Quality Assurance Project Plan Guidance & Template
Alaska Department of Environmental Conservation
Division of Water

Overview

A quality assurance project plan (QAPP) states the objectives and procedures to be followed for a project that uses or collects environmental information. The QAPP keeps all the information for the project in one location for easy access by everyone involved. ***Everyone involved with the project should be able to understand from the QAPP why the work is being done and how the project will achieve the established objectives.***

Following this page is a template that may be used to develop a QAPP. The template includes examples for a water monitoring project to help the reader understand, generally, how a QAPP is written, but **the template should be modified for your specific project.**

If your project is especially complex, it may not be suitable for your project and you should contact the DEC QA Officer for suggestions.

Using the Template

Instructions are highlighted in blue and examples are provided in italics. **Replace all italicized examples with the information from your project.**

Although not numbered 1-24, the template covers all 24 elements required for a QAPP. **Complete all tables that are relevant to your project. If a question does not apply to your project, simply note that and move on to the next question**. Do not leave any sections blank.

If you have questions about using the template or the information required, please contact DEC Division of Water QA Officer at dec.water.qa@alaska.gov

Why a QAPP?

By law, any EPA-funded project that collects or uses data must have an EPA-approved QAPP before it can begin collecting samples. The purpose of this requirement is to ensure that the data collected under these projects are of known and suitable quality and quantity.

The benefits of a QAPP are to communicate, to all parties, the how and why of project design, and to ensure that the quality objectives are achieved for the project. It does not guarantee success every time, but the prospects of a successful project are much higher with a QAPP than without one.

Even if this is not a requirement, organizations and facilities should still consider developing a QAPP, especially if they plan to conduct a data-oriented project, and seeks to have its information used by state, Federal, or local resource managers. Few agencies will use data unless methods of data collection, storage, and analysis can be documented. Clear and concise documentation of procedures also allows newcomers to the project to continue monitoring using the same methods as those who came before them.

Water Monitoring QAPP Requirement Summary		
Before submitting, please add a checkmark in the fourth column to indicate whether the section is present.		
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I. Title and Approval Page

Twisting River Monitoring

Twisting River, Alaska

Effective Date of Plan: _____

Project Manager:

_____

Signature/Date

Project Quality Assurance Manager:

_____

Signature/Date

Add additional signatures lines as needed. At a minimum, include the personnel listed above. If another group has written the QAPP for the facility or organization (e.g., contractor, state), then that information must also be included.

II. Project/Task Organization and Distribution List

The organization chart shows the lines of communication and reporting for the project, similar to a chain of command. Fill in the names of the individuals and their titles that are applicable to your project. If the project does not have all of the personnel in the chart, put N/A in the box where this applies. If necessary, add more boxes to accurately reflect the communication and reporting structure of your project.

In the responsibilities section, state what work/task each individual will be doing throughout the project. Project-specific details will be addressed in later sections of the QAPP.

Input the names and contact information for all individuals who need to be aware of/clear about the work being conducted; these are the individuals who will receive a copy of the QAPP.

Be sure to clarify who is responsible for distributing the approved final QAPP and any addenda to everyone.

Name	Title	Organization	Responsibilities (specific to this project)	Receive Copy of QAPP?	Email Phone
Name	*Project Manager*	*Facility/ Organization*	*Oversees quality assurance manager, data collection, team organization and training, etc., submits quarterly progress reports and Final Report to EPA*	*Yes*	*Email Phone*
Name	*Project Quality Assurance Manager*	*Facility/ Organization*	*Quality assurance, oversight and assessments, data verification, evaluation and usability, ensuring corrective actions are completed, etc.; distributes final QAPP to all on this list*	*Yes*	*Email Phone*
Names	*Field Personnel*	*Facility/ Organization*	*Field sampling and data analysis*	*Yes*	*Email Phone*
Names	*Lab Contact*	*Lab Name*	*Sample analysis and data validation*	*Yes*	*Email Phone*

III. Problem Definition, Project Objectives, and Data Users

Problem Definition

Clearly state the problem and environmental questions being addressed by the project.

Each year, the town of Twisting River hosts an annual Salmon derby competition that draws anglers from all over the world. From the time that the power generation plant started discharging water into the Twisting River two years ago, fishermen have noticed a decrease in the number and size of fish being caught, a decrease in the clarity of the water, and an increase in algae (chlorophyll a) in the river. This project will address the following questions:

- *Is the discharge water from the power plant causing the excessive growth of algae (chlorophyll a) in the Salmon's habitat?*
- *Is the discharge water affecting the water temperature?*
- *Are there differences in the water temperature and algae (chlorophyll a) growth concentrations upstream and downstream of the power plant?*

Project Objectives (linking data results with possible actions)

Describe how the project objectives will answer the problem presented above. Include the tasks that will be completed to address the problem.

We plan on investigating the effects of water temperature on algal growth in the Twisting River.

- *Objective 1: Collect water temperature data upstream of the discharge, at the discharge, and downstream of the discharge.*
- *Objective 2: Collect water samples to analyze the amount of algal growth upstream of the discharge, at the discharge, and downstream of the discharge.*

We will sample water for algae (chlorophyll a) from a series of sampling locations in the river where the power generation plant is discharging. The temperature of the river water will be determined in the field using a YSI meter. We will complete a correlation analysis comparing the temperature of the river and the concentration of algae (chlorophyll a).

Data Users

State who will use the data and what decisions or conclusions will be made based on the data. Include any action levels or standards to which the data will be compared.

The data collected from this project will be used by the city as screening level data. The city will use this data to decide if a more extensive project needs to be completed to determine if there are significant changes in temperature and algae (chlorophyll a) concentration in the river. The data will also be used to inform the Alaska Department of Environmental Conservation of a potential problem in the river so that DEC can follow-up with additional data collection and/or review the power plant's permit limits and re-evaluate the limits when the plant's permit is up for review at the end of this year.

IV. Background and History

In this section, state why the work needs to be done, identifying the reasons for conducting the work and/or the lack of information relating to the project. Provide any relevant historical information that would help the reader understand the problem that is being addressed. Discuss any previous work or data that has been collected as they relate to this project.

The power generation plant started discharging to the river in 2010. Local fishermen noticed visible changes to the clarity of the water, the growth of algae (chlorophyll a), and a decline in Rainbow Snouted Brook Trout, a species very sensitive to increases in temperature. It is unclear if the discharge water is contributing to the increase in algae (chlorophyll a) growth and the decline in fish.

The Twisting River has provided a natural habitat for Salmon for many years. Every year, the local fishermen host a world-renowned Salmon derby. Over the past two years, they have noticed a decrease in the size and number of Salmon, and an increase in algae (chlorophyll a) growth in the Twisting River.

Another town located 20 kilometers upstream has been collecting temperature information for the Twisting River for the past 4 years. That data has been entered into a database and will be used as baseline temperature data for the river. Additional information about the data can be found on Section VII (Existing Data). This data will be compared to the data collected on site.

V. Project Location

Provide a description of the site, sampling locations, site names, and how they were chosen. Provide the rationale for selecting sample locations and what you will sample. Provide a map showing the location and any other relevant information for the project. Tie this information back to the project objectives.

The location for the project will include a 1-kilometer stretch of the Twisting River not influenced by tides. This area of the river was selected to determine if there is a change in the temperature and algal concentrations due to the influence of the discharge water from the power plant. It extends 0.5 km upstream from the discharge point from the power generation plant and 0.5 km downstream from the discharge point that includes the habitat for the Salmon. Temperature data and water samples that will be analyzed for algae (chlorophyll a) concentration will be collected.

Three sampling locations were chosen in the midpoints of the river:

- *Location 1 (site name) is 0.5 kilometers upstream from the discharge point. It will provide data for the river that is not influenced by the discharge from the power plant.*
- *Location 2 (site name) is just south of the power plant discharge point. The data from this location will be used to determine if there is an impact from the discharge water.*
- *Location 3 (site name) is 0.5 kilometers downstream of the discharge point and within the Salmon's habitat. Data from this location will be used to determine if the discharge water is affecting the temperature and algae (chlorophyll a) concentrations in the Salmon's habitat.*

If necessary add a table with GPS coordinates and maps with the locations of the sites to be sampled.

VI. Project Schedule

In the table below, list all major activities that will be performed during the project. Provide an estimate of the timeframe for each activity.

Activities	Organization/Individual Responsible for Completion	Timeframe
Prepare QAPP	*Project Manager*	*January 2024*
Review QAPP	*Project Quality Assurance Manager*	*January/February 2024*
Procure equipment	*Project Manager*	*March 2024*
Gather existing data	*Project Manager* *Field Personnel*	*April-October 2024*
Collect samples	*Project Manager* *Field Personnel*	*April-October 2024*
Analyze samples	*Lab*	*April-October 2024*
Evaluate data	*Project Manager* *Field Personnel*	*April-November 2024*
Prepare final report	*Project Manager*	*January 2025*

VII. Existing Data

Complete this section only if your project will be using data that someone else has already collected (existing data). Just because data was collected by a reliable source, (such as a peer-reviewed journal article), doesn't mean it was collected in a way that your project can use. It is important to check the data to see how it was collected and if it is acceptable for the objectives of your project.

Identify all existing data that will be used for the project and their originating sources. Specify how the existing data will be used and the limitations on their use.

- In the Existing Data section, state what existing data you will use.
- In the Data Source section, state where that data will come from.
- In the How Data Will Be Used section, state the need for this data and/or what purpose it will be used for.
- In the Acceptance Criteria section, state what the requirements are for the data to use them in the project. For example, if you are looking for temperature data on water collected in July, then temperature data collected in June would not be acceptable. The instrument or method used to collect the data may also affect whether it can be used for the project.

Existing Data	Data Source	How Data Will Be Used	Acceptance Criteria
Water temperature data	*Sonde {or insert the field instrument used} located upstream from the power generation plant; data collected by {NAME of organization or facility}*	*To determine baseline temperatures of the Twisting River for the past 2 years*	1. *Temperature data has to be collected from a properly calibrated and functional instrument* 2. *Temperature data must be collected from within ½ km of power generation plant* 3. *Sensitivity of the temperature data from the buoy must be at least 0.1 °C*

VIII. Quality Objectives

Use this section to develop the data quality objectives that define the type, quantity and quality of data needed to answer specific environmental questions and support environmental decisions. The examples provided below are not appropriate for all projects. Complete this section for field measurements, existing data and laboratory data, if your project includes these components. Feel free to use a table format for describing the data quality objectives.

Precision

Precision is defined as the ability of a measurement to consistently be reproduced. Repeated measurements are usually used to determine precision by seeing how closely the repeated measurements agree. If repeated measurements will be taken, state how closely those measurements agree.

- *Field measurements – Duplicate temperature profiles will be taken at all three sampling stations during each sampling event. The two temperature readings for each station must agree within ±0.2 °C.*
- *Laboratory data – Results for duplicate algae (chlorophyll a) samples must agree within 25%.*
- *Existing data – Be sure precision was checked during the original project that produced the data we are using, and that the criteria are the same, e.g.: ±0.2 °C.*

Bias

Bias is defined as any influence on the project that might sway or skew the data in a particular direction. Taking samples from one location where a problem is known to exist, instead of taking samples evenly distributed over a wide area, is an example of how data can be biased. State any biases that may exist and how they will be addressed in your project.

- *Field measurements – All of our sampling locations are in the middle of the Twisting River. We may miss temperature or algal dynamics near the banks of the river. Given the limits of the budget and the screening level nature of the project, mid-point stream samples are sufficient.*
- *Laboratory data – Blank filters and calibration standards and calibration standards with concentrations from 0.05µg/L- 200µg/L will be used for chlorophyll. Resulting fluorometer readings must be within 10% of the known concentration.*
- *Existing data – The buoy is located upstream of the discharge point. Baseline temperature data will be used only from that location in the Twisting River. There is no baseline temperature data for areas downstream in our study area.*

Representativeness

Representativeness is how well the collected data reflects the true system. Describe how the collected data will accurately represent the population, place, time and/or situation of interest.

- *Field measurements – We are sampling within a 1 km section of the river, upstream, at the discharge and downstream to capture temperature and algae (chlorophyll a) in the Twisting River near the power generation plant. We are only assessing from April to October. Therefore, data is not meant to be representative of conditions during winter months.*
- *Existing data – The temperature data from the buoy records temperatures upstream of the discharge point from the power generation station. This should provide representative baseline temperatures for the Twisting River.*

Comparability

Comparability is defined as the extent to which data from one data set can be compared directly to another data set. Data sets should have enough common ground, equivalence or similarity to permit a meaningful analysis. State if the data is intended to be compared to other data sets and how this will be achieved.

- *Field measurements – We are using common calibrated field instruments (e.g., YSI sonde) and standardized, approved SOPs so our data will be comparable with data from other studies.*
- *Laboratory data – We are using Standard Methods 10300 for chlorophyll so our data will be comparable with data from other studies.*
- *Existing data – Our temperature monitor reads temperature to the same sensitivity as the buoy so we will have comparable baseline temperature data.*

Completeness

Completeness is the amount of data that must be collected to achieve the project objectives. State how much data will need to be collected for the project to be considered successful. This can be stated as a total number of samples or a percentage of data collected.

- *Field measurements – We will collect and analyze 100% of algae (chlorophyll a) samples, 42 samples and 14 duplicates throughout the project. If weather or other issues impede a sampling event, the event will be rescheduled.*
- *Existing data – Temperature data from the locations from April to October for the past 4 years will be used. If the data was not properly collected during any of that time, that data will not be used.*

Sensitivity

Sensitivity is essentially the lowest detection limit of a method, instrument or process for each measurement parameter of interest. State the sensitivity needed for the instruments, methods or processes used for the project to obtain meaningful data.

- *Field – The temperature monitor has a sensitivity of 0.1°C for a temperature range of -5°C to 95°C. Depth measurements will be made in cm.*
- *Existing data – The temperature probe on the buoy has a sensitivity of 0.1°C. The Laboratory has a method detection limit of 0.05µg chl a/L using Method 445.0.*

IX. Data Collection Methods

Sampling Design

Describe and justify the data collection activities. Include location-specific information, such as GPS coordinates or landmarks, for the data collection locations. Provide information about the frequency of sampling and the collection of quality control samples. Include information about your plans for identification and transportation of samples.

We plan to sample the Twisting River at 3 locations: one located ½ km upstream from the discharge point of the power generation plant, one located at the discharge point and one located ½ km downstream from the discharge point. All three sampling locations will be located at the midpoint of the Twisting River, equidistant from each bank.

At all 3 locations, surface samples will be collected for algae (chlorophyll a) using amber/dark 1-L HDPE bottles.

Temperature readings will be taken using a YSI sonde. River depth will be determined using a wading rod, depths are marked with tape on the YSI cable at 6 inch intervals. Temperature readings will be taken at the surface and bottom of the water column.

Schedule

Sampling will occur twice a month from April-October 2024 for a total of 14 sampling events. One duplicate algae (chlorophyll a) sample will be taken during each sampling event. Sampling will occur at the same time for each event. Algae (chlorophyll a) samples will be kept on ice until they are filtered in the lab.
Duplicate temperature readings at each depth will be taken at all stations during each sampling event. Sampling teams of 2 people will sample the 3 sampling locations.

Unique Sample Labeling

Samples will be labeled and identified (sample ID) using the following format MM-DD-YYYY- US/DS/DP, upstream (US), downstream (DS) or discharge point (DP). Sample labels will include the sample ID number. Samples will be transported to the laboratory immediately by the field staff.

Complete all information in the table below, using additional rows/columns if necessary. Only a short reference back to the project objective is necessary in the table.

- In the Matrix section, state what kind of matrix (air, water, soil, animal/organism) is being sampled during the project.
- In the # of Sampling Location(s) section, provide the number of sampling locations.
- In the # of Samples per Location section, state if multiple efforts will be made at one location, such as sampling at different depths or taking repeated measurements over a given amount of time (such as once per quarter).
- In the Parameter section, state what substance will be measured/sampled.
- In the Field QC Samples section, state how many and what type of quality control samples will be collected.
- In the Total Number of Samples section, state the total number of samples that will be collected for each sampling event or total project including field quality control samples.
- In the Sampling Standard Operating Procedures (SOP) Reference section, state what specific methods will be used for the sample/monitoring data collection. Attach any SOPs as an appendix to this document.
- In the Project Objective for Sampling and Analysis or Monitoring section, state why the data will be collected at the particular location, how often and when.

Matrix	**# of Sampling Locations**	**# of Samples per Location**	**Parameter**	**Field QC Samples**	**Total Number of Samples**	**Sampling SOP Reference**	**Project Objective for Sampling and Analysis or Monitoring**
Water	*3*	*1*	*Algae (chlorophyll a)*	*1 duplicate per sampling event*	*4 per sampling event*	*Tribal Chlorophyll a SOP*	*Meets the objective to sample for algae (chlorophyll a) in the Twisting River*
Water	*3*	*2*	*Temperature*	*6 duplicate readings, one at each station and depth*	*12 per sampling event*	*Tribal Temperature Monitoring SOP*	*Record temperatures in the Twisting River*

X. Equipment List and Instrument Calibration

Equipment List; Template #10A

Generate a list of all field equipment and supplies that will be used for the project.

- *Waders*
- *Coolers with ice*
- *Waterproof datasheets*
- *Chain of Custody form(s)*
- *Labels*
- *1-L HDPE amber bottles*
- *Temperature Monitor (include make, model and serial number)*
- *Pens*
- *Wading rod*
- *Life vest*

Instrument Calibration and Maintenance; Template #10B

In the table below, fill in any calibration or maintenance requirements for the equipment that will be used during the project. State how the calibration information will be documented.

Instrument/Equipment	Calibration Frequency	Maintenance Requirements
Temperature Monitor (include make, model and serial number)	*Calibrate before each use per manufacturer's instructions. Check calibration at the end of each day after use.*	*Per manufacturer's instructions (see SOP)*

All calibrations for this project will be documented. Calibration records will be kept on calibration data sheets specific to each piece of equipment. Calibration records will include date, time, name of individual doing calibration, and the calibration results. Acceptance criteria for calibration checks will also be included on the data sheets.

XI. Analytical Methods

Complete the following table when sample analysis by a laboratory is applicable to the project.

Matrix	Analytical Group/Parameter	Reporting Limit	Detection Limit	Analytical & Preparation Method/ SOP Reference	Sample Volume	Containers (*number, size, type*)	Preservation Requirements (*chemical, temperature, light protected)*	Maximum Holding Time (*preparation/ analysis)*	Laboratory used for Analysis
Water	*Algae (chlorophyll a)*	*0.2 ug/L*	*0.05 ug/L*	*EPA Method 445.0*	*1.0L*	*56 1.0-L HPDE sample containers*	*Store in dark place on ice. Filter as soon as possible. Filters should be stored in -20 °C freezer*	*3.5 weeks once filtered*	*XYZ University Ecology Lab 12 College Dr. Edison, NJ*
Water	***ADD ADDITIONAL ROWS AS NECESSARY***								

XII. Field Data Sheet

If a field data sheet will be used for the project, attach it below or as an appendix to this document.

Temperature Profile Datasheet (EXAMPLE)				
Date				
Location				
Sampler Name(s)				
Weather Conditions				
	Time of Temperature Reading	**Depth**	**Temperature °C (First Reading)**	**Temperature °C (Duplicate Reading)**
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

XIII. Training and Specialized Experience

Training

In this section, state any required training that an individual involved with the project would need, and how it will be documented. Also include any refresher trainings that may be conducted.

- In the Personnel/Group to Be Trained section, state who will need the specific training and how many people will be trained.
- In the Description of Training section, state who will perform the training and what kind of information the trainee will learn.
- In the Frequency of Training section, state how many times the training will be conducted during the project.

The project manager, who is also the field leader, will train all members of the monitoring team. They will be trained on the organization or facilities SOPs for sampling temperature, as well as all pertinent safety procedures. A signature page that contains the training materials covered and individuals who attended the training will be completed and retained with the project field forms.

Personnel/Group to Be Trained	Description of Training	Frequency of Training
Field Personnel	• *Proper use of temperature meter and water sampling equipment.* • *Chlorophyll a sampling procedures provide by laboratory being used by the project* • *Instruction on information to be recorded in the field.*	*One time at the beginning of the sampling season and repeated if needed at the project manager's discretion*

Specialized Experience

If any individuals have specialized experience that the project will use, please complete the specialized experience table. State who the individual is, what specialized experience they have related to the project and their years of experience.

Person	Specialized Experience	Years of Experience
Project Manager	*Freshwater fish biologist. Use of real-time monitoring equipment such as temperature meters. Experience collecting water samples for multiple parameters.*	*20*

XIV. Assessments and Oversight

Assessments and project oversight include various reviews to identify shortcomings or deviations from the project. For each type of assessment, describe procedures for handling QAPP and project deviations encountered during the planned project assessments. Fill in all necessary information.

Assessment Type	Frequency of Assessment	What Is Being Assessed	Who Will Conduct the Assessment	How Issues or Deviations Will Be Addressed
Data Checks and Assessments	*1 time per month*	*Field data entries into spreadsheet and database*	*Project Quality Assurance Manager*	*Verify with sampling team*
On-Site Field Inspection	*2 weeks into sampling season and mid-season*	*Data compared to QAPP/SOP*	*Project Manager*	*Re-train if necessary*
Laboratory reports	*Review laboratory reports within 1 week of receipt*	*Review of laboratory data for any potential reporting errors or other issues with the data that need to be addressed as soon as possible*	*Project Manager*	*Re-analysis of samples by laboratory or additional samples collected for analysis.*

XV. Data Management

Describe the data management processes used throughout the life of the project. Data management includes recording and transcribing field notes, retrieving and logging instrument data, transmitting automated field and laboratory results, data transformation and reduction procedures (translating the collected data into a form that would be usable to meet project objectives; something like aggregating continuous data into a daily average), compiling survey results, and storing and securing data throughout the project. Describe the way data handling errors will be controlled (i.e., making spot checks for transcription and calculation errors).

Field Datasheets and Field Data

All data from the field will be recorded on pre-printed datasheets (see template #12). Data will be transcribed from datasheets to an online database. All of the data will be checked for accuracy and transcription errors. If there are any discrepancies in data entries, the Project Manager will check the field datasheets and discuss them with the field sampling team. Original datasheets will be stored in the Project Manager's office for 5 years after completion of the project. Existing data will be obtained from an existing database, reviewed and added to an electronic database. The electronic database is located on a computer in the lab. Files will be backed up daily.

Laboratory Analytical Results

Lab results will be electronically delivered to the Project Manager. Any algae (chlorophyll a) data that did not meet the quality control requirements of the laboratory will be flagged. The laboratory data will be entered into the electronic database.

XVI. Data Review and Usability Determination

Include in this section the types of checks that will be performed at the end of the project to determine if the data collected is usable for achieving the goals of the project. Examples of data checks are provided in the table below.

Data Checks	
Field/Lab	**Data Management**
Monitoring performed per SOPs or QAPP	*Data entry and transcription errors*
Field QC samples performed correctly	*Calculation/reduction errors*
Measurements performed correctly	*Proper data and document storage*
Calibrations performed correctly	*Missing data documented*
Data meets acceptance criteria	
Holding times	
Evaluate any deviations from QAPP or SOPs to determine the impact to the data and project objectives	

Describe the process used to determine the usability of your project data. If, based on the table above, your data review does not uncover any issues and all of your quality control criteria are satisfied, then your data will be assumed to be usable for the intended project objective. However, this is not always the case, so you will need to have a process for determining data usability if all quality control criteria are not met.

All data issues identified will be discussed with the Quality Assurance Officer to determine data usability. All decisions to allow data that did not fully comply with quality control criteria or QAPP requirements will be explained, and any limitations on data use will be fully discussed in the final project report.

XVII. Reporting

Specify the frequency of all reports, the names of the authors and to whom they will be issued. Itemize what information and records must be included in the report(s). This might include:

- Sample collection records
- Quality control sample records
- Equipment calibration records
- Assessment reports
- Data reconciliation results and associated recommendations/limitations
- Final report of results

If your project includes posting data to a website for public access, state how data limitations will be explained.

The Project Manager is responsible for submitting quarterly project reports to the EPA Project Officer. The quarterly reports will provide a status update for the project and include a summary of the quality assurance data checks conducted and the results. The final report will summarize the quality assurance data check results for the entire project along with the data usability determinations made by the Project Quality Assurance Manager. The rational for the use of any data that does not fully comply with the quality criteria requirements of the approved QAPP will be fully explained in the final report.

Appendix A – Field SOPs and/or Field Data Sheet

Attach all field Standard Operating Procedures (SOPs) as an appendix to this document.