

DATA ASSESSMENT AND REPORTING

Supplement to the Clean Water Act Section 106 Tribal Guidance

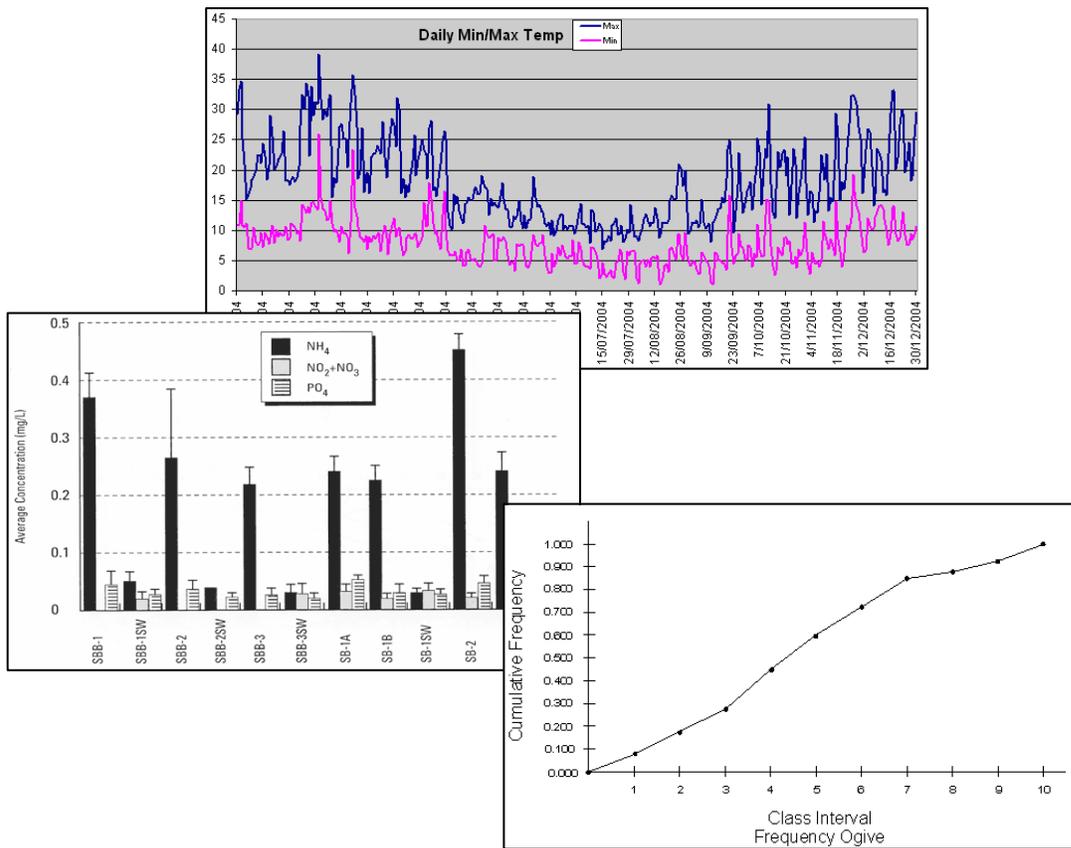


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Data Assessment and Reporting

Supplement to the Clean Water Act Section 106 Tribal Guidance

Introduction

What is the purpose of this tribal data assessment and reporting document?

In October 2006, the United States Environmental Protection Agency (EPA) issued the *Final Guidance on Awards of Grants to Indian Tribes under Section 106 of the Clean Water Act* (Tribal 106 Guidance)¹. The Tribal 106 Guidance provides a flexible framework for tribes and EPA regions to ensure that tribes' water quality program goals are met while being consistent with Section 106 of the Clean Water Act (CWA), the Governmental Performance and Results Act (GPRA), and other federal requirements. The Tribal 106 Guidance outlines new water quality reporting requirements and data expectations for all tribal programs receiving 106 funds. These requirements will help tribes collect and manage critical data and information for effective management of water quality programs, to measure environmental results, and report them to EPA.

As discussed in Chapter 8 and Appendix A of the Tribal 106 Guidance, EPA requires that tribes submit to EPA a Tribal Assessment Report that contains information about water quality on tribal land and demonstrates national results for the Section 106 Tribal program. The Assessment Report consists of: (1) a description of the tribe's monitoring strategy; (2) a water quality assessment; and (3) monitoring surface water quality data submitted electronically in a STORET-compatible format² that includes metadata for at least the nine basic parameters that are being monitored (dissolved oxygen, pH, water temperature, turbidity, total phosphorus, total nitrogen, macroinvertebrates, *E. coli* or enterococci, basic habitat information), as required considering the Tribal 106 Guidance and a tribal water quality program's level of sophistication.

This document is intended to complement the Tribal 106 Guidance and provide additional detail to tribes concerning the reporting information requested by EPA. This document addresses the water quality assessment component of a Tribal Assessment Report. Similar documents have been prepared to assist you in developing your monitoring strategy³ and performing data management for data submission in a STORET-compatible format⁴.

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.

¹ U.S. Environmental Protection Agency (EPA). Office of Water. Office of Wastewater Management. 2006. *Final Guidance on Awards of Grants to Indian Tribes under Section 106 of the Clean Water Act for Fiscal Years 2007 and Beyond*. EPA 832-R-06-003. (<http://www.epa.gov/owm/cwfinance/106tg07.htm>)

² "STORET" refers to EPA's STORage and RETrieval Data Warehouse, a repository for water quality, biological, and physical data on surface water and ground water collected by federal, state, and local agencies, tribes, volunteer groups, academics, and others. A new framework for data submission, called Water Quality Exchange (WQX), facilitates water quality data submission and exchange between EPA and its data partners. For more information about STORET/WQX, please visit <http://www.epa.gov/storet/>.

³ U.S. EPA Tribal Monitoring Strategy and Assessment Workgroup. 2008. *Developing a Tribal Water Monitoring Strategy: Supplement to the Clean Water Act Section 106 Tribal Guidance*.

⁴ U.S. EPA Tribal Data Management Workgroup, 2008. *Data Management: Supplement to the Clean Water Act Section 106 Tribal Guidance*

Reporting Recommendations for Different Levels of Tribal Monitoring Programs

The Tribal 106 Guidance includes reporting requirements for what should be included in a Tribal Assessment Report. This information is also included in Attachment B of this document. This document further clarifies these requirements by providing reporting recommendations that will enhance the quality of a tribe's Assessment Report.

The reporting recommendations are divided according to the three levels of sophistication of tribal monitoring programs described in the Tribal 106 Guidance. EPA recognizes that these levels are artificial designations and that a continuum of levels would more accurately reflect reality. EPA encourages tribes to read all sections of this document, regardless of program level, and use this information to help your program make progress moving from data collection to data interpretation. The objective is to use your data to better understand the current status of water resources, identify water bodies in need of restoration, etc. Reviewing your data and, as your program advances, interpreting the data, facilitates the translation of raw numbers into information that can be used to guide water quality management decisions.

The table below expands upon EPA's Tribal 106 Guidance water quality assessment reporting requirements. Tribal 106 Guidance requirements for each of the three program levels are described in the narrative sections below the table.

Program Level	Question Being Addressed	Report Contents
Fundamental	What data do you have?	<ul style="list-style-type: none"> • Narrative text with site description • Basic statistical summary table(s) • Quality assurance/quality control (QA/QC) review • Monitoring data submitted electronically⁵
Intermediate	What do your data mean?	Same as fundamental tribal programs plus, <ul style="list-style-type: none"> • Map of sites • Graphical data displays • Thresholds for comparison • QA/QC Summary • Text describing data observations
Mature	Are you meeting your water quality management goals?	Same as intermediate tribal programs plus, <ul style="list-style-type: none"> • Narrative text provides an assessment of condition • Identify causes and possible sources of impairments OR follows the 305(b) report guidance format

EPA and others often apply the term "data analysis" to describe the *process used to look for meaning in data*—usually involving simple or advanced statistics and/or graphing of the data. Data assessment is typically used by monitoring/assessment staff to mean the *process through which a decision about the condition/quality of water is made*—this usually involves interpreting the data against some societal value or goal. This document

⁵ http://www.epa.gov/storet/national_websim.html

uses the terms in this manner. The Tribal 106 Guidance defines these terms differently than the water program and the monitoring/assessment staff that support Tribal 106 efforts⁶.

I. Fundamental Tribal Programs

In general, water quality assessments generated by tribes with fundamental water quality programs address the question: *What data do you have?*

Tribes with fundamental water quality programs should focus on presenting their monitoring activities, raw data, and brief data summaries. Per the 106 Guidance, reports produced by tribes with fundamental water quality programs focus on reporting on the following parameters: dissolved oxygen, pH, temperature, and turbidity. Information on other parameters may also be included in the report.

EPA's Tribal 106 Guidance states that fundamental tribal program water quality assessments should include:

1. An atlas table of tribal water resources.
2. A narrative description of tribal water quality monitoring programs and assessment methods.
3. A narrative description of results of water quality monitoring on the reservation.
4. Brief narrative descriptions of issues of tribal concern.
5. Monitoring data, submitted electronically, for each assessed water body.

Attachment B presents the 106 Guidance describing each of these items. The following information provides more details for completing the narrative description of the tribal water quality monitoring program and for presenting the monitoring data.

First, it is important to compile useful background information that helps your audience understand why the data were collected. Include information in the introduction of the report that briefly describes the environmental setting (e.g., watershed, ecoregion) and the questions your monitoring activities were intended to answer. Your monitoring strategy provides a good starting point for this information.

A summary table is a useful way to easily highlight key information about your project. You may wish to present the following information:

- Type of data collected
- Location description for each site
- Sampling dates

Table 1 provides a template for summarizing sampling location and basic sampling information. EPA suggests having a staff person familiar with geographic information systems (GIS) generate maps of sampling locations and handle other mapping requests. If a GIS map cannot be produced, sampling locations can be identified on hard copy topographic maps and submitted with the report. In the narrative text in the report, consider describing the anticipated field activities versus actual accomplishments (e.g., you planned to sample 10 sites but could only sample six because four sites were dry).

⁶ **Data assessment** - the process in which you evaluate field, lab, and data management activities, organizations (e.g., labs), and personnel. The assessment can include evaluations of performance (e.g., sample collection techniques), systems (e.g., equipment and analytical procedures), and data quality (e.g., comparisons of actual data results with project quality objectives).

Data analysis - the process through which monitoring results are evaluated to determine what they reveal about the condition of a water body (U.S. EPA 2006, page 4-20).

Tribes with fundamental programs are expected to conduct a cursory quality assurance/quality control (QA/QC) reviews of their data. This review may be part of their Quality Assurance Project Plan (QAPP). The Tribal 106 Guidance (page 4-20) outlines several issues to consider as part of the data review. EPA regional staff may collaborate with tribal staff to conduct the initial QA/QC review.

Table 1. Sampling Locations and Dates for Mainstem Willow Creek

<i>Location Description</i>	<i>Latitude / Longitude</i>	<i>Station ID</i>	<i>Sampling Dates and Frequency</i>	<i>Data Type</i>
1/4 mi. below Durham railroad crossing	45°03'57" 110°07'22"	WC #1	July 2000 - Oct. 2000 (monthly) Jan. 11, 2001 (annually) Nov 2004 - April 2005 (quarterly)	Field parameters*
100' above Depot Creek confluence	47°15'15" 111°59'14"	WC #2	June – July 1978 (biweekly) Aug 1994 – Oct 2001 (annually) Nov. 10, 2004 (single sample)	Field parameters*
At Hwy 89	46°30'19" 112°05'19"	WC #3	May – August 1978 (weekly) June 1994 – Sept. 2005 (annually)	Field parameters* Nutrient data
100' above Cutbank Creek confluence	44°39'19" 109° 44'41"	WC #4	May to Aug. 1978 (monthly) July 1994 – July 2001(annually) June 2003 – Sept. 2005 (quarterly)	Field parameters* Nutrient data Macroinvertebrates

* Field parameters = Dissolved oxygen, pH, temperature, conductivity

If possible, consider including some basic statistical summaries of your data as part of your water quality assessment. Examples are provided in Tables 2 through 4 below. In addition, you may wish to generate simple scatterplot graphs, line graphs, bar charts or other graphs in Excel to review and present the data collected. EPA suggests graphing and summarizing the data on a site-by-site basis instead of aggregating the data for ease of examination of the data. In each graph or chart, be sure to identify the number of samples collected and used in creating the graph/chart (i.e., n=10).

If, working with your Region you are able to analyze your data, EPA suggests including your tribe's methods and results in the water quality assessment. The summary statistics and graphs should present data collected by site.

Table 2. Field data collected at site WC#1.

Statistic	Dissolved Oxygen (mg/l)	Temperature (°Celsius)	Conductivity (µmhos/cm)	pH	Turbidity (NTU)
Max Value	15.67	29.00	2190	9.43	200
Min Value	1.25	6.00	534	8.29	4
Median	9.89	23.00	1475	9.05	36
Average	9.53	21.41	1473	8.97	64
Number of samples (n)	12	17	19	18	5

Table 3. Field data collected at site WC#2.

Statistic	Dissolved Oxygen (mg/l)	Temperature (°Celsius)	Conductivity (µmhos/cm)	pH	Turbidity (NTU)
Max Value	13.20	26.60	1710	8.90	NA
Min Value	8.27	9.10	158	8.08	NA
Median	11.20	17.90	1560	8.67	NA
Average	10.74	18.52	1246	8.58	NA
Number of samples (n)	5	5	5	5	NA

Table 4. Lab data collected at site WC#2

Statistic	Total P (mg/L)	Copper (mg/L)
Max Value	0.1100	0.0030
Min Value	0.0300	0.0020
Median	0.0490	0.0025
Average	0.0595	0.0025
Number of samples (n)	4	2

If your data have not yet been migrated to STORET or are unavailable in a STORET-compatible format, field and laboratory data should be submitted to regional staff in an agreed-upon electronic format.

II. Intermediate Tribal Programs

In general, water quality assessments generated by tribes with intermediate water quality programs address the question: *What do your data mean?*

EPA expects that intermediate tribal monitoring programs will collect water quality data from sites within a watershed or throughout the reservation and store the data electronically. Intermediate tribal programs should have the internal capacity to begin to interpret their water quality data. In addition, EPA recommends having a staff person familiar with GIS generate maps of sampling locations and handle other mapping requests. Tribes that lack these skills should contact EPA's regional staff to request technical assistance and discuss reporting requirements.

EPA's Tribal 106 Guidance states that intermediate (and mature) tribal program Water Quality Assessments should include:

1. An atlas table of tribal water resources.
2. Brief narrative descriptions of monitoring programs and assessment methods.
3. Summary tables of the extent to which streams, lakes, and estuaries meet designated uses or tribal goals (including cultural uses of waters).
4. Summary tables of causes and sources of impairment

Appendix A of the Tribal 106 Guidance provides example approaches for documenting this information (see Attachment B of this document). Note that EPA believes tribes with intermediate programs may choose to reflect the summaries requested under #3 and #4 by comparing data against threshold values and reporting on specific sites rather than on the extent of a given resource meeting goals. Complementing the summary tables requested under #3 and #4, this section should also include a narrative description of water quality on the reservation and issues of tribal concern.

Tribes with intermediate programs should submit a QA/QC Summary within their report. A QA/ QC Summary further clarifies the narrative description of the monitoring and assessment methods used for analyzing and assessing data. This summary should describe the process used to review the QA/QC data and answer the following questions:

1. Were field and laboratory data reviewed?
2. Were any QC issues identified? Please explain the problems found.
3. How were these issues resolved?
4. Were the data removed or included in the subsequent analysis?

The core indicators for reporting purposes include the following parameters: dissolved oxygen, pH, temperature, turbidity, total nitrogen and total phosphorus. Intermediate tribal programs may also choose to report on additional parameters. In addition to the information required for fundamental program reports, tribes with intermediate programs may choose the best method for presenting their data. Graphs, scatterplots, box-and-whisker plots, tables, and narrative text are a few suggested methods for reporting data. Attachment A of this document provides some example tables as templates. Contact EPA regional staff if you are interested in seeing other example reports.

You will need to determine if you want to aggregate the data by watershed, by segment, by individual site, or by season. Be sure to document the rationale used to combine datasets. Briefly describe the decision rules applied to determining when sites remained distinct versus combined, highlight the number of sites and samples reflected in the analysis, and summarize how seasonal variation is addressed (if relevant to your dataset).

EPA recommends that data summaries identify the threshold/reference values that results will be compared against to evaluate condition. Be sure to state whether the value is a literature-based number, tribal water quality standard, state water quality standard, or reference-based threshold. If a reference value is not available, present the range of values observed in your results. Because few states or tribes have numeric nutrient criteria, EPA encourages tribes to compare nutrient concentrations to literature values appropriate to their region or to use EPA's 304(a) nutrient criteria for aggregated ecoregions. EPA's 304(a) criteria can be found at: <http://www.epa.gov/waterscience/criteria/nutrient/ecoregions>. These values provide a starting point for evaluating potential nutrient issues.

EPA also recommends that you document the process used for interpreting the data or reference your tribe's assessment methodology. Describe your observations when reviewing the data. Do the data exceed the proposed threshold? Do you have sufficient data to be able to draw any preliminary conclusions? Are there data gaps that could be addressed by modifying the sampling design? Document the answers to these questions in the report.

III. Mature Tribal Programs

In general, water quality assessments generated by tribes with mature water quality programs address the question: *Are you meeting your water quality management goals?*

In addition to collecting and storing data electronically, mature tribal programs should have the internal capacity to routinely review, analyze and interpret their water quality data. While it is not a requirement, these programs may have draft, tribal or EPA-approved water quality standards. Mature programs are beginning to develop assessment methodologies for comparing data to water quality criteria or other thresholds, and make attainment decisions for a given water resource, linking the attainment decision to an assessment unit (segment).

EPA's Tribal 106 Guidance states that reports submitted by tribes with mature (and intermediate) programs should include:

- 1) An atlas table of tribal water resources.
- 2) Brief narrative descriptions of monitoring programs and assessment methods.
- 3) Summary tables of the extent to which streams, lakes, and estuaries meet designated uses or tribal goals (including cultural uses of waters)
- 4) Summary tables of causes and sources of impairment.
- 5) Narrative description of water quality on the reservation and issues of tribal concern.

Five tables are included in Appendix A of the Tribal 106 Guidance to provide example approaches for documenting this information.

Tribes with mature programs are encouraged to submit a report similar to a 305(b) report following the tribal 305(b) reporting guidance found at: <http://www.epa.gov/volunteer/305btribal.pdf>. Contact your EPA region for more information on the 305(b) reporting guidance or to obtain an example of a tribal 305(b) report.

If a tribe chooses not to produce a 305(b) report, EPA recommends that mature tribal programs follow the recommendations for intermediate tribal programs as outlined in this document and in the Tribal 106 Guidance, and expand the analysis to assess waterbody condition. It is anticipated that mature tribal programs will have EPA-approved or tribally adopted water quality standards. For those tribes with tribal or EPA-approved water quality standards, the water quality assessment should indicate whether waterbodies are attaining the appropriate water quality standards. The report should include tables, similar to tables 2 through 5 in the Tribal 106 Guidance (pages A-6 to A-7 in Appendix A), that summarize information on the extent of impaired and fully supporting waters on the reservation and the causes of impairment.

The core indicators for reporting purposes include the following parameters: dissolved oxygen, pH, temperature, turbidity, total nitrogen, total phosphorus, *E. coli*, habitat measurements and macroinvertebrates. While water quality criteria exist for *E. coli*, EPA has limited guidance on interpretation of habitat or macroinvertebrate data. Tribes with a consistent method for interpreting habitat and macroinvertebrate data should describe that process in the report. In other situations, EPA recommends that tribes apply regionally relevant biological collection and assessment methods (e.g., state or ecoregional multimetric indices) to interpret their data. Tribes with mature water quality programs may choose to report on other parameters/indices.

If your tribe follows a weight-of-evidence approach to make assessment decisions, document in your water quality assessment the logic path followed to reach a conclusion and capture instances where data were insufficient or conflicting and a decision could not be reached.

Tribes with mature programs may want to consider using EPA's Assessment Database (ADB) to store and track assessment information. Tribes can download the ADB and read more about the database at: <http://www.epa.gov/waters/adb>.

Tribes may wish to submit draft reports to their EPA regional contacts for review and comment.

What is the tribal water quality reporting measure (Measure SP-14) and why is it important?

Measure SP-14 refers to a target in EPA's 2006-2011 Strategic Plan that tracks water quality improvement on tribal lands.⁷ This measure is intended to track national results for the Clean Water Act (CWA) tribal program. EPA currently lacks sufficient data to document improvement in water quality on tribal lands, and Measure SP-14 is one of the mechanisms EPA is using to fill this data gap. The reporting requirements outlined in the Tribal 106 Guidance will help tribes collect critical data and information to effectively manage their water quality programs. The requirements will also help EPA measure environmental results of the Section 106 program. In addition to the water quality assessments, the main component of these new reporting requirements, EPA regions may ask mature tribes to address tribal water quality reporting measures, such as SP-14, in their Assessment Reports. EPA regional staff are responsible for obtaining and reporting this information, and you

⁷ EPA. 2006. *2006-2011 EPA Strategic Plan*. EPA 190-R-006-001. http://www.epa.gov/water/waterplan/documents/subobjective2_2_1.pdf, pages 11-14 and 22-24 (sub-objective 2.2.1—improve water quality on a watershed basis) for the strategic target to improve water quality in tribal waters. Specifically, the target states,

[b]y 2012, improve water quality in Indian country at not fewer than 50 baseline monitoring stations in tribal waters ... (cumulative) (i.e., show improvement in one or more of seven key parameters: dissolved oxygen, pH, water temperature, total nitrogen, total phosphorus, pathogen indicators, and turbidity). (2005 baseline: 185 monitoring stations on tribal waters located where water quality has been depressed and activities are underway or planned to improve water quality, out of an estimated 1,661 stations operated by tribes.)

are encouraged to work with your EPA region to provide the information you have that is associated with this measure.

How do tribes report information for Measure SP-14?

In addition to the reporting requirements outlined in the Tribal 106 Guidance, the outcomes associated with Measure SP-14 can be documented in a variety of reporting formats such as:

- A 305(b) report. Tribes can address Measure SP-14 as an element of a 305(b) report by demonstrating improvement towards water quality attainment.
- An individualized report. Tribes can submit separate reports to EPA specifically to address Measure SP-14. These reports can present a weight-of-evidence approach to show water quality improvements or, if sufficient data exists, statistical analyses can be used to show significant water quality trends.
- Collaboration with regional staff.

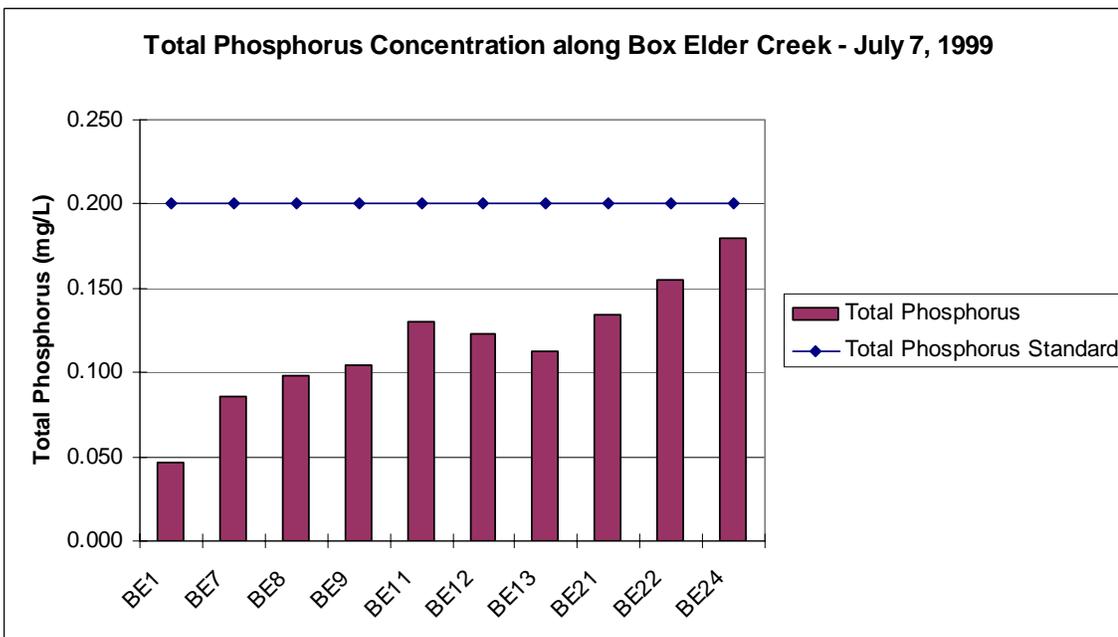
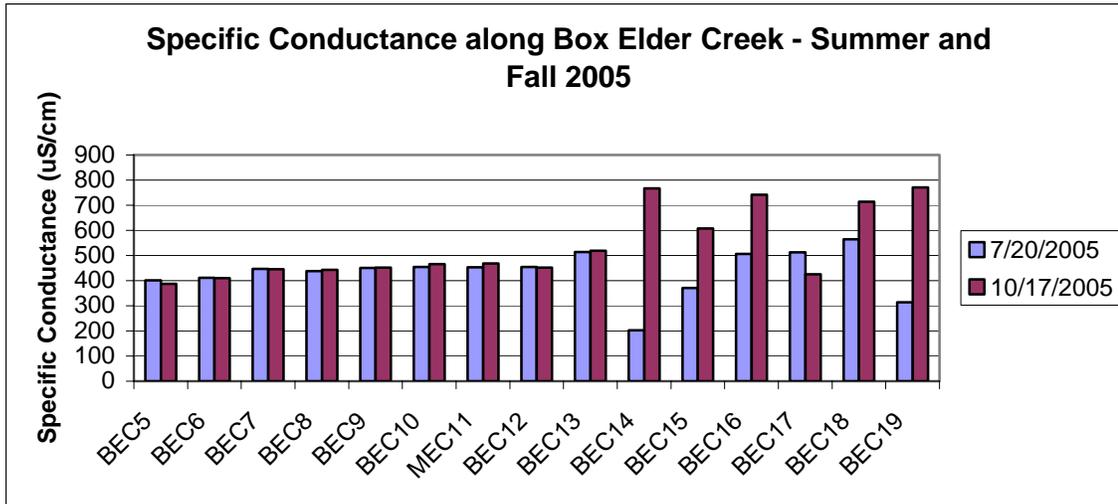
Since Measure SP-14 is an outcome measure that will be documented in a variety of ways, EPA encourages tribes reporting on Measure SP-14 to collaborate with their regional staff to determine the best method for presenting their results.⁸

⁸ EPA. 2006. *2006-2011 EPA Strategic Plan*. EPA 190-R-006-001. http://www.epa.gov/water/waterplan/documents/subobjective2_2_1.pdf, pages 11-14 and 22-24 (sub-objective 2.2.1—improve water quality on a watershed basis) for the strategic target to improve water quality in tribal waters.

ATTACHMENT A: Examples of Data Displays

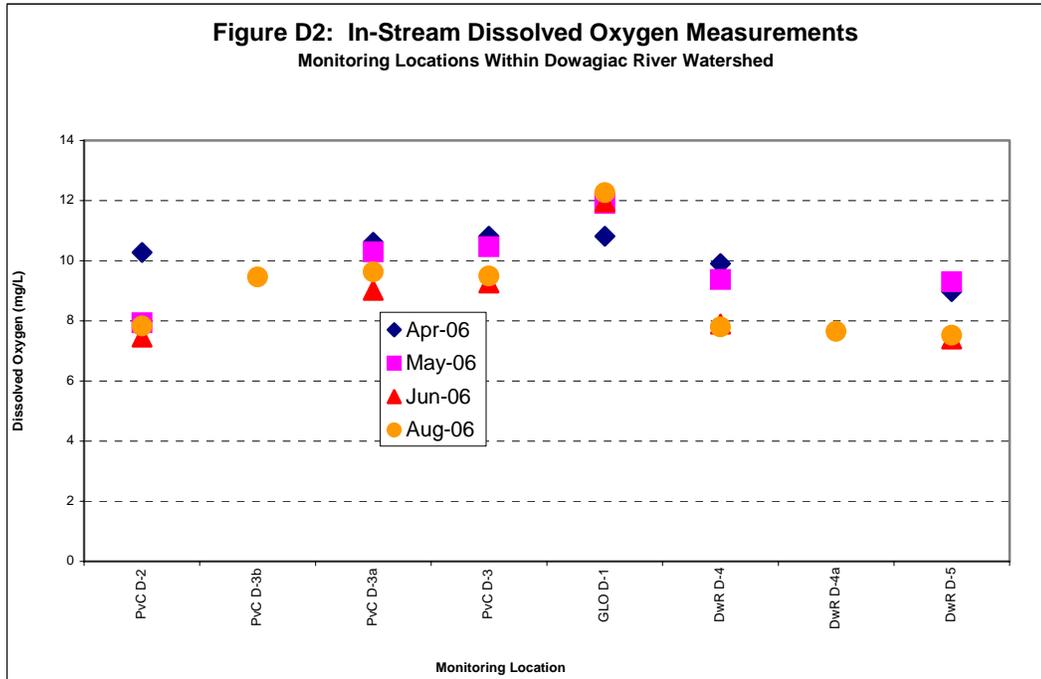
I. Simple Graphs

The two graphs below offer two examples of ways to display data. The first graph shows specific conductance collected twice in 2005 at various sampling locations. The second graph compares total phosphorus concentrations to EPA's 304(a) criteria for that ecoregion. All of the graphs in this attachment were created using an Excel spreadsheet.



II. Graphing Example

The graph below is from the Pokagon Tribe's Draft Assessment Report. The data depict dissolved oxygen concentrations at multiple sites during four sampling events. The narrative text below the graph summarizes the primary observations.



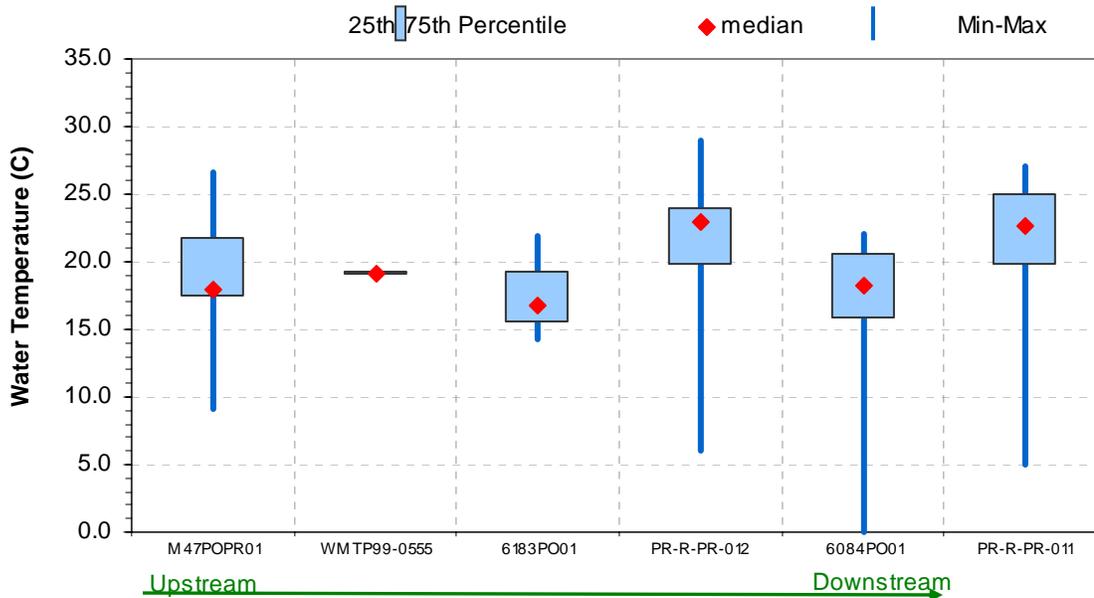
The data collected to date (number of samples = 26) indicate the following relationships relative to dissolved oxygen:

- The dissolved oxygen measurements recorded at the monitoring locations on the Dowagiac River, Peavine Creek, and the Gage Lake Outlet range from 7.4 mg/L to 12.26 mg/L (4.86 mg/L variation).
- The highest concentrations of dissolved oxygen were recorded at the Gage Lake Outlet monitoring location. These measurements range from 10.81 to 12.26 mg/L (1.45 mg/L variation).

The concentrations of dissolved oxygen recorded at the Gage Lake Outlet may be influenced by Gage Lake, since the monitoring location is proximally located to the Lake. The lake has more surface area and generally more exposure to wind than the Dowagiac River and Peavine Creek sites, which may allow more oxygen exchange.

III. Box-and-Whisker Plot Example

The box-and-whisker plot below presents temperature data collected at multiple sites within a watershed. The narrative text summarizes the key findings and provides recommendations for filling data gaps.



This graph depicts all the available temperature data for all sites in the East Fork Poplar River drainage on the Fort Peck Reservation (number of samples = 56). Also included are one site upstream from the reservation, and one site in a similar stream on the reservation (West Fork Poplar River). Overall, there are limited data. The data exceed the maximum temperature standard (max of 23°Celsius) at two locations on the East Fork and the West Fork as well. Additional sampling should be performed to determine if this is an area of naturally high water temperature or if the river is impaired.

IV. QA/QC Summary

The text below is an excerpt from the Pokagon Tribe’s Draft Assessment Report and shows one example of how to synthesize QA/QC findings.

Precision

Precision for nitrate analyses were evaluated through field duplicates. Precision is an assessment of the degree to which two or more measurements are in agreement. This is reported as the relative percent difference (RPD):

$$RPD = \frac{(S - D) \times 100}{(S + D)/2}$$

Where: S = first sample value (original or matrix spike value)

D = second sample value (duplicate or matrix spike duplicate value)

Nitrate Analysis

The sample identified as Dowagiac D-1 (or D-1) exhibited detectable levels of nitrate-nitrogen of 4.9 mg/L, and repeat measures of 5.3 and 5.2 mg/L from a duplicate. The higher of the two repeat measurements of the duplicate was used to calculate the RPD. The RPD for these samples calculates as 1.9.

The ground water sample identified as Dowagiac D-D, obtained from the housing office water well exhibited detectable levels of nitrate-nitrogen at 7.2 mg/L and 7.0 mg/L from a duplicate. The RPD for these samples calculates as 0.7.

Accuracy

Accuracy is the degree to which an observed value and an accepted reference value agree.

Nitrate Analysis

Three samples using a 10.0 mg/L nitrate-nitrogen standard solution (lot #6058; expiration date – August 2010) were prepared and analyzed to evaluate accuracy of the spectrophotometer. Two results exhibited 10.0 mg/L, and the third result exhibited 10.2 mg/L.

ATTACHMENT B: 106 Guidance Information on Tribal Assessment Report

(Pages A4-A7 in the *Final Guidance on Awards of Grants to Indian Tribes under Section 106 of the Clean Water Act for Fiscal Years 2007 and Beyond*. EPA 832-R-06-003. [<http://www.epa.gov/owm/cwfinance/106tgg07.htm>])

II. Water Quality Assessment Report

Under this *Guidance on Awards of Grants to Indian Tribes under Section 106 of the Clean Water Act*, tribes are required to collect, assess, and report annually on water quality monitoring data that were gathered using EPA Section 106 funding. The tribal water quality assessment should contain a basic set of information presented in a consistent fashion, as described below. EPA expects that each tribe's water quality assessment will become increasingly comprehensive as its monitoring program matures.

1. Fundamental Water Quality Program

The major components of an Assessment Report for a tribe with a fundamental water quality monitoring program should include the following:

1. **An atlas table of tribal water resources.** This atlas should include the estimated number of stream miles, lake acres, wetland acres, or estuarine square miles on your reservation.
2. **A narrative description of tribal water quality monitoring programs and assessment methods.** Refer to chapter 4 for general information on developing a water quality monitoring program. Sections I.3 and II.3 of chapter 4 contain information on assessment methods. This discussion should include:
 - The purpose of the monitoring program (e.g., to identify problem areas, track trends over time, identify NPS impacts, address public health concerns)
 - The number of stream miles/lake or wetland acres/estuary square miles monitored
 - Parameters monitored
 - Monitoring frequency
 - Discussion of any applicable WQI, tribal goals and objectives, or standards
 - Coordination or collaboration with other organizations
 - Any lab support
 - How data are interpreted and managed
3. **Narrative description of results of water quality monitoring on your reservation.** This should include an interpretation and summary of the findings of tribal monitoring activities, including probable causes and sources of impairment. Tribes that are in the early stages of developing a monitoring program should consider conducting simple watershed surveys and/or stream or lake habitat walks to learn about potential sources of impairment to their waters. EPA's Volunteer Stream Monitoring: A Methods Manual contains field sheets and explanatory information on conducting watershed surveys and habitat walks. Section I.3 of chapter 4 contains more information on interpreting your monitoring results through data assessment and analysis.
4. **Brief narrative descriptions of issues of tribal concern.** This discussion should identify any issues of special concern, such as:
 - Outbreaks of waterborne disease
 - Fish kills

- Fishing or shellfishing advisories
- Restrictions on surface drinking water supplies
- Restrictions on bathing

5. **Monitoring data, submitted electronically, for each assessed water body.** Latitude/longitude location of the sites monitored, the water body name, and the name of the watershed are integral parts of this information. Standard templates will be available through EPA regional offices.

2. Intermediate and Mature Water Quality Program

The major components of a tribal Assessment Report for an intermediate or mature program should include the following components. A standard format is provided below and is recommended for use by tribes.

1. **An atlas table of tribal water resources.** This atlas should include the estimated number of stream miles, lake acres, wetland acres, or estuarine square miles on your reservation.

Table 1 Atlas of Tribal Waters	
Total number of stream miles	95
Total number of lake acres	250
Total number of wetland acres	140
Total number of estuary square miles	10

2. **Brief narrative descriptions of monitoring programs and assessment methods.** This discussion should include:

- The purpose of the monitoring program (e.g., to identify problem areas, track trends over time, identify NPS impacts, address public health concerns)
- The number of stream miles/lake or wetland acres/estuary square miles monitored
- Parameters monitored
- Monitoring frequency
- Monitoring network design (e.g., rotating basin, fixed station)
- Discussion of any applicable WQI, tribal goals or objectives, or standards
- Coordination or collaboration with other organizations
- Nature of laboratory support
- How data are interpreted and managed

Note: The table below shows a suggested approach for determining support of designated uses or tribal goals using the nine basic parameters for tribes with EPA-approved or tribally-adopted WQS. Tribes with WQI or tribal codes can use a similar approach.

Table 2 Making Assessment Decisions	
Designated Use or Tribal Goal	Parameter(s) to be Measured to Determine Support of Use or Goal
Contact recreation/swimming/cultural uses	<i>E. coli</i> or enterococci, nitrogen, phosphorus
Aquatic life and wildlife	DO, temperature, pH, turbidity, macroinvertebrates, habitat, nitrogen, phosphorus
Drinking water	<i>E. coli</i> or enterococci, nitrates, turbidity
Shellfish/fish consumption	<i>E. coli</i> or enterococci

3. **Summary tables of the extent to which streams, lakes, and estuaries meet designated uses or tribal goals (including cultural uses of waters).** Tribes should use WQI or EPA-approved or tribally- adopted WQS to determine whether streams, lakes, and estuaries meet designated uses or tribal goals.

Table 3 Use/Goal Support in Tribal Streams				
Designated Use or Tribal Goal	No. of Stream Miles Monitored/ Assessed	No. of Stream Miles Fully Supporting Use or Goal	No. of Stream Miles Supporting Use or Goal but Threatened*	No. of Stream Miles Not Supporting Use or Goal
Swimming	50	40	5	10
Aquatic life	45	20	20	25
Cultural	30	30	5	0
Fish consumption	20	10	5	10

*Note: Threatened miles are a subset of those miles fully supporting the use or goal.

For tribes whose monitoring programs are in the intermediate stages, assessment decisions should be made on the best available information. Mature programs should consult EPA’s *Consolidated Assessment and Listing Methodology* (CALM) guidance, available online at <http://www.epa.gov/owow/monitoring/calm.html>, and *Elements of a State Water Monitoring and Assessment Program*, available online at <http://www.epa.gov/owow/monitoring/elements/>, for more information on making assessment decisions.

4. **Summary tables of causes and sources of impairment.**

Table 4 Causes of Impairment in Tribal Streams		
Parameter	No. of Stream Miles Monitored or Assessed	No. of Stream Miles Not Supporting Use or Goal
<i>E. coli</i>	50	10
Dissolved oxygen	45	25
Turbidity	45	20
Habitat degradation	45	25

Table 5 Sources of Impairment in Tribal Streams		
Source of Impairment	No. of Stream Miles Monitored or Assessed	No. of Stream Miles Not Supporting Use or Goal
Hydrologic modification	45	25
Agriculture (livestock grazing)	45	30
Stormwater runoff	20	20
Unregulated septic systems	50	25