GROUP A ELEMENTS: PROJECT MANAGEMENT

1. TITLE AND APPROVAL SHEETS

Quality Assurance Project Plan (Provisional)

For

PROJECT NAME: Lake Almanor Watershed Planning and NPS Control Project: Monitoring Plan

SWRCB Agreement Number: 04-123-555-0

Date: 04/20/2007

NAME OF RESPONSIBLE ORGANIZATION : Plumas County Flood Control and Conservation District

PROVISIONAL STATEMENT

This version of the Lake Almanor Watershed Monitoring Plan QAPP has been developed under SWRCB Grant No. 04-123-555-0 as a planning tool for consensus-building and support of funding development for a proposed comprehensive watershed monitoring program. For calendar year 2007, DWR and PCDEH (on behalf of the Plumas County Water Quality Subcommittee) expect to continue with their current level of water quality sampling using existing funding sources. In the mean time, the multiple stakeholder parties are working jointly to investigate options to secure continued funding. For the purposes of conducting the proposed monitoring, the grant organization and Regional Board representatives will be defined at a future date when funding is secured and in advance of implementation. Details of this QAPP will be updated at that time with input from the designated responsible parties.

Further information on the status of the monitoring can be found in the Lake Almanor Monitoring Plan.

APPROVAL SIGNATURES

The current version of the Lake Almanor Watershed Monitoring Plan and this associated QAPP have been developed as a planning tool for consensus-building and support of funding development. The grant organization and Regional Board representatives will be defined at a future date, when funding is secured and in advance of implementation. Further information on the status of the monitoring can be found in the Lake Almanor Monitoring Plan.

GRANT ORGANIZATION:

Title:	Name:	Signature:	Date*:
Project Manager			
QA Officer			

REGIONAL BOARD (SWRCB**):

Title:	Name:	Signature:	Date*:
Contract Manager			
QA Officer			

* This is a contractual document. The signature dates indicate the earliest date when the project can start.

** If the QAPP is being prepared under the jurisdiction of the State Water Resources Control Board (SWRCB) rather than a Regional Board, substitute the appropriate SWRCB information for the RWQCB information.

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3. DISTRIBUTION LIST

The current version of the Lake Almanor Watershed Monitoring Plan and this associated QAPP have been developed as a planning tool for consensus-building and support of funding development. The grant organization and Regional Board representatives will be defined at a future date, when funding is secured and in advance of implementation. Further information on the status of the monitoring can be found in the Lake Almanor Monitoring Plan.

Title:	Name (Affiliation):	Tel. No.:	QAPP No*:
Contractor Project Manager			
Contractor Administrative Manager			
Regional Board Contract Manager			
Regional Board QA Officer			
PROJECT PARTICIPANTS			
Almanor Basin Watershed Advisory Committee (ABWAC)			
Plumas County Water Quality Subcommittee			
Plumas County Environmental Health Division			
Sierra Institute for Community and Environment			

4. PROJECT/TASK ORGANIZATION

4.1 Involved parties and roles.
The current version of the Lake Almanor Watershed Monitoring Plan and this associated QAPP have been developed as a planning tool for consensus-building and support of funding development. The personnel responsibilities will be defined at a future date, when funding is secured and in advance of implementation. Further information on the status of the plan can be found in the Lake Almanor Monitoring Plan.

Table 1. (Element 4) Personnel responsibilities *(To be determined)*.

Name	Organizational Affiliation	Title	Contact Information (Telephone number, fax number, email address.)

4.2 Quality Assurance Officer role

4.3 Persons responsible for QAPP update and maintenance.
(To be determined)

4.4 Organizational chart and responsibilities
The current version of the Lake Almanor Watershed Monitoring Plan and this associated QAPP have been developed as a planning tool for consensus-building and support of funding development. The organizational chart will be defined at a future date, when funding is secured and in advance of implementation. Further information on the status of the plan can be found in the Lake Almanor Monitoring Plan.

5. PROBLEM DEFINITION/BACKGROUND

5.1 Problem statement.

Lake Almanor is an important scenic, recreational, and economic resource for Plumas County (County) and the broader community of northeastern California. The County and watershed stakeholders have recognized that the generally unimpaired state of the Lake Almanor watershed resources must be protected from degradation, and that an organized planning and management effort is essential to the long-term health of the watershed.

In response to this need, the County is conducting the Lake Almanor Watershed Planning and Non-point Source Control Project (Project) to provide data to support and develop a framework for management of the Lake Almanor watershed. The Project includes several important steps to ensure that appropriate long-term management measures are implemented, including developing a stable institutional framework for coordinated planning and management; completing a comprehensive watershed assessment; improving public awareness of watershed issues; and coordinating watershed monitoring. The Project is currently funded by a grant from the California State Water Resources Control Board (SWRCB) and is being executed by Plumas County Flood Control and Conservation District.

The purpose of this monitoring is to supply information to the interested stakeholders that will provide the basis for management decisions necessary to protect the resource values of Lake Almanor and the beneficial uses of the lake waters. As detailed below, there are a number of potential water quality issues that will require close attention and may warrant more active management of the lake and its watershed. The major water quality issues that the proposed monitoring will address include:

- Overall lake water quality associated with nutrient status and biological growth that reflects the cumulative effects of land condition and activities across the lake and contributing watershed;
- Bacterial issues associated primarily with human and animal waste in or near the lake; and
- Contaminants, most likely localized, from accidental spills or leaks from recreational activities on the lake or near the lake shore.

The proposed monitoring responds to the need to track the lake and watershed conditions with respect to these and other possible water quality issues. Detailed rationales for the proposed monitoring are discussed in the Monitoring Plan.

The current version of the monitoring plan is a starting point that captures the current state of knowledge about lake and watershed conditions and reflects the current vision of likely water quality stressors. The plan presented also reflects a balance of the level of concern with the resources available to conduct monitoring. As conditions change and new information becomes available, stakeholders may well develop a revised view of monitoring needs, in which case, appropriate modifications to the monitoring activities may be warranted. Accordingly, the monitoring plan may be updated, perhaps reducing or increasing sampling intensity, changing monitoring locations, or analyzing for additional or different constituents.

5.2 Decisions or outcomes.

As mentioned above, the purpose of this monitoring is to supply information to the interested stakeholders that will provide the basis for management decisions necessary to protect the resource values of Lake Almanor and the beneficial uses of the lake waters. The results of the proposed monitoring and accompanying interpretation will support a variety of planning and management decisions as well as serve to educate local stakeholders and visitors on issues and activities and their relationship to water quality in Lake Almanor.

The desired outcome of the water quality monitoring program is a well-informed watershed planning and management program to guide local efforts in such areas as:

- Development planning and zoning decisions
- Encouragement of Best Management Practices in:
    - Erosion control

    - Vegetation management
    - Riparian protection
    - Gasoline spill prevention
    - Septic installation and maintenance
    - Transportation planning
- Watershed stewardship education
- Appropriate regulatory programs
- Recreational facility planning

5.3 Water quality or regulatory criteria

The current water quality in Lake Almanor fully supports the designated beneficial uses of Lake Almanor and tributary waters. General trends in water quality or other indications of degradation or potential degradation are more applicable than specific water quality criteria in guiding watershed management options, since the goal of the overall watershed planning effort is to avoid significant degradation of the water quality in Lake Almanor. However, for site-specific high-use areas sampling, the REC-1 criteria from the Basin Plan is used as a benchmark for coliform bacteria observations.

6. PROJECT/TASK DESCRIPTION

6.1 Work statement and produced products.

Based on the most likely water quality issues and potential stressors, the proposed monitoring program includes regular monitoring of parameters in the following general categories:

- General Physical Parameters - generally measured in the field at same location and time as samples for other parameters are collected. These include temperature, pH, electrical conductivity (EC), and dissolved oxygen (DO).
- Nutrients – samples to be collected four times/year at three Lake Almanor locations and in the North Fork Feather River upstream of Lake Almanor. Specific parameters include the multiple forms of nitrogen and phosphorus.
- Major Minerals -- samples to be collected four times/year at three Lake Almanor locations and in the North Fork Feather River upstream of Lake Almanor. Specific parameters include the major cations and anions, hardness, total suspended solids, and alkalinity.
- Metals – samples to be collected four times/year at three Lake Almanor locations and in the North Fork Feather River upstream of Lake Almanor.
- Organics – samples to be collected approximately one time each year in selected high use areas, with occasional episodic sampling in the event of spills or other known events.
- Bacteria (E-coli) – samples to be collected one or more times each year in selected high use areas.
- Plankton -- Samples for Zooplankton and phytoplankton analyses will be collected four times per year at three Lake Almanor locations.
- Benthic Microinvertebrates (BIM) – BMI surveys will be conducted at approximately five year intervals at selected stream reaches in combination with more exhaustive stream condition surveys.
- Macrophytes and Periphyton – surveys to be conducted in selected shallow lake sites at approximately five year intervals.

More details on monitoring and sampling rationale can be found in the Monitoring Plan.

Annual reports of the monitoring results, including interpretation, will be prepared. These reports will be presented at public meetings. In addition, monitoring results will be added to the web-accessible database currently under development.

6.2. Constituents to be monitored and measurement techniques.

Field measurements of pH, conductivity, temperature, and dissolved oxygen will be conducted along with sample collection for other parameters.

For remaining chemical constituents, samples will be collected and submitted to the appropriate laboratory.

Table 2 summarizes the constituents to be measured. Specific measurement techniques are described in more detail in Section 11.

TABLE 2
Summary of Constituents to be Monitored *(Excerpted from Table 4 of Monitoring Plan)*

Parameter General Category	Specific Parameters	Sampling Locations	Frequency
WATER QUALITY COMPONENTS			
Priority 1 – Baseline/Essential Components			
Physical	- Temp - pH - DO - EC - Turbidity - Secchi Depth[1]	> LA-1 (DWR) (in lake) > LA-2 (DWR) (in lake) > LA-3 (DWR) (in lake) Multiple Depth Profile at Lake Locations (approximately 3 meter intervals) > LA-4 (DWR) (NFFR) Temperature, pH & DO only	4 times/year [2]
Nutrients	- NH_3 - NO_2, NO_3 - P (ortho &Total)	> LA-1 (DWR) (in lake) > LA-2 (DWR) (in lake) > LA-3 (DWR) (in lake) Near Surface and Near Bottom Samples at Lake Locations > LA-4 (DWR) (NFFR) Temperature, pH & DO only	4 times/year [2]
Major Minerals	Ca, Cl, K, Mg, Na, SO_3, Hardness, TSS, Alkalinity	> LA-1 (DWR) (in lake) > LA-2 (DWR) (in lake) > LA-3 (DWR) (in lake) Multiple Depth Profile in lake (approx. 1 m intervals) > LA-4 (DWR) (NFFR) Temperature, pH & DO only	4 times/year [2, 4]
Metals (in water)	Ag, Al, As, B, Cd, Cr, Cu, Fe, Hg, Mn, Ni, Pb, Se, Zn	> LA-1 (DWR) (in lake) > LA-2 (DWR) (in lake) > LA-3 (DWR) (in lake) Surface & Bottom in lake > LA-4 (DWR) (NFFR) Temperature, pH & DO only	4 times/year [2, 4]
Organics (Petroleum Products)	Multiple VOCs, MTBE	Selected High Use Areas -- e.g. near or at > LA-14 (DWR) > LA-16 (DWR) > LA-7 (DWR)	1 time/year (high use period)
Bacteria	E-coli Fecal Coliform	Selected High Use Areas > LA-7 (Plumas County) > LA-8 (Plumas County) > LA-12 (Plumas County) > LA-13 (Plumas County) > LA-16 (Plumas County) > Five stations near PG&E Recreation Sites[5]	1 time/year (high use period)
Plankton	Zooplankton Phytoplankton	Single Depth-integrated Net Tow > LA-1 (DWR) (in lake) > LA-2 (DWR) (in lake) > LA-3 (DWR) (in lake)	4 times/year [2]
Priority 2 – High Value/Special Needs Components			
Metals (in water)	Ag, Al, As, B, Cd, Cr, Cu, Fe, Hg,	> LA-1 (DWR) (in lake)	4 times/year [2, 4]

TABLE 2
Summary of Constituents to be Monitored *(Excerpted from Table 4 of Monitoring Plan)*

Parameter General Category	Specific Parameters	Sampling Locations	Frequency
	Mn, Ni, Pb, Se, Zn	> LA-2 (DWR) (in lake) > LA-3 (DWR) (in lake) Surface & Bottom in lake > LA-4 (DWR) (NFFR) Temperature, pH & DO only	
Bacteria	E-coli Fecal Coliform	Selected High Use Areas > LA-7 (Plumas County) > LA-8 (Plumas County) > LA-12 (Plumas County) > LA-13 (Plumas County) > LA-16 (Plumas County) > Five stations near PG&E Recreation Sites[5]	1 time/year (high use period) – **in addition to 1 time per year priority 1.**
Priority 3 – Intermittent/Opportunistic			
Stormwater Flow Spot Samples	Multiple Parameters as detailed above - Physical - Major Minerals - Nutrients - Bacteria - Metals - Organics	Selected locations draining developed areas	During large rain and/or snowmelt events as opportunities allow
WATERSHED CONDITION MONITORING COMPONENTS			
Priority 2 – High Value/Special Needs Components			
Benthic Macroinvertebrates[6]	Standard CSBP taxonomic level	> Newly-selected shallow lake sites > near LA-4 (DWR) (NFFR)[6] > near LA-06 (DWR) (Hamilton Branch) [6] > Bailey Creek[6] > Warner Creek[6] > Last Chance Creek[6] > Dearheart Creek[6]	Every 5 years[3]
Macrophytes and Periphyton (Attached Algae)		> Newly-selected shallow lake sites > NFFR > Hamilton Branch	Every 5 years[3]

DWR – Department of Water Resources

NFFR – North Fork Feather River

DO – Dissolved oxygen

EC – Electrical Conductivity

[1] *Relevant in deep lake sampling sites only. Not applicable to shallow tributary sampling.*

[2] *Approximately April, June, August and October.*

[3] *First time baseline sampling event to be conducted as soon as possible and frequency and location of ongoing sampling to be determined based on baseline observations.*

[4] *Reduction in frequency may be considered in future years*

[5] *As prescribed in 2105 Agreement (PG&E 2005)*

[6] *BMI and stream channel condition assessments could be combined at same stream reaches and use the standardized method such as USFS Stream Condition Inventory (SCI) or California Stream Bioassessment Procedure (CSBP) although additional channel condition parameters may be desirable*

6.3 Project schedule

The proposed monitoring is anticipated to continue indefinitely on the cycle (annual or otherwise) prescribed in Table 2.

As described in the Monitoring Plan, for Calendar year 2007, DWR expects to continue with its current level of water quality sampling, which covers the 4 times per year sampling of general physical parameters, nutrients, major minerals, metals, and plankton at the three Lake Almanor sites and the NFFR site at Chester. Similarly, the PCDEH, on behalf of the Water Quality Subcommittee, plans to continue bacterial sampling at the high-use recreational sites on the July 4th weekend.

A specific project schedule, including reporting timelines, will be developed for funded monitoring beyond calendar year 2007 when specific arrangements and responsibilities for monitoring beyond 2007 have been established.

6.4 Geographical setting

The Lake Almanor watershed comprises more than 300,000 acres of land in northern California, approximately two thirds in Plumas County and one third in Lassen County (see Figure 1). The watershed is located at the transition between the Sierra Nevada and Cascade Ranges in Northern California, and the watershed elevation varies from nearly 10,000 feet above mean sea level (msl) on the slopes of Lassen Peak down to 4,500 feet msl at Lake Almanor.

Lake Almanor is one of the largest reservoirs in California, with a storage capacity of over 1 million acre feet. The reservoir receives runoff from the Upper North Fork Feather River and various smaller streams and springs. Lake Almanor and Mountain Meadows Reservoir, which is located upstream of Lake Almanor on Hamilton Branch, are managed by the Pacific Gas & Electric Company for power generation, recreation, and irrigation.

Lake Almanor is an important scenic, recreational, and economic resource for Plumas County (County) and the broader community of northeastern California.

6.5 Constraints

For calendar year 2007, DWR expects to continue with its current level of water quality sampling, which covers the 4 times per year sampling of general physical parameters, nutrients, major minerals, metals, and plankton at the three Lake Almanor sites and the NFFR site at Chester. Similarly, the PCDEH, on behalf of the Water Quality Subcommittee, plans to continue bacterial sampling at the high-use recreational sites on the July 4th weekend. However, the long-term funding prospects for continued DWR contributions to the monitoring program are uncertain at this time. To prepare for continuation of the routine monitoring beyond 2007 and to develop funding strategies and responsibilities for the additional proposed monitoring, the County will convene discussions with the multiple stakeholder parties to investigate options for working jointly to secure continued funding.

Refer to the Monitoring Plan for a more complete explanation of the proposed project setting.

7. QUALITY OBJECTIVES AND CRITERIA FOR MEASUREMENT DATA

(Provide quality specifications. Provide established measurement performance or acceptance criteria. Express the criteria in terms of precision, accuracy, bias, representativeness, comparability, completeness, and sensitivity.)

Data Quality Objectives are developed according to the SWAMP standard recommendations and are summarized in Table 3.

Table 3.
Applicable Data Quality Objectives

Group	Parameter	Element 7 Requirements			
		Accuracy	**Precision**	**Recovery**	**Completeness**
Field testing	Dissolved Oxygen	± 0.5 mg/L	No SWAMP requirement – suggest ± 0.5 or 10%	NA	No SWAMP requirement – suggest 90%
	Temperature	± 0.5 °C	No SWAMP requirement – suggest ± 0.5 or 5%	NA	No SWAMP requirement – suggest 90%
	Conductivity	± 5%	No SWAMP requirement – suggest ± 5%	NA	No SWAMP requirement – suggest 90%
	pH by meter	± 0.5 units	No SWAMP requirement – suggest ± 0.5 or 5%	NA	No SWAMP requirement – suggest 90%
	Depth	± 0.2 meters	No SWAMP requirement – not necessary	NA	No SWAMP requirement
	Turbidity	No SWAMP requirement – suggest ± 10% or 0.1, whichever is greater	No SWAMP requirement – suggest ± 10% or 0.1, whichever is greater	NA	No SWAMP requirement – suggest 90%
Laboratory Analyses –	Conventional Constituents in Water	Standard Reference Materials (SRM, CRM, PT) within 95% CI stated by provider of material. If not available then with 80% to 120% of true value	Laboratory duplicate, Blind Field duplicate, or MS/MSD 25% RPD Laboratory duplicate minimum.	Matrix spike 80% - 120% or control limits at ± 3 standard deviations based on actual lab data.	No SWAMP requirement – suggest 90%
	Volatile Organic Analytes (including VOCs, MTBE, BTEX) in Water	Standard Reference Materials (SRM, CRM, PT) within 95% CI stated by provider of material. If not available then with 50% to 150% of true value	Field replicate or MS/MSD ± 25% RPD. Field replicate minimum.	Matrix spike 50% - 150% or control limits at ± 3 standard deviations based on actual lab data.	No SWAMP requirement – suggest 90%
	Trace metals in water, including mercury	Standard Reference Materials (SRM, CRM, PT) 75% to 125%.	Field replicate, laboratory duplicate, or MS/MSD ± 25% RPD. Laboratory duplicate minimum.	Matrix spike 75% - 125%.	No SWAMP requirement – suggest 90%
	Trace metals (including mercury) in tissue and sediment	Standard Reference Materials (SRM, CRM, PT) 75% to 125%.	Field replicate, laboratory duplicate, or MS/MSD ± 25% RPD except Hg in sediment at ± 0.35%. Laboratory duplicate minimum.	Matrix spike 75% - 125%.	No SWAMP requirement – suggest 90%
	Bacteria/ Pathogens	Laboratory positive and negative cultures – proper positive or negative response. Bacterial PT sample -–within the stated acceptance criteria.	R_{log} within 3.27*mean R_{log} (reference is section 9020B of 18th, 19th, or 20th editions of *Standard Methods*	NA	90%
	Benthic inverterbrates	≤ 5% difference	≤ 5% difference	NA	100%

8. SPECIAL TRAINING NEEDS/CERTIFICATION

8.1 Specialized training or certifications.

For general water chemistry field data collection and field measurements, no specialized certification is required. However, field personnel should be adequately trained in both stream and lake field sampling methods as well as boating safety.

Field personnel collecting samples for the low level metals analyses (EPA 1638 and 1631) should be appropriately trained in the Clean Hands-Dirty Hands sampling procedure.

Field personnel conducting BMI, macrophyte, and periphyton surveys must provide evidence of appropriate training and expertise.

Laboratory analyses will be performed by a laboratory certified by the State of California Environment Laboratory Accreditation Program (#1677). The selected laboratory shall operate under a written Quality Assurance (QA) Plan that includes independent onsite audits. All laboratory personnel performing analytical services should be trained to follow the QA plan and each Standard Operating Procedure as written for each test method. Additionally, selected laboratories must maintain a lab safety manual (LSM) in compliance with OSHA or equivalent state or local regulations.

8.2 Training and certification documentation.

Documentation of laboratory certification and OSHA compliance will be requested from selected laboratories.

8.3 Training personnel.

The project QA officer (yet to be designated) will be responsible for determining adequate training of field personnel and verification of laboratory suitability.

9. DOCUMENTS AND RECORDS

The following documents will be developed and kept on file as part of this project:

- Field notes
- Field data sheet records of field analyses
- Sample chain of custody records including analysis results
- Annual Reports

All analysis results and significant field observations will be transferred to the web-accessible electronic database for Lake Almanor (currently under development).

Copies of this QAPP (as finalized once project-specific organization details are defined) will be distributed to all parties involved with the project, including field collectors. Any future amended QAPPs will be held and distributed in the same fashion. Copies of versions, other than the most current, will be discarded so as not to create confusion.

Specific persons responsible for maintaining records for this project will be defined at a future date.

All records will be passed to the appropriate State Board Contract Manager (to be determined) annually or more frequently as negotiated.

GROUP B: DATA GENERATION AND ACQUISITION

10. SAMPLING PROCESS DESIGN

Please see Lake Almanor Watershed Monitoring Plan for a complete description of the monitoring plan rationale.

11. SAMPLING METHODS

The following are the proposed sampling methods developed following the recommendations of DWR, which has been conducting most of the previous monitoring in the Lake Almanor watershed. Recommendations for modifications to these standard operating procedures (SOPs) will be entertained from other agencies or contractors that may collect samples in the future.

Lake Almanor Monitoring Methods

Water Sample Collection

Lake water samples are collected with a Van Dorn style 2.2 liter sampler in 1 pint polypropylene plastic bottles. Samples are taken at discreet layers in the water column every three meters (beginning at 1 meter and continuing at 3m,6m,9m,... etc.) for shore analyses that includes pH, and specific conductance. Alkalinity, turbidity, and specific conductance are measured in the DWR Red Bluff lab from these same samples. Greater volumes are collected at 1 meter and at the bottom at lake stations for mineral, nutrient, and minor element analyses at either DWR's Bryte laboratory in Sacramento or an outside laboratory.

Surface water samples are collected in polypropylene plastic bottles.

Mineral and some nutrient samples are filtered in the field with the use of a Geotech Peristaltic Sampling Pump and a 142mm stainless steel filtering head capable of supporting a 0.45_m polycarbonate membrane filter.

Field Temperature Measurements

All lake station temperatures are measured with a YSI Dissolved Oxygen meter equipped with a multiparameter dissolved oxygen and temperature probe. As the probe descends, it is stopped every meter from surface to bottom, allowing for temperatures to stabilize, and then recorded. Surface water station temperatures are measured with a Orion Model 124 Conductivity / TDS meter. The probe is submerged into the sample, stirred, and temperatures are recorded.

Field Dissolved Oxygen Measurements

Dissolved oxygen measurements are taken concurrently with temperature data with the YSI multiparameter meter. Prior to collecting oxygen data the YSI is calibratedwith a field kit that determines dissolved oxygen using the Alsterberg (azide) modification of the Winkler method in which dry reagents in Hach powder pillows are used followed by tritation with a standard thiosulfate solution dispensed from an automatic burette. Following calibration, oxygen data are collected at 1 meter increments from surface to bottom during descent .Dissolved oxygen was determined at surface water stations with the use of the Winkler chemical titration method.

Field Transparency Measurements (Secchi Disk)

Transparency determination are made using a 20 centimeter secchi disk with alternating black and white quadrants suspended on a non-stretch metallic cloth tape measure. The disk is lowered from the shady side of the boat where the disappearance and reappearance are recorded and the average of the two depths was recorded.

Field pH Measurements

Samples are collected from a boat at lake stations every three meters from the water column and analyzed on shore as soon as possible after their collection. Lake samples are analyzed for pH with the use of a Hach One pH meter. Standard buffers of pH 7.0 and 10.0 are prepared in the lab and taken into the field to calibrate the Hach One. Once calibration is complete pH is measured in each of the lake station samples taken from each site , by immersing the probe in a subsamples of the collection.

Plankton Sampling

Net samples are collected with a Wisconsin (Birge) conical net and collection bucket being towed from bottom to surface, capturing plankton from the entire water column at any given site. Phytoplankton net and collection screen on bucket utilize a 80_ mesh, whereas a larger (153 æ) mesh is used for zooplankton. When the sampler reaches the

surface the net is gently washed to assure all plankton is deposited in the collection bucket. The contents of the collection bucket are washed into a 2 oz. bottle, preserved with 0.5-1ml of Lugol solution, marked and stored for subsequent identification.

Field Specific Conductance Measurements

The specific conductance is measured with a Orion Conductivity / TDS multiparameter meter. After returning to shore with lake samples collected every three meters from the water column at each station, the probe is submerged in the samples and reports specific conductance in _S/cm at 25 degrees centigrade. The Orion is periodically calibrated in the lab in Red Bluff.

Sediment sampling

Sediment samples were collected using a 2" Balchek core gravity sampler. The head assembly consists of bronze central cylinder to which an eye hook and stabilizing fins attach. The central cylinder is threaded on the bottom for core tube attachment and nose piece with eggshell trap. The corer is lowered on a rope until reaching the bottom where it is to raised until the nose piece is 10 feet or higher above the sediment layer (when depth allows) and dropped. The collection tube fills with sediment as the corer penetrates the bottom layers, trapped and retrieved. Approximate strata thicknesses and gross composition charactaristics were recorded. Sediment samples were sent to an outside laboratory for analyses.

Bacteria

To collect for bacteria, a sterile Corning Brand Coliform Water Test Sample Container of 100mL volume with a sodium thiosulfate tablet is filled to the 100mL mark with sample water. For surface water, dip the container about 0.15 m below surface if possible, open the lid and then seal the lid again once the appropriate amount of water has filled the container. If the sample water is groundwater, collect the sample directly from spigot after getting three consecutive, stable EC and temperature readings. Do not rinse container and do not remove sodium thiosulfate tablet! After collection, push tie-down through the hole in the front of the container to seal the container until the sample is processed. Leave room in the top of the container for mixing. Cap container and pull tie-down through the hole in front top of the container. Sample can be stored below 10°C for up to 24 hours before filtering.

Standard minerals,Total Hardness,TDS/Suspended Solids

Two HDPE ½ pint bottles and two HDPE quart bottles are used for collection of standard minerals, TDS, and suspended solids. A quart (Code 55, Suspended Solids) and a ½ pint (Total Hardness) are used for unfiltered sample water, the remaining quart (TDS) and ½ pint (Code 1) are used for filtered sample water. The unfiltered samples are collected directly from the sample body. The bottles are rinsed with sample water and then filled full and the cap replaced. Filtered samples are obtained by filtering sample water through a 142 mm diameter 0.45µm HA nitrocellulose filter. Filter kit is rinsed with a ½ pint of field blank water (distilled water). The filter is placed onto the screen and then rinsed with another ½ pint of field blank water. The samples are filtered into the ½ pint and quart bottles after a rinse. TDS and suspended solid samples are stored at 4ºC for 7 days. Total hardness and Code 1 (filtered) are preserved with 1.0 ml of 70% nitric acid in the field and stored at 4ºC for up to 180 days.

Minor elements, including Mercury

Collection requires two people, a “dirty hands” that handles the outer bag, and a “clean hands” that handles the inner bag and the collection of the water sample. Both people wear polyethylene or “poly” gloves, with the “clean hands” sampler having shoulder length poly gloves. The person who has “dirty hands” opens the outer bag for the person who has “clean hands” to open the inner bag and remove the clean plastic sample bottle. Clean hands then re-closes the inner bag and dirty hands re-closes the outer bag. The sample bottle is submerged into the sample water or collected from the spigot of a well or from a Teflon sampler until the bottle is partially filled. The cap is replaced, the sample bottle is shaken, and then the rinse water is discarded. This rinse is performed a total of three times. After the rinse, the sample bottle is filled, the cap replaced and the sample bottle is placed back into the re-opened inner bag by clean hands. The inner bag is sealed with dirty hands holding the outer bag with the inner bag within it. Clean hands does not touch the outer bag and dirty hands does not touch the inner bag. The outer bag is then sealed by dirty hands and the previously labeled sample is stored on ice until processing can occur. See EPA Method 1669.

Subsurface samples are collected similarly using a 1.2 liter Teflon Kemmerer Bottle Sampler. The sampler is lowered into the column with polyethylene gloves and held 1 meter above the bottom. A messenger is sent down the line to close the sampler and collect the sample. The sampler is raised to the surface and bottles are filled using similar protocol to surface samples. Samplers are washed with a 10% solution of nitric acid, then rinsed thoroughly with distilled or Milli-Q water prior to each use. Clean samplers are double bagged in sealed clear plastic tubing. Sealed samplers are kept and transported in foam padded plywood boxes. The lab seal is not broken until sampler is used in the field.

Nutrients

Two HDPE ½ pint bottles are used for collection of nutrients. The first is unfiltered sample water and the second is used for filtered sample water. The unfiltered sample is collected directly from the sample body. The ½ pint is rinsed with sample water and then filled 2/3-3/4 full and the cap replaced. Samples are stored at 4ºC for 24 hours or frozen for 28 days. The filtered sample is obtained by filtering sample water through a 142 mm diameter 0.45µm HA nitrocellulose filter. Filter kit is rinsed with a ½ pint of field blank water (distilled water). The filter is placed onto the screen and then rinsed with another ½ pint of field blank water. The sample is filtered into the ½ pint bottle after a rinse. Samples are stored at 4ºC for 24 hours or frozen for 28 days.

Total Ammonia

Use an HDPE pint to collect total ammonia samples. First, unscrew lid, fill partially bottle with sample water and shake bottle with lid for a rinse. Fill the pint sample bottle, add 1.0 mL of 1:1 sulfuric acid, and then replace cap. Sample can be stored at 4ºC for 28 days until it is sent to the lab.

12. SAMPLE HANDLING AND CUSTODY

In the field, all samples will be packed in wet ice or frozen ice packs during shipment, so that they will be kept at approximately 4˚C. Samples will be shipped in insulated containers. All caps and lids will be checked for tightness prior to shipping.

All samples will be handled, prepared, transported and stored in a manner so as to minimize bulk loss, analyte loss, contamination or biological degradation. Sample containers will be clearly labeled with an indelible marker. Where appropriate, samples may be frozen to prevent biological degradation. Water samples will be kept in bottles of the material composition described above and kept cool at a temperature of 4˚C until analyzed.

Ice chests are sealed with tape before shipping. Samples are placed in the ice chest with enough ice to completely fill the ice chest. RFA forms are placed in an envelope and taped to the top of the ice chest or they may be placed in a plastic bag and taped to the inside of the ice chest lid. It is assumed that samples in tape-sealed ice chests are secure whether being transported by staff vehicle, by common carrier, or by commercial package delivery. The receiving laboratory has asample custodian who examines the samples for correct documentation, proper preservation and holding times.

Contract laboratories will follow sample custody procedures outlined in their QA plans. Contract laboratory QA plans are on file with the respective laboratory.

All samples remaining after successful completion of analyses will be disposed of properly. It is the responsibility of the personnel of each analytical laboratory to ensure that all applicable regulations are followed in the disposal of samples or related chemicals.

Field crews shall be required to keep a field log for each sampling event. The following items should be recorded in the field log for each sampling event:

- time of sample collection;
- sample ID numbers, including etched bottle ID numbers for Teflon™ mercury sample containers and unique IDs for any replicate or blank samples;
- the results of any field measurements (temperature, D.O., pH, conductivity, turbidity) and the time that measurements were made;
- qualitative descriptions of relevant water conditions (e.g. color, flow level, clarity) or weather (e.g. wind, rain) at the time of sample collection;
- a description of any unusual occurrences associated with the sampling event, particularly those that may affect sample or data quality.

The field crews shall have custody of samples during field sampling. Chain of custody forms will accompany all samples during shipment to contract laboratories. All water quality samples will be transported to the analytical laboratory directly by the field crew or by overnight courier.

Laboratory Custody Log: Laboratories shall maintain custody logs sufficient to track each sample submitted and to analyze or preserve each sample within specified holding times.

Table 4. (Element 12). Sample handling and custody.

Parameters for Analysis in WATER Samples	Recommended Containers (all containers pre-cleaned)	Typical Sample Volume (ml)	Initial Field Preservation	Maximum Holding Time (analysis must start by end of max)
Conventional Constituents in Water				
Alkalinity	Polyethylene bottles (see **NOTE**[(1)] below)	100 ml	Cool to 4°C, dark	14 days at 4°C, dark
Chloride (Cl), Sulfate (SO_4) and Fluoride (F)	"	300 ml	"	28 days at 4°C, dark
Ortho-phosphate (OPO_4)	"	150 ml	"	48 hours at 4°C, dark
Nitrate + Nitrite ($NO_3 + NO_2$)	"	150 ml	"	48 hours at 4°C, dark
Total Keldjahl Nitrogen (TKN)	"	600 ml	"	Recommend: 7 days Maximum: 28 days Either one at 4°C, dark
Total Dissolved Solids (TDS)	"	1000 ml	"	7 days at 4°C, dark
Ammonia (NH_3)	"	500 ml	"	28 days at 4°C, dark
Total Phosphorus (TPO_4)	"	300 ml	"	28 days at 4°C, dark
(1)NOTE:The volume of water necessary to collect in order to analyze for the above constituents is typically combined in four 1-liter polyethylene bottles, which also allows enough volume for possible re-analysis and for conducting lab spike duplicates. This is possible since the same laboratory is conducting all of the above analyses; otherwise, individual volumes apply.				
Total Organic Carbon (TOC), Dissolved Organic Carbon (DOC)	40 ml glass vial	40 ml (one vial)	Cool to 4°C, dark	28 days at 4°C, dark
Total Suspended Solids (TSS)	500 ml amber glass jar	1000 ml (two jars)	Cool to 4°C, dark	7 days at 4°C, dark
Trace Metals in Water Samples				
DISSOLVED METALS (except Dissolved Mercury)	60 ml polyethylene bottle, pre-cleaned in lab using HNO_3	60 ml (one bottle) if salinity <0.5 ppt 180 ml (three bottles) if salinity >0.5 ppt	Filter at sample site using 0.45 micron in-line filter, or syringe filter. Cool to 4°C, dark. Acidify in lab, within 48 hrs, using pre-acidified container (ultra-pure HNO_3) for pH<2.	Once sample is filtered and acidified, can store up to 6 months at room temperature
DISSOLVED MERCURY	250 ml glass or Teflon	250 ml (one	Cool to 4°C, dark.	Once sample is filtered

Parameters for Analysis in WATER Samples	Recommended Containers (all containers pre-cleaned)	Typical Sample Volume (ml)	Initial Field Preservation	Maximum Holding Time (analysis must start by end of max)
	bottle, pre-cleaned in lab using HNO_3	bottle)	Filter in lab within 48 hours, using bench top Hg filtration apparatus. Acidify in lab within 48 hrs, with pre-tested HCL to 0.5%.	and acidified, can store up to 6 months at room temperature
Trace Metals in Water Samples				
HARDNESS	200 ml polyethylene or glass bottle	200 ml (one bottle)	Cool to 4°C, dark OR Filter and add 2 ml conc. H_2SO_4 or HNO_3 to pH < 2; Cool to 4°C, dark.	48 hours at 4°C, dark 6 months at 4°C, dark
Synthetic Organic Compounds in Water Samples				
VOLATILE ORGANIC ANALYTES (VOA's) including VOC, MTBE and BTEX	40 ml VOA vials	120 ml (three VOA vials)	All vials are pre-acidified (50% HCl or H_2SO_4) at lab before sampling. Cool to 4°C, dark	14 days at 4°C, dark
Bacteria and Pathogens in Water Samples				
E. Coli	Factory-sealed, pre-sterilized, disposable Whirl-pak® bags or 125 ml sterile plastic (high density polyethylene or polypropylene) container	100 ml volume sufficient for both E. coli and Enterococcus analyses	Sodium thiosulfate is pre-added to the containers in the laboratory (chlorine elimination). Cool to 4°C; dark.	STAT: 6 hours at 4°C, dark; lab must be notified well in advance
FECAL COLIFORM	Factory-sealed, pre-sterilized, disposable Whirl-pak® bags or 125 ml sterile plastic (high density polyethylene or polypropylene) container	100 ml volume sufficient for both fecal and total coliform analyses	Sodium thiosulfate is pre-added to the containers in the laboratory (chlorine elimination). Cool to 4°C; dark.	STAT: 6 hours at4°C, dark; lab must be notified well in advance
TOTAL COLIFORM	Factory-sealed, pre-sterilized, disposable Whirl-pak® bags or 125 ml sterile plastic (high density polyethylene or polypropylene) container	100 ml volume sufficient for both fecal and total coliform analyses	Sodium thiosulfate is pre-added to the containers in the laboratory (chlorine elimination). Cool to 4°C; dark.	STAT: 6 hours at 4°C, dark; lab must be notified well in advance
Biological				
	Plastic or Glass	Variable		

Parameters for Analysis in WATER Samples	Recommended Containers (all containers pre-cleaned)	Typical Sample Volume (ml)	Initial Field Preservation	Maximum Holding Time (analysis must start by end of max)
Freshwater Macroinvertebrates			70% ethyl alcohol OR 70% isopropyl alcohol OR Add formalin to produce a 5-10% formalin solution Store in dark and away from extremes of hot and cold	5 years
Netplankton	amber plastic or glass (Lugol's solution will permeate plastic cubitainers and stain materials in contact with cubitainer)	variable	Rinse net bucket with 3-5% buffered formalin OR If net bucket rinsed with tap water, preserve sample with 1 ml of modified Lugol s solution per 100 ml of sample. Store in dark and away from extremes of hot and cold.	5 years

13. ANALYTICAL METHODS

Analytical methods to be used are summarized in Table 5. If other methods are used due to equipment changes or contract laboratory preferences, such changes will be noted in reports and cumulative database.

Table 5. (Element 13) Laboratory analytical methods.

Analysis	Matrix	Reporting Units	Analytical Methods (May vary according to Selected Contract Lab)	Target Reporting Limit (TRL)
AMMONIA (as N)	water (dissolved)	mg/L	EPA 350.1 or SM 4500-NH_3 B, C	0.1
CALCIUM	water (dissolved)	mg/L	EPA 200.7	0.05
CHLORIDE (iodometric)	water (dissolved)	mg/L	EPA 300.0A	0.25
CONDUCTIVITY	water	uS/cm	SM 2510B	2.5
MAGNESIUM	water (dissolved)	mg/L	EPA 200.7	0.02
NITRATE+NITRITE	water	mg/L	EPA 353.2 or SM 4500-NO_3 E, F	0.1
ORTHO-PHOSPHATE (as P)	water (dissolved)	mg/L	EPA 365.3 or SM 4500-P E&F	0.01
PATHOGENS				
E. Coli	water	MPN/100 ml	SM 9223B	2
Fecal Coliform	water	MPN/100 ml	SM 9221E	2
POTASSIUM	water (dissolved)	mg/L	EPA 200.7	0.1
SODIUM	water (dissolved)	mg/L	EPA 200.7	0.1
SULFATE	water (dissolved)	mg/L	EPA 300.0A	1.0
TOTAL ALKALINITY (as CaCO3)	water	mg/L	SM 2320B	1
TOTAL DISSOLVED SOLIDS	water	mg/L	SM 2540C	10
TOTAL HARDNESS (as CaCO3)	water	mg/L	SM 2340C	1
TOTAL PHOSPHATE (as P)	water	mg/L	EPA 365.1-4 SM 4500-P B(5), E&F	0.05
TURBIDITY	water	NTU	SM 2130B	0.5 ntu
Trace Metals (Low Level Total and Dissolved)	Water	ug/L	EPA 1638	varies

14. QUALITY CONTROL

Table 6 summrizes the quality control (QC) requirements to be used.

Table 6. (Element 14) Sampling QC.

Group	Parameter	Element 14 Quality Control
Field testing	Dissolved Oxygen	Replicate (2) measurements plus maintenance practices.
	Temperature	Replicate (2) measurements plus maintenance and calibration practices.
	Conductivity	Replicate (2) measurements plus maintenance and calibration practices.
	pH by meter	Replicate (2) measurements, check against second pH buffer, plus maintenance and calibration practices
	Depth	Proper maintenance and calibration practices
	Turbidity	Replicate (2) measurements plus maintenance and calibration practices.
Laboratory Analyses	Conventional Constituents in water	Blanks – Laboratory and field blanks. No detectable amount of substance in blanks. Frequencies – Accuracy, precision, recovery, and blanks at 1 in 20 (5%) with at least one in every batch. All quality assurance and quality control procedures and criteria specified by selected method.
	Volatile organics (including VOCs, MTBE, and BTEX) in water	Blanks – Laboratory and field blanks. No detectable amount of substance in blanks. Frequencies – Accuracy, precision, recovery, and blanks at 1 in 20 (5%) with at least one in every batch. All quality assurance and quality control procedures and criteria specified by selected method.
	Trace metals, including mercury in water	Blanks – Laboratory and field blanks. No detectable amount of substance in blanks. Frequencies – Accuracy, precision, recovery, and blanks at 1 in 20 (5%) with at least one in every batch. All quality assurance and quality control procedures and criteria specified by selected method.
	Bacteria – pathogen indicators	Field and sterility checks (laboratory blanks) no detectable amounts or less than 1/5 of sample amounts for field blanks. Frequency – accuracy at 1 per culture medium or reagent lot. Precision at 1 in 10 (10%) with at least one per batch. All quality assurance and quality control procedures found in *Standard Methods* (18^{th}, 19^{th}, or 20^{th} editions) section 9020 and in the selected analytical method including confirmation practices.
	Benthic invertebrates	Frequency – accuracy and precision at 1 per 10 benthic samples.

15. INSTRUMENT/EQUIPMENT TESTING, INSPECTION, AND MAINTENANCE

Field measurement equipment will be checked for operation in accordance with the manufacturer's specifications. This includes battery checks, routine replacement of membranes, and cleaning of conductivity electrodes. All equipment will be inspected for damage and cleanliness when first handed out and when returned from use on each field visit.

The selected laboratory will be required to maintain its equipment in accordance with its SOPs, which include those specified by the manufacturer and those specified by the method.

16. INSTRUMENT/EQUIPMENT CALIBRATION AND FREQUENCY

Immediately before use in the field, pH measurement devices will be calibrated against standards and then checked against a standard from a different source than the calibration standard.

Dissolved oxygen devices will be checked against aerated water of known oxygen content.

Conductivity devices cannot be calibrated; however a calibration curve will be established by plotting known conductivity standards against device readings. Correction factors are derived from the chart. The devices are checked by analyzing a conductivity standard and determining if, after correction, the reading agrees within the stated accuracy criteria cited in section 7.

There are no calibration procedures for bacterial testing.

Contract laboratory will be required to show evidence of appropriate calibration practices as part of the method SOPs. The Quality Assurance Officer will review these practices and confirm that they are in conformance with SWAMP requirements.

General required equipment calibration frequencies are summarized in Table 7.

Table 7. (Element 16) Calibration frequency of sampling equipment and analytical instruments.

Group	Parameter	Element 16 Instrument Calibration/Frequency
Field testing	Dissolved Oxygen	Start of each sample run according to SOP
	Temperature	At least twice a year.
	Conductivity	Start of each sample run according to SOP
	pH by meter	Start of each sample run according to SOP
	Depth	No requirement
	Turbidity	Start of each sample run according to SOP
Laboratory analyses	Conventional Constituents in water	External calibration with 3 – 5 standards covering the range of sample concentrations prior to sample analysis. At low end, the lowest standard at or near the MDL. Linear regression $r^2 \geq 0.995$ Calibration verification every 20 samples after initial calibration. Standard source different that that used for initial calibration. Recovery 80% - 120%.
	Volatile organics (including VOCs, MTBE, and BTEX) in water	External calibration with minimum 5 standards covering the range of sample concentrations prior to sample analysis. At low end, the lowest standard at or near the MDL. %RSD for CCCs <30%, RF for SPCCs >0.1, except 1,1,2,2-tetrachloroethane, which is 0.3 Calibration verification every 12 hours. Standard source different that that used for initial calibration. RF for SPCCs same as initial calibration. RF of CCCs must be <20% difference from initial calibration.
	Trace metals, including mercury in water	External calibration with 3 – 5 standards covering the range of sample concentrations prior to sample analysis. At low end, the lowest standard at or near the MDL. Linear regression $r^2 \geq 0.995$ Calibration verification every 20 samples after initial calibration. Standard source different that that used for initial calibration. Recovery 90% - 110%, except for mercury 80% - 120%.
	Bacteria – pathogen indicators	Follow the requirements of *Standard Methods* (18th, 19th, or 20th editions) section 9020.
	Benthic invertebrates	No requirements.

17. INSPECTION/ACCEPTANCE OF SUPPLIES AND CONSUMABLES

Supplies will be examined for damage as they are received. The following supplies will receive additional checks as follows.

pH and conductivity standards will be checked by comparing their readings with those generated by the current lot of standards. Standards must agree exactly.

Contract laboratory will be required to show evidence of ongoing compliance with a supply inspection and checking SOP, which will be examined by Quality Assurance Officer.

18. NON-DIRECT MEASUREMENTS (EXISTING DATA)

Analysis and interpretation of the data collected may include consideration of previously collected data from other sources including data collected as part of DWR efforts over previous years. Previous water quality data for the watershed is summarized in the Lake Almanor Water Quality Report (CH2M HILL, 2006).

19. DATA MANAGEMENT

As described above in section 9, the ultimate storage medium for data collected as part of the program is a web-accessible database, which is currently under development. Data forms from the field (hardcopy) and contracted laboratory (paper or digital computer file) will be transferred as soon as practical after completion to the database manager (to be identified). Once data and metadata have been transferred to the database, copies of the original data forms (paper of digital) will be maintained in their original form for back-up purposes.

Details of the data format and storage medium will be updated for this QAPP when the project organization is finalized. Also, an SOP for record-keeping and tracking will be developed in cooperation with the specific team members once the organization is finalized.

GROUP C: ASSESSMENT AND OVERSIGHT

20. ASSESSMENTS & RESPONSE ACTIONS

All reviews will be made by the QA Officer and may include the SWRCB QA Officer. Reviews of sampling procedures will be conducted annually. Reviews will be observed practices against those found in the sampling SOPs. The contracted laboratories will provide evidence of their own independent audits annually.

If an audit discovers any descrepancy, the QA Officer will discuss the observed discrepancy with the appropriate person responsible for the activity (see organization chart – to be developed). The discussion will begin with whether the information collected is accurate, what were the cause(s) leading to the deviation, how the deviation might impact data quality, and what corrective actions might be considered.

The QA Officer has the power to halt all sampling and analytical work if the deviation(s) noted are considered detrimental to data quality.

21. REPORTS TO MANAGEMENT

(Identify all interim and final reports, including project QA status reports, that will be written during the project term. Identify frequency of reporting, responsible individuals, and report recipients. Information may be provided in narrative or tabular form below.)

Reporting will include:
written quarterly progress reports describing monitoring conducted, basic results and status of database update
oral reports on sampling status at water quality subcommittee meetings (approximately bi-monthly)
annual comprehensive monitoring report including analysis and interpretation of data

Exact delivery dates and recipients of reports will be developed at a future date prior to implementation of the monitoring.

GROUP D: DATA VALIDATION AND USABILITY

22. DATA REVIEW, VERIFICATION, AND VALIDATION REQUIREMENTS

Data generated by project activities will be reviewed against the data quality objectives cited in Element 7 and the quality assurance/quality control practices cited in Elements 14, 15, 16, and 17 (as updated in finalized QAPP. Data will be separated into three categories: data meeting all data quality objectives, data meeting failing precision or recovery criteria, and data failing to meet accuracy criteria. Data meeting all data quality objectives, but with failures of quality assurance/quality control practices will be set aside until the impact of the failure on data quality is determined. Once determined, the data will be moved into either the first category or the last category.

Data falling in the first category is considered usable by the project. Data falling in the last category is considered not usable. Data falling in the second category will have all aspects assessed. If sufficient evidence is found supporting data quality for use in this project, the data will be moved to the first category, but will be flagged with a "J" as per EPA specifications.

23. VERIFICATION AND VALIDATION METHODS

All data records will be checked visually and recorded as checked by initials and dates. The QA Officer will do all reviews. Contract laboratories will perform checks of its records according to their own SOP, and these will be reviewed by the project QA officer.

Reconciliation and correction of noted issues will be done by a committee composed of the QA Officer and additional representatives to be identified once project organization has been finalized.

24. RECONCILIATION WITH USER REQUIREMENTS

(Describe how the project results will be evaluated to determine whether the project's objectives have been satisfied. This element assumes that the data has already met all data quality objectives and other quality issues. The outcome here is whether the data does or does not support the original hypothesis or whether the data does not have the power to make the determination. Describe proposed methods -statistical or scientific- to analyze the data so as to determine possible anomalies or departures from assumptions made when the project was planned. Statistical analyses may include tests for outliers, trends, and dispersion.)

As part of the annual data analysis and interpretation process, an assessment of the general water quality conditions, stepwise changes from previous years, trends over long periods of time, as well as informed anecdotal observations will be documented and presented to the stakeholders.

As described in element 5, general trends in water quality or other indications of degradation or potential degradation are more applicable than specific water quality criteria in guiding watershed management options, since the goal of the overall watershed planning effort is to avoid significant degradation of the water quality in Lake Almanor. Therefore, determination of whether or not the data meet the stakeholder requirements will be inherently subjective.

Following the annual report presentation, an annual discussion will be conducted among the stakeholders, including input from the TAC, to develop ideas of how the monitoring program may be improved to better meet the general or specific guidance needs of the stakeholders and their management representatives.