPs, held in hard copy with the Project Manager, and stored in an electronic format within a secured area within the WPS folders on the SWQB's server where routine backup mechanisms are employed.

Effectiveness Monitoring

The records affiliated with Effectiveness Monitoring are held both in electronic and hard copy by the Effectiveness Monitoring Project Manager/Coordinator. Electronic records are held within a secured area within the WPS folders on the SWQB's server where routine backup mechanisms are employed.

Effectiveness Monitoring projects will document the *Planning Process,* through yearly development of FSPs.

Independent Studies

Hard copy and electronic copies of records affiliated with other projects conducted by the SWQB will be maintained by the principle investigator (Project Manager). Electronic records are held within a secured area of the SWQB's server where routine backup mechanisms are employed.

Non-direct Measurements

Hard copy and electronic copies of records affiliated with Non-direct Measurements, used in SWQB projects, will be maintained by the Project Manager. Electronic records are held within a secured area of the SWQB's server where routine backup mechanisms are employed. Records related to the data quality assessment of non-direct measurements evaluated for water quality standards attainment are stored in hard copy within the QAO files or held within a secured area of the SWQB's server where routine backup mechanisms are employed and in the administrative record for the relevant 303(d)/305(b) Integrated Report and List.

Modeling

Hard copy and electronic copies of records affiliated with Modeling utilized in projects conducted by the SWQB will be maintained by the Project Manager. Electronic records are held within a secured area of the SWQB's server where routine backup mechanisms are employed.

SWQB RECORD MANAGEMENT

Physical files and electronic files are maintained for all projects undertaken by the SWQB. Table 5 identifies the contents of each file type and the respective locations. The public has access to SWQB files in accordance with the Inspection of Public Records Act, NMSA 1978, Sections 14-2-1 et seq. and the NMED Inspection of Public Records Policy 01-06 (2004). The SWQB will retain project documents in accordance with applicable sections of New Mexico's Disposition of Public Records and Non-Records regulation, codified at 1.13.30 New Mexico Administrative Code (NMAC) and Retention and Disposition of Public Records regulations, codified at 1.21.2 NMAC.

Table *5*. Locations of Documents Available from the SWQB

Records	Locations	Contents
NPDES Inspection Records, PSRS Public Files	Hard Copy: SWQB Ste. N2050 or Electronic Copy: Bureau's designated folder on Agency server.	All information pertaining to NPDES permits and inspections. Files are maintained by facility type and filed under facility type, name and permit number in a "Reports" file. Results of non-traditional NPDES inspections and inspection reports are filed under "Reports" by NPDES permit type (e.g. CAFO, storm water, etc.). Any additional records obtained from the facility during an NPDES inspection or submitted by a facility operator for clarification subsequent to an inspection are also filed under the appropriate "Reports" file. Reports and files are maintained indefinitely; however, older files are transferred to an electronic filing system or archived.
MASS Project Files	Hard Copy: Project Manager or designee's office or	A project file is maintained for each project undertaken by the SWQB. The Project Manager creates the file immediately upon assignment and maintains the file until completion. Each project file includes all documents (hard copy and/or electronic copies) pertaining to the

Records	Locations	Contents
	SWQB Library (Ste. N2104 Rolling Files) Electronic Copy: Bureau's designated folder on Agency server.	project, including data forms, data reports, QA/QC and Data Verification and Validation information, notes, etc. Once a project is considered complete, the file is transferred to the appropriate SWQB Library location. Project records (hard copy and electronic) being implemented by outside entities for the MASS are stored according to project-specific QAPPs.
Quality Assurance Files	Hard Copy: QA Officer's office or SWQB Library (Ste. N2104 Rolling Files) Electronic Copy: Bureau's designated folder on SWQB server.	Quality Assurance files include all information relating to QAPP and QMP revisions, QAPP training, acknowledgment forms, project-specific QAPPs, SOPs, copies of Data Validation and Verification results, and Data Quality Assessment information.
Administrative Record for actions taken by the WQCC	Hard Copy: Administrator for Boards & Commissions Electronic Copy: Bureau's designated folder on Agency server, and stored electronically by the New Mexico WQCC	The Administrative Record contains all documents that were submitted to the WQCC for the record to set forth their decisions regarding the development and revisions to the State's Water Quality Standards, the approval of the 303(d)/305(b) Integrated Report and List, and issuance of TMDLs.
WPS Projects funded by the CWA	Hard copy: Individual Project Manager's office. Electronic Copy: WPS designated folder on SWQB server.	A project file is maintained for each project undertaken by the WPS. The Project Manager or Project Officer creates the file immediately upon assignment and maintains the file until completion. Each project file includes all documents (hard copy and/or electronic copies) pertaining to the project, including data forms, data reports, QA/QC and Data Verification and Validation information, notes, etc. Project records (hard copy and electronic) implemented by outside entities for the WPS are stored according to project-specific QAPPs.
Effectiveness Monitoring Data	Hard copy: Project Manager's office. Electronic Copy: Bureau's designated folder on SWQB server.	A project file is maintained for each project undertaken by the Project Manager. The Project Manager creates the file immediately upon assignment and maintains the file until completion. Each project file includes all documents (hard copy and/or electronic copies) pertaining to the project, including data forms, data reports, QA/QC and Data Verification and Validation information, notes, etc.
Reporting Documents (Table 6)	Hard Copy: State Library, Program Manager and SWQB Library (Ste. N2050 or N2104 Rolling Files) Electronic Copy: Bureau's designated folder on Agency server.	Table 6 provides details regarding SWQB reporting documents, content detailed in reports, and responsible SWQB Section. Contact the applicable Program Manager for more information.
Other Records	Hard Copy: SWQB Premises	Each Section within the SWQB maintains the documents produced by the section. In addition, each section also maintains reference and

Records	Locations	Contents
	Electronic Copy: Bureau's designated folder on Agency server.	informational documents pertinent to that section. Contact the Program Manager for information on exact locations.

Reporting Documents

Numerous reporting documents are produced by the various sections of the SWQB and are summarized in Table 6. In addition to the reports described below, many SWQB projects require the submittal of progress reports to provide periodic status reports on a project.

Table 6. Summary of SWQB Reporting Documents

Organizational Unit	Reporting Documents Produced	Description
Point Source Regulation Section (PSRS)	Inspection Reports	Inspection reports are partially based on a review and evaluation of records maintained by the facility and PSRS. Records reviews vary by the type of facility (different facilities/permits have different record keeping requirements) and may include: monitoring reports, previous inspection reports, permit applications, permits, and past or pending EPA enforcement actions, laboratory records, site self-inspection records, employee training records, nutrient management records, etc. Results from inspections are documented on EPA form 3560-3 and are discussed in the Inspection Report. Inspections Reports include details on all findings made during an inspection and may include photographs taken during the inspection. Inspection reports are submitted to both the facility operator(s) and EPA. Inspection reports may be used to determine compliance with the federal CWA.
Monitoring, Assessment, and Standards Section (MASS)	State of NM Clean Water Act §303(d)/§305(b) Integrated Report and List (IR)	The Integrated Report is a summary of the water quality status of NM waters and the management actions necessary to protect and restore them. The Integrated List identifies whether or not a particular surface water of the state is currently meeting its designated uses. The documents are commonly referred to as the IR and are developed using the procedures described in the NMED SWQB CALM.
	Water Quality Survey Summaries	A summary of a water quality survey that includes a map of the study area, descriptions of the sampling stations, and an inventory of the sampling events.
	TMDL Planning Documents	A written plan and analysis established to ensure that a waterbody will attain and maintain water quality standards, including consideration of existing pollutant loads and reasonably foreseeable increases in pollutant loads.
	Project Summaries	Provide detailed information on the results of individual watershed restoration projects completed for Clean Water Act §604(b) projects.
	State of NM Standards for Interstate and Intrastate Surface Waters (20.6.4 NMAC)	Establishes the designated uses for a waterbody in order to restore and maintain the chemical, physical and biological integrity for the protection of aquatic life and for recreation in and on the water in accordance with the CWA. It further defines the water quality criteria determined to be protective of the designated uses and establishes the State's antidegradation policy for protection of waters.
	Statewide Water Quality Management Plan/Continuing Planning Process	Establishes the state's processes that are used for managing its water quality program and describes how water quality assessments are used to prioritize water quality problems and implement control measures.
	Quality Management Plan	Describes the SWQB quality system for planning, implementing, documenting, and assessing the effectiveness of environmental data operations.

	Quality Assurance Project Plan	A planning document that describes the necessary QA procedures, QC activities, and other technical activities implemented by the SWQB.
Watershed Protection Section (WPS)	Nonpoint Source Pollution (NPS) Annual Report	Provides an overview of NPS management-related activities conducted in NM each year and summarizes the status of NPS 319(h) projects and wetland restoration activities.
	NPS Management Plan	A management plan used by States for controlling pollution added from nonpoint sources to waters within the State and improving the quality of such waters.
	Watershed-Based Plans (WBPs)	Comprehensive reports written to address water quality problems for impaired waterbodies.
	Wetland Action Plans (WAPs)	Comprehensive reports designed to specifically address wetlands and riparian resources within the boundary of a specific watershed. The WAP develops and proposes avenues to protect, restore, and create wetlands in NM.
	Effectiveness Monitoring Reports	Used to report changes in water quality due to implementation of BMPs
	Project Summaries	Provide detailed information on the results of individual watershed restoration projects

GROUP B. DATA GENERATION AND ACQUISITION

This section addresses all aspects of data generation and acquisition to ensure that appropriate procedures for sampling, measurements and analysis, data collection/generation, data handling, and QC activities that are employed and documented by the SWQB are appropriate, reliable, defensible, and of sufficient quality to fulfill the project goals and objectives.

B1. Sampling Design Process

Sample design for any data collection activity conducted by the SWQB must be completed before sampling or data collection commences to ensure data is collected in a manner that aptly reflects the study's goals and meets the DQIs of this QAPP. The general components incorporated into the sampling design for data collection conducted by the SWQB are described below.

- General project organization and key staff
- Sampling locations and a description of the methods used to determine the sampling locations
- Sampling parameters
- Sampling methodologies
- Sampling frequencies
- Sample size
- Overall timeframes
- Location and types of QC samples
- A summary of any previous data collection within the study area, including those beyond SWQB's activities, if the information is available

The sampling design for projects implemented under this QAPP will vary depending on the type of monitoring objective identified in Table 2. For each of the monitoring types listed under Table 2, sufficient information regarding the sampling design is either described under this QAPP or further supplemented with a FSP or SAP for the particular data collection activity. If a FSP or SAP is required, it must be reviewed

and approved by the applicable Program Manager and QAO prior to commencement of work and must be developed and approved to meet the requirements in SOP 2.1 Field Sampling Plan Development and Execution.

Work being conducted with federal funds that involves data collection or compilation by other entities and managed by the SWQB will require a project-specific QAPP, that is reviewed and approved by the applicable Program Manager, Project Manager, QAO, and EPA prior to commencement of work. Those projects include those funded with CWA 106, 314, 319(h), 104(b)(3), and 604(b), and Water Infrastructure Improvements for the Nation (WIIN) Act grants.

NPDES PERMIT COMPLIANCE INSPECTIONS

The federal NPDES permit program is the principal mechanism used by New Mexico for the protection of its surface waters from pollution by point-source discharges. Under this program, a permit specifies the amounts and concentrations of contaminants that a permittee may discharge to a waterbody. In addition, various (depending on the type of facility permitted) administrative (e.g., signatory, reporting and legal, etc.) and procedural (e.g., frequency and type of monitoring and analysis, etc.) requirements, and specific structural (e.g., detention/retention basins, vegetated swales and natural depressions, infiltration of runoff onsite, etc.) and non-structural (e.g., good housekeeping, preventive maintenance, spill prevention and response procedures, periodic inspections, employee training, nutrient management, etc.) pollution prevention measures and practices may be specified.

New Mexico does not directly implement the federal NPDES permitting program; however, the Point Source Regulation Section (PSRS) provides assistance to EPA in the following ways:

- Conducting compliance inspections on behalf of EPA;
- Providing information to the regulated community and the public;
- Reviewing NPDES permits proposed by EPA to assure that these permits are compliant with applicable provisions of the federal Clean Water Act §§208(e), 301, 302, 303, 306, and 307 and appropriate requirements of state law;
- Issuing CWA Section 401 State Certification for all NPDES permits to assure compliance with applicable state water quality standards.
- Conducting outreach as appropriate to inform facilities of the requirements of NPDES permits.

EPA categorizes NPDES permits as either “municipal,” “non-municipal (often termed “industrials”),” or “federal.” Municipal discharge permits are issued for publicly owned community wastewater treatment plants. Other dischargers are classified as non-municipal or federal. Many of the discharges covered by individual NPDES permits for non-municipal sources are from small private domestic wastewater or mining operations. Currently, discharges covered by general NPDES permits include Concentrated Animal Feeding Operations (CAFOs), storm water run-off associated with construction or industrial facilities, discharges from pesticide applications, and municipal separate storm sewer systems (MS4s). NPDES permittees are further categorized by EPA as either “major” or “minor” dischargers. Major municipal permittees are generally those with design flows of one million gallons per day (MGD) or greater. Industrial permittees are classified based upon a number of factors, including the type of industry, chemical constituents in the discharge, and designated uses of the receiving stream.

According to EPA policy, all active permitted facilities classified as major (municipal, non-municipal or federal) should be inspected periodically by either EPA or the SWQB's PSRS. Each year EPA coordinates with the PSRS to identify inspections that will be conducted by the PSRS or EPA. Facilities classified as minor dischargers are inspected on a prioritized basis. The priority list is based primarily on the date of the last inspection, with the facilities having gone the longest without an inspection receiving the highest priority. Additional factors considered when determining which minor facilities to inspect include citizen complaints, specific requests from EPA, the facility status with respect to Significant Non-Compliance status, and proximity to the above major and traditional minor facility inspection locations.

Several methods are used for ensuring compliance with environmental laws and regulations. These include conducting NPDES compliance evaluation activities (including inspections) to detect violations and create a strong enforcement presence. Enforcement actions may be taken by EPA against violators to correct violations. Inspections are a crucial link in this effort. An effective enforcement program begins with individual inspections and the specific enforcement responses to violations detected by those inspections. A principal function of an inspection, regardless of inspection type (evaluation, sampling, audit or reconnaissance, see Table 2 for descriptions) is to detect and document violations at the facility. Evidence collected during the inspection supports the resulting enforcement action that will bring the facility into compliance with EPA and NM WQCC regulations. Inspections can also provide an opportunity to communicate regulatory requirements to the facility operator, thus enhancing their ability to meet EPA program requirements. Requirements for inspection of NPDES permittees are addressed in §308 of the CWA. Guidelines for conducting these inspections are available in the NPDES Compliance Inspection Manual (EPA 305-K=001, Interim Revised Version, January 2017).

Effluent samples collected by the PSRS in conjunction with an NPDES permit compliance sampling inspection are collected from the facility outfall sampling location if practical and appropriate; and from existing stations, if available. If pre-existing stations are not available, then the Lead Inspector will select stations from a location that is representative of the effluent discharge quality. An accessible station will be selected far enough upstream from the discharge point to eliminate any possibility of influence from the discharge. A downstream station will be selected at a point where the effluent is completely mixed in the receiving water. This point can be determined by checking the specific conductance of a transect taken completely across the receiving water. When the readings are consistent, (±10 µmhos/cm) the effluent is considered to be completely mixed for sampling purposes. Table 7 provides a general summary of the parameters commonly sampled for compliance monitoring purposes. Sampling frequency is once per compliance sampling inspection event and the number of samples taken is one for all parameters except bacteria, which has a sample size of two. Any deviations from the generalized sampling plan set forth in Table 7 is documented as part of the NPDES permit compliance sampling inspection. Specific procedures, methods, and considerations are documented in SWQB SOP 8.3 for NPDES Wastewater Sampling.

Table 7. Parameters Commonly Sampled for NPDES Permit Compliance Evaluation Purposes

Analytical Suite	Parameters	Notes, if applicable
Field Parameters	pH	
	Temperature	
	Specific Conductance	
	Dissolved Oxygen (DO)	
	Turbidity	

Analytical Suite	Parameters	Notes, if applicable
	Flow (Discharge)	Inspection team evaluates permittee's flow-measuring equipment and uses the flow obtained if the equipment is found to be acceptable
Metals	Dissolved Metals	List of metals analyzed is determined on a permit-specific basis
	Total Metals	List of metals analyzed is determined on a permit-specific basis
	Dissolved Hardness	Must be collected concurrently with metals for which the WQS criterion is "hardness dependent"
Anion and Cations	Alkalinity	
	Bicarbonate	
	Calcium	
	Carbonate	
	Chloride	
	Fluoride	
	Magnesium	
	Potassium	
	Sodium	
	Sulfate	
	Total Dissolved Solids	
	Total Suspended Solids	
Nutrients	Ammonia	Sampled only if required in NPDES permit
	Nitrate plus Nitrite	Sampled only if required in NPDES permit
	Phosphorus, total	Orthophosphate is analyzed only when specifically requested
	Total Kjeldahl Nitrogen	Sampled only if required in NPDES permit
	Total Organic Carbon	Sampled only if required in NPDES permit
	Chlorophyll a	Sampled only if required in NPDES permit
Bacteria	Fecal coliform	Duplicate Samples Required
	Escherichia coli	
Other Parameters	Cyanide	Sampled only if required in NPDES permit; WQS criterion is for total recoverable cyanide
	Biochemical Oxygen Demand (5-day)	
	Chemical Oxygen Demand	Sampled only if required in NPDES permit
	PCBs	Sampled only if required in NPDES permit
	Total Chlorine Residual	Sampled only if required in NPDES permit

AMBIENT WATER QUALITY MONITORING

The Monitoring, Assessment, and Standards Section (MASS) conducts water quality surveys on waterbodies within basins throughout NM. Specific details on SWQB's monitoring program can be found in the *10-Year Monitoring and Assessment Strategy* (NMED/SWQB 2016). Information regarding specific sampling designs can be found in the FSPs. FSPs for surveys conducted under this QAPP are developed and approved using SWQB SOP 2.1 Feld Sampling Plan Development and Execution. Approved FSPs contain details including sampling locations, sampling frequencies, dates/timeframes, sample size, and frequency of QC samples. The *Planning Process* for Ambient Water Quality Monitoring is documented through FSPs for specific surveys.

The majority of the sampling conducted for Ambient Water Quality Monitoring is based on a targeted sampling design. Targeted sampling design is the selection of sampling locations, dates, parameters, and frequencies based on knowledge of the features and conditions under investigation and on professional judgment, with no randomization. The advantage of a targeted design is that data needs and questions regarding specific waterbodies can be addressed efficiently. However, targeted sampling adds potential bias to a dataset and reduces the level of confidence to be quantified and limits the statistical inferences that can be made (EPA 2002b). In order to draw unbiased conclusions on the status of the State's waters, SWQB also implements a probabilistic sampling design for select water resource types. Probabilistic monitoring is watershed-based and focuses on sampling within a specific watershed. Probabilistic monitoring occurs during the biomonitoring index period from August 15th through November 15th yearly and is typically conducted in the same watersheds as the concurrent two-year Water Quality Survey. Monitoring focuses on physical, chemical, and biological conditions and includes sampling for most conventional pollutants with numeric or narrative criteria in the WQS. Probabilistic monitoring FSPs will document sampling locations, sampling frequencies, dates/timeframes, sample size, and frequency of QC samples.

Monitoring locations in the targeted sampling design are determined using immediate data needs and the age of existing data. Data needs are determined based on impairments from previous studies, identified data gaps, and consultation with SWQB technical staff as well as other state agencies, federal agencies, tribes, local watershed groups, and interested parties. Waterbodies with most recent data greater than five years old are given a higher priority. The SWQB currently utilizes an eight to ten-year rotational monitoring schedule for water sampling activities. This rotational cycle may be modified as necessary to reflect changing priorities, special requirements, and resource constraints. The primary objective of Bureau's Ambient Water Quality Monitoring is to assess designate use attainment for the Integrated Report and List and provide information to the public on the condition of surface waters of NM. Table 8 lists analytes and parameters typically collected for Ambient Water Quality Monitoring. The FSP for a water quality survey describes analytes and parameters being sampled in greater detail. Table 9 provides the common analytes and parameters used to assess WQS criteria set forth in 20.6.4 NMAC. For the complete list of water quality standards pertaining to New Mexico's designated uses, see the numeric criteria in 20.6.4.900 NMAC and narrative criteria in 20.6.4.13 NMAC.

Table 8. Commonly Sampled Parameters

Analytical Suite	Parameters	Notes, if applicable
Field Parameters	pH	Both instantaneous and long-term deployment
	Temperature	Both instantaneous and long-term deployment
	Specific Conductance	Both instantaneous and long-term deployment
	Dissolved Oxygen (DO)	Both instantaneous and long-term deployment
	Turbidity	Both instantaneous and long-term deployment
	Flow (Discharge)	Flow not taken if stream gage present
Metals	Dissolved Metals	List of specific metals identified in FSP
	Total Metals	Total Al: 10 µm filter for Turbidity > 30 NTU, List of specific metals identified in FSP
Anion and Cations	Alkalinity	
	Bicarbonate	
	Calcium	For hardness calculation
	Carbonate	

	Chloride	Subject to segment-specific numeric criteria
	Dissolved Organic Carbon (DOC)	Model input parameter for metals and nutrients
	Hardness	Must be collected concurrently with metals for which the WQS criterion is "hardness dependent"
	Magnesium	For hardness calculation
	Sulfate	Subject to segment-specific numeric criteria
	Total Dissolved Solids	Subject to segment-specific numeric criteria
	Total Suspended Solids	
Nutrients	Ammonia	
	Nitrate plus Nitrite	
	Phosphorus, Total	
	Total Kjeldahl Nitrogen	
	Total Persulfate Nitrogen	
Bacteria	Escherichia coli	Primary and Secondary Contact
	Total Coliform	
Organic Chemicals	Base/Neutral/Acids Semivolatiles (SVOCs)	See USEPA Method 8270D or Appendix B for list of specific SVOCs analyzed
	Volatile Organic Chemicals (VOCs)	See USEPA Method 8260B or Appendix B for list of specific VOCs analyzed
	PCBs	Congeners, Blank Corrected
Radionuclides	Radium 226/228	Required for adjusted Gross α/Gross β
	Gross α/Gross β	
	Total Uranium	Required for adjusted Gross α/Gross β
Other Parameters	Cyanide	WQS criteria is for total recoverable cyanide
	Total Chlorine Residuals	
	Chlorophyll a	Collected for nutrient assessment
	Microcystin	Algal toxin affecting recreational use
Toxicity	Ambient Toxicity	Analysis performed by USEPA Region VI
Biological	Macroinvertebrates	
	Fish Community	
	Fish Tissue	Analyzed for PCBs, Hg, Se, DDT or other contaminants of concern
	Periphyton	
	Phytoplankton	
Physical Habitat	Percent Sand and Fines	General WQS Criteria
	Stream Slope	
	Percent Canopy Cover	
	Channel Cross Section	

Table 9. Parameters Commonly Associated with Designated Uses

Designated Use	**Parameters**
Aquatic Life[1]	- Dissolved oxygen, pH, specific conductance, and turbidity (7-14 day sonde deployment, generally in late summer and fall) - Temperature (capturing summer season maximum) - Total nutrients[2], total metals[3], dissolved metals[4], hardness -Flow (if a stream) and depth (if a lake)
Primary or Secondary Contact	*Escherichia coli,* pH, and Microcystin
Domestic Water Supply	Nitrate, total metals[3], dissolved metals[4], radionuclides[5], and organics[6]

Designated Use	Parameters
Irrigation	pH, dissolved metals[4], TDS/TSS, hardness, chloride, and sulfate
Livestock Watering	Total nutrients[2], total metals[3], dissolved metals[4], and radionuclides[5]
Wildlife Habitat	Total metals and cyanide
Human Health	Dissolved metals[4] and organics[6]

1 Parameters collected for aquatic life use are also used to assess narrative standards such as biological integrity, bottom deposits, plant nutrients, and turbidity.
2 Total Nutrients include nitrate + nitrite, ammonia, total Kjeldahl nitrogen, and total phosphorus and may also include Total Persulfate Nitrogen.
3 Total metals include aluminum, mercury, and selenium at a minimum.
4 Dissolved metals typically include aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, uranium, vanadium, and zinc.
5 Radionuclides include gross alpha/beta and Ra-226 + Ra-228 and Total Uranium.
6 Organics include base/neutral acid extractables (Method 8270) and volatile organic compounds (Method 8260).

Core biological indicators for surface waters

SWQB measures biological water quality indicators at probabilistic sites and targeted sites when core indicators indicate reasonable probability of impairment or to support special studies. Core biological indicators may include:

- Environmental Monitoring & Assessment Program (EMAP) or SWQB habitat survey (during baseflow conditions) to include physical habitat data such as substrate composition, geomorphology, and riparian health assessments
- Benthic macroinvertebrate collection (during index period – August 15 through November 15), identification, and enumeration
- Nutrient survey (during the growing season, see Appendix C of the CALM) to include chlorophyll *a*, ash free dry mass, and periphyton community composition
- Fish survey, identification, and enumeration
- Fish tissue samples for updates to fish consumption advisories and development of new fish consumption advisories

DISCHARGE MONITORING FROM POINT SOURCE

The *Planning Process* for Discharge Monitoring from Point Sources conducted by the Monitoring Team, is typically documented through FSP development for water quality surveys conducted for Ambient Water Quality Monitoring. The FSP must include the required elements of SWQB SOP 2.1 Field Sampling Plan Development and Execution (NMED/SWQB 2019). The FSP describes the parameters of interest, sample frequency, sample location, and quality control samples. The sampling for Discharge Monitoring from Point Sources is conducted in effluent discharged from a Point Source or on a surface waterbody in close proximity to a Point Source. The SWQB uses the data from sampling to determine pollutant concentration of effluent discharged to a surface waterbody and is used to inform TMDLs, evaluate for compliance with the limits and conditions specified in the State of NM Standards for Interstate and Intrastate Surface Waters (20.6.4 NMAC), or applicable permits, and determine load reductions necessary to meet WQS. The monitoring results may also be used to conduct antidegradation analyses and evaluate a discharge's

reasonable potential to cause or contribute to an impairment, or to establish permit limits that protect surface waters of the state. In addition to the above, the information can also be used to determine the magnitude, extent, and severity of impacts to designated or existing uses.

MONITORING FOR ENFORCEMENT PURPOSES

The sampling design for enforcement purposes will be developed on a case by case basis in cooperation with EPA and/or NMED's Office of General Counsel (OGC) to determine sampling locations, frequency of data collection, and parameters to be sampled. Collection and evaluation of environmental data from sites selected based upon known or suspected influences on water quality (both natural and anthropogenic) are used to determine whether pollutant concentrations in a waterbody are in compliance with the limits and conditions specified in the State of NM Standards for Interstate and Intrastate Surface Waters (20.6.4 NMAC). This type of monitoring is similar to targeted monitoring with modified procedures pertaining to the number of samples collected and chain of custody requirements. As described above, this monitoring type requires a *Planning Process;* however, due to possible enforcement action, the requirements of a FSP may not apply and is determined on a case-by-case basis by EPA or OGC.

INCIDENT RESPONSE MONITORING

Monitoring conducted in response to a known or suspected unpermitted release, discharge, or spill to a surface water body, requires a *Planning Process* prior to data collection but does not require an FSP. The monitoring can be initiated for any known or suspected unpermitted release, discharge, or spill to surface waterbody. Unpermitted release reported as part of sanitary sewer overflow, 7-day release, 15-day release, or final release completed by an external entity and sampled by the SWQB would be considered Incident Response Monitoring. SWQB may use this information to determine the magnitude, extent, and severity of impact to designated or existing uses. Monitoring may continue, as needed, to inform incident and recovery management and the need for corrective actions. All SWQB Teams may conduct Incident Response Monitoring that have reviewed and signed all applicable SOP(s) and acknowledgment form(s) required for data collection related to the incident.

HYDROLOGY PROTOCOL

The Hydrology Protocol (HP) is a survey method documented in Appendix C of the Department's WQMP/CPP used to collect information on the persistence of water in lotic systems. The Hydrology Protocol includes the collection and evaluation of hydrological, geomorphic and biological indicators and is organized into two levels of evaluations. Hydrology Protocol surveys may be used to determine the appropriate application of WQS and confirm WQS classification. An FSP is not needed for data collection; however, training is required and a *Planning Process* is highly recommended.

SWQB WATERSHED PROTECTION PROJECTS

SWQB staff working in the WPS periodically conduct water quality surveys on waterbodies throughout NM for various projects including but not limited to development of watershed based plans, determination of wetlands, and evaluation of wetland conditions. Projects implemented by outside entities that are not led by SWQB personnel must have their own project-specific QAPP.

Each project conducted by WPS, completed in-house, must have an FSP or SAP approved by the WPS Program Manager and the QAO. The FSP will document the *Planning Process* and address the requirements of SOP 2.1 Field Sampling Plan Development and Execution, prior to data collection. Should

the proposed data collection be outside of the approved SWQB SOPs or this QAPP, then a project-specific QAPP must be developed to be approved by the WPS Program Manager, QAO, and EPA Region 6 prior to commencing work.

EFFECTIVENESS MONITORING

The study designs for watershed protection projects consist of monitoring for effectiveness and assessment purposes and are described in this QAPP. Effectiveness Monitoring conducted by the Effectiveness Monitoring Coordinator (Project Manager) will not require a project-specific QAPP; however, an FSP will be developed yearly prior to data collection by the Project Manager, which addresses the requirements of SWQB SOP 2.1 Field Sampling Plan Development and Execution. The *Planning Process* for Effectiveness Monitoring is documented through FSPs for yearly monitoring. The study design will generally consist of sampling stations upstream and downstream of the project areas, with sampling conducted before and after project implementation (Grabow et al. 1998). Exact monitoring locations will be determined in the field based on professional judgment, restoration locations, data gaps, data needs, known SWQB monitoring locations, and may require cooperator assistance for determining monitoring locations for specific projects. Should the proposed data collection be outside approved SWQB SOPs or this QAPP, additional information will be required and documented in an EPA-approved project-specific QAPP.

For temperature-related projects, temperature data loggers are generally deployed at the selected locations between May and September of each monitoring year to construct a continuous record of temperature to identify maximums and minimums, as well as diel fluctuations. Temperature data loggers are deployed in accordance with SWQB SOPs in locations representative of ambient stream conditions, generally in the transition between a riffle/run and a pool or at the toe of a pool, rather than in shallow riffles or deep pools. Certain locations may be selected for analysis with the Stream Segment Temperature Model (SSTEMP, Bartholow 2002). At these locations, additional measurements will be collected to feed into the model, such as channel geometry, flow, percent canopy cover, and meteorology.

INDEPENDENT PROJECTS

The study design for SWQB Independent Projects (not including those conducted by outside entities) that are not identified specifically above, must have an FSP or SAP approved by the QAO and applicable Program Manager prior to implementing any work. The elements of the FSP or SAP must have, at a minimum, the general requirements identified in this QAPP. Projects that utilize FSPs must develop an FSP to address the requirements of SOP 2.1 Field Sampling Plan Development and Execution. In addition, these projects may require a project-specific QAPP to ensure quality assurance of any data collection or compilation, if determined by the QAO.

NON-DIRECT MEASUREMENTS

The study design for SWQB Projects that utilize Non-direct Measurements will follow the requirements detailed in the Non-direct Measurement Section of this QAPP. Projects that utilize non-direct measurements typically document the *Planning Process* in project-specific documents that include FSPs, SAPs, or QAPPs.

MODELING

The study design for SWQB Projects that utilize modeling will be documented through a Modeling Objective(s) Form, or a project-specific QAPP (see Quality Control Section of this QAPP), both documents will capture the *Planning Process.* The *Planning Process* will specifically address project-specific objectives for model outputs, document data inputs (direct and non-direct), and speak to quality assurance and quality control requirements for the model based on project objectives.

B2. Sampling Methods

Methods of sample collection, preservation, and handling used in determining water quality as a part of this QAPP shall be in accordance with SWQB SOPs (Table 10) or with methods described in the following references or otherwise approved by EPA:

- "Guidelines establishing test procedures for the analysis of pollutants under the Clean Water Act," 40 CFR Part 136 or any test procedure approved or accepted by EPA using procedures provided in 40 CFR Parts 136.3(d), 136.4 and 136.5;
- Standard Methods for the Examination of Water and Wastewater, latest edition, American Public Health Association;
- Methods for Chemical Analysis of Water and Waste, and other methods published by EPA Office of Research and Development or Office of Water;
- Techniques of Water Resource Investigations of the USGS;
- Annual Book of American Society for Testing and Materials (ASTM) Standards. Volumes 11.01 and 11.02, Water (I) and (II), latest edition, ASTM International;
- Federal Register, latest methods published for monitoring pursuant to Resource Conservation and Recovery Act regulations;
- National Handbook of Recommended Methods for Water-Data Acquisition, latest edition, prepared cooperatively by agencies of the U.S. Government under the sponsorship of the USGS;
- Federal Register, latest methods published for monitoring pursuant to the Safe Drinking Water Act regulations;
- EPA's most recent NPDES Compliance Inspection Manual; or
- Hydrology Protocol as published in Appendix C of the New Mexico Environment Department's EPA approved WQMP/CPP.

All field activities will be conducted in accordance with the SOPs; however, site conditions or project-specific data collection objectives may necessitate the use of alternative field procedures not included in the SOPs. The use of field methods other than those presented above or in the Bureau's SOPs must be approved prior to data collection by the applicable Program Manager and QAO and documented onto established SWQB forms or in designated field logbooks.

The SWQB uses established models for various environmental decision-making activities, including load reduction reporting, estimates for load-reduction in various water environments, air-water correlation, and aquatic toxicology that examines the bioavailability of analytes in the aquatic environments. Models will be used as described in modeling manuals (or equivalent). Modeling objectives will be documented through a Modeling Objective(s) Form or a project-specific QAPP. The Modeling Objective(s) Form or project-specific QAPP will be used to ensure the optimal model type is used for the intended project objective and to ensure data inputs are captured so that environmental decision-making based on model outputs is defensible.

Table 10. SWQB Standard Operating Procedures

SWQB SOPs	Description	Purpose
1.0 General SOPs		
1.1 Creation and Maintenance of SOP	Describes the process for creating, reviewing, and maintaining SOPs for the SWQB.	Template for creating SOPs.
2.0 Planning SOPs		
2.1 Development of Field Sampling Plan (FSP)	Describes the process for preparing and implementing a FSP	Serves as the comprehensive record for each project
3.0 Equipment		
3.0 Equipment	List the equipment used by SWQB for environmental data collecting activities	Serves a master equipment checklist for SWQB
4.0 Field Observations		
4.1 Probable Source Determination	Describes the process for developing a qualitative evaluation of probable sources of impairment based on visual observations made by professionals in the field	Used to incorporate information into Total Maximum Daily Loads (TMDLs) and the Clean Water Act (CWA) §303d/§305b Integrated List
4.2 Photo-documentation	*Pending*	*Pending*
Hydrology Protocol – Appendix C of the WQMP/CPP	Provides the methodology for distinguishing among ephemeral, intermittent and perennial streams and rivers in New Mexico.	Used to provide technical support for an UAA and is required for the expedited UAA process (20.6.4.15.C NMAC)
5.0 Physical Habitat		
5.0 Physical Habitat	Describes the procedure for measuring the physical habitat attributes and geomorphic characteristics relating to the dimension, pattern, and profile of wadeable streams.	Used by SWQB to ensure physical habitat measurements are collected in accordance with SOP so that accurate defensible data is collected by SWQB
6.0 Sondes & Thermographs		
6.1 Sonde Calibration and Maintenance	Describe the procedure for calibrating and maintaining water quality monitoring sondes and dataloggers for collection of instantaneous or unattended measurements.	Used by SWQB to ensure that sondes and dataloggers used by SWQB are properly calibrated, checked and maintained in accordance with SOP so that accurate defensible data is collected by SWQB
6.2 Sonde Deployment	Describes the procedure for deploying water quality monitoring sondes and dataloggers (excluding thermographs) in rivers and streams for instantaneous or unattended measurements.	Used by SWQB to ensure that sondes and dataloggers (excluding thermographs) are deployed in accordance with SOP so that accurate defensible data is collected by SWQB
6.3 Temperature Data Loggers (Thermographs)	Describe the procedure for deploying temperature data loggers s in rivers and streams for unattended measurements. Also, include maintenance procedures for temperature loggers.	Used by SWQB to ensure that temperature data loggers are deployed and maintained in accordance with SOP so that accurate defensible data is collected by SWQB
6.4 Data Logger & Upload	Describe the procedures for retrieving recorded data from sondes and datalogger. Used to assess the quality of data from sondes and dataloggers in water. Details how to standardize data	Used by SWQB for retrieving recorded data from sondes and data loggers, assessing data quality and details the

	formatting in Excel; for uploading data into SQUID.	procedure used for uploading data into SQUID.
7.0 Flow		
7.0 Flow	Describes the process and equipment for measuring stream flow in rivers and streams.	Used by SWQB to ensure that flow is collected in accordance with SOP so that accurate defensible data is collected by SWQB.
8.0 Chemical Sampling		
8.1 Cleaning of Sampling Equipment	Describes the procedure, equipment, and supplies, needed to clean typical water chemical sampling equipment.	Used by SWQB when cleaning and maintaining sampling equipment
8.2 Chemical Sampling in Lotic Environments	Describe the sample collection techniques, preservation and acidification requirements, equipment, and quality control activities associated with the chemical sampling of surface water in lotic environments.	Used by SWQB when sampling for total suspended solids, total dissolved solids, nutrients, metals, hardness, radionuclides, cyanide, organics, etc. in lotic environments to ensure accurate defensible data is collected according to SOP
8.3 NPDES Wastewater Sampling	Describes the methods and considerations to be used and observed when collecting wastewater samples for field screening and details laboratory analysis procedures during NPDES Compliance Sampling Inspections	Used by SWQB when sampling surface water for NPDES compliance sampling inspections.
9.0 Bacteriological Sampling		
9.1 Bacteriological Sampling	Describes the collection and analysis of ambient water and wastewater samples for total coliform and E. coli using the IDEXX laboratories, Inc. Colilert method for water quality standards assessment and permit compliance monitoring.	Used by SWQB when sampling for total coliform and E.coli.
11.0 Biological Sampling		
11.1 Benthic Macroinvertebrates	Describe the sample collection techniques, preservation requirements, equipment, and quality control activities associated with benthic macroinvertebrate sampling	Used by SWQB when sampling for benthic macroinvertebrate to ensure accurate defensible data is collected according to SOP
11.2 Periphyton	Describes the sample collection techniques, preservation requirements, equipment, and quality control activities associated with periphyton sampling in lotic environments.	Used by SWQB when sampling for periphyton to ensure accurate defensible data is collected according to SOP
11.3 Phytoplankton	See lake sampling SOP	
11.4 Fish Community Sampling	Describe the process of fish collection for fish community studies. NMED/SWQB only collects fish for community studies in lotic waters.	Used by SWQB when sampling for fish community studies to ensure accurate defensible data is collected according to SOP
11.5 Fish Consumption Advisory Program	Describe the development process for Fish Consumption Advisories to determine the presence of environmental contaminants in fish	Used by SWQB when sampling fish tissue to ensure accurate defensible data is collected according to SOP
12.0 Lake Sampling		
12.1 Lake Sampling	Describe the sample collection techniques, preservation requirements, equipment, and quality control activities associated with	Used by SWQB when sampling for chemical, physical, and biological characteristics of surface water in lentic environments

	chemical, physical, and biological sampling of surface water in lentic environments.	
13.0 Specialized Sampling		
13.1 Probabilistic Monitoring Surveys	Describes probabilistic monitoring which is a randomized sample design for stream monitoring that includes sample collection for physical habitat measurements, benthic macroinvertebrate samples, flow data, sonde grab data and collecting both chemical and bacteriological samples at each sampling site.	Used by the SWQB for data collection that provides an unbiased data set for evaluation of the condition of the state's perennial, wadeable streams.
15.0 Data Verification and Validation		
15.0 Data Verification and Validation	Describe activities associated with the validation and verification of chemical, physical, and biological data.	Used by SWQB staff for verification and validation of data collected under the SWQB.
16.0 SWQB Audits		
16.1 Technical System Audits (TSA)	Describe in detail how a TSA will be conducted for the various NMED SWQB projects	Used by the SWQB to establish and implement an effective audit and assessment program

B3. Sample Handling and Custody

This section describes SWQB's efforts to ensure that each sample collected retains its original physical form and chemical composition from time of collection through its final disposition.

SAMPLE HANDLING

The details of the sample handling procedures are found in the most current SWQB SOPs and NPDES Wastewater Sampling Guidance. A summary of the most common sample handling procedures is located in Appendix A. Amendments to EPA's sampling handling requirements as listed under Table II at 40 CFR 136.3(e) "*Required Containers, Preservation Techniques, and Holding Times*" will be updated in relevant SWQB SOPs.

SAMPLE CUSTODY

For samples that require transport off-site or physical change of custody, SWQB practices two different chain of custody procedures; informal or formal. They are as follows:

Informal chain of custody procedure:
Requires that the receiving laboratory acknowledge receipt of the samples by date stamping the submittal forms and providing copies of the stamped forms to the person delivering the samples. This date-stamped submittal form is then held as part of the record. This procedure, as outlined in SWQB SOP 8.2, ensures the integrity and quality of these samples. Unless specifically noted, this procedure is applied, as applicable, for Ambient Water Quality Monitoring, Hydrology Protocol Surveys, Watershed Protection Projects, Effectiveness Monitoring, Discharge Monitoring from a Point Source (except for compliance and enforcement purposes – *see* below), Incident Response Monitoring, Independent Studies, and other SWQB Projects not noted elsewhere.

Formal chain of custody procedure:
Required for NPDES Permit Compliance Inspections and Monitoring for Enforcement Purposes. This procedure, as outlined in SWQB SOP 8.3 NPDES Wastewater Sampling, is intended to ensure the integrity

of samples so they can be used as admissible evidence to enforce environmental laws and regulations. Facility samples taken in cases involving an enforcement or administrative action related to a permit, certificate, order, or potential violation of a regulation or law shall follow chain of custody procedures provided by the contracted analytical laboratory. Analysis sample containers are required to be sealed with evidence tape to uphold the integrity of the sample against tampering or contamination.

B4. Analytical Methods

Analytical methods shall be performed in accordance with methods listed in Appendix B, referenced in 20.6.4.14(A) NMAC, or otherwise approved by EPA for Clean Water Act purposes. Appendix B includes a list of common analytes and analytical methods for Ambient Water Quality Monitoring, Monitoring for Enforcement Purposes, Watershed Protection Projects, Effectiveness Monitoring, and other SWQB Projects.

Methods used for NPDES Permit Compliance Inspections and Evaluations shall be in accordance with those approved under 40 CFR Part 136 or other test methods specified in the permit or approved by the EPA Regional Administrator, and should be sufficiently sensitive to evaluate compliance with the permit limits and requirements.

Prior to contracting with any outside laboratory, the laboratory's equipment, analytical methods, and quality control procedures will be provided to the SWQB through a QAPP (or equivalent) to confirm they are in accordance with the procedures listed in this QAPP and current SWQB SOPs.

DETECTION LIMITS AND LABORATORY REPORTING CONVENTIONS

For most analytical analyses of samples, the SWQB uses the Air and Heavy Metals, Organics, Water, and Radiochemistry Sections of the New Mexico State Laboratory Division (SLD) Chemistry Bureau. SLD uses a software-based Laboratory Information Management System (LIMS) to issue standardized result reports which include detection limits, quantitation limits, and data qualifiers. Tables 11-13 summarize the reporting conventions adopted by the Organic and Inorganic Chemistry Sections.

- Method Detection Limit (MDL) –The minimum measured concentration of a substance that can be reported with 99% confidence that the measured concentration is distinguishable from method blank results (EPA 821-R-16-006, 2016).
- Minimum Reporting Level (MRL) - The lowest concentration at which an analyte can be detected in a sample and its concentration can be reported with a reasonable degree of accuracy and precision.
- Sample Detection Limit (SDL) – The sample specific detection limit; equal to (Dilution Factor x MDL (organics) or Dilution Factor x MRL (inorganics)).

Tables 11 and 12 summarize the detection and quantitation limit reporting for the Organic and Inorganic sections, respectively.

Table 11. SLD Organic Section Detection and Quantitation Limits

SLD Section	Method Detection Limit (MDL)		Dilution Factor (DF)		Sample Detection Limit (SDL)		Method Reporting Limit (MRL)
Organic	MDL	x	DF	=	SDL	=	MRL

Table 12. SLD Inorganic Section Detection and Quantitation Limits

SLD Section	Method Reporting Limit (MRL)		Dilution Factor (DF)	Sample Detection Limit (SDL)
Air and Heavy Metals	MRL	X	DF	= SDL
Water Chemistry	MRL	X	DF	= SDL

Table 13. Detection Condition Qualifiers and Reporting Conventions

LABORATORY QUALIFIERS AND REPORTING CONVENTIONS

Detection Condition	Criteria	Logical Response[(1)]	Qualifier	Reporting Convention
not detected at C ≥ SDL	C < SDL	TRUE	U	Report SDL
detected at C < SDL but >MDL	SDL > C >MDL	FALSE	J	Report estimated value
detected at C ≥ SDL	C ≥ SDL	FALSE	No Qualifier	Report value

C = analytical concentration

[(1)] Logical Question: Was the substance not detected at a concentration greater than or equal to the SDL?

The qualifiers and reporting conventions for the detection conditions of analytical results analyzed by the Organic and Inorganic Section of SLD, used by the SWQB are provided in Table 13.

Because “MDL” refers to a method detection limit and “SDL” incorporates both a quantitation factor and a sample-specific dilution factor, SWQB has requested that the Organics section assign “U” and “J” flags according to Table 13. The Inorganic sections report results as either positive values or <SDL. The SLD Inorganic sections use the MRL as a consistent reporting limit for a given analyte. The MRL is always greater than the MDL, which is instrument and operator-specific, by a factor that may range between 3 and 10.

The Radiochemistry section of SLD defines detection limit as the concentration of analyte that can be counted with a precision of plus or minus 100 % at the 95 % confidence level (1.96 σ , where σ (or sigma), is the standard deviation of the net counting rate of the sample) as referenced in 40 CFR 141.25(c). The Radiochemistry section notes that small negative or positive values less than 2 σ should be interpreted as "not detected," or less than the SDL. The Radiochemistry section reports results as either positive values or <SDL. See Tables 14 and 15 for more detail.

Table 14. Radiochemistry Detection and Quantitation Limits

SLD Section	Minimum Detection Limit (MDL)		Dilution Factor(DF)		Sample Detection Limit (SDL)
Radiochemistry Section	MDL*	X	DF	=	SDL

* concentration of analyte that can be counted with a precision of plus or minus 100 % at the 95 % confidence level

Table 15. Radiochemistry Section Detection Condition Qualifiers and Reporting Conventions

LABORATORY RADIOCHEMISTRY SECTION QUALIFIERS AND REPORTING CONVENTIONS

Detection Condition	Criteria	Logical Response[(1)]	Qualifier	Reporting Convention
not detected at C ≥ SDL	C < SDL	TRUE	U	Report SDL
detected at C ≥ SDL	C ≥ SDL	FALSE	No Qualifier	Report value

C = analytical concentration

The qualifiers and reporting conventions for the detection conditions of analytical results analyzed by the Radiochemistry Section of SLD, used by the SWQB are provided in Table 15.

B5. Quality Control

Quality control (QC) activities are technical activities, including data verification and validation procedures, that measure the attributes and performance of a process, item or service against a defined standard performed on a routine basis to quantify the inherent variability of any environmental data measurement activity. The purpose of implementing QC activities is to reduce variability and uncertainty in the decision-making process. Additionally, the results obtained from the QC analysis, or data quality assessment, may identify areas where the variability can be reduced or eliminated in future data collection efforts, thereby improving the overall quality of the project. Quality Control mechanisms are implemented as described under the Quality Objectives and Criteria for Measurement Data as well as the SWQB SOPs identified under this QAPP.

FIELD DATA COLLECTION (CHEMICAL, PHYSICAL, BIOLOGICAL AND CONTINUOUS)

The SWQB controls the field data quality by using standardized methods documented in the most current SWQB SOPs. All personnel who collect environmental data must be familiar with these protocols, sign

acknowledgment forms associated with specific SWQB SOPs and collect data according to the procedures defined in the SOPs.

The collection and analysis of field QC samples is an important part of the continuing effort to improve the resultant data quality by assessing and possibly refining the collection, transportation, and handling procedures. These procedures are summarized in this QAPP (Group B) and are also included in the most current SWQB SOPs.

Additional checks on the quality of field activities performed by the SWQB staff include periodic Quality Assurance Audits. Quality Assurance Audits are performed periodically as resources allow. Projects to be audited are randomly selected and the audits performed by the QAO or designee will use SWQB SOP 16.1 Technical System Audits.

BLANKS AND COLLECTION FREQUENCY

A blank sample is a sample that is processed and handled in the same manner as the associated environmental sample and is intended to be free of the analytes of interest.

The frequency of blank collection is based on sampling run and the number of samples collected per sampling run. The SWQB defines a sampling run (or run) as a period of time used to represent the most common collecting period or grouping of sampling activities indicative of SWQB sampling operations. Typically, most samples are collected during multi-day collection events that depart and return to the office in a given week (M-F). Blanks associated with a run are assumed to collectively represent a group of samples where the staff, equipment, vehicle, reagents, preservation, and storage remain constant. When multiple single-day trips are planned within a given week that maintain constant variables as described above, the single-day trips may be considered collectively as a run. The frequency of blanks is also outlined in the applicable SWQB SOPs.

The following types of QC blank samples are used by SWQB:

- Trip Blank – Trip blanks are samples of analyte-free water prepared in the analytical laboratory using deionized, distilled water, and preserved as required. Trip blanks are used for volatile organic compound samples only. Trip blanks are transported, unopened, to the field with other sample containers, handled like environmental samples, and shipped to the laboratory for analysis with the collected samples. Trip blanks are used to identify contamination that might occur during sample transport and analysis rather than during sample collection and processing (WQX Activity Type #26). One VOC trip blank is collected per sampling run involving the collection of VOC samples.
- Field Blank – A sample of analyte-free water that is prepared in the field using a clean sample container with an aliquot of deionized water. Field blanks are collected for *E. coli*, *TSS/TDS/anions,* nutrients, and cyanide and are treated as regular samples in all respects, including exposure to sampling station conditions, storage, and preservation. The purpose of these samples is to determine if any of these field conditions or processes have caused sample contamination (WQX Activity Type #21). A minimum of one field blank is collected per sampling run, with an additional blank collected for each 10th sample (for a minimum 10% collection rate). For example, a run consisting of nine samples would have one blank collected, while a run consisting of eleven samples would have two blanks collected.

- Equipment Blank – A sample of analyte-free water that is prepared in the field using the appropriate sampling equipment with an aliquot of distilled and deionized water that is processed using applicable field equipment in the same manner as environmental samples. Equipment blanks collected for dissolved analytes are used to demonstrate that sample-collection equipment and sample-processing equipment are not introducing contamination. Equipment blanks can be prepared for individual pieces of collection and processing equipment. Typically, SWQB equipment blanks are only prepared to assure non-contamination of samples during the filtration process (WQX Activity Type #28). A minimum of one equipment blank collected per sampling run with an additional blank collected for each 10th sample (for a minimum 10% collection rate).
- Reagent Blank – A sample of analyte-free water and reagent that is not exposed to site conditions. Reagent blanks may be collected for *E. coli* or nutrients or as need if contamination from sample containers, analyte-free water and/or preservative is suspected. Reagent blanks are performed in the laboratory to check the sample for contamination from the sample bottle and preservative or growth agents (WQX Activity Type #27).

  *WQX # refers to the applicable STORET WQX activity type identifier

BLANK VALIDATION CODES

An analysis of blank contamination is conducted in accordance with the SWQB Data Verification and Validation SOP during the data validation process. After validation is completed, qualifier codes are assigned to any data points that, based on the blank samples, may have been contaminated. Qualifier codes indicate to the data user that chemicals were detected in the associated blank and that the sample results may be compromised.

If a chemical or constituent (bacteria, chlorophyll, etc.) is not measured in the blank at a concentration greater than or equal to the Sample Detection Limit (SDL) [defined as the sample-specific Method Detection Limit (MDL) or Minimum Reporting Limit (MRL) times the dilution factor if the sample was diluted for analysis], no blank validation code is assigned.

If a chemical or constituent is measured in the blank at a concentration greater than or equal to the SDL then all results for the sampling run for that parameter since the previous compliant blank up to the next compliant blank are reviewed and validation codes of “BU”, “B1” or “RB1” are assigned according to the following guidelines and summarized in Table 16. If only one blank sample was collected during a discrete sampling run and results in a detection equal to or greater than the SDL, all samples collected during the sampling run are qualified. These blank validation codes serve to alert the data user that the results are outside Quality Assurance control limits and may require re-sampling or a separate qualitative analysis based on professional judgment.

- If the blank concentration is greater than or equal to 5% of the sample concentration, a blank validation code of RB1 is assigned.

- If the blank concentration is less than 5% of the sample concentration a blank validation code of B1 is assigned. Results with a B1 validation code may be used for assessment purposes since the analytical error associated with the reported sample concentration is typically 5% or greater, and the blank contamination would be indistinguishable from analytical error. Analytical error is the

coefficient of variation (the standard deviation of replicate measurements divided by the mean) expressed as a percent.

- If the blank concentration is equal to or greater than the SDL and the sample concentration is less than the SDL, a validation code of "BU" is assigned. These results are not rejected since the issue or analytical error that resulted in a blank detection did not measurably impact the environmental sample.

- If the sample was collected for compliance or enforcement purposes, and the blank concentration is greater than or equal to the SDL, a blank validation code of RB1 is assigned indicating that the results are rejected

Table 16. Blank validation codes

Concentration in Blank	Monitoring Type	
	I	II
< SDL	No Code	No Code
≥ 5% of Sample Concentration	RB1	RB1
≥ SDL and <5% of Sample Concentration	B1	RB1
≥ SDL and Sample Concentration <SDL	BU	RB1

I = Ambient Water Quality, Watershed Protection Projects, Discharge, Incident Response, and Effectiveness Monitoring
II = NPDES Compliance Evaluation and WQS Enforcement Monitoring

There may be cases where, due to the sensitivity of the analytical method (e.g. PCB congener analytical method) or other characteristics of the procedures, it may be appropriate to subtract the value of the blank from the value of the result. If this is done, the subtraction should be approved by the SWQB QAO, Program Manager , and documented.

FIELD REPLICATES AND DUPLICATES.

SWQB may collect replicates or duplicates as needed for special investigations. However, the SWQB does not routinely collect replicates because replicate samples do not isolate sample collection and analytical error from environmental variability, and because a small set of replicate samples does not provide information that is useful for making decisions about the other samples on the sampling run. Also, the SWQB does not routinely collect duplicate samples, and instead relies on standard procedures and laboratory quality assurance to ensure the repeatability of the data. Field replicates and duplicates are defined as:

- Duplicate – a sample that is split and submitted and analyzed as two routine samples. (WQX Activity Type #14.

- Replicate – a sample that is collected within 15 minutes and within 1 meter of routine sample and analyzed as a routine sample. (WQX Activity Type #22).

LABORATORY QUALITY CONTROL

Chemical data received electronically are provided to the QA Officer who is responsible for uploading into SQUID. All chemical analytical results received by the SWQB must include the following information, at a minimum:

- Data Source – the lab code from which the data originated
- SWQB unique sample location ID (specific to location)
- SWQB unique sample ID
- Sample Collection Date
- Sample Collection Time
- Laboratory Sample Number
- Sample Analysis Date
- Sample Analysis Time
- Analytical Method
- Analyte Suite
- Analyte Name
- Chemical Abstracts Service Reference Number (CASRN)
- Concentration Units
- Method Detection Limit (MDL) – The minimum concentration of a substance that can be measured and reported with 99 % confidence that the analyte concentration is greater than zero.
- Minimum Reporting Level (MRL) - Lowest concentration that can be reported.
- Sample Detection Limit (SDL) – The sample specific detection limit; equal to (Dilution Factor x MDL (organics) or Dilution Factor x MRL (inorganics)).
- Result Concentration Value and Laboratory Qualifier Codes

Numerical results should be reported in number format (not numbers in text format) with the maximum number of appropriate significant figures possible, typically 2-3, depending on laboratory section/instrument.

The NM Department of Health (SLD) conducts most chemical analyses for SWQB. The laboratory reports method detection limits, method reporting limits, and sample detection limits according to Tables 2.5 and 2.6.

All analytical samples, except those bacteria samples analyzed in-house using IDEXX water microbiology test kits, are analyzed by laboratories that have established QA programs that implement the following key elements:

- Demonstrate the laboratory's capability and qualifications to perform environmental analyses by summarizing and documenting the QA procedures employed by the laboratory,
- Control laboratory operations by establishing procedures that measure the laboratory's performance on a daily, weekly, monthly, quarterly, and yearly basis,
- Measure matrix effects to determine the effect of a specific matrix on method performance and analyte recoveries, and
- Provide a means of ensuring that appropriate QC information is consistent, available and recoverable, to enable the end user to assess the quality of the data.

Statistical criteria used by the contract laboratories to validate and express the variability of analytical results are described in the QAPP or equivalent provided by each laboratory. The majority of samples are analyzed by SLD. Their data qualifiers are listed in the Data Verification and Validation SOP Worksheet(s) (Data Verification and Validation Form) located on the SWQB website.

Bacteria samples analyzed in-house are collected and analyzed in accordance with the SWQB Bacteriological Sampling SOP. As part of the QC process, a certified thermometer is kept in the incubator. Incubator temperatures are recorded on the *E. coli* data sheet when the sample tray is placed in the incubator and at the end of the incubation period. If both the temperature at the initiation and conclusion of the incubation are within 35 ± 0.5°C, the results of the *E. coli* count are not flagged and can be used for assessment purposes without reservation. If either the initiation or the conclusion temperature is less than 34.5 °C, the data are discarded. If either temperature is between 35.5 and 38 °C, the data are flagged and may only be used as supporting evidence for assessments. If either temperature is greater than 38 °C, the data are discarded.

MODELING QUALITY CONTROL

A "graded approach" will be utilized for the use of models in SWQB projects. The graded approach will examine the use of inputs data (direct measurements and non-direct measurements) and parameter values for model development when used in environmental decision making. A graded approach is "the process of basing the level of application of managerial controls applied to an item or work according to the intended use of the results and degree of confidence needed in the quality of the results" (EPA 1998a). This is an important element of the SWQB's quality assurance requirements because it allows the application of quality assurance and quality control activities to be adapted to meet the rigor needed by the project at hand. A Modeling Objective(s) Form is used for projects conducted by SWQB staff that do not require a project-specific QAPP. The form will document project-specific objectives, data inputs (non-direct and direct), and quality assurance and quality control requirements for data acceptance and rejection criteria for use in modeling. These criteria will support and defend decisions based on model outputs. If determined by the QAO, a project-specific QAPP may be required when data collection or compilation is outside the scope of this approved QAPP. The project-specific QAPP must be reviewed and approved by applicable Program Manager, Project Manager, QAO, and EPA Region 6.

EFFECTIVENESS ANALYSIS

Effectiveness analysis utilizes a study design that generally consist of sampling stations both upstream and downstream of the project areas, with sampling conducted before and after project implementation. The data produced from this sampling design is analyzed according to procedures detailed in *Detecting Water Quality Changes before and After BMP Implementation: Use of a Spreadsheet for a Statistical Analysis* (Grabow et al. 1998). Before performing any statistical analyses to detect differences or change using Effectiveness Monitoring data, an "exploratory data analysis" will be done to confirm that the data are in the proper form for analysis. The Project Manager will check for autocorrelation and ensure data is normally distributed before data analysis and interpretation. Accounting for these variables allows for better documentation of the water quality change due to treatment type (Grabow et al. 1998). The regression analysis, used to determine differences or changes in water quality, is an analysis of covariance (ANCOVA), where two variables (e.g., water temperature and treatment type) are compared for a linear relationship. The statistical analysis is parametric and requires that the data be approximately normally distributed and independent (not autocorrelated).

COMPREHENSIVE ASSESSMENT AND LISTING METHODOLOGY (CALM)

The SWQB utilizes the detailed procedures written in the SWQB's CALM to assess surface water data against the water quality standards codified in 20.6.4 NMAC. Although EPA does not officially approve individual state's listing methodologies, EPA staff review the document and consult the protocols when reviewing New Mexico's draft 303(d)/305(b) Integrated Report and List. The CALM is reviewed and revised as needed every odd-numbered calendar year and the draft revision is open for a minimum 30- day public comment before finalizing for the listing cycle. For development of the Integrated Report and List, the EPA recommends that states follow the 2006 Integrated Report guidance (EPA 2005), supplemented by biennial memoranda (EPA 2006a, 2009, 2011, 2013b, 2015, and 2017, 2018, 2022 respectively).

B6. Instrument/Equipment Testing, Inspection and Maintenance

FIELD OPERATIONS

All field equipment must undergo inspection and maintenance prior to each sampling trip. Complete procedures for operating and maintaining equipment used for collecting environmental measurements are contained in the manufacturer's instruction manual for each instrument and the most current SWQB SOPs. Results of equipment maintenance and inspections are noted in a dedicated file for each instrument. Any deficiencies in equipment must be noted and reported immediately to the Project Manager or Program Manager, who will recheck the equipment and arrange for repair by the manufacturer or replacement. SWQB staff must not use equipment if the working condition of the equipment is in doubt. A list of equipment with specifics detailing inspection, calibration, and maintenance can be found in the SWQB SOPs at https://www.env.nm.gov/surface-water-quality/sop/.

LABORATORY OPERATIONS

Information regarding analytical equipment and associated maintenance used by contract laboratories is provided in the laboratory's QAPP or equivalent. Information regarding SWQB analytical equipment and analysis of total coliforms and *E. coli* are provided in SWQB SOP 9.1.

OFFICE OPERATIONS

The SWQB has ongoing technical support for Department-owned computers, email services, printers, plotters, databases, geographical information systems, network servers and software applications. Routine updates and repairs of information technology equipment are maintained by NMED's Office of Information Technology (OIT). Staff are responsible for reporting anomalies and malfunctions and reporting them to OIT in a timely manner.

B7. Instrument/Equipment Calibration and Frequency

FIELD OPERATIONS

All field equipment requiring calibration must be calibrated in accordance with the most current SWQB SOPs. Procedures for operating and calibrating field equipment used for collecting environmental data are contained in the manufacturer's instruction manual for each instrument. All SWQB personnel using field equipment are expected to read and be thoroughly familiar with all procedures detailed in these manuals. Frequency and specific calibration procedures unique to the NMED SWQB are specified in the specific SOP for each type of field equipment and data collection event. A calibration log shall be kept for each instrument which includes all of the calibration forms associated with the instrument. SWQB staff routinely enter dates of calibration, calibration methods used, and any other pertinent data (e.g. erratic instrument behavior) in the logbook. A summary of calibration procedures for field equipment is provided

in SWQB SOPs found at https://www.env.nm.gov/surface-water-quality/sop/. SWQB staff will not use equipment if the working condition of the equipment is in doubt.

LABORATORY OPERATIONS

Analytical instruments and equipment used by contract laboratories are calibrated prior to each instrument analysis batch using manufacturer's recommended procedures and the guidelines provided in the Handbook for Analytical Quality Control (EPA 1979). All calibration procedures are validated and documented by the contract laboratory and are described in the laboratory's QAPP or equivalent.

OFFICE OPERATIONS

There are no particular calibration requirements for equipment used in processing, writing, and evaluating data.

B8. Inspection/Acceptance of Supplies and Consumables

The activities and procurement processes for supplies and consumables for all activities discussed under this QAPP adhere to the State of New Mexico's purchasing policy. The SWQB typically receives most sample containers from SLD or IDEXX which go through the laboratory's and manufacturer's QA/QC acceptance criteria. Sample containers ordered directly by SWQB must be approved by the QAO for the planned analysis.

B9. Non-Direct Measurements

Most SWQB decisions made pursuant to this QAPP involve new data acquired using procedures described or referenced in this document. When decisions must be partially based on historical data, past data acquired by the SWQB are given preference because of known data quality. Data acquired by other sources will be reviewed by the Bureau but must be accompanied by supporting quality assurance documentation and metadata in order to evaluate its usability. Validated water quality and gage data collected by USGS are considered to meet the SWQB's QA requirements and may be used for most purposes, if referenced. The QAO will evaluate USGS water quality data acquisition procedures every three years to ensure data meet SWQB QA requirements and can be used to meet project objectives.

Data collected by individuals or entities other than the SWQB to be used for enforcement of water quality standards under the NM Water Quality Act (74-6-10 NMSA), water quality assessments in development of the Integrated Report and List (IR), TMDL development, or WQS amendments proposed by the SWQB must, at a minimum, meet the QA/QC requirements described in this QAPP. The quality assurance measures used to collect and manage the data must be incorporated in a QAPP (or equivalent) and submitted with the data set. The QAO will determine if the analytical methods used meet the requirements specified in Analytical Methods and Detection Limits (Appendix B) and the methods of data collection are the same as, or comparable to, those included in the most current SWQB SOPs and this QAPP. Additionally, the QC criteria used to verify and validate the data must be equivalent, or comparable to, those listed in the SWQB Data Verification and Validation SOP 15.0. The QAO will approve the use of the data if the supporting documentation demonstrates comparability to the Bureau's quality assurance requirements and if there is reasonable evidence or assurance that these procedures were followed by the external entity collecting and analyzing data. External data used in development of the IR must undergo a data quality determination by the QAO prior to use, for more information see Appendix A of the CALM.

Non-direct Measurements collected by EPA or a permittee intended for use with NPDES Permit Compliance Inspections and Evaluation must be collected in accordance with 40 CFR 136 or other test methods specified in the permit or approved by the EPA Regional Administrator and does not require the SWQB QA Officer's review prior to use for permit activities. Permitee data may be used by the SWQB Industrial & Stormwater Team and/or Municipal Team to characterize pollutant concentrations in effluent at outfalls or monitoring locations that discharge to surface waters of the state. This data will require a data quality determination if the data are to be used for enforcement of water quality standards under the NM Water Quality Act (74-6-10 NMSA), development of the Integrated Report and List (IR), or proposed WQS amendments.

Data collected by external entities intended for specific projects such as WBPs, WAPs, or effectiveness monitoring but not specifically conducted by the SWQB or under direct supervision of SWQB staff, or those projects that deviate from this QAPP must seek approval from the QAO before utilizing non-direct measurements in project development. The data collection must have been conducted under an approved QAPP or equivalent prior to conducting any work. The QAO will approve the use of the data, if the supporting documentation demonstrates comparability to the Bureau's quality assurance requirements.

It may be possible to use data that do not meet SWQB QA/QC requirements for purposes other than Ambient Water Quality Monitoring, Effectiveness Monitoring or Compliance Inspections and Evaluation. Examples include screening, planning, and informal information gathering to guide decision making.

Non-direct measurements for use in model development will be assessed by the SWQB QAO, on an individual project basis, to determine the requirement of a project-specific QAPP before use of model outputs for environmental decision-making. A Modeling Objectives Form will be used by SWQB staff who conduct modeling projects which utilize non-direct measurements that do not have a project-specific QAPP.

B10. Data Management

All data collected by the SWQB are maintained in either hard copy or electronic formats, depending on how the data were obtained. Document and records management are further detailed in Section 1.7.

PAPER DATA MANAGEMENT

SWQB data obtained or received in hard copy format are entered into one of the databases identified in Table 15, by the Project Manager or designee and then imported into electronic format for processing

All hard copy paper data is filed and labeled in a consistent manner. Project specific data are filed as specified in each data management section below. Paper copies of project specific data and associated materials are maintained in a project binder. Additional information pertaining to documents to be included in the project binders is provided in Section 1.7.

ELECTRONIC DATA MANAGEMENT

SWQB data obtained or received in electronic formats are imported or entered into the appropriate database(s) by the designated staff person dependent on data purpose and type.

Electronic data are initially managed on individual computers prior to being transferred to a specified location in the SWQB network server and then uploaded to SQUID. All data housed on individual

computers either awaiting calculations, Verification and Validation, or upload are backed up to the network server on a weekly basis at a minimum. These data are filed and labeled in a consistent manner using a dedicated filing system. The files and folders are named as clearly as possible, typically including the survey/project title and year and any other descriptors to help identify what is included in the file.

To facilitate the integration of all of these tools, waterbodies are georeferenced or categorized based on geographic location. Additional categories are applied to waterbodies, such as assessment unit, watershed size/area, designated uses, ecoregion, elevation, habitat type, etc., to facilitate data comparability and communication within and among the assorted data management tools used by various water quality management programs.

Data to be entered into the National Pollutant Discharge Elimination System (NPDES) Database fall into primarily two categories: permit information and inspection information. Unless otherwise indicated, each PSRS staff member is responsible for inputting and maintaining the data for the permits to which they are assigned. Permit information originates when either a permit application is received from an existing or potential permittee or when the EPA sends NMED a draft permit to be certified by the state. Inspection information originates when a PSRS staff member conducts a Compliance Evaluation Inspection (CEI), Compliance Sampling Inspection (CSI), or any other formal inspection. The summary of the inspection report is entered into the database by the staff member who conducted the inspection. The data are usable following entry into the database.

The primary data management tools used by the SWQB are summarized in Table 17.

Table 17. SWQB Data Management Tools

Data Management Tool	Description
SWQB Water Quality Database	Archival Access-based database used by the SWQB to house water quality data (chemical, physical, biological) collected by the Water Quality Monitoring Program for data collected in 2000- 2009.
SQUID	The SWQB's in-house Surface Water Quality Information Database (SQUID) is an integral tool for coordinated storing, assessing, and reporting of water quality data and conclusions between SWQB programs, to EPA, and to New Mexico's stakeholders. This Oracle© database, developed and maintained by NMED's Information Technology Bureau, allows for required electronic reporting of monitoring data to EPA's water quality exchange (WQX) database and WQS attainment conclusions to EPA's ATTAINS database. SQUID also contains many survey planning and tracking tools and reports. SQUID was updated in 2018 to be compatible with EPA's newly-redesigned ATTAINS database
ATTAINS	The Assessment, Total Maximum Daily Load (TMDL) Tracking and Implementation System (ATTAINS) is an online system for accessing information about the conditions in the Nation's surface waters. ATTAINS tracks water quality assessment data, including use attainment, and causes and sources of impairment, and supports three principal functions: (1) Improve the quality and consistency of water quality reporting (2) Reduce the burden of preparing reports under CWA §§ 303(d), 305(b), 314, and 319 (3) Improve water quality data analysis

Data Management Tool	Description
	ATTAINS provides data entry forms and automates the production of reports that NM submits to EPA through the 303(d)/305(b) process. The ATTAINS web reports also provide users with easy access to view the information on the status of waters at the national, state and site-specific waterbody levels.
SWQB's NPDES database	Oracle-based database that helps the SWQB track the status of the permits and the state's certification of the permits (and is not intended to duplicate database information maintained by EPA for NPDES permits). The database contains information about individual permits in relation to waterbody assessment units for integration into SWQB projects such as TMDL development and watershed assessment/planning activities.
Grants Reporting and Tracking System (GRTS)	The Nonpoint Source Program's main reporting vehicle for the CWA Section 319 program. GRTS is a data management system that enables EPA and States to describe the progress they have made in implementing the national Nonpoint Source (NPS) Pollution program. GRTS electronically tracks projects and activities funded with CWA Section 319(h) funds.
Water Quality Exchange	The Water Quality Exchange (WQX) Data Warehouse (previously referred to as STORET) is EPA's repository of the water quality monitoring data collected by water resource management groups across the country. WQX is populated with biological, chemical and physical data on surface and ground water collected by federal, state and local agencies, Indian Tribes, volunteer groups, academics and others. SWQB flows data to WQX through NMED's node. Outside groups can submit data to WQX through the Water Quality Portal.

TYPES OF DATA COLLECTED AND SPECIFIC MANAGEMENT

CHEMICAL DATA

Physio-chemical Field Data

Field data originate when the data is collected and recorded directly onto field sheets by SWQB technical staff. Field data include direct observations recorded by technical staff and data recorded immediately from various equipment onto field sheets (e.g. sondes and other meters). Field data only include instantaneous readings and do not include long-term deployment data that are electronically downloaded from recording devices such as sondes or data loggers that record data over an extended period of time (these data are covered in subsequent section). Original field forms are maintained by the Project Manager and kept in the project binder. Data from the field forms are entered into the SWQB SQUID database by the Project Manager or designee. Once the data are in the database, they are then verified and validated accordance with the procedures set forth in the most current SWQB Data Verification and Validation SOP. The data are usable following the completion of the data verification and validation process. Usable data are indicated as "V V" in the database heading attributes for each study. Additional details describing paper record (hard copy), electronic form, and data storage and management procedures are referenced in SWQB SOPs 8.2 and 12.0.

Chemical Analytical Data

Chemical analytical data originate when the contracted analytical laboratory produces results from the water samples submitted by the SWQB. Chemical analytical data include measurements from the water column or sediment of chemical parameters such as ions, nutrients, metals, volatile organic compounds, microcystins, and radionuclides. Analytical results are provided in paper copy or electronic files,

depending on the laboratory and parameters. If paper copies of data are received, they are maintained in the project binder. When chemical analytical data are received from the laboratory in paper format the data are entered into a spreadsheet by the Project Manager or designee and then uploaded to a database by the QAO . When data are received from the analytical laboratory in electronic formats, they are given to the QAO for upload to the database. The QAO performs an initial quality assurance audit of the reported detection flags and then informs project staff when all uploads have been completed. Once the data are in the database, they are then verified and validated by the designated project member in accordance with the procedures set forth in the most current SWQB Data Verification and Validation SOP. The data are usable following the completion of the data verification and validation process. Usable data are indicated as "V V" in the database heading attributes for each study.

Data transformations must be performed on subsets of data in order to assess the attainment of water quality standards:

- Hardness data are provided by the laboratory or calculated from a subset of metals data reported above a screening threshold set at the minimum possible standard (i.e. lowest possible hardness) performed using Microsoft Excel spreadsheets or R-scripted routines. These metals include dissolved silver, dissolved cadmium, dissolved chromium, dissolved copper, dissolved lead, total aluminum, dissolved manganese, dissolved nickel, and dissolved zinc. A paper copy of the calculation spreadsheet is attached to the applicable assessment form for those data.

- Gross alpha (Am-241 reference) transformations are completed for data reported at or above the quantification limit. The transformations are performed manually and reported on the applicable assessment forms.

Fish Tissue

Fish tissue data originate when the contracted analytical laboratory produces results from the fish tissue samples submitted by the SWQB. Fish tissue data include measurements of toxic chemicals present in fish tissue such as mercury, DDT, and PCBs to be used for development of fish consumption advisories. The data are received from the analytical laboratory in both paper copy and/or electronic formats. All paper copies of data are maintained by the SWQB fish biologist in cabinet files. Data are organized by waterbody. The data are eventually transferred to a summary spreadsheet. Electronic data are loaded into the SQUID database by the SWQB's lead fish biologist. The data are usable once incorporated into the summary spreadsheet and placed in the referenced repositories (paper file location or SQUID database). SWQB staff have access to the data directly via the database. These data are also provided to EPA annually who maintains a national database for fish consumption advisories. Data users can obtain data through EPA's website or through requests to SWQB staff.

Ambient Toxicity

Ambient toxicity data originate when EPA or contracted analytical laboratories produce results from water or sediment samples submitted by SWQB. Ambient water toxicity results include the results from analyses of water or sediment samples as measured by an organism's response upon exposure to the sample (e.g., lethality, impaired growth, or reproduction). These data are received from the lab in electronic or paper copies. Paper copies of the data are maintained in the project file by the Project Manager and electronic copies are filed according to the filing system described previously. Data are usable upon receipt from lab. Data can be obtained through requests to SWQB staff or via EPA's website.

Bacteriological Data

Bacteriological data originate when a contracted analytical laboratory produces results from the water samples submitted by the SWQB or when the results are produced from analyses conducted in-house by SWQB staff using IDEXX equipment. Results received from analytical laboratories are managed in the same way as chemical analytical data. Bacteriological data include organism counts and counts from qPCR or digital PCR. If results are produced in-house, then the results are transcribed from the results form into a spreadsheet that is then uploaded into SQUID. The results forms are filed in the Project Binder and the spreadsheets are maintained by the Project Manager on the SWQB's network server. The data are usable following the completion of the data verification and validation process described in the most current SWQB Data Verification and Validation SOP. Usable data are indicated as "V V" in the database heading attributes for each study. Additional details describing paper record (hard copy), electronic form, and data storage and management procedures are referenced in the most current SWQB SOP for Bacteriological Sampling.

CONTINUOUS DATA LOGGER

Sonde and Data Logger

Sonde and data logger data originate when the data are uploaded from a recording device and exported to LTD Data Management spreadsheets by the Project Manager or designee. Sonde and data logger data include parameters such as dissolved oxygen, pH, specific conductance, turbidity and temperature that are recorded during long-term deployment in waterbodies. The electronic files are maintained by the Project Manager according to the filing system described previously in Section A9 of this QAPP. The data are QA'd following procedures outlined in the most current SWQB SOP for LTD Datalogger Data QA and SQUID Upload. These data files are uploaded into the SWQB SQUID database by the Project Manager or designee. The data are usable following the completion of the Verification and Validation procedure identified in the most current SWQB Data Verification and Validation SOP. Usable data are indicated as "V V" in the database heading attributes for each study. Additional details describing paper record (hard copy), electronic form, and data storage and management procedures are referenced in most current SWQB SOPs for Sonde Deployment, Temperature Data Loggers, and LTD Data Logger QA and SQUID Upload.

PHYSICAL DATA

Habitat Data

Habitat data originate when the field measurements are recorded directly onto field forms by project team members. Data include physical habitat and geomorphological measurements such as percent canopy cover, pebble counts, cross-sections, etc. Each field form associated with habitat data is checked for completeness and accuracy by the crew lead in the field prior to leaving the site. Completely checked field forms are indicated by crew lead's initials on each page of field data. Physical habitat data are entered into electronic spreadsheets for upload to SQUID. The spreadsheets are maintained by the Project Manager using the filing system described previously. The data are usable following the completion of the Data Verification and Validation process. Usable data are indicated as "V V" in the database heading attributes for each study. SWQB staff have access to the data directly via the database. Additional details describing physical habitat paper records (hard copy), electronic forms, and data storage and management procedures are referenced in most current SWQB SOP for Physical Habitat.

Data transformations must be performed on subsets of data in order to assess the attainment of water quality standards:

- Logarithm of Relative Bed Stability (LRBS) calculations are performed within an Excel spreadsheet or calculated in SQUID reports to determine the relationship of the median particle size in a stream reach compared to the critical particle size calculated to be mobilized by standardized fluvial stresses in the reach. Median particle size is determined using a reach-wide pebble count (Peck et al. 2006). Critical particle size is calculated from channel dimensions, flow characteristics, and channel roughness factors (Kaufmann et al. 2008). The measure is expressed as a logarithm of the ratio of geometric mean to critical particle size.

Rosgen Geomorphic Data

Rosgen geomorphic data originates when the field measurements are recorded directly in field forms or field notebooks by project team members and are collected in accordance with Dave Rosgen procedures. Upon review and verification following field data collection activities, SWQB staff store data in project specific folders on the SWQB network server. It is the responsibility of the SWQB Project Officer to ensure data is stored in correct project-specific folder. Data are not uploaded into SQUID and are not used for Assessment purposes in the Comprehensive Assessment and Listing Methodology document. Additional information on Dave Rosgen geomorphic data collection procedures can be found in published literature.

FLOW DATA

Flow data originate when the data are recorded directly onto field forms by SWQB technical staff. Flow data include measurements recorded directly from various flow meters or equipment or using best professional judgment (the method is indicated with data), including entering a “0” for dry, non-flowing streams. Upon returning from the field, the flow data are entered into the Microsoft Excel template [located in SOP folder on the SWQB network server or available from the SWQB website] for flow discharge determination. All flow calculation files are maintained by project using the filing system described previously. Copies of the calculation spreadsheets are printed out and included in the project binder with the original field sheet or copy of the field notebook page(s). Once the calculations have been completed, a designated project member enters the results into the SQUID database. Once the data are in the database, they are verified and validated according to the procedures set forth in the most current SWQB Data Verification and Validation SOP. The data are usable following the completion of the Data Verification and Validation process. Usable data are indicated as “V V” in the database heading attributes for each study Additional details describing paper record (hard copy), electronic form, and data storage and management procedures are referenced in SWQB SOP for Flow.

BIOLOGICAL DATA

Biological data are provided to the Project Manager expert or designee responsible for importing or entering the data in the appropriate database. All biological analytical results received by the SWQB must include the following information:

- Sample Location,
- Sample Collection Date,
- Sample Collection Time,
- Sample Collection Method, and
- Results (list of specimens to lowest practical taxon and enumeration).

Fish Ecology

Fish community data originate when the data are recorded directly onto field forms by technical staff. Fish community data include species composition, number of each species collected, etc. Voucher specimens are typically taken for each species of fish for taxonomic verification. Any questionable identifications are verified upon returning to the SWQB lab, indicating any corrections directly on the field form. Museum of Southwestern Biology (Museum) staff also perform taxonomic verification on voucher specimens. Data from the field forms are transcribed to the Museum field notes form and submitted to the Museum for archiving. Copies of the Museum forms and the SWQB field forms are maintained by SWQB's lead fish biologist and are housed in the file cabinet located in their office. Data are organized by watershed. Data from field forms are entered into the SQUID database. Once the data are in the database, they are verified and validated in accordance with the procedures set forth in the most current SWQB Data Verification and Validation SOP. The data are usable following the completion of the Data Verification and Validation process. Usable data are indicated as "V V" in the database heading attributes for each study.

Macroinvertebrates

Macroinvertebrate data originate when a contracted taxonomic laboratory produces results from the macroinvertebrate samples submitted by SWQB. Macroinvertebrate data include identification to lowest practical taxon and enumeration of aquatic macroinvertebrate specimens collected from a waterbody. Results are received in electronic format and are maintained by the Project Manager or designee. The data are uploaded to SQUID database, where a series of calculations are performed for use in biological assessments. The data are usable following the completion of the Data Verification and Validation process. Usable data are indicated as "V V" in the database heading attributes for each study

Periphyton/Phytoplankton Data

Periphyton and phytoplankton data originate when a contracted analytical or taxonomic laboratory produces biomass (chlorophyll a) or community composition results from the periphyton and phytoplankton samples submitted by SWQB. Results from contract laboratories are received in electronic format and are maintained by the Project Manager or designee. The data are uploaded to SQUID by the Project Manager or designee and are usable following the completion of the Data Verification and Validation process. Usable data are indicated as "V V" in the database heading attributes for each study

HYDROLOGY PROTOCOL

The data collected in accordance with the Hydrology Protocol are uploaded into SQUID upon review and verification following field data collection activities. Additional information for Hydrologic Protocol field data form and data storage and management procedures is included in Appendix C of the New Mexico Statewide Water Quality Management Plan and Continuing Planning Process (WQMP/CPP).

PROBABLE SOURCE DETERMINATION

Identification of probable source(s) of pollutants are documented in the comment section of the Stream/River Field Data Form or Lake and Reservoir Field Data Form by staff in the field through visual observation during each sampling event and then uploaded to SQUID.

OTHER DATA TYPES/DATABASES

Photographs

SWQB manages photographs on an individual project or survey basis. Photographs are only used as ancillary data to document project location and physical features in project area. Photographs use predefined labeling conventions that incorporate site location, date, and watershed.

WQX

Data to be uploaded to WQX originate when the data have been verified and validated in accordance with the procedures set forth in the most current SWQB Data Verification and Validation SOP and considered to be "quality data" within SQUID. Quality data in SQUID are submitted to Internal Node, which generates an XML file and submits it to WQX. WQX Web utilizes a standard set of data elements and internet protocols to create and store XML data submission files. The data are then imported by EPA staff to the WQX national data warehouse. Data that are uploaded to WQX include field data, chemistry analytical data, and summary continuous data. All data that meet QA/QC specifications are uploaded to WQX. Figure 3 illustrates the data flow from SWQB field collection activities through the storage of validated data on the WQX system.

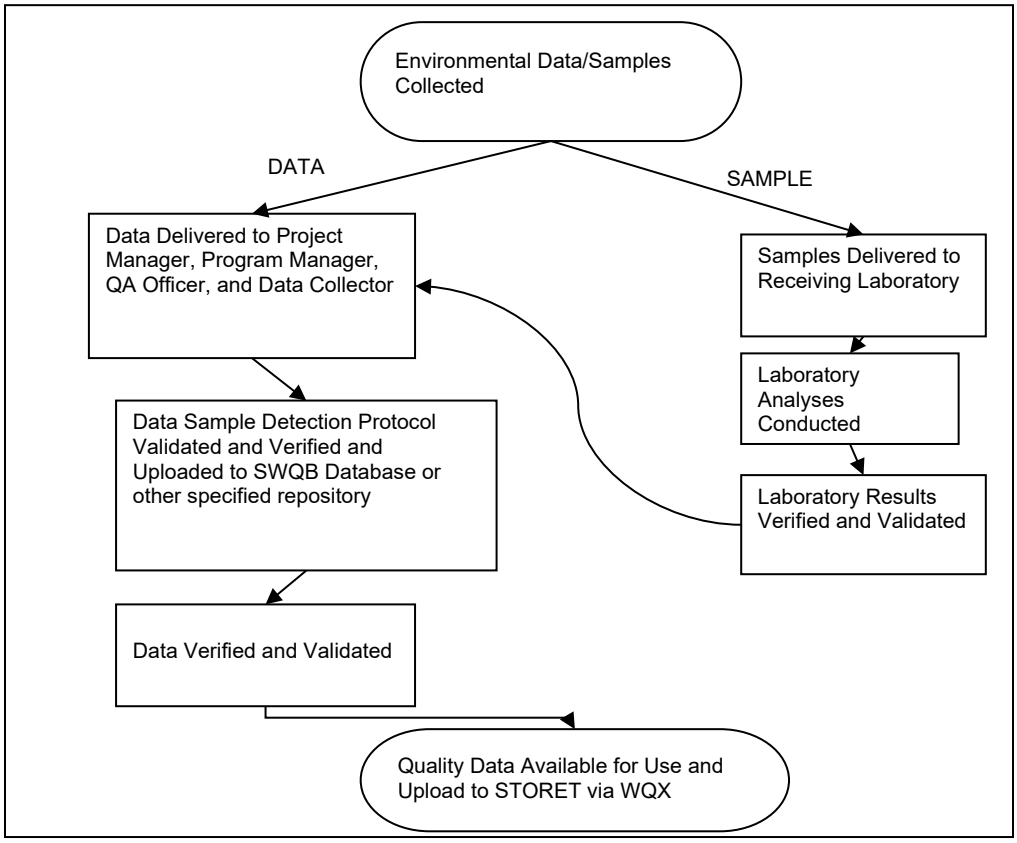

Figure 3. SWQB Data Flow Summary (Collection to WQX)

DATA ACCESS

SWQB staff have access to the data directly via the database(s). Other data users may obtain data through either requests to SWQB staff or through a formal Inspection of Public Records Act requests submitted to the NMED. The Department, with assistance through OIT, manages access to databases for authorized personnel through a database access approval process.

GRANT REPORTING AND TRACKING SYSTEM (GRTS)

Information to be input into the Grant Reporting and Tracking System (GRTS) originates when a contract or interagency agreement is approved for a Watershed Protection project identified through an advertisement process (e.g. Request for Proposals, Solicitation for Applications). Each Watershed Protection project has an assigned SWQB Project Officer who is responsible for maintaining the project-specific information in GRTS. Upon being assigned a project, the Project Officer logs onto the GRTS database and enters the identified mandatory elements for each project. The Project Officer is responsible for maintaining and updating the database throughout the course of the project. The information input into GRTS is usable immediately. GRTS is an EPA-mandated database and can be accessed by EPA, SWQB staff, and the general public (log on to database as guest user).

GROUP C. QUALITY SYSTEM ASSESSMENT AND OVERSIGHT

C1. Quality System Assessment and Response Actions

SWQB field sampling and measurement techniques are continually undergoing review and modification. It is envisioned that all SWQB procedures will continue to evolve and be refined. Techniques will never be considered "final," but will always be examined for possible improvements. The findings of procedural evaluations should be shared and discussed with other SWQB field personnel, Team Supervisors, and Program Managers. Problems encountered during a project will be immediately reported to the Project Managers, who will consult with appropriate individuals to determine appropriate action. Decisions will be made by Program Managers, Project Managers, and Team Leaders, with input from field staff, whether to continue with existing methods and techniques, switch to new methods and techniques or to use combinations of both. If it is discovered that methodologies must deviate from an approved SWQB SOP, a revision of the SOP must be approved before work can be continued. Any changes to procedures covered or referenced by this QAPP will be documented. Should the corrective action impact the project or data quality, the Project Manager will alert the QA Officer. The collection of high-quality and representative data is the most important consideration. It is important that all SWQB technical staff communicate throughout the entire survey process, from initial planning to final report publication.

Quality Assurance Evaluations/Audits will be conducted periodically to provide assessment of the implementation of the procedures outlined or referenced in this QAPP.

At the end of each field season (i.e., annually), data are verified and validated by the SWQB Project Manager or designee (see most current SWQB SOP 15.0 Data Verification and Validation) to determine variability and data usability. The QA Officer will work with appropriate staff and summarize QA issues periodically. Problem areas will be identified through this process and the QA Officer and appropriate Project Coordinators will work to take corrective action. QA reports prepared by contract laboratories further help to determine accuracy and the limits of the data. Due to the fact that analytical methods are continuously becoming more sensitive, this communication process is vital and on-going.

C2. Reports to Management

MASS

The Project Manager is responsible for keeping the Program Manager and Team Supervisors informed concerning the progress of the water quality survey or project(s) and any problems or anomalies encountered. The Project Manager or designee is responsible for maintaining and completing the applicable Data Verification and Validation Worksheet(s) and submitting a copy of the results to the QAO. The original Verification and Validation Worksheet(s) will be filed with the QAO and electronic versions maintained within the SPRT QAQC Document folder on the network server.

WPS

The Project Manager is responsible for keeping the Program Manager and Team Supervisors informed concerning the progress of projects and any problems or anomalies encountered. Data collected by WPS will follow the procedures outlined in the most current SWQB Data Verification and Validation SOP or will follow procedures detailed in project-specific QAPPs. The WPS maintain their own project binders along with original Verification and Validation (V&V) Worksheet(s). Electronic versions of the V&V Worksheets will be provided to the QAO for filing within the SPRT QAQC Document folder on the network server when data will be considered for enforcement of water quality standards under the NM Water Quality Act (74-6-10 NMSA), water quality assessments for development of the Integrated Report and List, TMDL development, or WQS amendments proposed by the SWQB.

PSRS

The Project Manager is responsible for keeping the Program Manager and Team Supervisors informed concerning the progress of projects and any problems or anomalies encountered. Data collected by PSRS will follow the procedures outlined in the most current SWQB Data Verification and Validation SOP. Electronic versions of the V&V Worksheets will be provided to the to QAO for filing within the SPRT QAQC Document folder on the network server when data will be considered for enforcement of water quality standards under the NM Water Quality Act (74-6-10 NMSA), water quality assessments for development of the Integrated Report and List, or WQS amendments being proposed by the SWQB. The PSRS maintains its own project binders along with original Verification and Validation (V&V) Worksheet(s).

ANALYTICAL REPORTING CONDUCTED BY LABORATORY

The SWQB QAO and technical personnel, in conjunction with appropriate laboratory staff, will determine if any corrective actions are necessary regarding laboratory analysis and reporting. Upon request, laboratories will submit a summary of data accuracy and precision, performance and system audit results, and discussion of significant QA problems and recommended solutions.

QAQC

The QAO will periodically compile a summary report of all QA/QC issues encountered to be distributed to the contract laboratories, EPA Region 6, and appropriate SWQB staff. Any adopted changes will be subsequently reflected as changes to this QAPP.

GROUP D. DATA VALIDATION AND USABILITY

All data collected by the SWQB undergo a series of Verification and Validation processes using a checklist (forms) to ensure that the data are of sufficient quality and conform to a project's specific objectives. SWQB Water Quality Databases are maintained for data retrieval purposes only and all data maintained in these databases have undergone Verification and Validation in previous years.

D1. Data Review, Verification, and Validation

Data review, verification, and validation are key steps for ensuring data integrity, suitability, and usability. All field and analytical data are continually reviewed by the Project Manager or designee and verified and validated according to the procedures identified in this QAPP and the most current SWQB Data Verification and Validation SOP. Results from the data verification and validation process are summarized on the Data Verification and Validation Worksheet and included in the project file. Copies of these results are also provided to the QA Officer before use in the assessment process for development of §303(d)/ §305(b) Integrated Report and List. The Project Manager and/or QA Officer will resolve data quality issues. All information pertaining to this process will be documented thoroughly and maintained in the project file on the network sever.

D2. Verification and Validation Methods

The data verification and validation procedures for chemical, physical, biological, and continuous data conducted by the SWQB are described in the most current SWQB SOP for Data Verification and Validation. This process establishes the criteria for accepting, rejecting, or qualifying data. The Data Verification and Validation Worksheet(s) serve as the summary of results for each type of data verified and validated. These worksheets serve as a record for the Project Manager and QA Officer, who will resolve any data quality issues. The QA Officer also uses the information provided in the Data Verification and Validation Worksheet(s) to prepare a summary of the issues that arose and the resulting resolution status on a periodic basis. All information pertaining to this process is documented and included in the project file. Data used to make attainment decisions for use in the CWA §303(d)/ §305(b) Integrated Report and List are required to have undergone a verification and validation procedure and a Data Quality Level determination issued by the SWQB QAO. More information is provided in the most current version of the Comprehensive Assessment and Listing Methodology, Appendix A - Data Quality Tables.

Data validation and verification procedures and associated acceptance criteria used by a contract analytical laboratory are described in the QAPP (or equivalent) as provided by each laboratory. Statistical criteria used by the laboratory for validating and expressing the variability of analytical results are the standard deviation, coefficient of variation, range, 95-percent confidence limits, and control charts.

All data not meeting the appropriate QA/QC requirements as identified through the data verification and validation process are assigned appropriate laboratory qualifiers or SWQB validation codes. A summary of laboratory and SWQB's qualifier codes is provided in the SWQB SOP for Data Verification and Validation Procedures, Attachments B1-B5.

D3. Reconciliation with User Requirements

Data collected for Ambient Water Quality Monitoring that have undergone the Verification and Validation procedures identified in SWQB SOP 15.0 Data Verification and Validation are considered usable for enforcement of water quality standards under the NM Water Quality Act (74-6-10 NMSA), water quality assessments for development of the Integrated Report and List, TMDL development, or WQS amendments proposed by the SWQB. Data are considered usable once the data verification and validation process has been completed and the data have been accepted, rejected or qualified. The SWQB uses the data to meet the objectives described in Section A of this QAPP. Data collected for other monitoring types listed in Table 2 need verification and validation (SWQB SOP 15.0 or equivalent) and will require a determination of Data Quality Level, issued by the QAO, for use in enforcement of water quality standards under the NM Water Quality Act (74-6-10 NMSA), water quality assessments for development of the Integrated Report and List, or WQS amendments proposed by the SWQB. Guidelines for using qualified

data for CWA §303(d)/ §305(b) attainment decisions and information on Data Quality Levels for consideration in development of the CWA §303(d)/ §305(b) Integrated Report and List are provided in the most current version of the Comprehensive Assessment and Listing Methodology (NMED/SWQB 2021). In general, rejected data (e.g., with a data qualifier of "R," "R1," "R2," etc.) are considered unusable for assessment in the CWA §303(d)/ §305(b) Integrated Report and List or for compliance purposes. Other data that are qualified (as specified by qualifier or validation code), but not rejected, may be used provided the potential uncertainties associated with the data are addressed and appropriate caveats attached. The data are also provided to the public for use through EPA's WQX database.

REFERENCES

Bartholow, J.M. 2002. *Stream Segment Temperature Model (SSTEMP)*, Version 2.0. Fort Collins, CO: U.S. Geological Survey. https://www.usgs.gov/centers/fort

Code of Federal Regulations (CFR) 2012. Title 40-Protection of Environment, Chapter I-Environmental Protect Agency, Part 136-Guidelines Establishing Test Procedures for the Analysis of Pollutants

Grabow, Spooner, Lombardo, and Line, 1998. *Detecting Water Quality Changes Before and After BMP Implementation: Use of a Spreadsheet for a Statistical Analysis*. NCSU

Kaufman, P.R. et al. 2008. *A Roughness-Corrected Index of Relative Bed Stability for Regional Stream Surveys.*

New Mexico Administrative Code (NMAC). 2020. *State of New Mexico Standards for Interstate and Intrastate Streams*. 20.6.4. New Mexico Water Quality Control Commission. December 2013. https://www.env.nm.gov/surface-water-quality/wqs/

Disposition of Public Records and Non-Records regulation, codified at 1.13.30. New Mexico Administrative Code (NMAC)

Retention and Disposition of Public Records regulations, codified at 1.21.2. New Mexico Administrative Code (NMAC).

*State of New Mexico Comprehensive Assessment and Listing Methodology (*NMED/SWQB) *2021. https://www.env.nm.gov/surface-water-quality/calm/*

New Mexico Environment Department/Surface Water Quality Bureau (NMED/SWQB). 2014-2021. *Standard Operating Procedures* SOPs. https://www.env.nm.gov/surface-water-quality/sop/

New Mexico Environment Department/Surface Water Quality Bureau (NMED/SWQB). 2016. *Surface Water Quality 10-Year Monitoring and Assessment*. June 2016. https://www.env.nm.gov/surface-water-quality/protocols-and-planning/

State of New Mexico Procedures for Assessing Water Quality Standards Attainment for the Integrated CWA §303(d)/§305(b) Water Quality Monitoring and Assessment Report. https://www.env.nm.gov/surface-water-quality/303d-305b/

New Mexico Environment Department/Surface Water Quality Bureau (NMED/SWQB). 2021. Quality Management Plan for Environmental Data Operations. https://www.env.nm.gov/surface-water-quality/protocols-and-planning/

New Mexico Statutes Annotated (NMSA). 1978. *New Mexico Water Quality Act*.

New Mexico Statutes Annotated (NMSA). 1978. *Inspection of Public Records Act*.

Peck, D.V.et al. 2006. Environmental Monitoring and Assessment Program-Surface Waters Western Pilot Study: Field Operations Manual for Wadeable Streams. EPA/620/R-06/003. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC.

New Mexico Department of Health, Scientific Laboratory Division 2020. *Quality Assurance Plan*, Scientific Laboratory Division, Chemistry Bureau, Index Number QSSEP 101, December 7, 2020 . New Mexico Scientific Laboratory Division, Albuquerque, NM.

U.S. Environmental Protection Agency (EPA). 1979. *Handbook for Analytical Quality Control in Water and Wastewater Laboratories*. Office of Research and Development, Cincinnati, OH. EPA 600/4-79-019. https://www.epa.gov/quality/handbook-analytical-quality-control-water-and-wastewater-laboratories-march-1979

Methods for Chemical Analysis of Water and Waste. EPA 600/4-79/019. Office of Research and Development, Cincinnati, OH, 1983. http://nepis.epa.gov/Exe/ZyNET.exe/30000Q10.TXT?ZyActionD=ZyDocument&Client=EPA&Index=1976+Thru+1980&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A\zyfiles\Index%20Data\76thru80\Txt\00000001\30000Q10.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h|-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=p|f&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=1&SeekPage=x&ZyPURL

EPA Requirements for Quality Assurance Project Plans, EPA QA/R-5. EPA/240/B-01/003. Office of Environmental Information, Washington, DC. March 2001. https://www.epa.gov/sites/production/files/2016-06/documents/r5-final_0.pdf

Guidance for Quality Assurance Project Plans, EPA QA/G-5. EPA/240/R-02/009. Office of Environmental Information, Washington, DC. December 2001. https://www.epa.gov/sites/production/files/2015-06/documents/g5-final.pdf

Guidance on Choosing a Sampling Design for Environmental Data Collection, EPA QA/G-5S. EPA/240/R-02/005. Office of Environmental Information, Washington, DC. December 2002. https://www.epa.gov/sites/production/files/2015-06/documents/g5s-final.pdf

NPDES Compliance Inspection Manual. EPA 305-K-17-001. Office of Enforcement and Compliance Assurance, Washington, DC. 2017. https://www.epa.gov/compliance/compliance-inspection-manual-national-pollutant-discharge-elimination-system

Guidance for Issuing Federal EPA Inspector Credential to Authorize Employees of State/Tribal Governments to Conduct Inspections on Behalf of EPA. Issued by: Michael M. Stahl, Director Office of Compliance Office of Enforcement and Compliance Assurance U.S. Environmental Protection Agency Washington, D.C. September 30, 2004. http://www.epa.gov/compliance/resources/policies/monitoring/inspection/statetribalcredentials.pdf https://www.epa.gov/compliance/guidance-issuing-federal-epa-inspector-credentials-authorize-employees-statetribal

APPENDICES

Appendix A
Sample Handling Procedures and Holding Times

Sample Type	Sample Container	Preservation [1]	Maximum Holding Time[13]
Inorganic Tests			
Ions – full Suite[2] Ions – SWQB suite [3]	1-quart polyethylene cubitainer	On ice, approximately 6°C	7 days TSS – TDS 14 days other
TDS and TSS only	250 ml HDPE or 1 quart polyethylene cubitainer	On ice, approximately 6°C	7 days
Chloride	1-quart polyethylene cubitainer	None	28 days
Total Nutrients [4]	1-quart polyethylene cubitainer	1 mL H_2SO_4, on ice, approximately 6°C	28 days
Total Persulfate Nitrogen	250 ml HDPE or 1 quart polyethylene cubitainer	On ice, approximately 6°C or freeze	On ice: 7 days Frozen: 6 months
Dissolved Nutrients [5]	1-quart polyethylene cubitainer	Filtered (0.45□m) within 15 minutes of sample collection[14], 1 mL H_2SO_4, on ice, approximately 6°C	28 days
Cyanide [6]	1-quart polyethylene cubitainer	5-7 pellets NaOH, 0.6g ascorbic acid if chlorine present on ice, approximately 6°C	14 days
Hardness Ca + Mg	1-quart polyethylene cubitainer	1.8 mL H_2SO_4, on ice, approximately 6°C	180 days
Dissolved Organic Carbon (DOC)	8 oz amber glass bottle	Filtered (0.45□m) within 48 hours, ≥2 ml H_3PO_4 to pH≤2, on ice, approximately 6°C	28 days
Total Organic Carbon (TOC)	8 oz amber glass bottle	≥2 ml H_3PO_4 to pH≤2, on ice, approximately 6°C	28 days
Metals			
Total Metals [7]	1-quart polyethylene cubitainer	2.0. mL HNO_3,	28 days mercury – 6 months other
Total Recoverable Aluminum	1-quart polyethylene cubitainer	Turbidity <= 30 NTU: 2.0 mL HNO_3 Turbidity > 30 NTU: Filtered (10□m) within 15 minutes of sample collection[14], 2.0 mL HNO_3	6 Months
Dissolved Metals [8]	1-quart polyethylene cubitainer	Filtered (0.45□m) within 15 minutes of sample collection[14], 2.0 mL HNO_3	28 days mercury – 6 months other
Microbiological Tests			
: Total Coliform, and *E. coli* [9]	120-mL shrink-banded containers(IDEXX part number WB120SBST) 125-mL sterile polypropylene bottels(lab)	0.0008% $Na_2S_2O_3$, on ice, less than 10°C	8 hours for regulatory 24 hours for non-regulatory
Microbial Source Tracking (MST)	Dependent on laboratory	On ice, < 10°C	Dependent on project DQOs
Organic Tests [10]			
Method 8270 – Base/Neutral Acid Extractables [11]	Two 1-liter amber glass bottles (lab)	On ice, approximately 6°C	7 days until extraction, 40 days after extraction
Method 8260 – Volatile Organic Compounds [11]	Two 40-mL glass vials (lab) in Whirl-Pack	5 drops 10% HCl per vail (HCl provided by lab and prepared within 30 days of use), on ice, approximately 6°C	14 days
Microcystin	Two 40-mL glass vials (lab) in Whirl-Pack	0.0008% $Na_2S_2O_3$, on ice, less than 10°C	14 days
Radiological Tests			
Radionuclides [12]	Two 1-gallon polyethylene cubitainers	No preservative, store at room temperature	6 months
Biological Tests			

Sample Type	Sample Container	Preservation [1]	Maximum Holding Time[13]
Ambient Toxicity (acute and chronic) in water and sediment	1-gallon polyethylene cubitainer (water) and/or Two 1-quart, wide-mouth glass containers (sediment)	On ice, approximately 6°C	36 hours
Chlorophyll *a* (streams/rivers)	1-quart opaque container	Filter sample with Whatman GF/F or GF/C filters. Place filters in cooler with dry ice or store in cooler at 6°C or less and freeze no more than 12 hours after collection	28 Days.
Chlorophyll *a* (lakes)	1-quart opaque container.	Filter sample with Whatman GF/F or GF/C filters. Place Whatman filter in petri dish, wrap in foil , and place in cooler with dry ice and keep frozen.	28 Days if samples taken from a lake with pH ≥7
Phytoplankton (lakes)	1-quart polyethylene cubitainer	10-25 mL Acid Lugol's Solution within 2 hours of collection, on ice or refrigerated, approximately 6°C or less, in the dark	not applicable
Diatoms (lakes/streams/rivers)	glass or plastic vials, 45 mL	10 mL 95% ethanol or Lugol's Solution. On ice or refrigerated, approximately 6°C	not applicable
Periphyton community composition (streams/rivers)	50-mL plastic vial	2-4 mL of 10% formalin	not applicable
Macroinvertebrates	glass or polypropylene jar(s), size varies	fill jar with 95% ethanol; remove air bubbles	not applicable
Fish	Whirl-pack or equivalent	10% formalin to cover; remove air bubbles	not applicable
Fish Tissue	Filet and wrap in foil	Keep on ice and freeze	not applicable

Notes:

1 Preserve samples as soon as reasonably possible, preferably immediately after sample collection. Pre-preserved sample containers may be used.
2 Ions (full suite) include calcium, magnesium, potassium, sodium, hardness, alkalinity, bicarbonate, carbonate, sulfate, chloride, TDS, and TSS.
3 Ions (SWQB suite) include TDS, TSS, hardness, fluoride, chloride, and sulfate.
4 Total Nutrients include nitrate + nitrite, ammonia, total Kjeldahl nitrogen, and total phosphorus.
5 Dissolved nutrients include nitrate + nitrite, ammonia, orthophosphate, and dissolved phosphorus.
6 If chlorine or sulfide is suspected to be present, see SWQB SOPs for alternative handling procedures and holding times.
7 Total metals include aluminum, mercury and selenium at a minimum.
8 Dissolved metals include aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, uranium, vanadium, and zinc.
9 $Na_2S_2O_3$ is included in containers provided by IDEXX. If samples analyzed by SLD, contact SLD Environmental Microbiology regarding sample containers and schedule.
10 Various other organic analyses are available upon request. Refer to the SLD Organic Chemistry section (505 841-2571) or other contract labs for sample container, preservation and holding time information.
11 Refer to 40CFR136 for the list of parameters analyzed using methods 8270 and 8260.
12 Radionuclides generally include gross alpha/beta and Ra-226 + Ra-228.
13 Contact laboratory in advance of sampling to ensure that samples can be analyzed within the required holding times.
14 Or as soon as practically possible. In some cases, it may not be feasible to filter a sample within 15 minutes (e.g., remote sites). See EPA methods 200.7 and 200.8

Appendix B

Analytical Methods and Detection Limits for:

Ambient Surface Water Quality Monitoring, Discharge Monitoring from Point Sources, Monitoring for Enforcement Purposes, Incident Response Monitoring, Watershed Protection Projects, Effectiveness Monitoring, and Independent Studies. *Methods and detection limits for NPDES Permit Compliance Inspections and Evaluations will be those approved under 40 CFR 136, specified in the permit or approved by the Regional Administrator, as appropriate.*

Analyte (Bold Indicates WQS)	CAS #	Fraction	Method #	MDL[1] (ug/l)
Alkalinity	E1640192	Total	SM 2320B	2875
Aluminum	7429-90-5	Dissolved	200.8	1.8
Aluminum	7429-90-5	Total	200.8	1.8
Ammonia	7664-41-7	Dissolved	350.1	21.76
Ammonia	7664-41-7	Total	350.1	21.76
Antimony	7440-36-0	Dissolved	200.8	0.035
Arsenic	7440-38-2	Dissolved	200.8	0.2
Asbestos	1332-21-4	Total	100.2	0.2 MFL
Barium	7440-39-3	Dissolved	200.8	0.22
Beryllium	7440-41-7	Dissolved	200.8	0.17
Bicarbonate	71-52-3	Total	SM 2320B	1340
Biological Oxygen Demand	N/A	Total	SM 5210B	2000
Boron	7440-42-8	Dissolved	200.7	3.8
Cadmium	7440-43-9	Dissolved	200.8	0.055
Calcium	7440-70-2	Total	200.7	8.38
Carbonate	3812-32-6	Total	SM 2320B	1600
Chemical Oxygen Demand	E1641638	Total	SM 5220D	10,000
Chloride	16887-00-6	Total	300	544
Chlorine Residual	7782-50-5	Dissolved	330.5	0.2
Chromium	7440-47-3	Dissolved	200.8	0.07
Chromium III	16065-83-1	Dissolved	N/A	1.38
Chromium VI	18540-29-9	Dissolved	N/A	1.38
Cobalt	7440-48-4	Dissolved	200.8	0.02
Copper	7440-50-8	Dissolved	200.8	0.38
Cyanide	57-12-5	Dissolved	335.4	2.98
Cyanide	57-12-5	Total	335.4	2.98
Dissolved Oxygen	7782-44-7	Total	360.1, D888-09C	N/A
Dioxin	1746-01-6	Total	8290	5 pg/L
Fluoride	7782-41-4	Total	340.2, SM 4500-F-C	100

Analyte (Bold Indicates WQS)	CAS #	Fraction	Method #	MDL[1] (ug/l)
Fluoride	7782-41-4	Total	300	39
Gross alpha (adjusted)	N/A	Total	Calculated	0.2 pCi/L
Gross Alpha	12587-46-1	Total	SM 7100B	0.1 pCi/L
Gross Beta	12587-47-2	Total	SM 7100B	0.1 pCi/L
Hardness (2.497*Ca + 4.118*Mg)	N/A	Dissolved	Calculated	N/A
Iron	7439-89-6	Dissolved	200.8	0.21
Lead	7439-92-1	Dissolved	200.8	0.0054
Magnesium	7439-95-4	Dissolved	200.7	1.3
Manganese	7439-96-5	Dissolved	200.7	0.011
Mercury	7439-97-6	Dissolved	245.1	0.01
Mercury	7439-97-6	Dissolved	200.8	0.007
Mercury	7439-97-6	Total	245.1	0.01
Methylmercury	22967-92-6	Total	1630	1.0 ng/g
Molybdenum	7439-98-7	Dissolved	200.8	0.03
Molybdenum	7439-98-7	Total	200.8	0.03
Nickel	7440-02-0	Dissolved	200.8	0.028
Nitrate + Nitrite	14797-55-8	Dissolved	353.2	14.5
Nitrate + Nitrite	14797-55-8	Total	353.2	14.5
Nitrate as N	84145-82-4	Total	353.2	5.73
Organic Carbon	7440-44-0	Dissolved	SM 5310C	500
Organic Carbon	7440-44-0	Total	SM 5310C	500
Orthophosphate	98059-61-1	Dissolved	365.1	3
pH	N/A	Total	150.2	N/A
Phosphate	7723-14-0	Dissolved	365.4	34.1
Phosphate	7723-14-0	Total	365.4	34.1
Polychlorinated biphenyls (PCBs)	1336-36-3	Total	1668A	0.00064
Potassium	7440-09-7	Total	200.7	20.68
Radium-226	13982-63-3	Total	903.1	0.14 pCi/L
Radium-226 + 228	N/A	Total	Calculated	N/A
Radium-228	15262-20-1	Total	904	0.21 pCi/L
Salinity	N/A	Total	2520A	N/A
Selenium	7782-49-2	Dissolved	200.9	0.27
Selenium	7782-49-2	Dissolved	200.8	0.23
Selenium	7782-49-2	Total	200.9	0.39
Selenium	7782-49-2	Total	200.8	0.23

Analyte (Bold Indicates WQS)	CAS #	Fraction	Method #	MDL[1] (ug/l)
Silicon	7440-21-3	Total	200.7	21
Silver	7440-22-4	Dissolved	200.8	0.02
Sodium	7440-23-5	Total	200.7	5
Specific Conductance	N/A	Total	120.1	N/A
Strontium	7440-24-6	Total	200.7	1.11
Strontium-90	10098-97-2	Total	SM 7110B	3 pCi/L
Sulfate	18785-72-3	Total	300	430
Temperature	N/A	Total	170.1	N/A
Thallium	7440-28-0	Dissolved	200.8	0.02
Turbidity	N/A	Total	ISO 7027	N/A
Total Dissolved Solids	E1642222	Total	SM 2540C	17350
Total Kjeldahl Nitrogen	E17148461	Total	351.2	62.5
Total Persulfate Nitrogen	5466-54-6	Total	SM 4500-N-C	10
Total Suspended Solids	E1642818	Total	SM 2540D	968
Tritium	10028-17-8	Total	N/A	N/A
Uranium	7440-61-1	Dissolved	200.8	0.02
Uranium	7440-61-1	Total	200.8	0.02
Uranium - 234 (isotopic)	15117-96-1	Total	Method 900	0.06 pCi/L
Uranium - 238 (isotopic)	7440-61-1	Total	Method 900	0.04 pCi/L
Vanadium	7440-62-2	Dissolved	200.8	0.06
Zinc	7440-66-6	Dissolved	200.8	0.57
Total Coliforms	E761700	Total	Colilert-182000, Colilert/2000, 9221, 9222	1 MPN/CFU
Escherichia coli	68583-22-2	Total	Colilert-182000, Colilert/2000, 9221, 9222	1 MPN/CFU
Microbial Source Tracking (MST)	N/A	Total	qPCR or digital PCR	N/A
1,1,1,2-Tetrachloroethane	630-20-6	Total	8260B	0.1
1,1,1-Trichloroethane	71-55-6	Total	8260B	0.4
1,1,2,2-Tetrachloroethane	79-34-5	Total	8260B	0.19
1,1,2-Trichloroethane	79-00-5	Total	8260B	0.1
1,1-Dichloroethane	75-34-3	Total	8260B	0.23
1,1-Dichloroethylene	75-35-4	Total	8260B	0.3
1,1-Dichloropropene	563-58-6	Total	8260B	0.2
1,2,3-Trichlorobenzene	87-61-6	Total	8260B	0.2

Analyte (Bold Indicates WQS)	CAS #	Fraction	Method #	MDL[1] (ug/l)
1,2,3-Trichloropropane	96-18-4	Total	8260B	0.12
1,2,4-Trichlorobenzene	120-82-1	Total	8270D	0.31
1,2,4-Trichlorobenzene	120-82-1	Total	8260B	0.22
1,2,4-Trimethylbenzene	95-63-6	Total	8260B	0.2
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	Total	8260B	0.15
1,2-Dibromoethane (Ethylene dibromide (EDB))	106-93-4	Total	8260B	0.14
1,2-Dichlorobenzene	95-50-1	Total	8270D	0.47
1,2-Dichlorobenzene	95-50-1	Total	8260B	0.12
1,2-Dichloroethane	107-06-2	Total	8260B	0.15
1,2-Dichloropropane	78-87-5	Total	8260B	0.12
1,2-Dinitrobenzene	528-29-0	Total	8270D	0.4
1,2-Diphenylhydrazine	122-66-7	Total	8270D	2
1,3,5-Trimethylbenzene	108-67-8	Total	8260B	0.2
1,3-Dichlorobenzene	541-73-1	Total	8270D	0.53
1,3-Dichlorobenzene	541-73-1	Total	8260B	0.16
1,3-Dichloropropane	142-28-9	Total	8260B	0.16
1,3-Dinitrobenzene	99-65-0	Total	8270D	0.91
1,4-Dichlorobenzene	106-46-7	Total	8270D	0.55
1,4-Dinitrobenzene	100-25-4	Total	8270D	0.35
1,4-Dioxane	123-91-1	Total	8260B	18
1-Methylnaphthalene	90-12-0	Total	8270D	0.32
2,2-Dichloropropane	594-20-7	Total	8260B	0.46
2,3,4,6-Tetrachlorophenol	58-90-2	Total	8270D	0.4
2,3,5,6-Tetrachlorophenol	935-95-5	Total	8270D	0.4
2,4,5-Trichlorophenol	95-95-4	Total	8270D	0.31
2,4,6-Trichlorophenol	88-06-2	Total	8270D	0.23
2,4-Dichlorophenol	120-83-2	Total	8270D	0.29
2,4-Dimethylphenol	105-67-9	Total	8270D	0.43
2,4-Dinitrophenol	51-28-5	Total	8270D	0.42
2,4-Dinitrotoluene	121-14-2	Total	8270D	0.2
2,6-Dinitrotoluene	606-20-2	Total	8270D	0.23
2-Butanone (MEK)	78-93-3	Total	8260B	2.2
2-Chloroethyl Vinyl Ether	110-75-8	Total	8260B	1
2-Chloronaphthalene	91-58-7	Total	8270D	0.23

Analyte (Bold Indicates WQS)	CAS #	Fraction	Method #	MDL[1] (ug/l)
2-Chlorophenol	95-57-8	Total	8270D	0.32
2-Chlorotoluene	95-49-8	Total	8260B	0.33
2-Hexanone	591-78-6	Total	8260B	0.39
2-Methylnaphthalene	91-57-6	Total	8270D	0.4
2-Methylphenol	95-48-7	Total	8270D	0.22
2-Nitroaniline	88-74-4	Total	8270D	0.34
2-Nitrophenol	88-75-5	Total	8270D	0.37
3,3'-Dichlorobenzidine	91-94-1	Total	8270D	0.45[2]
3-Methylphenol & 4-Methylphenol	108-39-4 & 106-44-5	Total	8270D	0.655
3-Nitroaniline	99-09-2	Total	8270D	0.96
4,4'-DDD	72-54-8	Total	8081A	0.0144[2]
4,4'-DDE	72-55-9	Total	8081A	0.00437[2]
4,4'-DDT	50-29-3	Total	8081A	0.00727[2]
4,6-Dinitro-2-methylphenol	534-52-1	Total	8270D	0.4
4-Bromophenyl Phenyl Ether	101-55-3	Total	8270D	0.19
4-Chloro-3-methylphenol	59-50-7	Total	8270D	0.32
4-Chloroaniline	106-47-8	Total	8270D	0.2
4-Chlorophenyl Phenyl Ether	7005-72-3	Total	8270D	0.41
4-Chlorotoluene	106-43-4	Total	8260B	0.2
4-Isopropyltoluene	99-87-6	Total	8260B	0.2
4-Methyl-2-pentanone	108-10-1	Total	8260B	1.0
4-Nitroaniline	100-01-6	Total	8270D	0.43
4-Nitrophenol	100-02-7	Total	8270D	0.4
Acenaphthene	83-32-9	Total	8270D	0.56
Acenaphthylene	208-96-8	Total	8270D	0.36
Acetone	67-64-1	Total	8260B	3.3
Acetonitrile	75-05-8	Total	8260B	7.6
Acrolein	107-02-8	Total	8260B	13[2]
Acrylonitrile	107-13-1	Total	8260B	1.5[2]
Alachlor	15972-60-8	Total	8270D	0.2
Alachlor	15972-60-8	Total	525.2	0.031
Aldrin	309-00-2	Total	8270D	0.2[2]
Aldrin	309-00-2	Total	525.2	0.015[2]

Analyte (Bold Indicates WQS)	CAS #	Fraction	Method #	MDL[1] (ug/l)
Aldrin	309-00-2	Total	8081A	0.025[2]
Allyl Chloride	107-05-1	Total	8260B	3.8
alpha-BHC	319-84-6	Total	8270D	0.1[2]
beta-BHC	319-84-6	Total	8081A	0.025
Aniline	62-53-3	Total	8270D	0.1
Anthracene	120-12-7	Total	8270D	0.44
Atrazine	1912-24-9	Total	8270C or D	0.03
Azobenzene	103-33-3	Total	8270D	0.28
Benzene	71-43-2	Total	8260B	0.2
Benzidine	92-87-5	Total	8270D	0.31[2]
Benzo(a)anthracene	56-55-3	Total	8270D	0.2
Benzo(a)pyrene	50-32-8	Total	8270D	0.43
Benzo(b)fluoranthene	205-99-2	Total	8270D	0.44
Benzo(g,h,i)perylene	191-24-2	Total	8270D	0.63
Benzo(k)fluoranthene	207-08-9	Total	8270D	0.35
Benzyl alcohol	100-51-6	Total	8270D	0.21
beta-BHC	319-85-7	Total	8270D	0.2[2]
beta-BHC	319-85-7	Total	8081A	0.025
bis(2-Chloroethoxy)methane	111-91-1	Total	8270D	0.49
bis(2-Chloroethyl)ether	111-44-4	Total	8270D	0.24
bis(2-Chloroisopropyl)ether	108-60-1	Total	8270D	0.46
bis(2-Ethylhexyl)adipate	103-23-1	Total	8270D	1
bis(2-Ethylhexyl)phthalate	117-81-7	Total	8270D	1
Bromobenzene	108-86-1	Total	8260B	0.12
Bromochloromethane	74-97-5	Total	8260B	0.21
Bromodichloromethane	75-27-4	Total	8260B	0.2
Bromoform	75-25-2	Total	8260B	0.34
Bromomethane	74-83-9	Total	8260B	13
Butylbenzyl Phthalate	85-68-7	Total	8270D	0.36
Carbazole	86-74-8	Total	8270D	0.18
Carbon Disulfide	75-15-0	Total	8260B	0.2
Carbon Tetrachloride	56-23-5	Total	8260B	0.2
Chlorobenzene	108-90-7	Total	8260B	0.16
Chloroethane	75-00-3	Total	8260B	1.4

Analyte (Bold Indicates WQS)	CAS #	Fraction	Method #	MDL[1] (ug/l)
Chloroform	67-66-3	Total	8260B	0.2
Chloromethane	74-87-3	Total	8260B	0.37
Chloroprene	126-99-8	Total	8260B	0.33
Chrysene	218-01-9	Total	8270D	0.26[2]
cis-1,2-Dichloroethene	156-59-2	Total	8260B	0.2
cis-1,3-Dichloropropene	10061-01-5	Total	8260B	0.15
cis-1,4-Dichloro-2-butene	1476-11-5	Total	8260B	1.1
cis-Chlordane (alpha-chlordane)	5103-71-9	Total	8270D	0.2
cis-Chlordane (alpha-chlordane)	5103-71-9	Total	8081A	0.015
Chlordane	57-74-9	Total	8270D	0.2[2]
Chlordane	57-74-9	Total	8081A	0.3[2]
Cyanazine	21725-46-2	Total	525.3	0.2
delta-BHC	319-86-8	Total	8270D	0.2
delta-BHC	319-86-8	Total	8081A	0.025
Dibenz(a,h)anthracene	53-70-3	Total	8270D	0.66
Dibenzofuran	132-64-9	Total	8270D	0.23
Dibromochloromethane	124-48-1	Total	8260B	0.25
Dibromomethane	74-95-3	Total	8260B	0.13
Dichlorodifluoromethane	75-71-8	Total	8260B	0.35
Dieldrin	60-57-1	Total	8270D	0.1[2]
Dieldrin	60-57-1	Total	8081A	0.025[2]
Diethylphthalate	84-66-2	Total	8270D	0.35
Dimethylphthalate	131-11-3	Total	8270D	0.26
Di-n-butyl Phthalate	84-74-2	Total	8270D	0.59
Di-n-octyl phthalate	117-84-0	Total	8270D	0.33
Endosulfan I (alpha)	959-98-8	Total	8270D	0.1[2]
Endosulfan I (alpha)	959-98-8	Total	8081A	0.025
Endosulfan II (beta)	33213-65-9	Total	8270D	0.2[2]
Endosulfan II (beta)	33213-65-9	Total	8081A	0.025
Endosulfan sulfate	1031-07-8	Total	8270D	0.2
Endosulfan sulfate	1031-07-8	Total	8081A	0.01
Endrin	72-20-8	Total	8270D	0.2[2]
Endrin	72-20-8	Total	8081A	0.025
Endrin aldehyde	7421-93-4	Total	8270D	0.1

Analyte (Bold Indicates WQS)	CAS #	Fraction	Method #	MDL[1] (ug/l)
Endrin aldehyde	7421-93-4	Total	8081A	0.025
Endrin ketone	53494-70-5	Total	8270D	0.2
Endrin ketone	53494-70-5	Total	8081A	0.025
Ethyl Methacrylate	97-63-2	Total	8260B	0.79
Ethylbenzene	100-41-4	Total	8260B	0.2
Fluoranthene	206-44-0	Total	8270D	0.28
Fluorene	86-73-7	Total	8270D	0.36
gamma-BHC (lindane)	55963-76-6	Total	8270D	0.1
gamma-BHC (lindane)	55963-76-6	Total	8081A	0.05
Heptachlor	76-44-8	Total	8270D	0.019[2]
Heptachlor	76-44-8	Total	8081A	0.025[2]
Heptachlor epoxide	1024-57-3	Total	8270D	0.2[2]
Heptachlor epoxide	1024-57-3	Total	8081A	0.025[2]
Hexachlorobenzene	118-74-1	Total	8270D	0.23[2]
Hexachlorobutadiene	87-68-3	Total	8270D	0.27
Hexachlorobutadiene	87-68-3	Total	8260B	0.31
Hexachlorocyclopentadiene	77-47-4	Total	8270D	0.32
Hexachloroethane	67-72-1	Total	8270D	0.2
Indeno(1,2,3-cd)pyrene	193-39-5	Total	8270D	0.41[2]
Iodomethane	74-88-4	Total	8260B	0.68
Isobutyl Alcohol	78-83-1	Total	8260B	10
Isophorone	78-59-1	Total	8270D	0.43
Isopropylbenzene	98-82-8	Total	8260B	0.2
meta para Xylene mix	108-38-3 & 106-42-3	Total	8260B	0.32
Methacrylonitrile	126-98-7	Total	8260B	4.4
Methoxychlor	72-43-5	Total	8270D	0.024
Methoxychlor	72-43-5	Total	8081A	0.075
Methyl Methacrylate	80-62-6	Total	8260B	0.15
Methylene Chloride (Dichloromethane)	75-09-2	Total	8260B	0.1
Metolachlor	51218-45-2	Total	525.2	0.1
Metribuzin	21087-64-9	Total	525.2	0.1
Naphthalene	91-20-3	Total	8270D	0.42
Naphthalene	91-20-3	Total	8260B	0.24

Analyte (Bold Indicates WQS)	CAS #	Fraction	Method #	MDL[1] (ug/l)
n-Butylbenzene	104-51-8	Total	8260B	0.3
Nitrobenzene	98-95-3	Total	8260B	5.4
Nitrobenzene	98-95-3	Total	8270D	0.27
N-nitrosodimethylamine	62-75-9	Total	8270D	0.36[2]
N-nitroso-di-n-propylamine	621-64-7	Total	8270D	0.4[2]
N-nitrosodiphenylamine	86-30-6	Total	8270D	0.31
ortho-Xylene	95-47-6	Total	8260B	0.2
Pentachloroethane	76-01-7	Total	8260B	0.2
Pentachlorophenol	87-86-5	Total	8270D	0.27
Phenanthrene	85-01-8	Total	8270D	0.45
Phenol	108-95-2	Total	8270D	0.58
Prometryn	7287-19-6	Total	619	0.1
Propionitrile	107-12-0	Total	8260B	4.3
Propylbenzene	103-65-1	Total	8260B	0.2
Pyrene	129-00-0	Total	8270D	0.21
Pyridine	110-86-1	Total	8270D	0.46
sec-Butylbenzene	135-98-8	Total	8260B	0.2
Simazine	122-34-9	Total	525.2	0.022
Styrene	100-42-5	Total	8260B	0.13
tert-Butyl Methyl Ether (MTBE)	1634-04-4	Total	8260B	0.32
tert-Butylbenzene	98-06-6	Total	8260B	0.2
Tetrachloroethene	127-18-4	Total	8260B	0.19
Tetrahydrofuran (THF)	109-99-9	Total	524.2	7.9
Toluene	108-88-3	Total	8260B	0.2
Toxaphene	8001-35-2	Total	8081A	0.075[2]
Toxaphene	8001-35-2	Total	508.1	0.013[2]
trans-1,2-Dichloroethene	156-60-5	Total	8260B	0.2
trans-1,3-Dichloropropene	10061-02-6	Total	8260B	0.31
trans-1,4-Dichloro-2-butene	110-57-6	Total	8260B	0.5
trans-Chlordane	5103-74-2	Total	8081B	0.2
Trichloroethene	79-01-6	Total	8260B	0.2
Trichlorofluoromethane	75-69-4	Total	8260B	0.3
Bromoform	75-25-2	Total	8260B	0.34
Chloroform	67-66-3	Total	8260B	0.18

Analyte (Bold Indicates WQS)	CAS #	Fraction	Method #	MDL[1] (ug/l)
Dichlorobromomethane	75-27-4	Total	8260B	0.2
Chlorodibromomethane	124-48-1	Total	8260B	0.25
Vinyl Acetate	108-05-4	Total	8260B	0.4
Vinyl Chloride	75-01-4	Total	8260B	0.3
Xylene	1330-20-7	Total	8260B	0.12
Mercury	7439-97-6	Tissue	7471A	9.9 ug/kg
Selenium	7782-49-2	Tissue	6020	98 ug/kg
Aldrin	309-00-2	Tissue	8081	0.14 ug/kg
Dieldrin	60-57-1	Tissue	8081	0.16 ug/kg
Endosulfan sulfate	1031-07-8	Tissue	8081	0.53 ug/kg
Endrin	72-20-8	Tissue	8081	0.21 ug/kg
Endrin aldehyde	7421-93-4	Tissue	8081	0.35 ug/kg
Endrin ketone	53494-70-5	Tissue	8081	0.32 ug/kg
Heptachlor	76-44-8	Tissue	8081	0.51 ug/kg
Heptachlor epoxide	1024-57-3	Tissue	8081	0.17 ug/kg
Lindane	58-89-9	Tissue	8081	0.21 ug/kg
Methoxychlor	72-43-5	Tissue	8081	2.4 ug/kg
Toxaphene	8001-35-2	Tissue	8081	20 ug/kg
cis-Chlordane	5103-71-9	Tissue	8081	0.17 ug/kg
p,p'-DDD	72-54-8	Tissue	8081	0.29 ug/kg
p,p'-DDE	72-55-9	Tissue	8081	0.22 ug/kg
p,p'-DDT	50-29-3	Tissue	8081	0.79 ug/kg
trans-Chlordane	5103-74-2	Tissue	8081	0.18 ug/kg
.alpha.-Endosulfan	959-98-8	Tissue	8081	0.19 ug/kg
.alpha.-Hexachlorocyclohexane	319-84-6	Tissue	8081	0.14 ug/kg
.beta.-Endosulfan	33213-65-9	Tissue	8081	0.81 ug/kg
.beta.-Hexachlorocyclohexane	319-85-7	Tissue	8081	0.55 ug/kg
.delta.-Hexachlorocyclohexane	319-86-8	Tissue	8081	0.22 ug/kg
Polychlorinated biphenyls (PCBs) Congeners, Total Blank Corrected	1336-36-3	Tissue	1668A	0.5 ug/kg

[1] The MDL information presented is based primarily on the NMDOH Scientific Laboratory Division and contract laboratory reported limits. These limits are approximate and may change based on laboratory and individual sample performance.

[2] MDL may be greater than the water quality criterion defined in 20.6.4.900 NMAC.