**[Insert Project Name, NFWF ID No., Grant Type. Complete Information in Document Header]**

**QUALITY ASSURANCE PROJECT PLAN**

COMPLETED PLAN PREPARED BY:

**[Insert name here]**

**[Date]**

Refer correspondence to:

**[Name, organization, address, telephone, and email]**

*(Note to All Grantees: Instructions in this QAPP Template are given in bold, highlighted type. Make sure to complete or revise all sections and remove any underlining. Also, ERASE the instructions, including this one, as you complete the QAPP for your specific project. Make sure to define acronyms/ abbreviations when they initially appear in the text (i.e. mg/L, NTU, etc.). Make changes in other places as necessary. If a section is not applicable to your project, delete the template text, replace with “N/A”, and include an explanation regarding why the section is not applicable.)*

Please read the entirety of this document. Do not fill in information without reading the whole document. It is necessary to fully understand the contents of this Quality Assurance Project Plan (QAPP) in order to complete the required components successfully. Every QAPP will be unique and responsive to the proposal approved by NFWF. Please note that the QAPP is to be a stand-alone document.

qapp Approvals PAGE

Approval Signatures (required prior to project start):

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**[Insert Name]**

Project Lead, **[Insert Organization]**

**[Insert Title]**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**[Insert Name]**

**[Insert Role and Organization. Delete if not applicable. Copy and add additional signatories as appropriate. Delete extra spacing so that they fit on this single page. This expedites the signatory process]**

**[Insert Title]**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Manager, Chesapeake Bay Programs  
National Fish & Wildlife Foundation  
1133 15th Street NW, Suite 1000

Washington, DC 20005   
Direct (202) 888-1677

Website: [www.nfwf.org/chesapeake](http://www.nfwf.org/chesapeake)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

EPA Region 3 Delegated Approving Official

U.S. Environmental Protection Agency

**(WHEN DOCUMENT IS COMPLETE RIGHT CLICK ON Table of Contents and ‘UPDATE FIELD” then “UPDATE ENTIRE TABLE”)**

1 PROJECT MANAGEMENT 5

1.1 Contact Information 5

1.2 Project Objectives and Approach 6

1.3 Data Quality Objectives 8

1.4 Quality Assurance Objective Criteria 10

1.5 Documentation and Records 12

2 DATA ACQUISITION 12

2.1 Sampling Information 12

2.2 Sample Handling Procedures 15

3 QUALITY CONTROL REQUIREMENTS 16

3.1 Measurement Performance Criteria 16

3.2 Internal Quality Control 17

3.3 Field Quality Control 18

4 INSTRUMENTATION AND EQUIPMENT PREVENTIVE MAINTENANCE 19

4.1 Sample Equipment Cleaning Procedures 19

4.2 Instrument and Equipment Testing Procedures and Corrective Actions 19

5 DATA MANAGEMENT 19

5.1 Data Assessment Procedures 21

5.2 Data to be Included in QA Summary Reports 21

5.3 Reporting Format 22

6 DATA VERIFICATION AND USABILITY 22

6.1 Self-Assessment, Data System Audits 23

7 REFERENCES 23

Appendices 24

**[Verify numbering here and against text at completion of QAPP]**

# 1 PROJECT MANAGEMENT

## 1.1 Contact Information

[Please provide the name and phone number of project personnel as applicable. Include an Organization Chart if your project team is comprised of multiple project partners and/or more than five (5) team members. Only include project partners if they are involved in project activities discussed in the QAPP]

All personnel listed below in Table 1 will receive copies of this Quality Assurance Project Plan (QAPP), and any approved revisions of this plan. Once approved, this QAPP will be available to any interested party by requesting a copy from the project management.

**Table 1: Project Team Contact Information**

|  |  |  |
| --- | --- | --- |
| **Title** | **Name (Affiliation)** | **Phone Number/E-mail** |
| Project Manager |  |  |
| Primary Field Sampler |  |  |
| Environmental Scientist |  |  |
| National Fish and Wildlife Foundation (NFWF) Program Manager |  | ( |
| QA Officer [This person should not be involved in data collection. If title does not apply to anyone on the Project Team then add “ / QA Officer” after the Project Manager Title and delete this line] |  |  |

Describe the roles and responsibilities of project team members involved in data collection and/or quality assurance, including contractors or volunteers as appropriate. Project team members would actively work on one or more phases of your project. If volunteers or students are part of the project team, summarize their role and reference to later sections of the QAPP that discuss training details (i.e., Section 1.5, 2.0). Include the names, duties, and responsibilities of all parties and/or groups involved in the key aspects of your project. If names are unknown specify general title, affiliation, and briefly describe project role. Clarify the intended data user(s) for each data collection activity as applicable.

**[EXAMPLE ONLY – EDIT AS APPLICABLE TO YOUR PROJECT]**

PROJECT MANAGER (Name) has the overall responsibility for ensuring that the project meets the project objectives and quality standards. The Project Manager will be the responsible for overseeing all activities conducted on this project including schedule adherence, budgeting, and oversight of all scope-related activities. Scope-related activities include assigning project tasks to personnel, data collection, data analysis, interpretation, communication, and final reporting. The Project Manager will also coordinate all program/project needs related to project personnel and convene periodic project-planning meetings.

## Project Objectives and Approach

**[FOR HYBRID QAPPs: Create subsections as applicable to discuss all data collection activities. Guidance is provided for both secondary data collection/modeling AND stakeholder workshops/interviews/surveys. If you are not collecting one of these categories of data, you may disregard instructions for that category and remove non-applicable subsections from template.]**

**[Insert your condensed proposal narrative here. Modify according to your project specific objective and address the following in this section:**

* Clearly state or list the objectives of your project and what the project is intended to accomplish.
* What methods/surveys/data collection activities will be implemented to achieve these objectives?
* What is the geographic scope for your project? Add a map of the project area as an Appendix and reference in this section.
* Provide background to support the project objectives, including previous work/grants, team experience, and relevant context for your project.
* Discuss whether the project must comply with agency legislation, permits, comprehensive management plans, or organizational goals.
* If applicable, discuss actions under different grants or regional programs that may have provided supporting framework or strategy for your project objectives.

**Secondary Data Collection/Modeling/Geospatial**

* Why are secondary data collection, modeling, or geospatial assessment the best approach for achieving the project objective?
* Discuss what type of secondary data collection, modeling, or geospatial assessment is being implemented for this project.
* If conducting a modeling assessment, describe the model, provide a reference (if applicable), and a version number. Discuss why this model is the best fit for the project, and who selected it for use.

**Stakeholder Surveys/Interviews/Workshops**

* Discuss what type of interview, survey, workshop, or meeting is being implemented for this project and why.
* Who are the targeted interviewees, stakeholders, or survey recipients, who selects them, and how are they selected?
* How many interviews, meetings, or surveys will occur?]

The objective of this document is to identify the quality assurance components that are necessary to implement the project activities under the **[Insert project name]**. This objective will be achieved by using the following methodology [**Briefly summarize methodology, survey type, or any other data collection activities associated with the project – make sure to attach documents to QAPP and reference as appendix or provide details on how the reader can access the information as needed. Details regarding data collection should be discussed in later sections of the QAPP**.] to collect and/or measure, analyze and/or interpret [**Insert measurement type. i.e.: water and biota**] samples.

[Briefly list/discuss the sites to be sampled as part of this project. Explain the process for site selection here or in section 1.3 if certain decision criteria were or will be applied to select sites for sampling. If sites are not selected yet, discuss the criteria you will use to choose sampling sites and why]

The overall project timeline is **[Insert dates]**. Required monitoring or measurements will begin **[Insert dates, data or measurements that will be taken, start/stop dates for this activity, etc. If timeline is not determined yet, discuss the potential timeline or that it will be determined at a later date. Data collection associated with this QAPP cannot be in the past.]** Table 2a lists the constituents that are required to be monitored or measured.

**[EXAMPLE ONLY – EDIT AS NEEDED TO REFLECT YOUR PROJECT]**

Table 2a: Constituents to be Measured

| **Constituent** | **Unit** |
| --- | --- |
| Vegetation | % cover |
| Flow | CFS (Ft3/Sec) |
| pH | pH units |
| Temperature | 0F |
| Dissolved Oxygen | mg/L |
| Turbidity | NTU |
| Total Dissolved Solids | mg/L |
| Total Suspended Solids | mg/L |
| Phytoplankton | #individuals/ mL |
| Macroinvertebrates | #individuals |
| Location | lat/long |

[If you are collecting secondary data (ex. literature review), conducting a GIS analysis, public opinion assessment, or modeling assessment then please use sections below as applicable to your project . If you are collecting secondary data, including GIS layers, and know the sources please include them in Table 2b or 2c below or provide as an appendix. If utilizing a geospatial application or model for data assessment, list the constituents to be evaluated in Table 2b or 2c. Remove example Table 2b or 2c that is not applicable to your project and re-number tables as needed]

**Geospatial/Modeling/Secondary Data**

Data collection for **[Geospatial/Modeling/Secondary Data]** will begin **[Insert start/stop dates for this activity. If timeline is not determined yet, discuss the potential timeline or that it will be determined at a later date]**. Table 2b/c lists the constituents/data sources that are required to be evaluated or assessed through the project data collection for **[specify project component]**.

Table 2b Constituents to be Evaluated [For Geospatial/Modeling Projects]

| **Constituent** | **Unit** |
| --- | --- |
| Vegetation | Type preference |
| Fencing | Color preference |
| Site Access | Private/Public/Limited |
|  |  |

Table 2c: Constituents to be Evaluated [For Secondary Data Assessment]

| **Constituent** | **Unit** | **Data Reference [Add full citation and weblink for data source]** |
| --- | --- | --- |
| Vegetation | %cover |  |
| Population Density | # of persons/mi2 |  |
| Wetland | type of wetland |  |

[If secondary data sources are not known, discuss or list potential sources of information (e.x. NOAA precipitation data or county-level population data). Explain parameters to be researched, why these are the appropriate parameters for your project, and who selected them.]

**Survey mailers/Workshops/Interviews**

[Survey mailers/workshops/interviews] will begin [Insert start/stop dates for this activity. If timeline is not determined yet, discuss the potential timeline or that it will be determined at a later date.] Table 2d lists the constituents that are required to be evaluated or assessed through the project survey.

[If you are conducting a survey or focusing on specific constituents or parameters for the stakeholder interviews/workshops, please include them in Table 2d below. Otherwise, remove Table 2d and discuss or list the topics to be addressed by the interviews, workshops, or surveys]

Table 2d Constituents to be Evaluated

| **Constituent** | **Unit** |
| --- | --- |
| Vegetation | Type preference |
| Fencing | Color preference |
| Site Access | Private/Public/Limited |
| # of responses to survey |  |

[Clarify whether volunteers, students, or other individuals that require training would be involved in data collection activities. Describe training for these individuals, as applicable, including methodology, timing, and person with primary responsibility for training.]

## 1.3 Data Quality Objectives

**[READ THROUGH HIGHLIGHTED INSTRUCTIONS BEFORE COMPLETING]**

[Data quality objectives (DQOs) will define project data collection design, including:

1) when and where to collect samples (if identified in section 1.2, state here and reference section 1.2),

2) the acceptable level of data uncertainty and decision errors for the study (also discussed in section 1.4),

3) how many samples to collect (what is the conceptual site model), why is this the appropriate sampling/study design to meet project objectives

4) why the data type you are collecting is appropriate to meet your project objectives, and

5) who is making these decisions, how, and when were they made?]

Questions to consider when completing this section:

* How is the quality of your data being ensured? Examples may include
  + an explanation of the experience of the project team (or reference section 1.1 for this information),
  + proper training and oversight of data collectors,
  + adherence to accepted methods and protocols to achieve project objectives, including citations for methods and protocols, or
  + using lessons learned from successful past projects that were similar to this project design, providing a summary of past projects.
* How were sites selected for this project? (May be discussed in section 1.2 and referenced to here or vice versa – but MUST be discussed in one of the sections and reference to in the other)
  + Why are the sites selected for sampling appropriate to achieve the project objectives?
  + What was the decision criteria to select sites for sampling (if discussed in section 1.2, reference to that here or vice versa – but MUST be discussed in one of the sections and reference to in the other)? Who made these decisions and when?
* Why was the data being collected chosen to address the project objectives and what information will it be providing?
* If the data is not collected as planned, how will that affect the project/project objectives?

**For Modeling projects**

* What assumptions will need to be made to use the model?
* Is any calibration required?
* Will any specialized equipment or training be required to utilize the model?
* What is the source for data inputs (see criteria above if using secondary data)?
* Identify key data inputs and any data processing elements that allow for evaluation and assessment of the model outputs to meet project objectives.

**For Secondary Data collection and Geospatial Analysis**:

* Define the temporal boundaries for sources. How recent does it need to be? Will you use the most recent available data? Why or why not?
* If data layers or sources represent a varying time scale, will data be comparable?
* If data layers or sources represent varying geography, will data be comparable?
* What it is the process for determining secondary data or geospatial data is accurate, reliable, and complete? Where did the data come from? How was it collected? What is the margin of error on the source data?

**For Stakeholder Surveys/Interviews/Workshops**

* Describe approach for analyzing survey data if applicable, including formulas, calculations, units, definitions of terms, and statistical analysis, will be included and defined.
* What was the decision criteria to select interviewees, workshop attendees or survey recipients?
* Decision criteria for software/application used for surveys or respondent evaluation, if applicable.
* What is the acceptable number of interviews or attendees to a workshop to meet the project objectives?
* Why is the interview, workshop, or survey format (structure, length, type of questions, etc.) the most appropriate to meet project objectives?
* Who is making these decisions, how, and when were they made?
* What types of questions will be asked during the interview, workshop, or as part of the survey? Attach questions as an appendix and reference here or provide examples of potential questions

**[MAIN THEME FOR THIS SECTION and SECTION 1.4: When completed, these sections will identify the required data and criteria which will support developing quality data collection designs or processes. These sections should discuss how the project will ensure that the type, quantity, and quality of environmental data used in decision-making will be appropriate for the intended application. It should help the reader understand why this data provides the information necessary to answer study questions and meet project objectives.]**

## 1.4 Quality Assurance Objective Criteria

The Quality Assurance Objectives (QAOs) define a tolerable level of potential decision error for data collected on a project. They help to define the DQOs and clarify the project objectives further. The QAOs are then used as comparison criteria during data quality review by [explain the group that is responsible for collecting data] to determine if the minimum requirements have been met and the data may be used as planned.

* How will the project team know data collected in the field is “fit for use” on the project and not an error or unacceptable for reporting? This section must support text in sections 1.3, 3.0 and 5.0
* What are the decision criteria in place to determine data collected for this project meets the project objectives? What/who is the source for these criteria?
* Identify key indicators of data quality associated with your data: PARCC Precision, Accuracy/bias, Representativeness (may be identified in section 1.2 or 1.3, please reference to it here), Comparability and Completeness. **Identify data quality indicators for your dataset as follows:**
  + Precision: Precision is an expression of agreement between two measurements. It provides a measure of reproducibility of sample results/measurements.
  + Accuracy: Accuracy is used to identify the agreement between an observed value and a reference or true value.
  + Representativeness: Refers to how well the data collected is representing the area of interest. This may be a discussion of why sampling points were chosen as a representation for your study.
  + Comparability: A qualitative discussion and refers to the equivalency of data sets.
  + Completeness: Completeness is a project/study level metric which identifies the measure of the amount of valid data collected as compared to the amount of data planned. Comparability is typically a qualitative discussion on how data being collected will be comparable to other datasets.
  + Sensitivity: Sensitivity identifies the capability of a method or an instrument to detect a given parameter at that concentration.

The quality assurance objectives are listed in Table 3**.** [Add more discussion as applicable to explain the source for the QAOs outlined in Table 3. NOTE: Comparability and Representativeness are not listed in Table 3 – make sure these indicators are addressed in the text. Detection and reporting limits should be added to the QAPP as applicable. If detection and reporting limits are extensive, they may be added as an appendix and referenced here. If completeness is not 100%, please add a statement below the table explaining why this is acceptable for the project]

Table 3: QAOs for Field Related Measurements [EXAMPLE ONLY – EDIT AS NEEDED]

| **Parameter** | **Method** | **Sensitivity** | **Precision** | **Accuracy** | **Completeness** |
| --- | --- | --- | --- | --- | --- |
| EXAMPLE | | | | | |
| Dissolved Oxygen | YSI Field Meter | .5 mg/L | Field and Laboratory Duplicates: 10%RPD[[1]](#footnote-1) | Adherence to sampling protocols mfg instructions | 90% |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

[All columns may not apply to all parameters. The term “N/A” may be added for certain parameters; however, reasoning for use of the term “N/A” must be clarified with an explanation after Table 3. Accuracy and completeness should apply to all parameters. When completing Table 3, make sure to identify all acronyms in a footnote and make sure that values in the table are clearly identified as to what they represent (for example, 10% RPD for field duplicates). This can be identified in the cell of the table (see dissolved oxygen) or footnoted at the bottom of the table.]

**For Modeling or Geospatial analysis**

* Identify resolution and accuracy required for data input.
* Who will review the outputs or results to make sure they are clear, unbiased, and objective?
* What margin of error would be acceptable for outputs/analysis and why?

What data quality indicators will be used to qualify the data? (Consider accuracy, precision, consistency, any validation or processing metrics key to your data)

* How will it be determined that the results satisfy the purpose of the project? Clarify if there a specific range of data outputs that are acceptable?
* Identify specifications regarding geospatial coordinate data and data accuracy.
* Identification any topology, labeling, attribute accuracy, and other processing quality indicators for map digitizing (data gap identification etc.), if required.
* Identify criteria to be met in ground-truthing satellite imagery, as required for your project
* Identify any metadata requirements to ensure consistency, this can be project-defined or a reference to a standard (append documents if applicable).

**For Secondary Data Assessment**

* What are the qualifiers for accepting information to support the project objectives? Does information need to be
  + geographically relevant to a specific area
  + a specific type of information (e.g. federal government agency resource) or developed by a specific author
  + inclusive of a certain level of quality
  + in compliance with a management plan or legislative requirements
  + representative of a specific timeframe
  + other requirements for using information?

What data quality indicators will be used to qualify the data?

If this information is already described in section 1.3, then just reference discussion here.

**For Stakeholder Surveys/Interviews/Workshops**

* What is the decision criteria to select data collected frominterviews, surveys, or during workshops for use based on the project objectives?
* What are the potential limitations of data being used for this project? If applicable, specify acceptance criteria for survey results
* What data quality indicators will be used to qualify the survey, workshop, or interview data as acceptable or not?
* Who will review the survey/interview questions to make sure they are clear, unbiased, and objective? Or clarify whether this has already occurred if survey/interviews questions have been developed.
* What is the acceptable/expected rate of return for surveys and why?
* Is there a contingency plan if the surveys have a low response rate?
* What margin of error would be acceptable for survey responses and why?
* What information will participants be given ahead of the workshop or interview?
* What are the qualifiers for accepting information to support the project objectives from interviews or workshop participants? Does information need to be
  + geographically relevant to a specific area?
  + in compliance with a management plan or legislative requirements?
  + representative of a specific timeframe?
  + other requirements for using information gathered from workshop participants?

## 1.5 Documentation and Records

[Include the following in this section:

* Description of Staff/Volunteer/Intern/Student Training documentation and records as applicable or clarify why these are not required.
* Explain how data and information will be transferred between project partners including advisory groups and contractors (ex. secure file share).
* Describe or list permits or reports to be prepared as part of this project, including information to media outlets or government agencies, and how reports or media would be distributed. If no reports or media will be developed as part of this project, then clarify here.]
* Clearly state whether or not data or project results will be made available to the public.

All records generated by this project will be stored at **[Insert name here]** main office. Copies of this QAPP will be distributed to all parties involved with the project, including signatories and field sampling personnel. Any future changes or amendments to the QAPP will be held and distributed in the same fashion. Copies of previous versions of the QAPP will be clearly marked as “superseded by Revision #” so as not to create confusion.

The records of all project information and data used to complete the activities of the project will be retained for at least seven years from the date of sampling, measurement, report, or application.

# 2 DATA ACQUISITION

**[Edit as applicable to your project. Describe data collection staff and staff training if not described in Section 1]**

## 2.1 Sampling Information

Information on sample locations can be found in Appendix A. Methods for sample collection in the field will be done according to **[describe methods/procedures or refer to discussion in section 1.2**.**]** The project team will ensure that a representative sample is collected by adhering to [discuss or reference sampling techniques, protocols, and methods]. Expand on this discussion and address the following:

* Discuss any preparation required by the sampling team before the data collection event, including weather checks, equipment preparation, site determination, or team meetings. If weather checks are required, please include source with active hyperlink for determination. Clarify which team member is responsible for preparation activities.
* Clarify which team members will participate in sampling events and who provides sampling equipment to team members.
* Explain how site locations are selected for each sampling event, when the sites are selected, and who on the project makes this decision (reference previous QAPP section if already discussed)

Field Measurements and Observational Data

This section should discuss any field measurements that you will be taking in the field to support your sampling. For example:

Water quality parameters including [Insert project-specific information, such as weather, GPS, flow rate, pH, dissolved oxygen, and temperature] will be measured prior to collecting samples. [Describe measurements to be collected in the field, or reference discussion in another section. If visual or photo documentation will occur on your project, then note the procedure for taking photos or recording visual observations here. Note: If you will be collecting geospatial points then please note in this section and in Table 2]

QC SAMPLE COLLECTION

[Edit to be specific to your project or clarify why this section is not applicable and remove the boilerplate text. Alternatively, only discuss types of QC samples being collected. Identify the type of QC sample, frequency of collection, reference to Table 3, and discuss QC acceptance criteria.] Equipment blanks and field duplicates will be collected at a frequency of about 1 per 20 normal samples, or 1 per sampling event, whichever is greater.

FIELD INSTRUMENT CALIBRATION

Routine field instrument calibration will be performed at least once per day prior to instrument use to ensure instruments are operating properly and producing accurate and reliable data. Calibration will be performed at a frequency recommended by the manufacturer. [Explain what instruments will be used on this project, or reference discussion elsewhere in the QAPP (e.g. section 4.0) and attach or provide a reference for the manufacturer’s instructions. Note who on the project team will perform calibration and whether a calibration log or records will be kept.]

DECONTAMINATION PROCEDURES

All field and sampling equipment that will contact samples will be decontaminated after each use in a designated area. [Edit as applicable to your project. Describe decontamination area location, how decontamination would occur, and who would determine the placement for this site. If decontamination procedures are not required (i.e. all equipment is one time use/not used for additional samples or project does not require formal decontamination procedures) then clarify here and briefly state cleaning procedures as applicable.]

FIELD DOCUMENTATION

All field activities will be adequately and consistently documented to ensure defensibility of any data used for decision-making and to support data interpretation. [If boilerplate text is used, explain how the project team is ensuring adequate and consistent documentation. Reference other sections as appropriate. Be sure decision-making processes are explained in section 1.2 and 1.3 and reference any QA discussion (section 3.0) or data management procedures (section 5.0) for this documentation]

Pertinent field information, including (as applicable), the [Insert field project-specific sampling/measurement parameters, such as width, depth, flow rate of the stream, the surface water condition, crop and cultivation practices or sediment management, and location of the tributaries] will be recorded on the field datasheets. [Provide field sheets as an appendix and reference here. Explain whether data would be recorded electronically and on what device, or in hard copy (e.g. data sheets or a logbook), and who would do this.]

DATA COLLECTION PROCEDURES FOR NON-FIELDWORK PROJECT ACTIVITIES

**Secondary Data Collection/Modeling/Geospatial Assessment**

* Discuss which team members participate in secondary data collection/geospatial analysis/modeling and what the process is for data collection or analysis.
* If conducting a secondary data search, list and explain search criteria. Who selects the search criteria and what is the process for determining search criteria?
* How will the data collection or assessment be recorded and by whom?
* Reasoning for any electronic data collection devices.
* If a specific data log or record-keeping system will be used to track data collection, attach as an Appendix and reference here.

**Stakeholder Surveys/Interviews/Workshops**

[Discuss which team members participate in interview or survey design/mailing/assessment or workshops. Explain source of contact information for interviewees, workshop participants, or survey recipients and who mails surveys or invites interview/workshop participants. Append interview protocol, survey or meeting agenda if already developed and reference here.

**For surveys**

* Explain how surveys are prepared for sending and how they are sent (email, hard copy, etc.) Is any information provided to recipients other than the survey? Explain source of information and reason for inclusion.
* If surveys are sent, accessed, or processed using a specific program, state the program and version used for this project.
* Who receives completed/returned surveys and how are they stored for analysis? Are the surveys labeled in a project-specific manner upon receipt?
* What is the timeframe for receiving surveys (e.g. surveys received 2 months after mailer will not be accepted)?

**For workshops/interviews**

* Discuss and append or reference any information given to interviewees/workshop participants ahead of time. Explain the purpose of providing this information.
* Describe interview/workshop structure, facilitators/lead interviewers, and how long the interview/workshop will be.
* Discuss any post-workshop/interview data collection activities (e.g. follow-up surveys, individual interviews, etc.]

DOCUMENTATION PROCEDURES FOR NON-FIELDWORK PROJECT ACTIVITIES

All data collection and assessment activities will be adequately and consistently documented **[describe how adequacy and consistency in documentation will be confirmed]** to ensure defensibility of any data used for decision-making, as described in section **[insert section where this is discussed]** and to support data interpretation.

**Secondary Data Collection/Modeling/Geospatial Assessment**

* How will information be filed or organized for data analysis and QA review?
* Will secondary data be organized into a database or summarized in a synopsis? Who would do this?
* When will this occur?
* Who is responsible for filing and documenting data and/or analysis results?
* To ensure transparency and defensibility in the decision-making process, how will the project team document why certain models, project reports and/or existing data were not used?
* Describe the data format (e.g., electronic, hardcopy) and how data will be maintained for the project. If data are obtained from databases, include as much accompanying quality control, temporal, locational data, etc. as needed to document and verify the quality of the data.
* For Modeling/Geospatial Projects: Identify data collection devices, how you will handle alternative collection if needed, and data processing requirements (any requirements around speed, sequencing, or calibration).
* For Modeling/Geospatial Projects: Identify key meta data and valid values (assuming these were discussed in terms of consistency in Section 1.3 – expand upon details or requirements here as needed. Reference to any standards or developed protocols)

**Stakeholder Surveys/Interviews/Workshops**

**For survey projects, address the following:**

* What will happen to completed surveys when received, either through the mail or online? If mailer surveys would be transferred to an electronic form, please clarify here.
* How will information be filed for data analysis and QA review?
* When will this occur post-survey receipt?
* Who is responsible for filing and documenting surveys upon receipt?
* Discuss use of software/applications for survey response processing, if applicable.

**For stakeholder workshops/interviews address the following:**

* Will a professional transcriber be hired to record meeting minutes/interviews, or will members of the project team be assigned to take notes? What are the procedures for taking notes, if any?
* How many note-takers will be involved in the workshop or interview and why is this number adequate to ensure quality for this process?
* If the interview/workshop will take place over several hours, or will include a large number of participants, how will the project team ensure notetaking is accurate and all relevant information (as discussed in sections 1.3 and 1.4) is captured?
* Is any training required for project team members to take notes?
* Will notes be recorded by hand, on white boards by the facilitator, or electronically?
* Will the workshop/interview be recorded? If so, when will the recording be viewed and notes transcribed?
* What happens to the notes after the workshop/interview is over? How are the meeting notes processed for data analysis and QA review? When does this occur and who is responsible for this activity?

## Sample Handling Procedures

**[Revise and expand on this section as applicable to your project]**

Sample containers will be pre-cleaned and certified to be free of contamination according to the **[Insert specification]** for the appropriate methods. **[Discuss how sampling devices and sample bottles will be rinsed as applicable prior to sampling.]**

The following table describes sample collection methods and containers for each parameter.

[EXAMPLE ONLY – EDIT AS NEEDED]

Table 4: Sampling Collection and Container Requirements

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Instrumentation Type** | **Sample Bottle** | **Typical Sample Volume** |
| Temperature | Thermometer | Plastic Bottle | 150 mL |
| pH |  | Plastic Bottle or sample directly | 150 mL |
| Turbidity |  | Plastic Bottle | 150 mL |
| Total Dissolved Solids |  | Plastic Bottle | 1000 mL |
| Total Suspended Solids |  | Plastic Bottle | 1000 mL (two jars) |

SAMPLE IDENTIFICATION

All samples will be identified with a unique number and samples labeled with the following information.

* Sample ID
* Location ID
* Date
* Time
* Initials of sample collector
* Sample type (normal or QC) **[NOTE: If you are not collecting QC samples, remove reference to QC here and in sections below]**

SAMPLE CUSTODY AND DOCUMENTATION

Samples will be traceable from the time of sample collection until results are reported. **[Insert title of appropriate person from Table 1]** will be responsible for ensuring that the field sampling team adheres to proper documentation procedures. Field datasheets will be maintained for all samples collected during each sampling event. **[Discuss how samples will be handled and disposed of in the field]**

# 3 QUALITY CONTROL REQUIREMENTS

The types of quality control assessments required for this project are discussed below. Detailed procedures for preparation and analysis of quality control samples are provided in the SOPs for the sample type **[Revise this statement if not relevant to project]**.

## 3.1 Measurement Performance Criteria

**[Text should be adjusted to meet project specific requirements]**

The overall QA objective for this project is to develop and implement procedures for field sampling and reporting that will provide results that are scientifically defensible. Specific procedures for sampling, reporting of data, internal QC, audits, preventive maintenance of field equipment, and corrective action are described in the other sections of this QAPP

### **3.1.1 Field Precision**

**[Confirm based on actual fieldwork. Remove what does not apply (i.e. if you are only evaluating with RPD, remove references to RSD]**

Field precision is assessed through the collection and measurement of field duplicates at a rate of one duplicate per 10 analytical samples. See Table 3 for details on precision objectives in the field. **[Adjust text below as needed to match project specifics]**

Precision will be assessed through the calculation of the relative percent difference (RPD) for two replicate samples and relative standard deviation (RSD) for three or more replicate samples. RPD is the absolute difference between two results expressed as a percentage of the average result. It is calculated according to the following formula:

RPD = S – D X 100

**(S + D) / 2**

Where: S = Original sample value.

D = Duplicate sample value.

The acceptance criteria for RPD will be less than or equal to 20%. Percent RSD is calculated according to the following formula:

**%RSD = Standard Deviation X 100**

**Mean**

### **3.1.2 Field Accuracy**

**[Confirm based on actual fieldwork. Remove what does not apply (e.g. remove discussion of trip blank samples if not being collected)]**

Accuracy of the field sample collection procedures ensures that samples are not affected by sources external to the sample, such as sample contamination by ambient conditions. Field sampling accuracy will be assessed by the data from equipment and trip blank samples.

Trip blank samples will provide **[Add explanation]**.

**[If GPS or geospatial information is being collected for your project, discuss field accuracy here]**

## 3.2 Internal Quality Control

Internal QC is achieved by collecting and/or analyzing **[****explain how QC is achieved internal to the project team during field work and during desktop work]** to ensure that results are within the specified QC objectives discussed in sections 1.3 and 1.4 **[be sure QC objectives are defined in sections 1.3 and 1.4]**.

**[If QC samples are not being collected, the following text may be revised. Modify as applicable to your project to explain sampling QC]** The QC sample results are used to quantify precision and accuracy and identify any problem or limitation in the associated sample results. The internal QC components of a sampling and analyses program will ensure that the data of known quality are produced and documented. The internal QC samples, frequency, acceptance criteria, and corrective action must meet the minimum requirements presented in the following sections.

**Secondary Data Collection/Modeling/Geospatial Assessment**

Internal QC is achieved by review of the **[model results/secondary data records]** by the QA/QC Officer **[or insert title from Section 1.0.]** to ensure that results are within the specified QC objectives discussed in sections 1.3 and 1.4 **[be sure QC objectives are defined in sections 1.3 and 1.4]**. The internal QC components of a data collection and analyses program will ensure that the data of known quality are produced and documented. [Discuss timing and process for QA/QC review of information once it is input to a database or other online filing system. Who from the project team would do this and when? Describe how problems will be resolved, including chain-of-command, and documentation process. Include examples of types of corrective actions that might be implemented (e.g., access other data sources, loosen or tighten acceptance criteria).]

**Stakeholder Surveys/Interviews/Workshops**

Internal QC is achieved by review of the **[Interview notes/synopsis/survey results]** by the QA/QC Officer **[or insert title from Section 1.0.]** to ensure that results are within the specified QC objectives discussed in sections 1.3 and 1.4 **[be sure QC objectives are defined in sections 1.3 and 1.4]**. The internal QC components of a data collection and analyses program will ensure that the data of known quality are produced and documented. [Discuss timing and process for QA/QC review of information once it is transcribed from the surveys or interview/workshop notes to a database or other online filing system. Who from the project team would do this and when? How will interview/workshop notes or survey results be evaluated and tallied? What is the process for ensuring accuracy of notes? Describe how problems will be resolved, including chain-of-command, and documentation process. Include examples of types of corrective actions that might be implemented (e.g., access other data sources, loosen or tighten acceptance criteria)]

## 3.3 Field Quality Control

[**The subsections below are examples. Confirm text that is appropriate for your project and remove text that does not apply.** **Explain how QC will be ensured during fieldwork, referencing previous sections as applicable**.]

Field QC samples are used to assess the influence of sampling procedures and equipment used in sampling. They are also used to characterize matrix heterogeneity. For basic water quality analyses, quality control samples to be prepared in the field will consist of equipment blanks, field duplicates, and matrix spikes (when applicable).

Equipment Blanks

Equipment blank samples will be collected and analyzed for all analytes of interest along with the associated environmental samples. Equipment blanks will be collected by routing lab grade water (certified contaminate free) through decontaminated sampling equipment using the same procedures as for environmental samples. The Equipment Blank samples will be analyzed to determine if field procedures have introduced contaminants into the samples. Equipment blank samples will be collected at a rate of 1 per 20 normal samples, and should not contain analytes of interest above project defined reporting limits

Field Duplicates

Field duplicates will be collected at the rate of 1 per 20 normal samples, or 1 per sampling event, whichever is greater. Field duplicates will be collected at the same time as environmental samples or of two grab samples collected in rapid succession and will be analyzed along with the associated environmental samples. If the relative percent difference (RPD) of field duplicate results in greater than 25% and the absolute difference is greater than the reporting limit (RL), both samples should be reanalyzed. **[Reference to Table 3a (QAOs) as applicable and discuss acceptance criteria from the table]**.

# 4 INSTRUMENTATION AND EQUIPMENT PREVENTIVE MAINTENANCE

## 4.1 Sample Equipment Cleaning Procedures

Equipment used for sample collection must be cleaned and maintained in accordance with proper field practices. **[Explain what these field practices are and reference other sections of the QAPP** **(such as the Decontamination discussion in section 2.1) and SOPs as appropriate]**

## 4.2 Instrument and Equipment Testing Procedures and Corrective Actions

All instrument and equipment testing will be performed according to manufacturer recommendations and documented in the [Specify how the project team will document testing and where these records will be located. Explain what instruments and equipment will be used for this project, or reference section where this is already discussed in the QAPP. How often will equipment be tested and when? What will happen to equipment that fails testing procedures – what are the corrective actions?]

# 5 DATA MANAGEMENT

**[Elaborate on this process as appropriate.** **Please review boilerplate text and edit if statements are not accurate to your project.]**

Copies of field datasheets, original preliminary and final reports, and electronic media reports will be kept for review by the **[Insert organization name]**. The field crew will retain original field datasheets.

Field data sheets are checked and signed in the field by the project **[Insert “leader”, “manager”, etc.]**. They will identify any results where sample identification information is incorrect, samples were inappropriately handled, or calibration information is missing or inadequate. Such data will be marked as unacceptable by and will not be entered into the electronic data base and/or otherwise used for project analysis, reporting or other purpose. [**Clarify timeframe for completing this check, post-fieldwork and whether there would be a need to repeat fieldwork and/or re-train data collectors if results are unacceptable. If consensus is required by the project team for decision-making, explain the consensus process here. Describe how problems will be resolved, including chain-of-command, and documentation process. Include examples of types of corrective actions that might be implemented.**]

The data generated will be [**Identify how data will be stored and used, uploaded into a database, entry into a spreadsheet, etc**.] maintained by [**who will be responsible for data entry and management?**] and available for NFWF staff review when requested. This review is for QA/QC purposes only and will not be used for any other purpose. All project information will remain confidential. See Section 5.2 for additional information on this data reporting requirement.

After data entry or data transfer procedures are completed for each sample event, data will be inspected for data transcription errors [**how long after data collection and by whom? How are errors determined (reference sections 1.3 - 1.4)? What happens to data found to have errors?**], and corrected as appropriate. After the final QA checks for errors are completed, the data will be added to the project database. [**Specify who would do this and the timeframe, post-data collection. Describe how data will be used for reporting as applicable**]

**Secondary Data Collection/Modeling/Geospatial Assessment**

Copies of **[model results/secondary data records]**, original preliminary and final reports, and electronic media reports will be kept for review by the **[Insert organization name]**. [**If project data or information is being used for data sharing purposes (such as data sharing to a public site or into another system external to the project team) discuss how quality control will be ensured for data processing requirements and validation external to the project team**]

**[Model results/secondary data records]** are checked and signed by the project **[Insert “leader”, “manager”, etc.]**. They will identify any results where information is incorrect, missing, or inadequate **[what would identify a response as “inadequate”?]**. Such data will be marked as unacceptable by and will not be entered into the electronic data base and/or otherwise used for project analysis, reporting or other purpose. **[Clarify if this process applies to your project. Include the timeframe for completing this check, post-data collection and whether there would be a need to repeat data collection or modeling assessment and/or re-train data collectors if results are unacceptable.** **If consensus is required by the project team for decision-making, explain the consensus process here**]

The data generated will be converted to a standard database format **[revise to be accurate to your project]** maintained by **[who will be responsible for data entry and management?]** and available for NFWF staff review when requested. This review is for QA/QC purposes only and will not be used for any other purpose. All project information will remain confidential. See Section 5.2 for additional information on this data reporting requirement.

After data entry or data transfer procedures are completed for each **[insert type of data collection/assessment event]**, data will be inspected for data transcription errors **[how long after data collection and by whom? How are errors determined (reference sections 1.3-1.4)? What happens to data found to have errors?]**, After the final QA checks for errors are completed, the data will be added to the project database. **[Specify who would do this and the timeframe, post-data collection. Describe how data will be used for reporting as applicable]**

**Stakeholder Survey/Interviews/Workshops**

Copies of **[meeting notes/survey responses]**, original preliminary and final reports, and electronic media reports will be kept for review by the **[Insert organization name]**.

**[Meeting notes/survey responses/assessments/synopsis]** are checked and signed by the project **[Insert “leader”, “manager”, etc.]**. They will identify any results where information is incorrect, missing, or inadequate **[what would identify a response as “inadequate”?]**. Such data will be marked as unacceptable by and will not be entered into the electronic data base and/or otherwise used for project analysis, reporting or other purpose. [Clarify if this process applies to your project. Include the timeframe for completing this check, post-data collection and whether there would be a need to repeat surveys/meetings/interviews and/or re-train data collectors if results are unacceptable. For interview or workshop notes, would the notes be sent to interviewees/workshop attendees for review? Why or why not? If consensus is required by the project team for decision-making, explain the consensus process here]

The data generated will be converted to a standard database format **[revise to be accurate to your project]** maintained by **[who will be responsible for data entry and management?]** and available for NFWF staff review when requested. This review is for QA/QC purposes only and will not be used for any other purpose. All project information will remain confidential. See Section 5.2 for additional information on this data reporting requirement.

After data entry or data transfer procedures are completed for each **[insert type of data collection event]**, data will be inspected for data transcription errors [how long after data collection and by whom? How are errors determined (reference sections 1.3-1.4)? What happens to data found to have errors?], After the final QA checks for errors are completed, the data will be added to the project database. [Specify who would do this and the timeframe, post-data collection. Describe how data will be used for reporting as applicable].

## 5.1 Data Assessment Procedures

Data must be consistently assessed and documented to determine whether project QAOs discussed in section 1.4 have been met, quantitatively assess data quality and identify potential limitations on data use. Assessment and compliance with quality control procedures will be undertaken during the data collection phase of the project. **[Reiterate, describe or reference the QC procedures for this project]**

## 5.2 Data to be Included in QA Summary Reports

During the project, NFWF may require periodic reporting, as noted below. Table 5 summarizes the types of data to be reported and the method in which that information will be delivered to NFWF staff.

**[Remove lines not applicable to your project (e.g. remove the line for FieldDoc if you are not using). Please be sure this table matches the table in Appendix D]**

|  |  |  |  |
| --- | --- | --- | --- |
| **Table 5: QA Summary Reporting Data** | | | |
| Data | Data Description | Reporting Method | Frequency |
| Best Management Practice (BMP) Data | Raw data from project reports in units of miles, linear feet, acres, individuals, etc. | Metrics uploaded to NFWF online system. | Annually and at NFWF Request during the closeout procedure |
| Monitoring Data | Raw data on project effectiveness, ambient water quality in priority watershed, stormwater flow, project conclusion data, etc. | Raw data, reports, and/or spreadsheets submitted through NFWF online system through the Final Programmatic Report. | At NFWF Request during the closeout procedure |
| Geospatial Data | Google polygon maps, latitude/longitude info, watershed segment | Uploaded via NFWF online system map page | At NFWF Request at application, during any Map Update Tasks, and during the closeout procedure |
| FieldDoc Project Summary and Data | Uploaded/Calculated data from [www.fielddoc.com](https://urldefense.proofpoint.com/v2/url?u=http-3A__www.fielddoc.com&d=DwMFAg&c=QSj8pw-Dfe-PLjj4Ds2WCg&r=aNkZtp4kpEpP1ipGPZNtzbQQpAhLoJp_s0rTl55efUM&m=hGWxde1zGRO8hIf1kYCAch3FbZQnvBC--UJkv2RSA8Q&s=YYVYkZ2zI-RtQMrRGx3Ts1ToWlqRmvVSBiIEhbowJzY&e=):   * Project sites – geospatial point(s) or polygon(s) * Practices – buffer type, livestock exclusion, bioretention, etc. * Metrics – acres protected by BMPs, gallons of stormwater infiltrated, nitrogen and phosphorus annual load reductions, etc. | Raw calculations and input via FieldDoc, PDF package submitted through NFWF online grants system or via email | Initially calculated at time of application, updated annually, and at NFWF request during closeout procedure |

At project completion, the field team will provide copies of the field data sheets (or relevant pages of field logs) as a representative sample subset submittal of analysis as discussed in section 5.0 **[Be sure to discuss data verification here or in the beginning of section 5]**. At a minimum, sample-specific information must be provided for each sampling type to NFWF staff according to the QA Summary Report template, included as Appendix D.

## 5.3 Reporting Format

All results meeting data quality objectives and results having satisfactory explanations for deviations from objectives will be reported in the QA Summary Report. The final results will include the results of all field quality control samples [**Modify this statement if field QC samples not collected]**. Results will be reported to NFWF at project completion as noted in Section 5.2 above. Reports may be submitted electronically along with the final programmatic report.

# 6 DATA VERIFICATION AND USABILITY

**[Discuss here how the project team will determine that data is fit for use. Address how all data will be reviewed following the processes outlined in this QAPP and any changes, qualifiers, and notations recorded based on the decision rules/criteria appropriate for the data set, also outlined in the QAPP. For instance, data sets may have missing or unclear entries that can be filled in or modified based on other available records such as photographs or other documentation. Discuss how you will determine your data to be fit for use.]**

## 6.1 Self-Assessment, Data System Audits

**(DO NOT EDIT - THIS SECTION MUST REMAIN AS IS)**

Periodic self-assessments and/or data system audits are implemented based on the nature and scope of project-specific data collection activities. For data users, these technical audits and assessments provide project personnel with a tool to determine whether data collection activities are being or have been implemented as planned. They also provide the basis for taking action to correct any deficiencies that are discovered. For QAPP Categories 1-2, NFWF may request periodic self-assessments or a data system audit. For QAPP Categories 3-4, NFWF requires the implementation of one of these tools. The decision is made by the project manager and based on the frequency of project-specific data activities.

# 7 REFERENCES

**[EXAMPLE ONLY] [Edit as applicable to your project and remove example references below not used for this project. Be sure all references listed in this section are cited in the main body text of the QAPP]**

U.S. EPA 1983. Methods for Chemical Analysis of Water and Wastes. EPA-600/4-79-020, third edition

U.S. EPA 1988. Methods for Determination of Organic Compounds in Drinking Water (EPA-600/4-88/039)

EPA/600/R-99/080 2000. Guidance on Technical Audits and Related Assessments for Environmental Data Operations

# Appendices

A) Project Site Map(s)

1. Standard Operating Procedures
2. Field Data Sheet
3. QA Summary Report

**[Attach all SOPs and methods mentioned in your QAPP]**

APPENDIX D – At Project Close Out

[Insert Project Name]

QA Summary Report - Components

This project resulted in **[Insert deliverable description]**. This work product received the required nature and scope of QAPP oversight appropriate for the intended use of the data.

The data sets, data products and other supporting QA documentation is/are maintained on file with the assigned research staff as noted in the QAPP until **[Insert date].**

All QAPP elements were met and completed according to the procedures and methods outlined therein.

**NFWF QA Summary Reports will be submitted to NFWF annually and at project completion as requested. The QA Summary reports will include the following information, as appropriate –**

1. QA Summary Closeout reports include the extent to which projects are implemented according to the stated scope of work and the methodologies specified in this QAPP in their final programmatic reports.
2. Significant changes to the objective, scope, or methodology of environmental data collection or use of environmental technology require the review and approval of the NFWF Program Manager and the NFWF QA reviewer. Therefore, if needed, appropriate revisions to this QAPP will be completed and submitted to the NFWF Program Manager for review and approval prior to implementation of changes.
3. Additionally, periodic QA Summary Reports will be submitted to NFWF annually, if requested, according to the table, below.

**The following table summarizes the types of data to be reported and the method in which that information will be delivered to NFWF staff**

|  |  |  |  |
| --- | --- | --- | --- |
| Data | Data Description | Reporting Method | Frequency |
| Best Management Practice (BMP) Data | Raw data from project reports in units of miles, linear feet, acres, individuals, etc. | Metrics uploaded to NFWF online system. | Annually and at NFWF Request during the closeout procedure |
| Monitoring Data | Raw data on project effectiveness, ambient water quality in priority watershed, stormwater flow, project conclusion data, etc. | Raw data, reports, and/or spreadsheets submitted through NFWF online system through the Final Programmatic Report. | At NFWF Request during the closeout procedure |
| Geospatial Data | Google polygon maps, latitude/longitude info, watershed segment | Uploaded via NFWF online system map page | At NFWF Request at application, during any Map Update Tasks, and during the closeout procedure |
| FieldDoc Project Summary and Data | Uploaded/Calculated data from [www.fielddoc.com](https://urldefense.proofpoint.com/v2/url?u=http-3A__www.fielddoc.com&d=DwMFAg&c=QSj8pw-Dfe-PLjj4Ds2WCg&r=aNkZtp4kpEpP1ipGPZNtzbQQpAhLoJp_s0rTl55efUM&m=hGWxde1zGRO8hIf1kYCAch3FbZQnvBC--UJkv2RSA8Q&s=YYVYkZ2zI-RtQMrRGx3Ts1ToWlqRmvVSBiIEhbowJzY&e=):   * Project sites – geospatial point(s) or polygon(s) * Practices – buffer type, livestock exclusion, bioretention, etc. * Metrics – acres protected by BMPs, gallons of stormwater infiltrated, nitrogen and phosphorus annual load reductions, etc. | Raw calculations and input via FieldDoc, PDF package submitted through NFWF online grants system or via email | Initially calculated at time of application, updated annually, and at NFWF request during closeout procedure |

1. RPD – Relative Percent Difference [↑](#footnote-ref-1)