Klamath Tribal Water Quality Consortium
Quality Management Plan

YUROK TRIBE

HOOPA VALLEY TRIBE

KARUK TRIBE

RESIGHINI RANCHERIA

QUARTZ VALLEY INDIAN RESERVATION

June 2018

APPROVAL PAGE

The member Tribes of the Klamath Tribal Water Quality Consortium hereby adopt this Quality Management Plan as it pertains to their shared authorities and responsibilities. Adoption of the Klamath Tribal Water Quality Consortium Quality Management Plan does not mean that all portions apply to their Tribe.

QA Officer, Hoopa Valley Tribe EPA	Date
QA Officer, Karuk Tribe Department of Natural Resources	Date
QA Officer, Yurok Tribe Environmental Program	Date
QA Officer, Quartz Valley Tribe Environmental Department	Date
QA Officer, Resighini Rancheria Tribe EPA	Date
EPA Region 9 QA Manager	Date

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KLAMATH TRIBAL WATER QUALITY CONSORTIUM QUALITY MANAGEMENT PLAN

1. INTRODUCTION

The indigenous people of the Klamath River Basin have lived in harmony with the river and the adjoining lands for thousands of years. Klamath River Tribes owed their prosperity, in large part, to the river's abundant runs of salmon and other fish species. The Klamath Tribal Water Quality Consortium is comprised of the heads of environmental departments of the Yurok, Hoopa Valley, and Karuk Tribes, the Quartz Valley Indian Reservation, and the Resighini Rancheria (Figure 1). The Tribes all depend upon a healthy river to support a broad range of cultural and ceremonial activities, many of which are not yet recognized or protected by State and federal environmental protection policies.

Following a massive adult salmon kill in September 2002, the Tribes formed the Klamath Basin Tribal Water Quality Work Group "to prevent future disasters through sound scientific research, data analysis, and thorough planning." In 2015 the Work Group decided to formalize its collaboration by creating the Klamath Tribal Water Quality Consortium (Consortium) and adopting a *Strategic Plan and Bylaws* (KBWQC 2017) that is attached as Appendix A. While Consortium member Tribes collaborate on research and share information, the body takes no collective policy positions, but defers to individual Tribes to offer statements on issues related to resource management.

“The mission of the Klamath Tribal Water Quality Consortium is to implement, coordinate and collaborate on water quality monitoring, analysis, and research throughout the Klamath Basin. Working together with our partners, we seek to provide the scientific information necessary to inform land and water management that will protect, promote, and preserve the cultural/natural resources and ecological processes upon which current and future generations of Tribal members depend” (KBWQC 2017). Projects funded through the Work Group and Consortium have led to the advancement of science, especially in the realm of Klamath River nutrient dynamics and algae blooms, including toxic cyanobacteria.

These studies help the Consortium members to understand the river that is so important to their wellbeing, and also to provide data for water quality management agencies like the North Coast Regional Water Quality Control Board and the U.S. Environmental Protection Agency (U.S. EPA). The Consortium has also shared all data collected and all reports produced on their website: http://www.klamathwaterquality.com/. The portal also allows for tracking important regulatory processes that affect water quality, fisheries and Tribal Trust resources in the Klamath River watershed.

U.S. EPA Order 5360.1 A2 requires any entity funded by the agency for collecting scientific data to create a QMP. The *Klamath Tribal Water Quality Consortium Quality Management Plan* (*KCQMP*) as envisioned by the member Tribes and U.S. EPA Region 9 (R9) is a framework to be used for all activities funded through the group. This *KCQMP* is based on the "*EPA Requirements for Quality Management Plans, EPA QA/R-2"* (U.S. EPA 2001a) document, which outlines the necessary components of a Quality Management Plan (QMP). Once completed, this plan will be valid for five years. Each participating Tribe has an independent relationship with U.S. EPA and each has developed necessary Quality Assessment and Quality Assurance Plans (QAPPs), Sampling Analysis Plans (SAPs), Standard Operating Procedures (SOPs) and in some cases QMPs. In addition to references embedded in text below, this *KCQMP* relies on information extracted from U.S. EPA (2001a, 2002a, 2002b, 2007).

Portions of the KCQMP are adapted from the *Yurok Tribe Environmental Program Quality Management Plan* (YTEP 2011) the United South and Eastern Tribes (USET 2014) *Umbrella Quality Management Plan*.

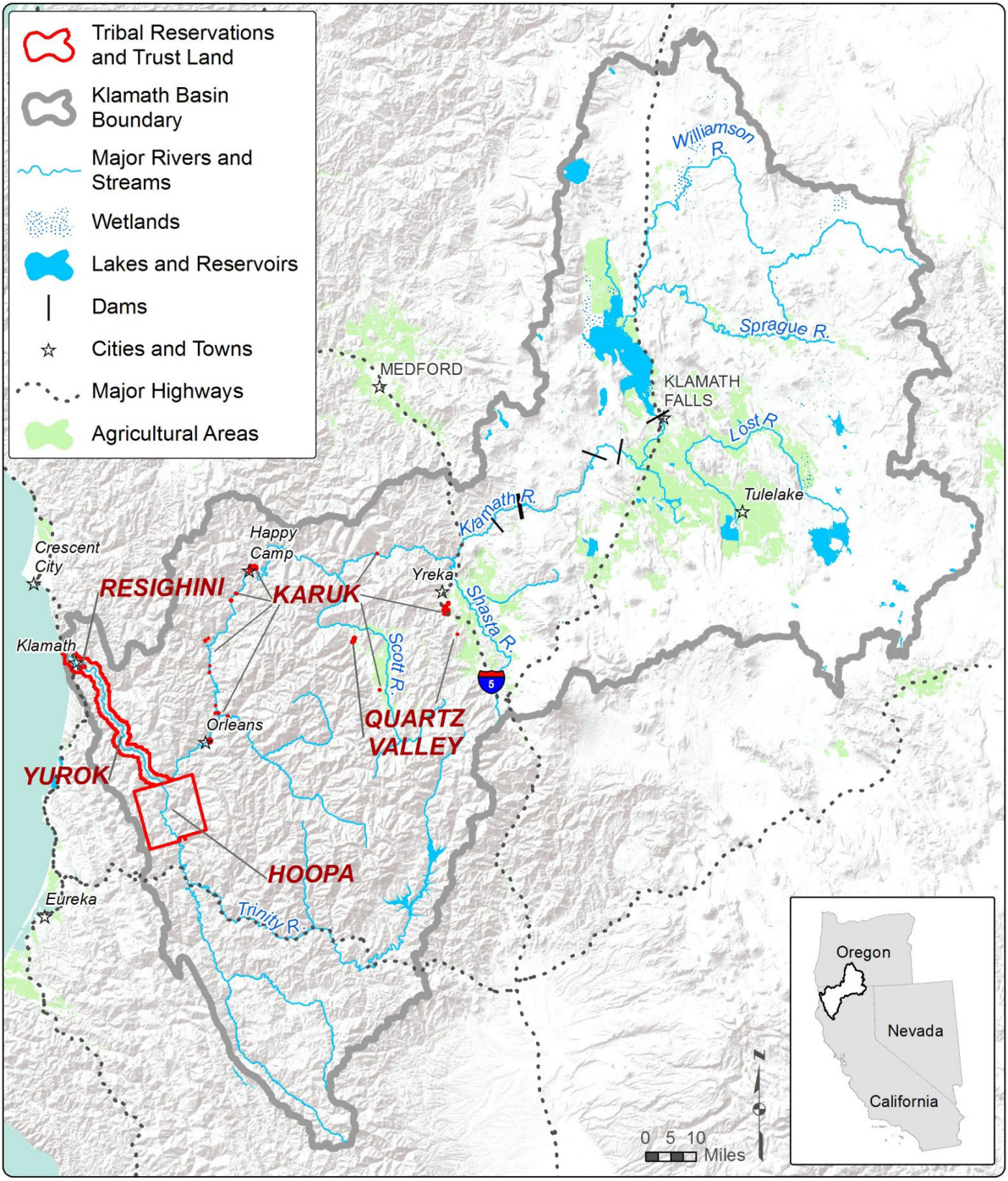

Figure 1. Klamath River watershed map showing Trust Lands and Reservations of the member Tribes of the Klamath Tribal Water Quality Consortium.

2. MANAGEMENT AND ORGANIZATION

2.1. Quality Assurance Policy Statement

The *KCQMP* Quality Assurance Policy is that all environmental data and documents generated and utilized meet the required standards for all environmental decisions, including immediate decisions and those required in the future. Each participating Tribe requires that all data collection activities will follow the quality system and quality practices presented in the *KCQMP* and/or in Tribe-specific QMPs, QAPPs, SAPs, and SOPs (Table 1). This *KCQMP* describes the quality system, including policies, objectives, principles, organizational authority, responsibilities, accountability, and implementation plan, that each Tribe will conform to when working on a project funded through the Consortium.

The U.S. EPA (2001a) states that the Quality Management Plan is a "means of documenting how an organization will plan, implement, and assess the effectiveness of its quality assurance and quality control operations applied to environmental programs. The process of planning, implementing, and assessing these management systems is called quality management and the product of this process is called the Quality System." The *KCQMP* is the over-arching Quality System for Consortium sponsored projects carried out by Consortium member Tribes or contractors.

The Consortium does not have its own Quality Assurance Officer (QAO). Instead, the QAO at each member Tribe is responsible for ensuring that QA/QC measures are being implemented and that performance of projects funded through the Consortium meet with U.S. EPA (1987, 2000a, 2000b) standards and those in this KCQMP.

Since the Consortium's inception in 2015, the Environmental Director of the Quartz Valley Indian Reservation (QVIR) has served as the Consortium's Contract Manager and thus provides oversight of the activities of the member Tribes and consultants funded through the Consortium. If the QVIR Environmental Director becomes aware of QA/QC problems or deficiencies requiring corrective action occur, they will work with the member Tribe environmental department or contractor to make corrections or take further actions to enforce QMP compliance. Ultimately, the *Klamath Tribal Consortium Strategic Plan and Bylaws* (KBTWQC 2017) allows any unallocated resources for any contract not meeting specifications to be reclaimed by the Consortium Steering Group and used to complete project performance.

Importance of QA and QC

Quality Assurance (QA) is an integrated system of management activities involving planning, implementation, documentation, assessment, reporting and quality improvement to ensure that a process, item, or service is of the type and quality needed and expected by the client. QA is the component that ensures data and documents are correct in their respective use. Evidentiary data and documents must have QA before they can be effectively utilized to their fullest potential.

Tribal entities must also have these assurances for their own use in writing permits, performing enforcement, and other related activities that utilize these products. QA activities improve the work product by focusing on improving the work process. All Consortium member Tribes are committed to maintaining the highest QA on projects sponsored by the group.

Quality Control (QC) is a system of technical activities that measures the attributes and performance of a process, item or service against defined standards to verify that they meet the stated tribal and U.S. EPA (2007) requirements. QC activities evaluate the quality of the work product to ensure that the process is performing as expected or required, and verifies that the work product is a usable quality

QC verification should be non-subjective since it requires comparing the work product to a standard. In summary, nearly all activities associated with the conduct of Consortium mission involve processes that are being reviewed and improved through the quality assurance process.

Standard Operating Procedures (SOPs) are prepared and implemented to ensure that data collection is scientifically repeatable and reproducible. SOPs are used to document routine procedures, whereas Quality Assurance Project Plans (QAPPs) document the overall data collection activities for a given project or site. The combination of SOPs within a QAPP and QAPPs developed as defined herein, when properly implemented, form the basis for QC.

Objectives and Goals of the Quality System

As stated above, the Quality System is the tool that Tribes will use so that environmental decisions, immediate and future, are supported by data of known and documented quality. Each Consortium member commits to using the relevant portions of the *KCQMP* and their own specific QMP, QAPPs, SAPs and SOPs so that environmental data and documents collected using this framework will be of sufficient quality for their own use, other member Tribes, the U.S. EPA, and other cooperating agencies. New environmental data generated will be of known and documented quality. Tribes will establish the intended use(s) for environmental data and documents through use of the Quality System and following proper project planning. This will ensure there is the level of data quality necessary to support decisions prior to initiation of data collection / document production efforts. Consortium members shall provide adequate resources to support the Quality System to accomplish objectives for environmental data collection programs.

Resource Allocations Policy

Tribes using this KCQMP, and their own respective QMPs, QAPPs, SAPs and SOPs referenced herein, commit to having the necessary resources in order to implement and complete environmental data collection and document production for projects. This ensures projects will be completed in a timely manner with viable, usable, data and documents. The Quality

Assurance Officers at each Consortium member Tribe will ensure that studies are being properly conducted and deadlines for data collection and reporting are met.

2.2. Organization

The organization chart in Figure 2 is for the Consortium. Tribe-specific organization charts are included in their quality management documents and water quality plans. Funds made available by the U.S. EPA may include resources from the Indian Environmental General Assistance Program (GAP), Clean Water Act Section 106 Water Pollution Control Grants, and Clean Water Act Section 319 Nonpoint Pollution Abatement. Funds allocated to the Consortium will not come at the expense of member Tribes. The Consortium may also receive funding from other entities such as the U.S. Bureau of Reclamation (KBWQC 2017).

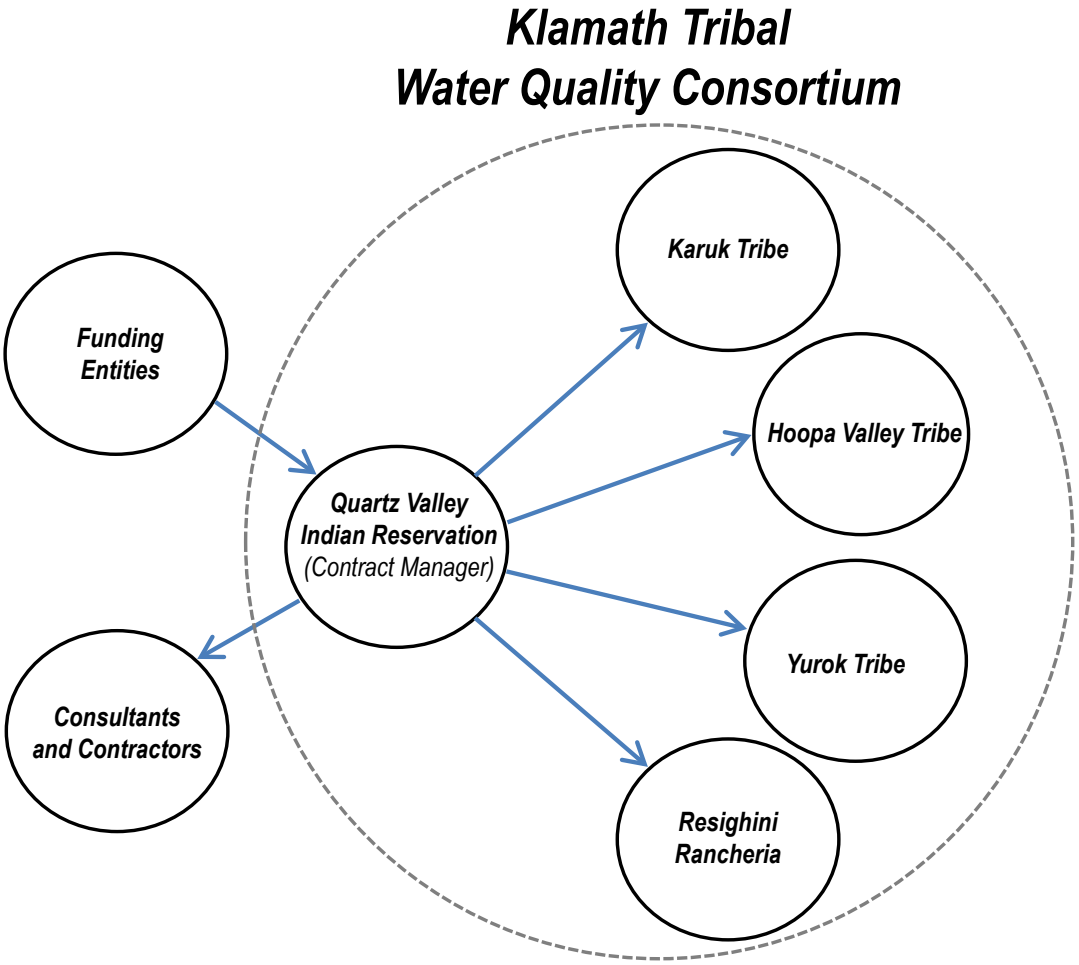

Figure 2 Organizational chart of Consortium project administration.

Tribes performing work under the Consortium all have independent documents required by U.S. EPA that indicate proficiency in areas of studies being conducted, clear lines of authority within each Tribe including a chain of custody, and ensure that the highest scientific standards are met. Each Tribe has stipulated within each QMP, QAPP, SAP, and SOP the personnel responsible at each level and the details from those documents are not repeated here.

Table 1 shows the documents currently on file by member Tribes that comply with U.S. EPA requirements and that allow for each to receive funding from the agency. The *KCQMP* and member Tribe U.S. EPA-required plans are intended to be living documents, not just something done as a requirement which then gathers dust on a shelf. Instead, they are to be reviewed annually by each Consortium member Tribe as a means to maintain compliance with Quality Systems to ensure production of the highest quality environmental data and documents. Consortium members include the following Tribes, each of which has a history of coordinating with the U.S. EPA in order to exercise authority over maintaining Reservation water quality and in some cases attaining status as co-managers.

Table 1. Klamath Tribal Water Quality Consortium quality assurance/quality control documents (QMPs, QAPPs, SAPs, SOPs) and projected dates updates. Associated documents are included in the References section below.

Tribe	**QAPP (Y/N)(Year)**	**Anticipated QAPP/SAP Update**	**SAP**	**QMP**	**SOP**
QVIR	Y: 2016	2021	Grazing/E coli: 2015		Surface Water: 2008, Ground Water: 2016, Metals, Pesticides in Ground Water: 2016
Yurok	Y: 2012	2017[2]	Nutrients/Algae: 2012; Coastal Resources: 2012	YTEP (2012)	Grab: 2008, Churn: 2008, Cyanobacteria[2]: 2009
Hoopa	Y: 2007	Currently Updating			
Karuk	Y: 2011	2017	Nutrients/Algae: 2009		Cyanobacteria[2]: 2009
Resighini	N	2017	Surface Water : 2010		

[1] Yurok Tribe has already completed 2017 internal revisions to QAPP and SAP but has not yet sent to U.S. EPA for approval.

[2] Yurok and Karuk Tribes use the KBGAWG (2009) SOP for cyanobacteria.

Hoopa Tribe: The Hoopa Valley Tribe applied for status as a state with respect to the Water Pollution Control Program under Section 106 of the Clean Water Act (CWA) on July 16, 1989. The United States Environmental Protection Agency announced formal approval of the application on July 3, 1990, which made the Hoopa Valley Tribe the first tribe in the State of

California to receive such approval. The Hoopa Valley Tribal Council adopted the Water Quality Control Plan (Hoopa TEPA 2008), which consists of water quality criteria, standards, anti-degradation policy, and implementation plans, in accordance with the Pollutant Discharge Prohibition Ordinance (PDPO). The Plan covers both the Trinity and Klamath rivers because the Hoopa Valley Reservation intersects with the main Klamath River at Saint's Rest just upstream of Weitchpec. Hoopa TEPA protects the quality of surface and ground waters for the use and enjoyment by the people of the Hoopa Tribe and requires control of the waste discharge to waters of the Reservation. Hoopa TEPA's website is http://www.hoopatepa.org/water.html.

Karuk Tribe: The need for comprehensive water quality planning is set forth in Karuk Tribe of California (KTOC) laws under Resolution 96-R-24. The Federal Water Pollution Control Act as amended by the Clean Water Act of 1977 requires water quality control plans for the waters of tribes as well as public review of the plans. The basic purpose of KTOC's planning effort is to determine the future direction of water quality control for protection of Tribal waters. The Water Quality Control Plan (2014) is comprehensive in scope. It contains a brief description of Tribal trust property located along the middle portion of the Klamath River, and describes the present and potential beneficial uses of the surface and ground waters. The water quality objectives contained in the report are prescribed for the purposes of protecting the beneficial uses. The implementation plans section describes the measures, which include specific prohibitions, action plans, and policies which form the basis for the control of water quality. KTOC plans and enforcement mechanisms are included. The report contains provisions for public participation, complies with the requirements of CWA Section 303, and establishes a setting and the framework for the development of discharge regulations. The Karuk Tribe's water quality website is: http://www.karuk.us/index.php/departments/natural-resources/somes-bar-water-quality

Yurok Tribe: The primary responsibility for the protection of the water quality on the Yurok Indian Reservation (YIR) has been assigned to the Yurok Tribal Environmental Program (YTEP) and the Fisheries Program (YTFP). YTEP and YTFP provide YIR wide coordination of the water quality control program by developing, reviewing, and recommending Tribal (Yurok Tribe) approval of Reservation-wide policies, plans and permits for the implementation of Tribal and federal law. YTEP's (2004) water quality standards are designed to fully protect the beneficial uses of Reservation waters. YTEP has set a high standard in collecting water quality data, including cyanotoxins, and has even set up real-time gauges where Tribal members and other citizens can monitor Klamath River conditions via the Internet. As a sovereign power recognized by the Federal Government, a co-manager of natural resources, and by U.S. EPA for purposes of water pollution control, the Tribe maintains jurisdiction over waters that flow into and through the Reservation, regardless of the geographic origins of water sources. YTEP's website is: www.yuroktribe.org/departments/ytep/ytep.htm

Quartz Valley Indian Reservation: The Quartz Valley Indian Reservation (QVIR) Environmental Department began the process of developing a Water Pollution Control Program in accordance with the Clean Water Act (CWA) in 2005. The Tribe set primary goals of ensuring salmonid spawning and rearing habitat, fishing, swimming, other wildlife habitat and cultural needs. The objective is to ensure these goals are met for the future protection and sustained use of valuable Reservation water resources, protection of public health and welfare, and the enhancement of water quality resources. The Tribe intends to protect and improve water resources through water quality monitoring, habitat evaluation, education and community outreach, planning and implementation. QVIR's website is: www.qvir.com/. QVIR is the Contract Manager for the Consortium.

Resighini Rancheria: The members of the Resighini Rancheria have a primary interest in the protection, control and conservation of the water resources of the lower Klamath River, which flow through the Reservation. The quality of these waters must be protected to ensure the health, economic, aesthetic and cultural well-being of Tribal members. The Resighini Rancheria possesses inherent sovereign authority to regulate on-Reservation pollution discharges that affect fundamental Tribal interests and public health and safety, including when such activities are conducted by non-members of the Tribe on privately owned land within the Reservation. The Tribal Environmental Protection Agency is within the Resighini Rancheria Division of Natural Resources. See also http://resighinirancheria.com/

The delegation of Consortium grant funds are controlled as described in the Strategic Plan (KTWQC 2017):

> "Each Party undertakes to each other Party to perform and fulfill on time the tasks assigned to it by the Steering Group and all other of its obligations under this Strategic Plan/Bylaws and the Annual Work Plan/Budget. If a Party fails to complete its tasks and deliverables on time, then the Party's de-obligated portion shall be re-allocated by the Steering Group."

2.3. Key Personnel

Each Consortium member Tribe has their own QA Project Manager and they will be involved in inspecting, planning, managing, monitoring and reporting of environmental data collection programs and projects. While each Tribe is autonomous, the QVIR is designated as the Consortium's Contract Manager and therefore provides oversight of Consortium Quality Systems. Contracts between the Contract Manager and each individual Tribe "will address direct and indirect costs, procurement, reports to funding agency, and indemnification" (KBWQC 2017). The job of the Contract Manager is contractual oversight. If there is an indication of problems with performance, the Contract Manager, in coordination with the Consortium's Steering Group, would then perform audits and assessments, if necessary, and take corrective

actions for non-conformance with SOPs/QAPPs or methods called for in contracts (KTWQC 2017).

The Quality System is designed to ensure that each Consortium member meets their goals and objectives through a system of review and corrective action. Each Tribe's QA Project Manager is responsible to document the annual reviews of their specific projects, to maintain QA/QC within their organizations, and to provide training for staff.

Required documentation shall include the findings of the QA/QC discussion with staff on the QAPP, SAPs and SOPs. The QA/QC discussion needs to include data quality assessment, data verification and validation, outside contractors (including their QAPP and data verification), and a technical system review (QAPP and SOP related). It shall also include any corrective action with an implementation schedule. Corrective action activities include but are not limited to a change in SOPs, QAPP revisions to meet project goals and objectives, and any additional training needs for project staff.

2.4. Technical Activities and Programs

Specific Programs Requiring Quality Management Controls

All Environmental Programs funded by U.S. EPA require Quality Management controls, as specified by EPA 48 CFR Part 46 Quality Assurance and applicable regulatory requirements. Applicable programs are included in Tribe-specific QMPs or other compliance documents. Consortium Tribes have to develop QAPPs, SAPs, and/or SOPs for the following activities:

- General sampling procedures
- Analytical methodology
- Sample collection devices, storage containers, and sample additives such as preservatives
- Instrumentation selection and use
- Instrumentation calibration and standardization
- Instrument preventative and remedial maintenance
- Duplicate, spiked, blank samples and analysis
- Field and laboratory quality control procedures
- Sample documentation, sample custody, transportation, and handling procedures
- Field and laboratory safety
- Data management and assessment procedures
- Document control

Oversight for Contracted, Delegated, or Extramural Programs

The Consortium and member Tribes may contract out for collection of specific data or analysis, such as for an outside laboratory to analyze water quality samples for specific water quality elements or for a consulting firm to collect samples or assist with analysis and reporting.

All laboratories conducting such analysis will meet all specified standards in prior QAPPs, SAPs and SOPs. Member Tribes will only use the laboratories that are specified in their QAPPs. Member Tribes oversight of laboratories and contactors shall include at a minimum:

- Using only state approved/certified laboratories, if it is a laboratory.
- Sharing the QMP and individual Tribal quality management documents with the Contractor and having the Contractor agree to the terms of the QAPPs, SAPs, SOPS and QMP(s)
- Tribes will be responsible for reviewing lab performance as specified in QAPPs
- Meeting with the Contractor on (at a minimum) an annual basis to review the Contractor's Scope of Work, data analysis, and data collection techniques.
- Contractor must use State/Tribal approved Standard Operating Procedures (SOP).
- Contractor shall adhere to Quality Assurance Project Plan (QAPP) previously submitted by the Tribe with SOPs, QA/QC, responsible authorities, and other information.

Management Assurance for Quality System

Each Tribe covered by this *KCQMP* shall have a Quality System which provides a framework for planning, implementing, documenting and assessing work conducted within each Tribal EPA program and Tribal outside Contractor. The purpose of the Tribal Quality System is to generate the type and quality of information required to fulfill its environmental mission and support its Tribal members.

The foundation of this Quality System is Tribal management's commitment to quality as described in the *KCQMP* and the Tribal specific documents referenced herein. The Tribal Quality Program shall reflect their management's philosophy and serves as a guiding principle for all environmental data collection and document activities. It specifies that all personnel have responsibility for quality and will continually strive to build quality into work processes, products and services. Tribal Management provides policy definition, leadership and oversight for each Tribe's Quality System, and is responsible for allocating resources so that the each Tribe's Quality Program is effectively and efficiently implemented.

Each Tribal program manager has primary responsibility for coordinating the following QA and QC activities for their assigned projects with the QAO:

- Ensuring that work assignments, work plans, and contract deliverables include appropriate QA documents

- Preparing and implementing approved Quality Assurance Project Plans (QAPPs) for intramural projects
- Ensuring that approved QAPPs and SAPs are developed for and implemented in extramural projects
- Coordinating with the QAO on the selection and design of audits and performance evaluation materials appropriate for the project
- Identifying, resolving, and implementing project-specific QA and QC issues (which may include data quality assessment, information management, data integration, and data validation), and
- Providing review and approval of QAPPs and SAPs from a programmatic perspective.

The Quality System is designed to meet the requirements of 48 CFR 46, the EPA Order CIO2105, *Policies and Procedures for EPA Organizations*, EPA CIO Standard 2106-S-02, *Quality Standard for Environmental Data Collection, Production and Use by Non-EPA (External) Organizations* (U.S. EPA 2011) and the QA document *Overview of the EPA Quality System for Environmental Data and Technology (*U.S. EPA 2002c).

Dispute Resolution Process

The Tribes shall resolve their disputes involving QA/QC matters internally, as they are sovereign. The objective of the resolution process is to ensure that proper QA/QC is being followed so that both data and documents shall meet the requirements contained in Tribe specific quality management documents referenced herein, and the relevant portions of this *KCQMP*. Each Tribal quality management document will need to include their Dispute Resolution procedures for resolving disputes arising from quality system requirements, QA policies, QC procedures, internal and external assessment findings, and corrective actions.

3. QUALITY SYSTEM COMPONENTS

The *KCQMP* relies on each Consortium member Tribe to implement the Quality System that assures environmental data are of known and documented quality and can be used for their intended purpose. The principal components of the Consortium quality system are quality system documents, management evaluations, project-level planning, project-level documents, routine procedures documents, project-level evaluations, and quality system personnel standards. The following tools are used by member Tribes in implementing the principal components of the quality system:

- Quality Management Plan (quality system document)

- Quality System Audits and Management System Reviews (management evaluations)
- Annual Program Reviews (management evaluations)
- Systematic Planning Process (project-level planning)
- Quality Assurance Project Plans (project-level documents)
- Standard Operating Procedures (routine procedures documents)
- Analytical Methods Manual (routine procedures documents)
- Data Quality Assessments (project-level evaluations)
- Technical System Audits (project-level evaluations)
- Performance Evaluations (project-level evaluations)
- Quality Assurance Training (quality system personnel standards)

Details regarding how the identified components are implemented, timelines defined, and the responsibilities for management and staff of each Tribe are included in the previously completed QAPPs, SAPs, SOPs and QMPs.

3.1. Quality Management Plan

The *KCQMP* is being created in order for this multi-tribal entity, the Consortium to receive funds directly from the U.S. EPA, but it relies in turn on the capacity of member Tribes and their interlinked U.S. EPA approved quality assurance policies, procedures, and governing management systems. This document describes the quality system in terms of the organizational structure; details can be found in each Tribe's plans. Management personnel at each Tribe is responsible for implementing quality assurance policies to ensure that all environmental data generated for the Consortium are of known and documented quality and are acceptable for their intended use. The approved KCQMP will also be accessible to staff of all Consortium member Tribes and on the web at www.klamathwaterquality.com.

3.2. Quality Systems Audit

Each Tribe shall conduct their own Quality System Audit. Such audit will be used so that the Project Goals and Objectives are being met with data that are usable and reliable so that sound environmental decisions can be made. It also should be used to determine if the existing quality system requirements are being implemented properly and consistently across the organization. Findings from Quality System Audits will be shared among Consortium member Tribes at the Consortium's Steering Group meetings (see section 8.0 Planning below for discussion of meeting frequency and format).

3.3. Review and Documentation

The Quality Assurance Officer (QAO) for each Consortium member Tribe is responsible for ensuring that there is annual review of the quality system. Such review shall consist of a Data Quality Assessment (DQA) (if data is collected), Data Verification and Validation (if data is

collected), Technical System Review (TSR), and Quality Systems Review (QSR). Tribal QA officers from the Consortium member Tribes will collaborate to develop a shared set of Standard Operating Procedures (SOPs) for each of these audit activities so they can be applied as consistently as possible across the Consortium. Due to the inherent differences in program size, capacity, and scope, it is likely that not all Consortium member Tribes will be able to implement every element of the shared DQAs, TSRs, and QSRs; however, the coordinated approach will still be beneficial.

The Data Quality Assessment is the responsibility of the Tribal Project Manager. They are responsible for evaluating the project data both during the project and after completion on a statistical and scientific basis. This will allow the Tribe to assess the quantity, quality, and type of data that is generated during the project to ascertain if it meets the planning and project objectives. This includes the QAPP components, sample collections, analytical procedures, and data suitable for its intended purpose.

Data Verification and Validation is the systematic process whereby data collected is evaluated against analytical method-specific technical and quality control criteria and requirements, project-specific DQOs and data quality indicators. Data transferred from field to laboratory to analysis are checked for accuracy, data generated is in accordance with project and QAPP specifications, and is consistent with the intended use. Analytical laboratories usually perform data verification prior to release of analytical results to clients. Data validation is usually done by the client to determine bias and limitations according to the project goals and associated QAPP. Tribes utilizing outside laboratories will rely on them to do data verification according to the approved Laboratory QAPP. The Tribal Project Manager is responsible for data validation.

Technical System Review is the process whereby work performed is checked against the procedures documented in SOPs and/or QAPPs. Technical system review is the methodical approach whereby a process is reviewed from start to finish, assessing each step along the way. The SOPs need to be written in such a manner that a competent person can follow the procedure as outlined in a step-wise approach.

Each member Tribe QAO is responsible for the Quality Systems Review. Such review will include the three reviews listed above plus the other components as listed below. A Quality System review will be conducted every two years to assess the performance and project goals, and to ascertain Quality Improvement implementation. Data Quality Assessment, Data Verification and Validation, and Technical System Review will be conducted annually with findings presented to the Tribal QAO. Quality Improvement is the goal of the Quality System. Each Tribal QAO is responsible for implementing the Quality Improvements as determined by the Annual Reviews and the Biennial Quality System Review.

The Management Assessment/Review is conducted to ascertain how well the Quality System is understood and implemented by Project Staff. Each Tribal QAO has the responsibility to

determine that the Quality System functions as designed and to implement corrective actions as needed. The Project Specific assessment (a technical systems audit/assessment of a project) is overseen by the Tribal QAO on the approved QAPP. Each Tribal Project Manager shall assess actual performance, results, planned activities, and data collection and provide a Project Report to the Tribal QAO.

3.4. Training Plans

Each Tribe shall utilize their own Training Plans so that project staff shall be adequately trained to carry out the Project Goals and Objectives. If personnel require certification for a particular purpose, then the Tribal Project Manager shall see that the certifications are kept up to date through training and workshops so that the proper requirements are met. Training plans should also include technical training as necessary to carry out job functions for environmental data collection operations, QA/QC training, and any other training deemed necessary, such as boat operation and 4 wheel drive operation. The Consortium annual Work Plan sometimes includes a budget for training member Tribe staff.

In addition to the general training discussed in the preceding paragraph, additional specific training will be required for Tribal QA officers so that they can effectively implement the QA tools described above in section 3.3 which include shared SOPs. The Consortium will develop a training program for quality systems following the simplified approach outlined in the U.S. EPA (2000c) guidance which will likely include the following steps:

- Get informed: Review existing information, conduct observations, and survey stakeholders.
- Organize the workload: identify skills and experience needed to develop the plan, identify the roles required to develop the plan, list the possible candidates, and select the best choice(s).
- Perform gap analysis: identify job roles and responsibilities, identify required quality systems skills, identify existing skill levels, describe gaps, and verify results.
- Identify methods to address goals: rank quality systems training needs, determine what progress should look like, and identify available training that meets high priority needs.
- Formulate the plan: write a draft quality systems training program, and evaluate the program, obtain feedback from stakeholders, and develop a final quality systems training program.

3.5. Systematic Planning of Projects

All Consortium Projects require a methodical, systematic approach to ensure that the Project goals and objectives will be attained. This will require planning by the Tribal staff and the Tribal Project Manager with oversight from the Tribal QAO. The systematic planning process is used to develop the QAPP. SOPs should be prepared based on routine or repetitive operations. Routine environmental activities may call for a less formal approach but planning is still

essential as part of the Quality System. Tribal Project Managers are responsible for establishing data quality needs before project commencement, QAPP development, SOPs, and QA/QC methodology requirements. The Planning process should address the following:

- problem identification;
- project goals and objectives;
- identifying the project leader and personnel who will be working on the project;
- communication between all the parties involved (including EPA);
- validity of scientific models and methods proposed for use;
- Type and quality of data / information needed;
- data quality criteria and QA/QC activities and list of analytical methods used;
- how, when, and where data will be obtained/collected;
- budget, personnel qualifications, roles and responsibilities;
- clear, standardized SOPs or QAPP as required;
- Procedures for reviewing analytical data and QC data, and
- How data will be used/published.

Quality System Assessments

Assessments are an essential part of the Quality System which allows the Tribal Project Manager and the Tribal QAO to review their projects and data in a systematic method. The Quality System assessment is expected to:

1. Identify strengths and weaknesses,
2. Cause corrective actions to be taken to alleviate problems,
3. Facilitate the initiation of changes to enhance the QA program,
4. Serve as a vehicle for providing technical assistance,
5. Enhance awareness and understanding of QA/QC policies and procedures, and
6. Provide a measurement of the effectiveness of QC in assuring the quality of data.

Assessments are conducted to ensure the integrity and appropriate use of data and to identify opportunities for improving the Project as a whole. Tribal staff, Tribal scientists, and other data and project users will provide input. The Tribal Project Manager, in conjunction with the Tribal QAO, will choose the appropriate assessment for each project with clearly defined goals, acceptance criteria, and procedures. All assessments will be documented to provide evidence of QA for future use of project data and conclusions.

QA Project Plan (QAPP)

QA Project Plans will be developed as applicable by each Tribe. The QAPP level of detail varies from Tribe to Tribe according to the specific projects, nature of the work, and intended use of the data. Various U.S. EPA funded programs will determine the complexity of the QAPPs by utilizing a graded approach to determine the level of detail necessary. For example, an acceptable QAPP for some environmental data collection will require a qualitative discussion of the scientific process to be used. Extensive documentation for complex environmental programs may be necessary to adequately describe those projects. Each Tribe will establish intended uses. SOPs, when appropriate, and EPA-approved QAPPs will be developed and implemented. Each QAPP will describe the following:

- project management;
- responsibilities and lines of authority and communication;
- project goals;
- project implementation processes which include data acquisition and measurement goals and criteria (the DQO process);
- List of biological, chemical, physical and radiological testing methods to be used and the actual analytes / compounds, etc., tested for
- project oversight;
- corrective action and management controls;
- data verification and validation (including a list of data qualifiers and their definitions;
- data interpretation and criteria for data usability; and
- data assessment and analysis, including the intended data use, level of quality to be obtained, and data acceptance criteria for field, laboratory, and data management activities.

Data verification and validation

Data verification and validation is used to evaluate whether data has been generated according to specifications, satisfy acceptance criteria, and are appropriate and consistent with their intended use. Data verification is a systematic process for evaluating performance and compliance of a set of data when compared to a set of standards to ascertain its completeness, correctness, and consistency using the methods and criteria defined in the project documentation. Data validation follows the data verification process and uses information from the project documentation (which contains the technical and QA / QA requirements specific in the analytical or testing methods, etc.) to ascertain the usability of the data in light of its measurement quality objectives and to ensure that results obtained are scientifically defensible.

An analytical laboratory usually performs data verification prior to the release of analytical results to clients. Data validation determines whether the data / information generated are

compliant with the technical and QA / QC requirements specified in the analytical / testing methods, SOPs and QAPPs. It also determines analytical bias, overall usability of the data / information in making informed site decisions, and identifies any limitations in the data set that would restrict its use.

Organizational Components

Organizational components are the personnel who make the Quality System work through due diligence, QAPP and SOP development, annual reviews, audits, frank and open discussions, implementation, and corrective action. Organizational components consist of the Tribal QAO, Tribal Project Manager, and Tribal Project staff who constantly and consistently work to determine that the Project Goals and Objectives are being met. Each Tribe will institute a system of checks and balances for each Project for Quality Systems so that the UQMP process will be met. It is important that the Tribal QAO has access to Tribal Senior Management/Administration for QA/QC related issues. The Tribal QAO must have the support of Tribal Senior Management/Administration to ensure that the quality system is being implemented properly across all staffing levels.

4. PERSONNEL QUALFICATIONS and TRAINING

4.1. QA Training Program

To assist personnel with their responsibilities and requirements, Consortium member Tribes have staff attend appropriate trainings that are hosted by various government agencies, equipment manufacturers and private consulting firms. These trainings include aspects of QA procedures that are related to the specific type of environmental data they are responsible for collecting. Tribal Program Managers are also responsible for training technicians and other staff in various details to ensure QA procedures are followed and documented accordingly.

4.2. Training Requirements

In order for the quality system to be effective and to be implemented in a consistent manner by all Consortium member Tribes, the staff needs to be properly equipped with the appropriate level of knowledge of quality assurance policies, principles and procedures. Each Tribe is responsible for creating QA training programs that will fulfill this need. The staff members who are directly involved in the generation and/or use of environmental data are the primary focus of the training program

Management

Program Managers at each member Tribe are responsible for ensuring that the Consortium's Quality System is implemented and the resources are available in meeting the criteria of the system. Therefore, it is critical that each Tribe's management has a good understanding of the

Quality System and Quality Management issues that are described in the *KCQMP* and in Tribal QAPPs and SAPs. The Program Managers are responsible for identifying needed QA training to meet the requirements in the QAPPs and SAPs.

Supervisors

Supervisors at each Consortium member Tribe are ultimately responsible for the quality of data. Therefore, it is critical that supervisors receive the necessary awareness training to ensure their understanding of the importance of quality assurance, their responsibilities as supervisors of environmental data activities, and specific Consortium quality assurance policies and procedures. Supervisors who oversee environmental programs which generate or use environmental data should be familiar with the specific QAPPs, SAPs and SOPs that staff is to follow when collecting environmental data. Supervisors should require that SOPs are updated as specific quality control measures are improved over time. Additional training, including an introductory course tailored to supervisors' needs, may be provided depending on the specific duties and responsibilities of the individual.

Program Managers, Lab and Field Personnel

Program Managers, technicians and other staff are responsible for ensuring that all projects are conducted with known quality, and are in compliance with Consortium and U.S. EPA (2011) standards. Staff involved in the collection of environmental data, physical measurements, and any other data pertaining to the assessment and monitoring activities will be trained according to U.S. EPA, USGS or appropriate field sampling techniques and procedures. Staff will be trained in areas of health and safety when working in hazardous conditions as well as database management, reporting and automated data collection methods. Certified program staff will participate in further training as appropriate to refresh program-related skills. Certifications for specific skills and requirements will be kept current and on file. Training levels of contractors will be equivalent or higher than tribal staff, when used and will be documented.

5. PROCUREMENT AND FINANCIAL ASSISTANCE

Items and Services procured by Tribes for use in their environmental programs may need to meet certain standards and specifications so that the goals and objectives of Environmental Projects are met. Items purchased with funds from Consortium would be those deemed necessary to carry out specific projects identified in the annual Work Plan. It is the policy of all Consortium member Tribes to state the designated quality assurance and quality control requirements when acquiring items and/or services that may result in or relate to environmental programs. Contracts, equipment or lab services funded through the Consortium will be in accordance with project plans and be overseen by the Project manager at each member Tribe and the Consortium's Contract Manager.

5.1. Review and Approve Procurement Documents

Item or service needed

Each Tribal Project Manager shall determine the items and services needed for each project in accordance with guidance provided by the Consortium Steering Committee and the annual Work Plan. The Consortium's Contract Manager shall develop contracts with Member Tribes that specify purchasing by category (laboratory, supplies, equipment, administration, and travel), as detailed in the Work Plan which is developed annually by the Consortium Steering Committee and approved by US EPA.

Associated technical and quality requirements

It is the responsibility of the Tribal Project Manager to determine the technical and quality requirements for each item and service procured for each Consortium project. Written technical and quality specifications will be completed prior to proceeding to procurement. This will ensure that proper items and/or services will be acquired so the project goals and objectives can be met.

5.2. Review and Approve Solicitations

The Consortium shall have documentation on items and services procured:

- Preparation of requests for proposals (RFP)
- Publication of RFPs
- Award identification
- Technical evaluation of proposals
- Ensure timely submission of financial and technical reports
- Service provider given and agrees to meet Tribal QAPP requirements for Project
- Service provider given and agrees to meet requirements for Tribal and U.S. EPA QA/QC procedures

5.3. Procured Items and Services Meet Acceptable Quality

By following the above outlined procedures, each Tribe has assurance that the products and/or services procured will meet the Quality System.

6. DOCUMENTS AND RECORDS

Documentation and records of the data collected by Consortium member Tribes will be stored and compiled electronically with copies stored in separate locations, shared with other member Tribes, U.S. EPA and cooperating agencies. Reports of compiled study results will be released according to the timeline stipulated in the project proposal and work plan. After appropriate review, final reports are also posted to: www.klamathwaterquality.com.

6.1. Reporting Format

All Consortium projects will be documented in quarterly and annual reports to the U.S. EPA by the Consortium's Contract Manager (QVIR). All scientific reports will also be submitted and posted to www.klamathwaterquality.com. Reports will be in Microsoft Word format or shared as Adobe Portable Document (pdf) files.

6.2. Sample collection records

Each member Tribe of the Consortium will retain records that show the proper sampling protocol was performed in the field. This documentation includes the names of persons conducting activities, sample number, sample collection points, maps and diagrams, equipment/method used, and climatic conditions.

6.3. Chain-of-custody records

Each member Tribe of the Consortium will maintain chain-of-custody records that document the progression of samples as they travel from the original sampling location to the laboratory and finally to the disposal location. Copies of these records are stored in file cabinets at each member Tribes office.

6.4. Sample Records

Each member Tribe of the Consortium will be responsible for generation of QC samples such as field, trip, and equipment rinsate blanks and duplicate samples. Documentation on sample integrity and preservation will include calibration and standards' capable of providing a reproducible reference point. Quality control sample records will contain information on the frequency, conditions, level of standards, and instrument calibration history. These records will be stored in file cabinets at each member Tribes business office.

6.5. General Field Procedures

General field procedures are documented in SOPs that record procedures used in the field to collect data and outline potential areas of difficulty in gathering environmental data. Each member Tribe of the Consortium shall maintain appropriate SOPs that are updated routinely.

6.6. Corrective Action Reports

If necessary, corrective action reports will be created to show what methods were used in cases where general field practices or other standard procedures were violated, including the methods used to resolve noncompliance. Problems and corrective actions will also be documented in final reports by member Tribes of the Consortium or consulting firms performing as contactors.

7. DATA MANAGEMENT / COMPUTER HARDWATER AND SOFTWARE

Consortium member Tribe Program Managers are responsible for performing or overseeing all data management within their respective departments. Data management tasks will fall into the following categories.

7.1. Data Recording

Data recording will be performed using logbooks and standard data recording sheets. Standard forms can be found in U.S. EPA approved QAPPs and SAPs that member Tribes have created.

7.2. Data Validation

The Program Managers will oversee all data validation, data reporting and data entry, which will be performed by the Program Managers, technicians, other staff, or consultants. Supervisors will visually inspect all entered data sets to check for inconsistencies with original field or laboratory data sheets. Where inconsistencies are encountered, data will be re-entered and re-inspected until the entered data is found to be satisfactory.

7.3. Data Transformation

Any transformations of data will be clearly labeled and explained as necessary on the same data sheet or computer file in which the transformation is performed. Where irreversible data transformations are performed, such as production of a graph from numeric data, the source and location of the original data set will be clearly indicated.

7.4. Data Transmittal

Raw data that has passed QA/QC, as well as summary data, will be made available to other Consortium member Tribes, the U.S. EPA and other cooperating agencies through electronic file sharing over the Internet.

7.5. Data Reduction

Data sets shall be reduced only in cases where suspect or invalid data is being purged from the data set, or where redundant data is being eliminated for clarity of data presentation. Any reduced data set will be labeled as such, with a reference to the source and location of the full original data set.

7.6. Data Analysis

Standard methods will be used for statistical and graphical data analysis. Software programs used by Consortium members and consultants for data analysis include AQUARIUS Time-Series, Microsoft Excel, Microsoft Access, ArcGIS, and R. Data will also be shared with authorized consultants working on projects to perform data analysis. These data analyses will be reviewed in draft by Program Managers before they are finalized.

7.7. Data Tracking

Consortium member Tribe technicians and consultants will report directly to the Program Managers on the status and location of all data sets. Data will not be given to or shared with anyone outside of the study team until after data has undergone QA/QC and associated reports have been produced.

7.8. Data Storage and Retrieval

Consortium member Tribes will store and retrieve data using their preferred software programs which may include but are not limited to AQUARIUS Time-Series, Microsoft Excel, Microsoft Access, and ArcGIS.

Portions of the data will also be submitted to state and national water quality databases including the U.S. EPA's STORET Data Warehouse via the Water Quality Exchange (WQX) framework and/or the California Environmental Data Exchange Network (CEDEN). Staff from the Klamath Basin Monitoring Program (KBMP) has recently been assisting Consortium member Tribes with submitting their data to CEDEN. The State of California is currently upgrading CEDEN so that data uploaded to CEDEN will also automatically be uploaded to the STORET Data Warehouse.

8. PLANNING

The Consortium developed a Strategic Plan and Bylaws in 2015, with minor updates to the Bylaws in 2017 (KTWQC 2017). The Strategic Plan and Bylaws identifies the following goals, objectives, and activities to implement the Consortium's mission:

- Collect water quality data
- Maintain water quality monitoring databases and share data
- Laboratory equipment/facilities
- Water quality standards
- Training and education
- Participate in processes that affect water resources
- Capacity building
- Data analysis and reporting
- Collaboration/coordination
- Outreach

The Strategic Plan and Bylaws specifies that the Consortium's Steering Group, composed of one representative of each Consortium member Tribe, will update the strategic plan on an as-needed basis.

The Steering Group meets in person at least once yearly, conducts conference calls approximately quarterly, and communicates at least monthly via email. Additional meetings may be called by two or more parties or at the request of the Chair/Program Manager.

Each fiscal year (July 1 – June 30), the Steering Group develops an Annual Work Plan/Budget which allocates budgets from awards contracts/grants into specific tasks and sub-tasks to carry out the overall Strategic Plan.

The past ten years have provided the Klamath Consortium Tribes with the necessary baseline data and trend analysis to work effectively with many agencies in the development and implementation of multiple programs and policies designed to protect environmental resources in the Klamath Basin. The Consortium is well networked with other agencies and entities monitoring in the Klamath Basin and studies and projects are carefully chosen to plug strategic data gaps and to answer evolving questions related to Klamath River ecological function and water quality. Consortium member Tribes actively participate in the Klamath Basin Monitoring Program (KBMP) which is a collaborative multi-agency group that coordinate water quality monitoring and research throughout the Klamath Basin.

Depending on the project, the member Tribe performing the work will need to develop QAPPs and SAPs to document how individual data operations will be planned within the organization to ensure that data or information collected are of the needed and expected quality for their desired use. Each Tribe's Program Manager will develop, review, approve, implement, and revise a QAPP or equivalent planning document based on input from U.S. EPA Project Officers and the QA Office. U.S. EPA QAPP and SAP templates (http://www.epa.gov/region9/qa/index.html) will be used to describe specific staff roles, responsibilities, and authorities of management staff.

9. IMPLEMENTATION OF WORK PROCESSES

The procedures described in this section regarding the implementation of work process must be followed within all divisions and departments of Klamath Consortium member Tribes. The implementation of programs will be guided by the *KCQMP* and member Tribe QAPPs, SOPs and SAPs, with the proper levels of management participation and approval identified.

9.1. Program Implementation

The *KCQMP* will be reviewed annually by the Steering Group and member Tribe Program Managers, to determine if its objectives are being met and whether the information remains relevant. If changes are warranted, the KCQMP will be updated immediately and the revised *KCQMP* will be shared with the U.S. EPA and posted to the Internet. The *KCQMP* will be thoroughly reviewed on a five-year cycle from the original approval date. The *KCQMP* will also go through the complete approval cycle anytime changes are made that require major reorganization, or changes to the Consortium's Quality System.

9.2. Project Implementation

The Project Manager at each member Tribe is responsible for ensuring that QAPPs and SAPs are implemented. This can be done on an informal basis using routine on-site surveillance or project status reports (or other project reports as required and identified in the project-specific QAPP). Due to unforeseen circumstances, changes in a QAPP and planned procedures may become necessary during the project. Any revisions required to the approved QAPP can be documented in a second or subsequent revision or an addendum. The Project Manager at each member Tribe is responsible for ensuring all appropriate personnel receive a copy of the revised QAPP or addendum once it is approved.

9.3. Standard Operating Procedures

Each member Tribe must constantly check to see that QA/QC of data is performed and such audits are documented in SOPs to ensure consistency in the quality of the products and/or processes. The SOPs will thoroughly describe steps and techniques, and will be sufficiently clear to be readily understood by a person with knowledge in the general concept of the procedure or process. The need for an SOP for a specific activity or operation can be identified by any staff member of any member Tribe, and can be written by any member Tribe staff person who is knowledgeable of the activity, equipment, procedure or process to be addressed. All SOPs will be kept on file at member Tribe offices. All SOPs will be reviewed at least every two years from the time of implementation or the last review at which time the SOPs will be revised or deemed to be sufficient and saved accordingly.

Uses of SOPs

The SOPs developed by Consortium member Tribes are accessible to all member Tribe personnel. Consortium member Tribe SOPs are referenced in QAPPs and other documents, as appropriate, in order to alleviate having to include descriptions of entire processes or procedures that are routinely performed.

Implementation of SOPs

It is normally the responsibility of the Project Manager to ensure SOPs referenced in specific QAPPs are implemented. It is the responsibility of the individual users of an SOP to follow the procedures contained in the SOP, or to document any deviations. The implementation of SOPs will be assessed through internal oversight activities by each Consortium member Tribe.

9.4. Analytical Methods Manual

Most Consortium member Tribes do not maintain water quality laboratories but rather contract with U.S. EPA approved facilities and that are accredited in the State where services are performed. The methods that the labs follow must be standard methods that are recognized by the wider scientific community. Those member Tribes that do support analytical laboratories

have developed methods manuals and SOPs to maintain QA/QC in their operation that are on file at their offices.

10. ASSESSEMENT AND RESPONSE

10.1. Assessment Activities and Project Planning

Overall project planning will be the responsibility of Program Managers at each Consortium member Tribe, in consultation with the QAO at each Tribe. Assessment will take place in three forms:

- overall program evaluation, including Management Systems Review;
- ongoing surveillance by program managers; and
- technical systems audits

Management Systems Review (MSR) techniques will be used by Consortium member Tribes as described in *Guidance for the Management Systems Review Process, 1998* (EPA QA/G-3) to review organization, policies and procedures. Project activities, including environmental data sample collection, monitoring, handling and transport of samples, laboratory analysis and data entry and analysis, will be assessed on an ongoing basis by the Consortium member Tribe Program Managers, with periodic reports to a Tribe's QAO.

10.2. Documentation of Assessments

Each Consortium member Tribe will retain a copy of assessments on file at their offices.

Number, Frequency, and Types of Assessments

MSR and surveillance of the different programs at each Consortium member Tribe is the responsibility of each Tribe's QAO and Program Managers, and must be performed on an ongoing basis over the life of the each project. The number, frequency and types of assessments will vary by project.

Schedule of Assessment Activities

Assessment activities will be scheduled as needed for each specific project by the Program Manager at each Consortium member Tribe.

Reporting and Resolution of Issues

All assessment reports prepared by Consortium member Tribe staff, consultants, or peer reviewers will be provided to the applicable Tribes' QAO and Program Manager. Consortium member Tribe Program Managers will be responsible for implementation of any corrective action called for by the assessment process. Corrective actions may include, but will not be limited to: substitution of alternative methodologies for sampling, analysis or reporting;

reassignment of task responsibilities to program staff; or replacement of consultants, contract laboratory, or other non-Tribal program participants.

11. QUALITY IMPROVEMENT

Consortium member Tribes understand that quality assurance is a critical component of all projects and programs. The intent of this *KCQMP* is to provide the basis for integrating appropriate quality assurance activities into the full cycle of programs by all Consortium member Tribes from the planning phases through the evaluation phases. If the principles outlined in the *KCQMP* are followed, problems can be detected in a timely manner, before programmatic and financial issues become critical and hinder program implementation and decision making.

11.1. Consortium Reviews

Each year the Consortium quality system and KCQMP will be reviewed by the Consortium's Steering Group annually to ensure that it is still relevant to the organization's mission. It will be the responsibility of the Consortium's Contract Manager to coordinate the review and to ensure that the KCQMP be modified to reflect changing needs or additional guidance. The Contract Manager may initiate projects to address and correct quality assurance problems identified. The QAO at each member will also address specific quality assurance problems of significance, change procedures accordingly, and share with all relevant staff. Actions developed to correct any major quality assurance deficiencies will be documented in quarterly and annual reports and reports related to specific projects.

11.2. SOP Reviews

At least every two years, each Consortium member Tribe will review their SOPs to determine if they remain relevant to the mission of the program and properly describe the procedures used to obtain data of known and sufficient quality to support programmatic decisions. Ensuring that this review occurs is the responsibility of Program Managers and staff responsible for implementing the program. Actions will be developed by Program Managers or their designee to correct any major quality assurance deficiencies.

11.3. Program Reviews

Program reviews and internal MSRs are conducted with the intent to look for opportunities for improving the quality system. The program reviews and internal MSRs will be utilized as a means of evaluating implementation and effectiveness of quality systems by each Consortium member Tribe.

11.4. Project Reviews

Each Consortium member Tribe Program Manager, with assistance from the QAO, and project participants, will review project implementation at regular intervals to identify where improvements in data quality can occur. Project reviews can consist of:

- Technical System Audits
- Data Quality Assessments
- Peer reviews
- Meetings

Generally there should be a meeting at the end of the data collection phase of a project. If results from preliminary DQAs are available for this meeting, participants can use the information to determine whether a QAPP was followed and if quality was controlled to an acceptable level. The SOPs should be revised to reflect changes and improvements in procedures that were developed during the program. Weaknesses, problems, and recommended corrective actions for future programs should be documented in the quality assurance section of the final project report.

11.5. Quality Improvement Responsibilities

Consortium member Tribe staff, at all levels, are accountable for continuous quality improvement. The process of continuous quality improvement leads to a better and more responsive quality system. Field staff responsible for the day-to-day operations typically have the most direct experience with the quality system process and will be encouraged to identify opportunities for improving the quality system by contacting the Project Manager directly or through discussion with their direct supervisor. Within each Consortium member Tribe, the QAO will also periodically meet with the Program Managers to discuss and address QA issues which have been identified by staff or outside review teams.

12. REFERENCES

Hoopa Valley Tribe Environmental Protection Agency (HVTEPA). 2007. Final Quality Assurance Program Plan (QAPP) for Water Quality Assessment and Monitoring. Hoopa Tribal EPA. Hoopa, CA. 84 p.

Hoopa Valley Tribe Environmental Protection Agency (HVTEPA). 2008. Water Quality Control Plan Hoopa Valley Indian Reservation. Approved September 11, 2002, Amendments Approved February 14, 2008. Hoopa Tribal EPA. Hoopa, CA. 285 p.

Hoopa Tribal Environmental Protection Agency. 2013. Water Quality Monitoring by the Hoopa Tribal Environmental Protection Agency 2008–2012. Prepared by the Hoopa Tribal Environmental Protection Agency in cooperation with Kier Associates. 21p.

Karuk Tribe Department of Natural Resources. 2006. Eco-Cultural Resources Management Plan. Karuk DNR, Orleans, CA. 76 p.

Karuk Tribe Department of Natural Resources. 2009. Mid-Klamath River Nutrient, Periphyton, Phytoplankton and Algal Toxin Sampling Analysis Plan (SAP). Prepared with assistance from Kier Associates. Karuk DNR, Orleans, CA. 52 p.

Karuk Tribe Department of Natural Resources. 2011. Quality Assurance Project Plan (QAPP) For Water Quality Sampling and Analysis. Pursuant to CWA 106 grant # BG-97991209. Karuk DNR, Orleans, CA. 132 p.

Karuk Tribe of California. 2014. Water Quality Control Plan. Karuk Tribe Department of Natural Resources, Orleans, CA. 45 p.

Klamath Basin Water Quality Consortium. 2017. Klamath Tribal Water Quality Consortium Strategic Plan and Bylaws. Revisions complete on January 9, 2017. Quartz Valley Indian Reservation, Fort Jones, CA. 9 p.

Klamath Blue Green Algae Working Group (KBGAWG). 2009. Standard Operating Procedures Environmental Sampling of Cyanobacteria for Cell Enumeration, Identification and Toxin Analysis. Developed for the 2009 AIP Interim Measure 12, Water Quality Monitoring Activities, Klamath River. Consortium of government agencies and Tribes. 36 p.

Quartz Valley Indian Reservation. 2009. Water Quality Monitoring and Assessment Report 2008. By Crystal Bowman, Environmental Director, QVIR, Fort Jones, CA. 65 p.

Quartz Valley Indian Reservation. 2014. General Assistance Program Funding Proposal FY 2015. Prepared by the QVIR for the Klamath Tribal Water Quality Consortium for the U.S. EPA R 9, Fort Jones, CA. 7 p.

Quartz Valley Indian Reservation. 2016. Quality Assurance Project Plan 2016 Revision Water Quality Sampling and Analysis. CWA 106 grant identification # I-96927206-0. Prepared by the QVIR Tribal Environmental Protection Department, Fort Jones, CA. 126 p.

Quartz Valley Indian Reservation. 2008. Surface Water Sampling Standard Operating Procedure (SOP 1, Version 1), May 7, 2008. Prepared by the QVIR Tribal Environmental Protection Department, Fort Jones, CA. 7 p.

Quartz Valley Indian Reservation. 2016a. Standard Operating Procedures for Ground Water Sampling (SOP 2, Version 1). Prepared by the QVIR Tribal Environmental Protection Department, Fort Jones, CA. 9 p.

Quartz Valley Indian Reservation. 2016b. Standard Operating Procedures for Ground Water Sampling For Heavy Metals, Pesticides, and Herbicides (SOP 2, Version 1). Prepared by the QVIR Tribal Environmental Protection Department, Fort Jones, CA. 28 p.

Resighini Rancheria Environmental Protection Authority. 2006. The Resighini Rancheria Tribal Water Quality Ordinance Number 01-2002. Resighini Rancheria, Klamath, CA.

Resighini Rancheria. 2010. Surface Water Sampling and Analysis Plan for the Resighini Rancheria. Pursuant to Section 106 Water Quality Assessment, Clean Water Act Project. Prepared by Resighini Environmental Protection Authority (REPA), Klamath, CA. 18 p.

United South and Eastern Tribes (USET). 2014. Umbrella Quality Management Plan. Performed by Southeast Indian Tribes, Inc for Region 4 U.S. EPA. Tribes include Catawba, Cherokee, Miccosukee, Choctaw and the Poarch Band of Creek Indians. Nashville, TN. 35 p.

U.S. Environmental Protection Agency (U.S. EPA). 1987. Directive 2100 Chapter 10 Records Management. IRM Policy Manual. U.S. EPA, Washington DC.

U.S. Environmental Protection Agency (U.S. EPA). 2000a. Guidance for the Data Quality Objectives Process EPA QA/G-4. U.S. EPA, Washington DC, EPA/600/R-96/055. 100 pp.

U.S. Environmental Protection Agency (U.S. EPA). 2000b. Guidance for Data Quality Assessment Practical Methods for Data Analysis EPA QA/G-9 QA00 Update. U.S. EPA, Washington DC, EPA/600/R-96/084. 219 pp.

U.S. Environmental Protection Agency (U.S. EPA). 2000c. Guidance for Developing a Training Program for Quality Systems EPA QA/G-10. U.S. EPA, Washington DC, EPA/240/B-00/004. 52 pp.

U.S. Environmental Protection Agency (U.S. EPA). 2001a. EPA Requirements for Quality Management Plans EPA QA/R-2. 2001. EPA/240/B-01/002. 30 pp.

U.S. Environmental Protection Agency (U.S. EPA). 2001b. EPA Requirements for Quality Assurance Project Plans (QA/R-5) (EPA-2001). U.S. EPA, Washington DC.

U.S. Environmental Protection Agency (U.S. EPA). 2002a. Guidance on Environmental Data Verification and Validation EPA QA/G-8. U.S. EPA, Washington DC, EPA/240/R-02/004. 96 pp.

U.S. Environmental Protection Agency (U.S. EPA). 2002b. Guidance for Quality Assurance Project Plans EPA QA/G-5. U.S. EPA, Washington DC, EPA/240/R-02/009. 111 pp.

U.S. Environmental Protection Agency (U.S. EPA). 2002c. Overview of the EPA Quality System for Environmental Data and Technology EPA/240/R-02/003. 35 pp.

U.S. Environmental Protection Agency (U.S. EPA). 2007. Guidance for Preparing Standard Operating Procedures (SOPs) EPA QA/G-6. U.S. EPA, Washington DC, EPA/600/B-07/001. 60 pp.

U.S. Environmental Protection Agency (U.S. EPA). 2011. Quality Standard for Environmental Data Collection, Production and Use by Non-EPA (External) Organizations. U.S. EPA, Washington DC.

Yurok Tribe Environmental Program. 2004. Water Quality Control Plan For the Yurok Indian Reservation. Yurok Tribe Environmental Program, Klamath, CA. 37 p.

Yurok Tribe Environmental Program (YTEP). 2011. Yurok Tribe Environmental Program Quality Management Plan. YTEP, Klamath, CA. 23 p.

Yurok Tribe Environmental Program (YTEP). 2012a. Lower Klamath River Nutrient, Periphyton, Phytoplankton and Algal Toxin Sampling Analysis Plan (SAP). Prepared by YTEP with assistance from Kier Associates. YTEP, Klamath, CA. 55 p.

Yurok Tribe Environmental Program (YTEP). 2012b. Final Quality Assurance Program Plan (QAPP) for Water Quality Assessment and Monitoring. April 2012. YTEP, Klamath, CA. 76 p.

Yurok Tribe Environmental Program (YTEP). 2012c. Yurok Tribe Coastal Monitoring Sampling and Analysis Plan (SAP). Prepared by YTEP, Klamath, CA. 18 p.

13. GLOSSARY of QUALITY SYSTEM TERMS

Acceptance criteria-Specified limits placed on characteristics of an item, process, or service defined in requirements documents.

Accuracy -The degree of agreement between an observed value and an accepted reference value. Accuracy is a data quality indicator and measures bias within an analytical system or data collection operation.

Activity -An all-inclusive term describing a specific set of operations or related tasks to be performed, either serially or in parallel (e.g., research and development, field sampling, analytical operations, equipment fabrication), that, in total, result in a product or service.

Assessment -As defined in the UQMP, the evaluation process used to measure the performance or effectiveness of a system and its elements against specific criteria. Glossary of Quality Assurance and Related Terms Examples include, but are not limited to, audits, proficiency testing, management systems reviews, data quality assessments, peer reviews, inspections, or surveillance.

Audit (quality) -A systematic and independent examination to determine whether QA/QC and technical activities are being conducted as planned and whether these activities will effectively achieve quality objectives. See also Technical Systems Audit.

Bias -The systematic or persistent distortion of a measurement process, which causes errors in one direction (i.e., the expected sample measurement is different from the sample's true value).

Blank -A sample subjected to the usual analytical or measurement process to establish a zero baseline or background value; a sample that is intended to contain none of the analytes of interest. A blank is used to detect contamination during sample handling preparation and/or analysis.

Calibration -A comparison of a measurement standard, instrument, or item with a standard or instrument of higher accuracy to detect and quantify inaccuracies and to report or eliminate those inaccuracies by adjustments.

Certification -The process of testing and evaluation against specifications designed to document, verify, and recognize the competence of a person, organization, or other entity to perform a function or service, usually for a specified time.

Chain of custody -An unbroken trail of traceability that ensures the physical security of samples, data, and records.

Completeness -A measure of the amount of valid data obtained from a measurement system compared with the amount that was expected to be obtained under correct, normal conditions. It includes the number of samples actually collected compared to the total number intended.

Conformance -An affirmative indication or judgment that a product or service has met the requirements of the relevant specification, contract, or regulation; also, the state of meeting the requirements.

Contractor - Any organization or individual contracting to furnish services or items or to perform work.

Corrective action - Any measures taken to rectify conditions adverse to quality and, where possible, to preclude their recurrence.

Data quality indicators (DQIs) - The quantitative statistics and qualitative descriptors that are used to interpret the degree of acceptability or utility of data to the user. The principal data quality indicators are precision, accuracy/bias, comparability, completeness, representativeness, and sensitivity. Also referred to as data quality attributes.

Data quality objectives (DQOs) -Qualitative and quantitative statements derived from the data quality objectives (DQO) process, as defined by EPA QA/G-4. DQOs can be used as the basis for establishing the quality and quantity of data needed to support decisions.

Data quality objective (DQO) process -A systematic planning tool based on the scientific method that clarifies study objectives, defines the appropriate type, quantity and quality of data and specifies tolerable levels of potential decision errors needed to answer specific environmental questions and to support proper environmental decisions. The DQO process is one type of systematic planning process. See also Systematic planning process.

Decision-maker -Project manager, stakeholder, regulator, etc., who has specific interests in the outcome of site-related activities and will use the collected data to make decisions regarding the ultimate disposition of the site or whether to proceed to the next study phase.

Document-Written text such as a report, standard operating procedure, plan. Once written, documents can be revised or amended, unlike records which are not revised once written.

Document control -The policies and procedures used by an organization to ensure that its documents and their revisions are proposed, reviewed, approved for release, inventoried, distributed, archived, stored, retrieved and controlled in accordance with the organization's requirements.

Environmental data -Any parameters or pieces of information collected or produced from measurements, analyses, or models of environmental processes, conditions, and effects of pollutants on human health and the ecology, including results from laboratory analyses or from experimental systems representing such processes and conditions. It also includes information collected directly from measurements, produced from models, and compiled from other sources such as databases or the literature.

Environmental data operations -Any work performed to obtain, use, or report information pertaining to environmental processes and conditions.

Environmental monitoring -The process of measuring or collecting environmental data.

Environmental processes -Any manufactured or natural processes that produce discharges to, or that impact, the ambient environment.

Environmental programs -An all-inclusive term pertaining to any work or activities involving the environment, including but not limited to characterization of environmental processes and conditions; environmental monitoring; environmental research and development; the design, construction, and operation of environmental technologies; and laboratory operations on environmental samples.

Finding -An assessment conclusion that identifies a condition having a significant effect on an item or activity. An assessment finding may be positive or negative and is normally accompanied by specific examples of the observed condition.

Graded approach -The objective process of establishing the project requirements and level of effort according to the intended use of the results and the degree of confidence needed in the quality of the results.

Guidance -A suggested practice that is not mandatory, intended as an aid or example in complying with a standard or requirement.

Guideline -A suggested practice that is not mandatory in programs intended to comply with a standard.

Inspection -The examination or measurement of an item or activity to verify conformance to specific requirements.

Management-Those individuals directly responsible and accountable for planning, implementing, and assessing work.

Management system -A structured, nontechnical system describing the policies, objectives, principles, organizational authority, responsibilities, accountability, and implementation plan of an organization for conducting work and producing items and services.

Method -A body of procedures and techniques for performing an activity (e.g., sampling, chemical analysis, quantification), systematically presented in the order in which they are to be executed.

Must-When used in a sentence, a term denoting a requirement that has to be met.

Nonconformance-A deficiency in a characteristic, documentation, or a procedure that renders the quality of an item or activity unacceptable or indeterminate; non-fulfillment of a specified requirement.

Objective evidence-Any documented statement of fact, other information, or record, quantitative or qualitative, pertaining to the quality of an item or activity, based on observations, measurements, or tests that can be verified.

Observation -An assessment conclusion that identifies a condition (either positive or negative) that does not represent a significant effect on an item or activity. An observation may identify a condition that has not yet caused a degradation of quality.

Organization -A public or private company, corporation, firm, enterprise, or institution, or part thereof, whether incorporated or not, that has its own functions and administration.

Parameter-A quantity, usually unknown, such as a mean or a standard deviation characterizing a population. Parameter is commonly misused for variable, characteristic, or property.

Precision -A measure of the reproducibility of measurements taken under specified conditions. Sample precision is typically assessed through the use of sample duplicates, sample replicates, and/or matrix spiked duplicates. Examples of QC measures for precision include field duplicates, laboratory duplicates, and analytical replicates.

Procedure -A specified way to perform an activity.

Process -A set of interrelated resources and activities that transforms inputs into outputs. Examples of processes include analysis, design, data collection, operation, fabrication, and calculation.

Project- An organized set of activities within a program.

Project quality objectives (PQOs) - Qualitative and quantitative statements derived from a Systematic Planning Process (e.g., EPA QA/G-4 DQO process) that clarify study objectives, define the appropriate type of data, and specify tolerable levels of potential decision errors. PQOs will be used as the basis for establishing the quality and quantity of data needed to support decisions.

Quality -The totality of features and characteristics of a product or service that bears on its ability to meet the stated or implied needs and expectations of the user.

Quality assurance -An integrated system of management activities involving planning, implementation, assessment, reporting, and quality improvement to ensure that a process, item, or service is of the type and quality needed and expected by the client.

Quality assurance project plan (QAPP) -A formal document describing in comprehensive detail the necessary quality assurance (QA), quality control (QC), and other technical activities that must be implemented to ensure that the results of the work performed will satisfy the stated performance criteria.

Quality control -The overall system of technical activities that measures the attributes and performance of a process, item, or service against defined standards to verify that they meet the stated requirements established by the customer; operational techniques and activities that are used to fulfill requirements for quality; also the system of activities and checks used to ensure that measurement systems are maintained within prescribed limits, providing protection against "out of control" conditions and ensuring that the results are of acceptable quality.

Quality management -That aspect of the overall management system of the organization that determines and implements the quality policy. Quality management includes strategic planning, allocation of resources, and other systematic activities (e.g., planning, implementation, and assessment) pertaining to the quality system.

Quality Management Plan -A formal document that describes the quality system in terms of the organization's structure, the functional responsibilities of management and staff, the lines of authority, and the required interfaces for those planning, implementing, and assessing all activities conducted.

Quality System - A structured and documented management system describing the policies, objectives, principles, organizational authority, responsibilities, accountability, and implementation plan of an organization for ensuring quality in its work processes, products, and services. The quality system provides the framework for planning, implementing, documenting, and assessing work performed by the organization and for carrying out required quality assurance (QA) and quality control (QC) activities.

Record (quality) -A document that furnishes objective evidence of the quality of products, services, or activities and that has been verified and authenticated as technically complete and correct. Records may include photographs, drawings, magnetic tape, computer files, and other data recording media.

Representativeness -A measure of the degree to which data accurately and precisely represent a characteristic of a population, a parameter variation at a sampling point, a process condition, or an environmental condition.

Requirement -A formal statement of a need and the expected manner in which it is to be met; documented statements that specify activities that must be done; the mandated activities.

Scientific method -The principles and processes regarded as necessary for scientific investigation, including rules for formulation of a concept or hypothesis, conduct of experiments, and validation of hypotheses by analysis of observations.

Secondary Data -Data not originally collected for the purpose for which they are now being used. It is also data generated external to a particular organization. In addition, the level of QA/QC provided at the time of the original data collection may be unknown.

Sensitivity -The capability of a test method or instrument to discriminate between measurement responses representing different levels (e.g., concentrations) of a variable of interest. Examples of QC measures for determining sensitivity include a method detection limit study, and initial calibration low standards at the quantitation limit.

Service - The result generated by activities at the interface between the supplier and the customer; the supplier's internal activities to meet customer needs. Such activities in environmental programs include design, inspection, laboratory and/or field analysis, repair, and installation.

Specification - Requirements which refer to or include drawings or other relevant documents. Specifications should indicate the means and criteria for determining conformance.

Standard Operating Procedures (SOPs) -A written document that details the method for a routine operation, analysis, or action, with thoroughly prescribed techniques and steps. SOPs are officially approved as the methods for performing certain routine or repetitive tasks.

Supplier -Any individual or organization furnishing items or services or performing work according to a procurement document or a financial assistance agreement. Supplier is an all-inclusive term used in place of any of the following: vendor, seller, contractor, subcontractor, fabricator, or consultant.

Systematic planning process -Systematic planning is a process that is based on the scientific method and includes concepts such as objectivity of approach and acceptability of results. Systematic planning is based on a common sense, graded approach to ensure that the level of detail in planning is commensurate with the complexity and intended use of the work and the available resources. This framework promotes communication among all organizations and individuals involved in an environmental program. Through a systematic planning process, a team can develop acceptance or performance criteria for the quality of the data collected and for the quality of the decision.

Technical Systems Audit (TSA)-A thorough, systematic, on-site technical audit of facilities, equipment, personnel, training, procedures, record-keeping, data validation, data management, and reporting aspects of a system.

Traceability-The ability to trace the history, application, or location of an entity by means of recorded identifications. In a calibration sense, traceability relates measuring equipment to national or international standards, primary standards, basic physical constants or properties, or reference materials. In a data collection sense, it relates calculations and data generated throughout the project back to the requirements for the quality of the project.

Tribal Project Manager – Tribal Staff person responsible for administering an EPA environmental project.

Tribal QA Officer (QAO) – The Person identified by the Tribe as being responsible for certifying, administering, and implementing the Quality System with delegated authority from the Tribe.

Validation -Confirmation by examination and provision of objective evidence that the particular requirements for a specific intended use are fulfilled. Data validation is an analytical process evaluation that includes evaluating compliance with testing methods, procedures, or contracts, and comparison with criteria based upon the quality objectives developed in the project QAPP. The purpose of data validation is to assess the performance associated with the analysis to determine the quality of specified data.

Verification -Confirmation by examination and provision of objective evidence that the specified requirements (sampling and analytical) have been completed. This is to be a completeness check.