

Developing a Tribal Water Quality Program Monitoring Strategy

Supplement to the Clean
Water Act Section 106 Tribal Guidance



Table of Contents

NOTICE	ii
INTRODUCTION.....	1
ELEMENTS OF A MONITORING STRATEGY.....	1
ELEMENT I: MONITORING PROGRAM STRATEGY.....	1
ELEMENT II: MONITORING GOALS	3
ELEMENT III: MONITORING DESIGN.....	5
ELEMENT IV: CORE AND SUPPLEMENTAL WATER QUALITY PARAMETERS	8
ELEMENT V: QUALITY ASSURANCE.....	12
ELEMENT VI: DATA MANAGEMENT	13
ELEMENT VII: DATA ANALYSIS AND ASSESSMENT	13
ELEMENT VIII: REPORTING.....	15
ELEMENT IX: PROGRAMMATIC EVALUATION.....	16
ELEMENT X: GENERAL SUPPORT AND INFRASTRUCTURE	17
APPENDIX A: KEY TERMS	19

Notice

This document has been reviewed and approved for publication by EPA. Mention of trade names or commercial products or services does not convey and should not be interpreted as conveying official EPA approval, endorsement, or recommendation. Any use of words such as “should” or “may” are not intended to be mandatory language, rather, these are statements of suggestion that a tribal program may or may not adopt depending upon available resources.

Cover Photo Credits (Clockwise from Right)

Summer interns electroshocking Fond du Lac Creek for fish community data, photo courtesy of Fond du Lac Resource Management

Water quality sample collection, photo courtesy of Pyramid Lake Paiute Tribe

Green Lake, photo courtesy of Red Lake Band of Chippewa Indians

Introduction

The Tribal Section 106 grant award includes three programmatic reporting deliverables, one of which is a Monitoring Strategy. This document is a supplement to the [Clean Water Act Section 106 Tribal Guidance](#) document and addresses in more detail the development of a Water Quality Monitoring Strategy.

This document is meant to provide additional detail about how to address the ten elements of a Monitoring Strategy that describe the current and future water quality program goals. Example tables throughout the document may serve as a useful starting point for describing a monitoring program. These tables are intended to serve as general examples only. Monitoring program staff can modify or replace these tables to reflect the specifics of a Tribe's monitoring and assessment program.

The complexity of a Monitoring Strategy will depend on the complexity of the monitoring program and can vary in length. The overall goal of a strategy is to adequately describe a program that meets data and information needs and considers future needs. The format should be based on what works best for each Tribe. The extent of information in a Monitoring Strategy may include links to other programs and funding sources as they interrelate to help provide a more comprehensive view of a monitoring and assessment program. The Monitoring Strategy should cover 5 years. Tribes should review their strategies annually, update them as needed, and submit them to EPA at least every 5 years.

A Monitoring Strategy is a long-term implementation plan that describes how a monitoring program will serve tribal water quality management needs and address tribal water resources over time. A Monitoring Strategy addresses the ten elements identified in this document and is reviewed by EPA. It serves to ensure continuity of the program as staff change and serves as a communication tool with other programs, management, and communities. In some instances, Quality Assurance Project Plans (QAPPs) may include components of a Monitoring Strategy. In these circumstances, Tribes and EPA regional staff evaluate and identify any additional information that may need to be documented to meet the Monitoring Strategy requirements. A Monitoring Strategy describes current and future monitoring plans and incorporates a timeline for implementation, including milestones, to address needed enhancements. The Monitoring Strategy should be comprehensive in scope (for example, serve all water quality management needs and address all tribal waters, including all waterbody types, such as streams, rivers, lakes, Great Lakes, reservoirs, estuaries, coastal areas, wetlands, and ground water). The strategy should also identify issues and needs that currently impede an adequate monitoring program. Where possible, a Monitoring Strategy will document plans and needed resources for filling current gaps and weaknesses in the Tribe's monitoring program.

Elements of a Monitoring Strategy

Element I: Monitoring Program Strategy

This section of a Monitoring Strategy introduces the water quality program and can include historic information, departmental responsibilities, and other information to provide overall context. Table 1 highlights content to be considered when developing a strategy.

Table 1. Recommended content of a Monitoring Strategy

Program Plan
<p>A. Ten elements of the Tribe’s Monitoring Strategy.</p> <ol style="list-style-type: none"> I. Monitoring program strategy II. Monitoring goals III. Monitoring design IV. Core and supplemental water quality parameters V. Quality Assurance VI. Data management VII. Data analysis and assessment VIII. Reporting IX. Programmatic Evaluation X. General support and infrastructure <p>B. Background information such as:</p> <ul style="list-style-type: none"> • Extent of water resource (for example, an atlas). • Current condition (if known). • Data currently available (for example, number of years of data). • Other pertinent information to put monitoring program objectives in context (such as Indigenous Knowledge, past studies, proposed development). <p>C. Objectives for the monitoring program with priorities and a timeline for addressing issues, and future interests.</p> <p>D. Consideration of all waterbody types on the reservation and resources the Tribe is focusing on (such as streams, rivers, lakes, ponds, springs, wetlands, Great Lakes, ground water, estuaries, reservoirs, and coastal areas).</p> <p>E. Identification of assessment tools and an assessment methodology identified, for example, comparing results against criteria such as tribal water quality standards, thresholds, or historic information with a reference to sources. The strategy may also reference an assessment methodology document.</p> <p>F. Consideration of resource needs to implement major priorities.</p> <ul style="list-style-type: none"> • Training (such as training on field protocols, data management, data analysis, or other). • Laboratory needs (for example, availability, cost, shipping, and holding time requirements). • Staffing availability and needs (full-time and part-time employees). • Equipment available, equipment needed, and maintenance or replacement of equipment. <p>G. A strategy that covers a 5-year period.</p> <p>H. Addresses goals through the use of parameters and assessment methods.</p> <p>I. A list of reports completed under the Section 106 Program and to whom are they distributed.</p> <p><i>Note: EPA recommends that all programs give special attention to ensuring that data management, assessment methodologies, and reporting capabilities are developed during the first several years of program implementation.</i></p>

Element II: Monitoring Goals

Monitoring goals identify what data Tribes need to collect, why, and how they will use the data. Tribes can base their monitoring goals on historic knowledge, Indigenous Knowledge, and data they collect on or near tribal waters. The goals documented in the Monitoring Strategy help determine the direction of the program and may evolve over time. Chapter 4 in the [Clean Water Act Section 106 Tribal Guidance](#) has additional information on establishing monitoring goals, including what activities are eligible, and it includes a section on eligible water quality monitoring locations. In addition to the example goals listed below, Table 2 highlights content to be explored for Element II.

Example goals may include:

- 100% assessment of waters on the reservation.
- Establishment of the current condition of waters for pertinent uses over a set time frame (status).
- Periodic reassessment (trends).
- Development and refinement of tribal goal use or designated uses (tiered).
- Refinement of thresholds or water quality criteria.
- Identification of waters needing restoration and those needing protection.
- Identification of causes and sources of possible impairment (point and nonpoint).
- Development of restoration or protection plans.
- Information for permitting (as needed).
- Evaluation of projects at various scales (such as, what water quality improvements occurred as a result of implementing a shoreline stabilization or a local ordinance).
- Emergency monitoring (for example, fish kills or spills).
- Other.

Table 2. Example approach to establish monitoring goals

Example Approach to Establish Monitoring Goals
<p>A. Identify current questions or goals the Tribe is addressing that require water quality data. Some initial goals may include:</p> <ul style="list-style-type: none"> • Watershed- or reservation-wide assessments to help determine tribal or uses or designated uses. • Assess the status and condition of resources. • Assess the condition of priority goals (see list of goals below). • Identification of waters needing restoration and those needing protection, and what the possible source of impairment may be. • Evaluation of restoration and protection projects at various scales (such as, what water quality improvements occurred because of implementing a shoreline stabilization or a local ordinance). <p>B. Identify questions and goals for which decision makers and the programs will need information in the future (consider program growth, introduction of new programs, expansion to cover additional waterbody types).</p> <p>C. Prioritize monitoring goals (this should play into the schedule for making enhancements to the program over time).</p> <p>D. Identify the scope and scale needed to answer each goal (for instance, reservation-wide, watershed, or waterbody specific).</p>

Tribes generally consider additional details pertinent to their water monitoring program with each of the goals (for example, what trends are being tracked and why).

Table 3 and Table 4 are examples of how narrative information on describing monitoring goals can be organized in a table format.

Table 3: Example of goals organized in table format

Program Area	Goal	Timeframe
Chemical and Physical Water Quality Monitoring	<p><u>Goal 1:</u></p> <ul style="list-style-type: none"> Assess ambient water quality conditions in rivers and streams. Monitor <i>E. coli</i> levels at sampling sites adjacent to swimming holes. Identify seasonal trends in water quality data. 	Monthly between May-September
Biological Monitoring	<p><u>Goal 2:</u></p> <ul style="list-style-type: none"> Establish macroinvertebrate inventory and assess data for Bear Creek. Establish fish community inventory and assess data for Bear Creek. 	Every other year in the spring between April - May
Groundwater Recharge/Source Water Protection	<p><u>Goal 3:</u></p> <ul style="list-style-type: none"> Monitor ground water quality at monitoring wells that are part of or suspected to be contributors to the groundwater of the community. 	Annually between May-September
Future Studies/Funding Dependent		
Continuous Water Quality Monitoring	<ul style="list-style-type: none"> Establish a continuous monitoring location in Deer Lake. Gain a better understanding of the seasonal and flood dependent water quality within the wetland. 	Ice-out to Freeze-up (April or May to November)
Additional Chemical Water Quality Parameters	<ul style="list-style-type: none"> Sample ground water related parameters (hard metals and nutrients) at sites known to be associated with ground water recharge, source water, or other monitoring sites of interest Explore sampling locations and needs for pharmaceutical, PFAS, or microplastics. 	May-September Funding Dependent

Table 4: Example of narrative to compliment above table in describing how goals may be achieved and measured

Description of how to address goals identified in Table 3
<ol style="list-style-type: none"> 1. Establish current chemical water quality conditions based on a minimum of 5 years of sampling data and against existing thresholds (condition). 2. Determine biological community composition and health of surface water resources of interest (condition). 3. Determine extent surface water quality is changing over time by comparing results in chemical water quality, biology, and habitat (trends). 4. Identify causes and sources of degraded water (Section 319 application). 5. Evaluate the effectiveness of best management practices (BMPs), conservation practices, and ordinances implemented by the Tribe or stakeholders.

Element III: Monitoring Design

A monitoring design lays out the location, frequency, and timing of sample collection for meeting monitoring goals. As water quality programs grow and program priorities change, Tribes should update monitoring designs to best represent changes in monitoring goals. Information about different monitoring designs is also available in more detail in the [CWA Section 106 Tribal Guidance](#) in Chapter 5. Table 5 describes content to be considered when documenting a monitoring design.

Table 5: Monitoring Design considerations

Monitoring Design
<ol style="list-style-type: none"> A. Describe the monitoring programs and networks (such as other sources of information) the tribal monitoring program used to meet each of the goals (some designs will support more than one objective). Describe the designs and number of stations the Tribe typically sampled each year. See Chapter 5 of CWA Section 106 Tribal Guidance for further information. B. Identify which of the goals the Monitoring Program did not meet based on designs in the Monitoring Plan. Identify which goals need additional sites, different designs, or greater frequency to be successful. Identify weaknesses in the current program for meeting the Tribe’s objectives. Examples: <ul style="list-style-type: none"> • Perhaps the Tribe cannot yet monitor all lakes or all wetlands. • Perhaps the Tribe is starting up a non-point source (NPS) implementation program and will need program designs to monitor the success of the project. C. Describe how the Tribe utilizes resources (# of stations, # of times sampled, sampling protocols, holding times) to meet goals. D. Identify and describe other monitoring networks used (U.S. Geological Survey [USGS], states, watershed organizations and partners, other Tribes) to help meet goals. Describe the goals they serve.

DRAFT FINAL Developing a Tribal Water Quality Program Monitoring Strategy

Along with a narrative that provides more detailed information on why sites are selected or how to address relocation if needed, Table 6 and Table 7 can help document sample designs. A map of the area and possible sample locations may also be useful. In Table 6, the “Design” column identifies the type of design used for sampling as targeted, probabilistic, or other sampling design options. The “# of Sites” and sampling “Frequency” columns summarize the information annually. The “Resources” column captures the staff time required to conduct the monitoring and the last column provides a brief description of the program.

Table 6: Summary of various monitoring activities and their design in an ambient water ambient monitoring program

Program Area	Design	# Sites	Frequency	Resources	Program Description
Ambient Water Quality	Rotating basin with targeted sites.	10	Bi-weekly	2 FTE for 9 months	2022 – Long Lake 2023 – Deer Lake 2024 – Duck Creek 2025 – Bear River
Water Quality Status & Trends	Fixed station network of integrator sites.	5	3 x per year	2 FTE for 6 months	Begun in 2022. Long-term sites for trends.
NPS Effectiveness Monitoring	Targeted design upstream/downstream of NPS projects	5 sites/ 2 projects	Monthly sampling during the summer	1 FTE	NPS sampling targets sites above and below BMP implementation projects. Sampling for each project covers a 2-4 year timeframe.

DRAFT FINAL Developing a Tribal Water Quality Program Monitoring Strategy

In Table 7, the “Segment” column refers to the extent of the area that will be assessed using the sample design and the tribal “Goal Use” column could be replaced with designated use for Tribes that have water quality standards.

Table 7: Example of monitored waterbody segments

Waterbody	Segment	Goal Use
Duck Creek xx.xxxx, -xx.xxxx	From the confluence of Duck Creek and the lower branch of the Salmon River upstream to Trout Road crossing. Area to include popular swimming hole	Aquatic Life, Cultural, Recreation
Deer Lake xx.xxxx, -xx.xxxxx	Entire Lake	Edible Aquatic Plant
Salmon River xx.xxxxx	Entire length of the stream	Aquatic Life, Recreation, Cultural, Wildlife
	From the mouth of Bear Bay upstream 500 feet	

Table 8 and Table 9 are additional examples of tables and how they can be structured to include goals for monitoring along with a description of activities that are associated with the goal and parameters that will be collected to determine if the tribal goal uses or designated uses are being met.

Table 8: Example of parameters used to evaluate tribal goal use or designated uses

Tribal Goal Use or Designated Use	Activity	Parameter
Aquatic Life	General Aquatic Life Protection	pH, conductivity, temperature, dissolved oxygen, ammonia
Recreation	Swimming, Wading, Boating, Canoeing	E. coli
Cultural	Hunting, Gathering	<i>E. coli</i> , enterococci
Edible Aquatic Plant	Harvesting	2,4-D or other aquatic herbicide(s)

Table 9: Example of how water quality monitoring goals are tracked

Program Area	Specific Goal	Water Quality Parameter	How Results are Tracked
Ambient Quality Monitoring	Characterize the current water quality status	Number of nutrient criteria exceedances in ambient surface water samples from rivers/streams and lakes	Samples are collected quarterly and sent to a laboratory for analysis. Ammonia-Nitrogen and Total Phosphorus data are collected.
	Develop or refine designated and tribal goal uses		
	Determine attainment or meeting goal uses using water quality standards or thresholds	Change in ambient stream chemistry (such as pH, DO, conductivity)	At fixed stations, grab samples are collected along with in situ measurements quarterly.
	Identify waters needing restoration	Change in biological parameters (such as benthic macroinvertebrate, Index of Biological Integrity (IBI))	Streams are monitored on a rotating basis annually

Element IV: Core and Supplemental Water Quality Parameters

Water quality parameters are an important aspect of the monitoring design. The parameters a Tribe selects should reflect what the Tribe needs to evaluate whether the program is meeting tribal goal use or designated uses of the resources. Water quality parameters provide basic information about the aquatic environment to meet long term goals. Table 10 provides factors a Tribe may consider when identifying water quality parameters.

For additional information, factsheets on basic parameters are available on EPA’s [Factsheet on Water Quality Parameters](#) Web page. See Chapter 5 of the [CWA Section 106 Tribal Guidance](#).

Table 10: Example of considerations to take when identifying water quality parameters

Identifying Water Quality Parameters
A. Identify parameters that meet monitoring goals, often meeting tribal use goals or designated uses.
B. Accessibility, cost, holding time of samples, and frequency of sampling may all weigh in when selecting parameters to be collected.
C. Parameters are tied to tribal use or designated use and frequency.
D. Frequency of sampling and locations should consider the assessment method of each parameter.
E. Seasonal impacts and conditions and desired level of confidence in the data should be considered in selecting parameters.

Table 11 through Table 15 are examples of how Tribes can summarize the parameters they collect as part of each monitoring program.

Table 11: Parameter categories sampled by water resource type and program area

Water Resource Type or location or CWA Program Area	Dissolved Oxygen	Water Temperature	Conductivity	pH	Turbidity	Nutrients (TP/ TN)	Physical habitat	Macroinvertebrates	Pathogens	Other (please specify)
Ambient Water Quality (Rotating Basin Sites) Or Deer Creek	X	X		X	X	X				
Water Quality Status & Trends (Fixed Station Network)	X	X	X	X	X	X		X		
NPS Effectiveness Monitoring	X		X	X	X	X		X		

Table 12: Examples of parameters and the tribal goal use they meet

Aquatic Life and Wildlife Parameters	Recreation Parameters	Fish Consumption (Human Health) Parameters
<ul style="list-style-type: none"> • Dissolved oxygen • Temperature • Specific conductance • pH • Water clarity (turbidity, TSS, Secchi depth) • Habitat assessment • Flow • Nutrients + chlorophyll <i>a</i> • Toxics and heavy metals • Landscape conditions (% cover of land uses) • Additional parameters for lakes: • Trophic condition • Additional parameters for wetlands: • Wetland hydrogeomorphic settings and functions • Sediment toxicity • Other chemicals of concern in water column or sediment (primarily mercury, but also PFAS, other emerging contaminants of concern) • Health of organisms 	<ul style="list-style-type: none"> • Pathogen (<i>E. coli</i>) • Nuisance plant growth • Flow • Nutrients • Chlorophyll <i>a</i> • Landscape conditions (% cover of land uses) • Additional parameters for lakes: • Secchi depth • Additional parameters for wetlands: • Wetland hydrogeomorphic settings and functions • Other chemicals of concern in water column or sediment • Aesthetics 	<ul style="list-style-type: none"> • Mercury in fish tissue and in the water column • Organochlorine compounds • PCBs • PFAS

DRAFT FINAL Developing a Tribal Water Quality Program Monitoring Strategy

Table 13: Example of a Tribe’s list of parameters that they collect, sampling frequency, and the goal use they hope to attain

Parameter	Program Element			Tribal Goal Use
	Change in condition (Lakes)	Change in condition (Rivers and Streams)	Status (Ground Water)	
Dissolved Oxygen	Weekly	Weekly	Monthly	Aquatic Life
Water Temperature	Weekly	Weekly	Monthly	Aquatic Life, recreational use
Total Nitrogen	Quarterly	Quarterly	Monthly	Aquatic Life, recreational use, drinking water source
Chlorophyll a	Quarterly	Quarterly	N/A	Aquatic Life, recreational use, drinking water source
Iron, Total	N/A	N/A	Monthly	Drinking water source
Secchi Depth	Weekly	N/A	N/A	Aquatic Life, recreational use, drinking water source

Table 14: Example of monitoring designs and frequency of sampling

Program	Specific Monitoring	Design	# of Sites	Frequency	
Ambient Monitoring	Chemistry	Fixed Site	23	Monthly	
	Nutrients	Fixed Site	23	Seasonal	
	Habitat	Fixed Site	23	Annually	
	Biological	Macroinvertebrates	Targeted	4	Spring
		Fish	Targeted	4	Fall
Periphyton		Targeted	4	Odd years	
Fish Tissue Monitoring		Rotating/ Targeted	1	5-year rotation	

Table 15: Example of sampling methodology used for each parameter and their reference values

Parameter	Reference Value	Sampling Method	Source	Current Program
Dissolved Oxygen	Coldwater fishery X mg/L Warmwater fishery X mg/L	In-Situ XX Sonde	Tribal Reference	Yes
pH	Between X and X	In-Situ	State Agency	Yes
Water Temperature	Coldwater Fishery Not-to-exceed values: April - Jul: X°C Aug - Sep: X°C Warmwater Fishery Not-to-exceed values: April - Jul: X°C Aug- Sep X°C	In-Situ	State Agency	Yes
Turbidity	X NTU (0.84 – 14.50 NTU)	In-Situ	USEPA CWA 304(a)	Yes

Element V: Quality Assurance

The Quality Assurance section of a Monitoring Strategy is a place where the Tribe can reference their approved or underdeveloped Quality Assurance Project Plans (QAPPs). Table 16 shows the information to include about a QAPP in a Monitoring Strategy. Additional information on QAPPs is available in more detail in the [CWA Section 106 Tribal Guidance](#) in Chapter 5.

Table 16: Information to include about a QAPP in a Monitoring Strategy

Quality Assurance
A. Briefly describe the QAPPs that are in place for sampling projects. Identify the date approved, and how often the QAPP is updated.
B. Identify the issues to be included in a quality assurance/quality control (QA/QC) review.

Table 17 is an example table that could be used in the Quality Assurance section. It may also include Quality Assurance procedures and references to SOPs. QAPPs generated for multi-year projects that cover the same type of work must be resubmitted every 5 years. A table like this can help Tribes track the status of QAPPs and plan for when they must resubmit each QAPP.

Table 17: Example of quality assurance documentation and submission dates

Type	Title	Completion Date	Submitted to EPA Date	EPA Approval/Date
QAPP	Water Quality Monitoring of Surface Waters	1/20/2022	3/14/2022	4/9/2022
QAPP	Zooplankton Monitoring	11/20/2022	12/4/2022	1/9/2023
SOP	Handheld Sonde	1/10/21	3/14/2021	N/A
QAPP	Wetlands Monitoring	(Expected future date)	(Expected future date)	

Element VI: Data Management

The Tribe’s strategy should describe how it will manage data within the tribal government and how these data will be submitted to EPA, see Table 18. Please also see [Tribal Data Management for WQX Submission](#) for information on how to upload tribal data into the Water Quality eXchange network (WQX).

Table 18: Data Management considerations

Data Management
A. Describe and include WQX codes that may be used and the expected frequency that data will be uploaded into WQX.
B. Describe any locations where data may be stored until they are uploaded into WQX or other locations where the data is shared with the community.

Element VII: Data Analysis and Assessment

Once data have been collected, the Tribe will use this section of the Monitoring Assessment to analyze and interpret the data to assess water quality conditions, see Table 19. This is a good place to reflect on the purpose of the assessment and general procedures to assess the data to determine if the Monitoring Assessment addresses the goals of the water quality program. Reference to other documents, such as an assessment methodology, may be appropriate, or a description of thresholds and tools used to calculate the index of biological integrity (IBI) may be included.

Table 19: Data Analysis and Assessment considerations

Data Analysis and Assessment
<p>A. Describe how assessments are done. If the Tribe does not yet interpret its data, provide details on plans and resource needs to conduct assessments.</p> <p>B. Identify other sources of information used in data analysis.</p> <p>C. Include or reference thresholds or water quality criteria that will be used to analyze data or indexes that may be used to assess biological data.</p> <p>D. Assessment methodology documents may also be referenced.</p>

Table 20 through Table 22 are examples of how some of the information regarding thresholds may be organized to supplement any narratives on how the data will be analyzed or assessed.

Table 20: Example table of parameters threshold value by resource type and it's source

Parameter	Reference	Value
Chlorophyll- <i>a</i>	USEPA Nutrient Ecoregion Reference Condition (Ecoregion 51)	River: 1.03 ug/L Lake: 2.02 ug/L
Total Phosphorus	USEPA Nutrient Ecoregion Reference Condition (Ecoregion 51)	River: 28.75 ug/L Lake: 20 ug/L
<i>E. coli</i>	Tribal Water Quality Standard	The monthly geometric mean for <i>E. coli</i> shall not exceed X organisms/100 mL. When fewer than five samples are collected in a month, densities of <i>E. coli</i> shall not exceed X organisms/mL in any single sample.

Table 21: Example table of parameter with threshold value associated with specific water resource

Parameter	Big Lake (surface)	Straight Creek (warm water)	Curvy River (cold water)
Dissolved Oxygen	6 mg/L	5 mg/L	7 mg/L

Table 22: Example table of parameter associated with different assessment goals with associated threshold values and description of what the parameter is used for

Parameter	Sampling Design			Threshold Value	Parameter Description
	Waterbody Type	Goal	Tribal Goal Use		
Chlorophyll- <i>a</i>	Lakes	Assess status and track change over time.	Aquatic, Recreational	X mg/L	Measure of algal biomass-trophic status
<i>E. coli</i>	Lakes, Rivers	Assess status	Aquatic, Recreational Cultural	X <i>E. coli</i> cfu per 100 mL	Human health protection, identify if there are possible sources

Element VIII: Reporting

The Monitoring Strategy should describe how the Tribal monitoring program staff will communicate products of the collected data to those interested in the results, such as the Tribal Council, the tribal community, the general public, and EPA. Table 23 identifies some points to consider when reporting.

In addition to the reporting requirements described in the [CWA Section 106 Tribal Guidance](#), Tribes may generate other reports such as:

- Fish Consumption Advisory.
- Nonpoint Source Assessments.
- Water Quality Summary.
- Swimming Advisories.

Table 23: Considerations when developing and listing reports

Reporting
A. Describe major reports and products the Tribe produces using water quality information. Include water quality information that relates to overall program goals.
B. Describe plans for ensuring that decision-makers receive information promptly. Describe how monitoring results are communicated.
C. Identify gaps that exist and ways to address these in the future.

Table 24 is an example format of how Tribes can share information to indicate what reports will be developed, the frequency with which they will be made available, and the audience who will receive them.

Table 24: Example format for listing reports and their intended audience

Report	Timeframe	Entities receiving copies of the report	Comments
Progress Report	Quarterly, semi-annual, or annual frequency	EPA Regional Office/Project Officer	Report summarizes performance and progress on the work plan.
Fish Consumption Advisory	No less frequently than every five years.	Tribal Community	Based on tribal subsistence consumption rates.
Water Quality Assessment	Every one or two years (based on discussions with your Project Officer)	EPA Regional Office/Project Officer Tribal Community Tribal Planning Department	Serves as the primary assessment of water quality conditions on the reservation
NPS Assessment Report	At least every five years	EPA Regional Office, Tribal Planning Department	Meets NPS program goals.

Element IX: Programmatic Evaluation

The Tribe’s Monitoring Strategy should include a process for reviewing the monitoring program to identify any necessary revisions. Table 25 explains what to include in the programmatic evaluation.

Table 25: Points to address as part of a Program Evaluation

Programmatic Evaluation
<p>A. Describe the process used to annually review the Tribe’s monitoring program. This may be met internally or by existing discussions held with EPA regional office.</p> <p>B. Describe the internal process used to systematically and regularly look at the Monitoring Strategy to see if it is providing answers to support the Tribe’s needs, goals, and objectives. This would include addressing program enhancements such as expanding to new waterbody types or introducing new parameters.</p>

Below is an example of language describing a general evaluation process between the Tribe and EPA.

A primary need identified through the development of the Monitoring Strategy is for a more comprehensive annual process for reviewing existing monitoring programs. This process should address programmatic coordination and evaluate the effectiveness of the monitoring and assessment program. The program will evaluate data needs and identify gaps and priorities that may be changing due to resource limitations, new and emerging issues, and changing program objectives. This should be part of a continuous improvement feedback loop.

An annual review and update of the Monitoring Strategy between (identify appropriate) tribal and regional EPA staff has been identified as important to implementing the strategy. Specific areas of focus will be selected annually based on priorities outlined in the strategy.

Element X: General Support and Infrastructure

This section of a Monitoring Strategy should indicate what resources are currently available to address objectives and identify what resources are needed to address any future goals a Tribe has identified in the strategy. Table 26 describes the Tribe’s general support and current infrastructure.

Table 26: Considerations for General Support and Infrastructure

General Support and Infrastructure
<p>A. Describe the resources of the Tribe’s current program.</p> <p>B. Consider resources that are needed for major priorities or next steps in the Tribe’s water monitoring program.</p> <p>Categories for consideration include:</p> <ul style="list-style-type: none">• Staffing• Training• Equipment• Lab resources

DRAFT FINAL Developing a Tribal Water Quality Program Monitoring Strategy

Table 27 provides an example of how the information can be presented to document the current and future goals.

Table 27: Example table to document current and future goals of a Tribal monitoring program

	Goals	Staffing	Training	Equipment/Lab
Current Goals	Ambient Surface Water Quality Monitoring	2 Full Time Equivalent (FTE): monitoring, data analysis, and reporting for current program.	WQX training completed	Canoe, handheld sonde, flow meter, general field gear (Like waders or life jackets), microscopes. Macroinvertebrates are processed by staff and sent to a lab for genus level identification. Nutrient samples to a commercial lab.
Future Goals	Wetlands monitoring	+1 FTE wetlands monitoring	Would depend on additional staff knowledge base.	Will need general gear, such as measuring tapes, magnifying glasses, boots, plant guidebooks, and plant presses.

Table 28 can be useful for capturing categories of resources, corresponding descriptions, and associated cost values.

Table 28: The below format can be used to describe current and future program budget

Category	Description	Resources
Personnel	Water quality sampling, data entry, assessment, and analysis	\$xxxx
Equipment	Handheld sonde, boat	\$xxxx
Supplies	Calibration and sampling supplies, Outreach education material	\$xxxx
Travel	Conference and public meetings	\$xxxx
Contractual	Lab Analysis, equipment repair	\$xxxx
Other	Groundwater training	\$xxxx
	Total	\$xxxx

Appendix A: Key Terms

Assessment Methodology – A document that outlines how Tribes perform their data analysis, which includes decisions to ensure consistency in data interpretation, and provides transparency to stakeholders about how the program performed assessments and how others can reproduce the data.

Best Management Practices (BMPs) – Practices, measures, or actions that are commonly recommended to prevent, reduce, or mitigate pollution from nonpoint sources.

Designated Use – A designated use is a classification specified in water quality standards for each waterbody or segment describing the level of protection from perturbation afforded by the regulatory programs. The designated aquatic life uses established by the Authorized Tribe set forth the goals for restoration and baseline conditions for maintenance and prevention from future degradation of the aquatic life in specific waterbodies.

Fixed Station (monitoring design) – Fixed station networks monitor the same sites over a long period of time. These are often used to establish long-term trends in water quality at these sites.

Full-Time Equivalent (FTE) – This term is used to determine the number of full-time employees available to work on various projects within an organization, and institutions have varying definitions for this term.

Goals – The desired outcomes for their program, based on their water quality needs. For example, if a Tribe identified needing to assess the condition of their rivers, one of the program goals should be to develop these assessments.

Integrator Sites – Stream sampling sites located down-stream of drainage basins that are large and complex and often contain multiple environmental settings. Most integrator sites are on major streams with drainage basins that include a substantial portion of the study area of interest.

Intensive (monitoring design) – Intensive monitoring designs incorporate a large number of sites in an area, like a watershed, for a specified period. This design may take the form of an intensive basin, watershed survey, or site-specific study.

Monitoring Strategy – A long-term Monitoring Strategy serves as the foundation for a monitoring program and addresses how the program will meet water management needs.

Nonpoint Source (NPS) Pollution – Pollution not discharged from a point source. This generally consists of pollution from diffuse sources, without a single point of origin or not introduced into a receiving stream from a specific outlet. The pollutants are generally carried off the land as a result of precipitation events (rainfall, snowmelt). Common nonpoint sources are agriculture, forestry, urban, mining, construction, dams, channels, land disposal, saltwater intrusion, and city streets.

Parameters – Water quality parameters are measurements that are used to assess the quality of a water body. The terms “indicator,” “analytes,” “characteristics,” and “constituents” are synonymous for the purpose of this document. Parameters can measure the physical (temperature), chemical (phosphorus or nitrogen), or biological (macroinvertebrates or bacteria) characteristics of waterbodies.

Point Source – A stationary location or fixed facility from which pollutants are discharged through a conveyance system; any single identifiable source of pollution, such as a pipe, ditch, ship, ore pit, or concentrated animal feeding operation.

Probability-Based (monitoring design) – A probability-based monitoring design (or statistically valid survey) is based on some form of random selection of sites or sampling locations. This approach eliminates the potential for sampling bias toward water locations with known problems. A probability-based design allows the extrapolation from a relatively small sample of monitored sites to the entire population of waterbody types covered by the design.

Quality Assurance Project Plan (QAPP) – A QAPP is a written document that outlines procedures that a monitoring project will use to ensure that the samples collected and analyzed, the data stored and managed, and the reports produced are of sufficient quality to meet project needs. The QAPP documents the technical and quality aspects of a project (monitoring, detection limits, analytical methods, data management and analysis, and reporting) and provides a blueprint for obtaining the type and quality of environmental information needed.

Quality Assurance/Quality Control (QA/QC) – QA/QC refers to a system of procedures, checks, audits, and corrective actions to ensure that all technical, operational, monitoring, and reporting activities are of the highest achievable quality. QA is a management or oversight function; it deals with setting policy and running an administrative system of management controls that cover planning, implementation, and a review of data collection activities and the use of data in decision making. QC is a technical function that includes all the scientific precautions, such as calibrations and duplications, needed to acquire data of known and adequate quality.

Rotating Basin (monitoring design) – A rotating basin monitoring design targets certain basins within a state or region for intensive and probability-based monitoring. The basins change each year so that over a period of time (typically five years), the entire state or region is monitored.

Supplemental Water Quality Parameters – Supplemental parameters provide specific or additional information (to supplement core parameters) and can be used to support a special study or screen for a potential pollutant.

Targeted (monitoring design) – Judgmental or targeted monitoring designs are based on land use, geological setting, and other natural and human influences.

Water Quality Criteria – Water quality criteria are adopted by states and authorized Tribes to protect designated uses (numeric pollutant concentrations and narrative requirements). Section 304(a)(1) of the CWA requires EPA to develop criteria for water quality that accurately reflects the latest scientific knowledge. These criteria are based solely on data and scientific judgments on pollutant concentrations, as well as environmental or human health effects. Section 304(a) also provides guidance to states and Tribes in adopting water quality standards. Criteria are developed for the protection of aquatic life as well as for human health.

Water Quality eXchange (WQX) –WQX will facilitate water quality data submission and exchange between EPA and its data partners. WQX consists of standard data formats for sharing data with EPA as a centralized national data warehouse. (For more information, please see [Tribal Data Management for WQX Submission Supplement](#))

Water Quality Standards – Water quality standards are the foundation of the water quality-based pollution control program mandated by the Clean Water Act. Water quality standards define the goals for a waterbody by designating its uses, setting criteria to protect those uses, and establishing provisions to protect waterbodies from pollutants. A water quality standard consists of four basic elements:

- Designated uses of the waterbody (such as recreation, water supply, aquatic life, or agriculture).
- Water quality criteria to protect designated uses (numeric pollutant concentrations and narrative requirements).
- An antidegradation policy to maintain and protect existing uses and high-quality waters.
- General policies addressing implementation issues (for example, low flows, variances, or mixing zones).