FY 04-05 Workplan
Surface Water Ambient Monitoring Program (SWAMP)
Lahontan Region

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EXECUTIVE SUMMARY

The Surface Water Ambient Monitoring Program (SWAMP) was created by the California Legislature in fiscal year 2000-2001. The program relies primarily on contractors to collect information about the quality of the State's waters. Each RWQCB receives an annual contract allocation, and modest funding for staff to oversee the program. This is the FY04-05 workplan for RWQCB-6 (Lahontan Region).

This workplan assumes approximately 1 staff position (1 PY) and $316,814 in contract funds for Region 6's SWAMP program in FY04-05. This is significantly less than previous years' funding, and far less than the funding that would be needed to implement the comprehensive monitoring program originally proposed by the SWRCB in its 2000 Report to the Legislature.[1] Given the limited funding for FY04-05, staff of the Lahontan RWQCB plans to continue the Region's existing bioassessment program, and to focus on management and reporting of previously collected data. No funding is available this FY for surface water sampling by USGS, although modest sampling by USGS will continue through Spring of 2005 using funds remaining from FY03-04. The following table depicts the breakdown of planned contract expenditures using FY04-05 funds:

Contract Purpose	Contractor	Amount
Surface water sampling	U.S. Geological Survey	$0
Bioassessment	U.C. Santa Barbara (SNARL)	$160,000
Student Assistance	Community College Foundation	$20,000
Data Management & Analyses	Moss Landing Marine Lab	$85,814
Donner Lake bioaccumulation study	Calif. Dept. of Fish & Game	$51,000
	TOTAL	**$316,814**

U.S. Geological Survey, $ -0-

Due to substantial cuts in the FY04-05 budget compared to prior years, no FY04-05 funds are allocated for surface water sampling by USGS. During FY04-05, the USGS will continue quarterly sampling at approximately twenty "integrator" sites (see FY03-04 workplan) until the Region's FY03-04 funds are exhausted. If funding is restored for FY05-06, the USGS sampling program should be able to continue with minimal gaps in sampling. However, if funding is not restored for FY05-06, the Lahontan Region's surface water monitoring program will be significantly curtailed.

U.C. Santa Barbara, Sierra Nevada Aquatic Research Lab (SNARL), $160,000

The UCSB-SNARL will continue its on-going efforts to establish "reference conditions" for streams, and to develop indices of biological integrity (IBIs) based on instream community assemblages. IBIs are a powerful tool for assessing the biological integrity of streams, and will be developed over time to cover various parts of the Region. (The size and diversity of the Lahontan Region will likely require the development of multiple

[1] *See* "Proposal for a Comprehensive Ambient Surface Water Monitoring Program–Report to the Legislature," November 2000. http://www.swrcb.ca.gov/legislative/docs/swrcb_monitoring_rpt1100.pdf

IBIs.) The Region's bioassessment program primarily utilizes benthic (bottom-dwelling) macroinvertebrates, but a pilot program is also being conducted to explore the utility of using algae assemblages as cost-effective indicators of pollution. The UCSB-SNARL contract for FY04-05 includes tasks for bioassessment sampling, quality assurance, data management, and limited technical assistance to RWQCB staff.

Community College Foundation, $20,000
Student Assistants (graduate and/or undergraduate) will be hired to aid with data entry and analyses. As time allows, Student Assistants may also perform field sampling duties. Note: $8,000 of the original $20,000 allocation has been "traded" to the State Water Board's Clean Water Team (CWT). The CWT will utilize $8,000 of the Lahontan Region's FY04-05 student allocation, leaving $12,000 for use by the Lahontan Region. In return, the Lahontan Region will utilize $8,000 of the CWT's "master contract" allocation from FY03-04 to fund data analysis activities through the Moss Landing Marine Lab.

Moss Landing Marine Lab (through SJSUF Master Contract), $85,814
The team of scientists at MLML that is building the state-wide SWAMP database will perform a host of data management and evaluation tasks, including: (1) compile and enter SWAMP data for Region 6 into the state-wide SWAMP database; (2) perform QA/QC tasks, including data validation; and (3) analyze the SWAMP data for Region 6, and prepare interpretive reports, fact sheets, etc. (The $85,814 amount is in addition to the $8,000 discussed under the student assistant section, above.)

California Department of Fish & Game (through Master Contract), $51,000
The former Toxic Substances Monitoring Program, State Mussel Watch Program, and Coastal Fish Monitoring Program have all been rolled into a single "bioaccumulation" program within the SWAMP. Funding is very limited (only $300,000 state-wide in FY04-05 for all bioaccumulation studies). The Lahontan Region submitted a competitive proposal in July 2004 that was accepted for funding. This one-time project (at Donner Lake) is described in Attachment #3 to this workplan.

Introduction

History and Background

The Porter-Cologne Water Quality Control Act and the federal Clean Water Act direct that water quality protection programs be implemented to protect and restore the chemical, physical, and biological integrity of the State's waters. California Assembly Bill 982 (Water Code Section 13192; Statutes of 1999) required the State Water Resources Control Board (SWRCB) to assess and report on the State's water quality monitoring programs.

AB 982 envisioned that ambient monitoring would be independent of other water quality regulatory programs, and serve as a measure of: (1) the overall quality of the State's water resources, and (2) the overall effectiveness of the prevention, regulatory, and remedial actions taken by the SWRCB and the nine Regional Water Quality Control Boards (RWQCBs). To implement this directive, modest funding for ambient water

quality monitoring was allocated to the SWRCB and RWQCBs beginning in State Fiscal Year 2000-2001.

AB 982 also required the SWRCB to prepare a proposal for a comprehensive surface water quality monitoring program. That proposal, entitled ***Proposal for a Comprehensive Ambient Surface Water Quality Monitoring Program***, was transmitted to the State Legislature on November 30, 2000. At this writing, sufficient funding has not been appropriated to fully implement that plan.

Using the limited available funding, the SWRCB has created the Surface Water Ambient Monitoring Program (SWAMP). The SWAMP is intended—to the extent that funding is available—to provide measures of the State's ambient water quality and the effectiveness of the State's water quality protection programs.

The SWAMP program relies primarily on contractors to collect information on the quality of the State's waters. Limited RWQCB staff time is spent largely on programmatic (i.e., planning, contracting, reporting) issues; little staff time is available for sample collection or detailed data analyses.

Goals and objectives

The goals and objectives of this year's SWAMP monitoring by the Lahontan Region are twofold: The first objective is to determine—to the extent that funding is available and using a region-wide network of sampling stations—whether ambient water quality at the monitored sites is in compliance with the chemical and physical water quality objectives contained in the ***Water Quality Control Plan for the Lahontan Region*** ("Basin Plan"). The second objective is to continue an effort begun in 1999 to establish indices of biological integrity (IBIs) for streams in the eastern Sierra Nevada based on instream benthic macroinvertebrate and algae assemblages.

What this data will be used for

The data will be available and utilized for the entire suite of the RWQCB's regulatory and restoration efforts. For example, the data will be used to assess water bodies for compliance with relevant standards; to evaluate the effectiveness of permit conditions, watershed management programs, and nonpoint source programs; and to assist in developing remedial strategies when necessary.

It is also envisioned that the data will be posted on the internet, so it is available to all stakeholders, including the regulated community, academic institutions, and the general public.

Water bodies to be monitored and type of habitat they represent

Monitoring of chemical and physical parameters will occur at stations located throughout the Region. These stations represent the wide range of habitats found throughout the Lahontan Region, including subalpine, montane, mixed conifer forest, high desert, and low-elevation desert. Bioassessment monitoring will focus on the eastern Sierra Nevada, from the Truckee River watershed in the north, to the Owens River watershed in the south, including primarily montane and mixed conifer forested habitat types. A preliminary list of water bodies to be sampled during FY04-05 is found in Attachment #1 ("Beneficial Uses and Monitoring Objectives"). Further information

regarding the specific analytes and parameters to be sampled/measured is included in Attachment #2 ("USGS Surface Water Monitoring").

Description of watersheds & water bodies

Background

The Lahontan Region is the second largest region in California. (Only the Central Valley Region is larger.) The Lahontan Region spans eastern California from the Oregon border in the north to the Mojave Desert in the south. The Region is nearly 600 miles long and has a total area of more than 33,000 square miles. It includes the highest point (Mount Whitney, +14,494 ft.) and lowest point (Badwater, Death Valley, –282 ft.) in the contiguous United States, more than 3,000 miles of streams, and more than 700 lakes.

The economy of the Region is based largely on recreation and tourism; other major economic sectors include agriculture (i.e., livestock grazing, silviculture), resource extraction (i.e., mining, energy production), and defense-related activities.

Due to the size of the Region, its north-to-south extent of nearly 600 miles, and the variety of elevations, the Lahontan Region contains diverse habitats, ranging from alpine mountain environments that receive heavy snowpack each year, to low-elevation, dry deserts. There is also a great range of habitats, precipitation regimes, and ecosystem types in between these two extremes.

Because of its size and diversity, the limited funding under SWAMP, and because the Lahontan RWQCB has adopted discrete numeric water quality objectives that apply to specific locations throughout the Region (as identified in the Basin Plan), the Lahontan Region has elected not to employ the probabilistic or "rotating basin" approaches being utilized by some other (smaller) RWQCBs. The Lahontan Region has instead implemented a monitoring strategy similar to the other large regions in California (e.g., the Central Valley and North Coast regions) by using its limited SWAMP funding to establish a core network of long-term water monitoring stations throughout the Region. The Lahontan Region's water monitoring stations have been established primarily at locations where discrete numeric water quality objectives have been adopted (in the Basin Plan), and where little monitoring has occurred in recent decades. This approach will allow the Lahontan Region to make more rapid and definitive assessments of the extent to which the sampled waters are meeting standards, because sampling results can be directly compared to relevant standards. Staff at the Lahontan Region recognizes that a probabilistic and/or rotating basin sampling approach could provide a more robust estimate of the percentage of water bodies that meet (vs. violate) standards, but such approaches would require substantially more funding and staff resources.

Although the water column monitoring stations are dispersed broadly throughout the Lahontan Region, the Region is focusing its bioassessment efforts on a more limited area. ("Bioassessment" is defined as an assessment of the biological integrity of water bodies based on direct sampling of the assemblages of instream flora and/or fauna.) The Region's bioassessment monitoring is currently focused within six major watershed basins in the center of the Region (e.g., Truckee River, Lake Tahoe, Carson River, Walker River, Mono Basin, Upper Owens River). This central portion of the Region contains special resources, such as two designated Outstanding National Resource Waters

(i.e., Lake Tahoe, Mono Lake), and key habitat for threatened aquatic species (i.e., Lahontan cutthroat trout, Paiute cutthroat trout, Yosemite toad, mountain yellow-legged frog, and others). This area also has numerous water bodies that are listed as having impaired water quality. The reason for focusing bioassessment monitoring on this area is to develop biological "reference conditions" for streams in the eastern Sierra. Establishment of reference conditions is a necessary first step toward developing indices of biological integrity (IBIs) that can be used to assess the current degree of support for aquatic life uses, and as a regulatory mechanism (e.g., "biocriteria," permit conditions, numeric targets for TMDLs, etc.) to ensure healthy stream ecosystems.

Beneficial uses, monitoring objectives, and indicators

The SWRCB's November 30, 2000, Report to the Legislature (cited above) contains a comprehensive suite of potential monitoring objectives for the SWAMP. The objectives and associated beneficial uses of water for each sample location within the Lahontan Region are found in Attachment #1 ("Beneficial Uses and Monitoring Objectives").

A variety of water quality indicators will be used, as listed in Attachment #1. A tentative list of specific chemical analytes and physical parameters to be measured at each surface water sampling station are listed in Attachment #2 ("USGS Surface Water Monitoring"). Additional water quality indictors will be used for bioassessment studies. The key bioassessment indicators being explored for use by the Lahontan Region are benthic macroinvertebrates, periphyton, and chlorophyll-a.

General watershed information

For purposes of watershed management, the Lahontan Region is roughly divided into six geographic areas or Watershed Management Areas (WMAs). These WMAs are:

- **Northern WMA** (includes the following Hydrologic Units [HUs]: Cowhead Lake, Surprise Valley, Bare Creek, Cedarville, Fort Bidwell, Duck Flat, Smoke Creek, Madeline Plains, Susanville, Little Truckee River, Truckee River)
- **Lake Tahoe Basin WMA** (includes Lake Tahoe HU)
- **Carson/Walker WMA** (includes the following HUs: West Fork Carson River, East Fork Carson River, West Walker River, East Walker River)
- **Mono/Owens WMA** (includes the following HUs: Mono, Adobe, Owens, Fish Lake, Deep Springs, Eureka, Saline, Race Track, Amargosa, Pahrump)
- **Mojave WMA** (includes the following HUs: Mojave, Broadwell)
- **Antelope Valley/Other Southern Watersheds** (includes the following HUs: Mesquite, Ivanpah, Owlshead, Leach, Granite, Bicycle, Goldstone, Coyote, Superior, Ballarat, Trona, Coso, Upper Cactus, Indian Wells, Fremont, Antelope, Cuddeback)

Northern Watersheds Management Area. In the Surprise Valley (Modoc County) and Susan River (Lassen County) watersheds, there are potential impacts from livestock grazing and limited agriculture (alfalfa, some row crops). In the Susanville area of Lassen County, additional nonpoint source impacts potentially result from urban runoff,

construction-related impacts from land development, roads, timber harvest, use of herbicides for silviculture and weed control, and septic systems. Impacts to wetlands and riparian areas from fill or channelization is also a concern.

In the Truckee River watershed (Nevada County), nonpoint source impacts potentially result from transportation corridors (railways and roads), urban runoff and construction-related impacts from rapid land development, ski areas and other recreation developments, livestock grazing, and timber harvests. Sediment resulting from hydromodification activities, such as reservoir management, is also a concern, as are impacts to wetlands and riparian areas from fill or channelization.

Lake Tahoe Watershed Management Area. In the Lake Tahoe basin (El Dorado and Placer counties), there are potential nonpoint source impacts from ski areas and other recreation, timber harvests, livestock grazing, roads, urban runoff and construction-related impacts from land development. Sediment from shoreline erosion (due to operation of Lake Tahoe as a reservoir) is also a concern. Also of concern are impacts to wetlands and riparian areas from fill or channelization.

Carson-Walker Watersheds Management Area. In the Carson River watershed (Alpine County), there are potential nonpoint source impacts from numerous abandoned mines, livestock grazing, recreation, roads, use of herbicides for weed control, and timber harvests. Also of concern are impacts to wetlands and riparian areas from fill or channelization.

In the Walker River watershed (Mono County), there are potential nonpoint source impacts from recreation, livestock grazing, roads, use of herbicides for weed control, septic systems, abandoned mines, and timber harvests. Also of concern are impacts to wetlands and riparian areas from fill or channelization, as well as impacts from operation of the Bridgeport Reservoir.

Mono-Owens Watersheds Management Area. In the Mono basin (Mono County), potential nonpoint source impacts are mainly from livestock grazing, roads, and hydromodification due to water exports. There are some concerns about the operation of Grant Lake as a reservoir, impacts from small hydroelectric plants, recreation (including the ski area at June Mountain), and urban runoff. Also of concern are impacts to wetlands and riparian areas from fill or channelization.

In the upper Owens River watershed (Mono County), there are potential nonpoint source impacts from recreation, livestock grazing, roads, and hydromodification due to water exports and reservoir management. Also of concern are impacts to wetlands and riparian areas from fill or channelization. In the Town of Mammoth Lakes, additional concerns are from urban runoff and construction-related impacts from rapid land development.

In the lower Owens River watershed (Inyo County), there are potential nonpoint source impacts from recreation, livestock grazing, roads, septic systems, and hydromodification due to water exports and reservoir management. Also of concern are impacts to wetlands and riparian areas from fill or channelization. In the City of Bishop, additional concerns are from urban runoff and construction-related impacts from land development.

Mojave Watershed Management Area. In the Mojave River watershed (San Bernardino County), nonpoint source issues relating to overdraft of the ground water are

of concern, including impacts to wetlands and springs. Confined animal facility impacts (as from dairies and chicken farms) are of concern, as are impacts from other agricultural activities. The area is generally in transition from predominately agricultural to urban. Thus, the nonpoint source concerns are shifting towards urban runoff and construction-related impacts from land development. Other concerns include efforts to eradicate invasion of exotic plants and animals, as well as flood control projects.

Antelope Valley/Other Southern Watersheds Management Area. In these watersheds, land development issues (urban runoff, septic systems) contribute to nonpoint source pollution. At least one confined animal facility is of concern. Historic agricultural use was mainly alfalfa; more common current crops are row crops such as carrots. Pesticide management and irrigation return water management are nonpoint source concerns. Ground water contamination and ground water overdraft are also issues. Some timber harvest occurs. Two small ski areas are proposed for expansion; snowmaking could become an issue. Erosion and habitat loss from deforestation following wildfires is also of concern.

General study design

Overview of general approach

Water sampling. The Lahontan Region is using an approach of investigator pre-selected sites. This approach is termed "directed" sampling. Sample locations for both water sampling and bioassessment are selected based on accessibility (i.e., public access must be available). While a probability-based (i.e., random) site-selection approach would provide a more robust estimate of the extent to which water bodies in the region attain (or violate) water quality standards, such probabilistic sampling would be far more expensive, and is not feasible within current budget appropriations. Probabilistic sampling is more expensive for two key reasons: First, randomly selected sites would occur across the landscape, including on private lands. Considerable staff time would be needed to locate access and to obtain permission to sample on private lands, while most sites sampled under the "directed" approach will have easy (i.e., public) access. Second, a probabilistic approach would require substantially more staff time for data analysis, which is not currently available.

Water sampling stations have been established throughout the Lahontan Region, including at least one station within most major hydrologic units. At each water sampling station, data on chemical and physical water quality is collected. Sampling will be conducted quarterly at most stations, except for lakes and desert springs, where samples will generally be collected twice per year. (Lakes are most appropriately sampled during "turnover," when the water column is mixed, which generally occurs during the spring and fall seasons. And the chemistry of most desert springs changes little over the course of a year, so it is more cost-effective to sample less often for a larger suite of analytes than to sample more often for fewer analytes.) In response to budget cuts for the FY04-05 year, the sampling frequency at some stream sites has also been reduced from quarterly to 3 times/year. This is not ideal, but is necessary given funding constraints.

The analytes/parameters measured at each water sampling station generally include those chemical and physical analytes/parameters for which region-wide or site-

specific standards have been adopted to protect beneficial uses of water, as identified in the Basin Plan. Because the modest funding available under SWAMP is not sufficient to conduct exhaustive sampling or data analysis, the list of analytes is tailored to each site in order to streamline the analysis process. That is, an unique list of analytes has been selected for each site so that the data can be directly compared to the applicable water quality objectives adopted for that site.

The water sampling program described above may need to be discontinued or drastically curtailed if funding is not restored in FY05-06. Sampling is only happening during the current fiscal year because funds were made available in the prior year's (FY03-04) budget. Due to the budget cuts experienced in FY04-05, there is currently no source of funding to continue the USGS stream sampling program beyond the Spring of 2005.

Bioassessment. The current focus of the Region's bioassessment sampling is to establish "reference conditions" for streams in the eastern Sierra Nevada. Sampling is conducted at investigator-selected sites that are believed to be minimally-impaired. Selected sites are sampled synoptically for benthic macroinvertebrates, periphyton (i.e., attached algae & diatoms), physical habitat, and selected water chemistry parameters. A first generation IBI for the eastern Sierra will be produced by mid-2005. At that time, a decision will be made whether to continue sampling in the eastern Sierra (i.e., to improve the eastern Sierra IBI, if necessary) or to move to another part of the Region to begin IBI development elsewhere.

Bioaccumulation. The former Toxic Substances Monitoring Program, State Mussel Watch Program, and Coastal Fish Monitoring Program have all been rolled into a single "bioaccumulation" program within the SWAMP. Funding is very limited (only $300,000 state-wide in FY04-05). The Lahontan Region submitted a competitive proposal in July 2004 that was accepted for funding. This one-time project is described in Attachment #3 to this workplan.

How data will be analyzed

The chemical and physical data gathered by the USGS at water sampling stations will be directly compared to the objectives contained in the Basin Plan to assess compliance with water quality standards.

Bioassessment data will be analyzed to yield conclusions on taxonomic composition (e.g., density, diversity, biotic index, presence or absence of indicator taxa, dominance of functional groups), in order to facilitate the development of "reference conditions." The bioassessment data will also be analyzed using multi-metric and multivariate techniques, to yield an index of biological integrity (IBI) for streams in the eastern Sierra. That IBI is under development by contractors at the UCSB's Sierra Nevada Aquatic Research Laboratory (SNARL), and is scheduled for completion by the Spring of 2005.

The bioaccumulation data collected at Donner Lake will be evaluated by toxicologists at the California Office of Environmental Health Hazard Assessment, and

by the local county health department(s), if warranted. See Attachment #3 for more information on this special study.

Specific study design & activities planned

Number of stations

During FY04-05, the USGS will conduct water and sediment sampling at approximately twenty (20) stations located throughout the Lahontan Region, as detailed in Attachment #2 ("USGS Surface Water Sampling"). The UC-SNARL will conduct bioassessment sampling at approximately twenty (20) stations located throughout the eastern Sierra.

Types and numbers of samples

Surface water sampling by U.S. Geological Survey (USGS). The Lahontan Region has contracted with the USGS to conduct surface water sampling at selected sites. Sampling will generally be conducted four (4) times per year at each site, following standard USGS protocols for sample collection, handling, processing, preservation, and analysis. A tentative list of sites and analytes is included in Attachment #2 ("USGS Surface Water Monitoring"). That attachment includes sites to be sampled between Summer 2004 and Spring 2005, using FY03-04 SWAMP funds. No funding for USGS is allocated using FY04-05 funds.

Bioassessment. Using FY 04-05 SWAMP funds, the Lahontan RWQCB has executed a contract (#04-157-256-0) with the University of California, Sierra Nevada Aquatic Research Lab (UC-SNARL) to perform bioassessment sampling, manage & analyze bioassessment data, construct an algae-based IBI for the eastern Sierra, provide technical assistance, and update the Quality Assurance Project Plan for bioassessment.

Bioassessment sampling to be conducted during FY04-05 will include approximately twenty (20) sites using FY02-03 and FY03-04 SWAMP funds (contract numbers 02-103-160 and 03-149-160). Bioassessment sampling to be conducted using FY04-05 funds will begin during the summer of 2005. (This "staggered" approach is necessary because the index period for bioassessment sampling in the Lahontan Region is mid-June through mid-September, and it is not possible to execute contracts in time for sampling to occur using the current FY's funds. Hence, bioassessment sampling is always conducted using the prior years' funds.) The number and location of sites to be sampled using FY04-05 funds, and the specific method(s) have not been finalized. This is because the SWAMP bioassessment committee is actively discussing alternative approaches to bioassessment sampling.

Staff of the Lahontan RWQCB will collect water samples at the bioassessment sites, to be analyzed for nutrients and sulfate. Standard Operating Procedures (SOPs) for this sample collection are located in Attachment #4. Nutrient samples will be analyzed by High Sierra Water Lab, using FY03-04 SWAMP funds. Sulfate samples will be analyzed by the RWQCB's contract laboratory, using non-SWAMP funds.

The Lahontan Region has executed a contract with UC-SNARL (#9-191-160-0), using funding sources other than SWAMP, to evaluate three common methods for

collecting bioassessment information. The results of that study are being analyzed to inform the decision regarding the methods by which bioassessment samples will be collected in the future. Pending the outcome of ongoing deliberations of the SWAMP bioassessment committee, and based upon the results of that "methods comparison" study, bioassessment data collection will follow the protocols specified in the above-referenced contracts, and detailed at:
http://www.swrcb.ca.gov/rwqcb6/files/QAPP/QAPP.htm.

Bioassessment data will be analyzed to yield conclusions on taxonomic composition (e.g., density, diversity, biotic index, presence or absence of indicator taxa, dominance of functional groups), in order to facilitate the development of "reference conditions" and indices of biological integrity for eastern Sierra streams.

Notes: A preliminary list of water bodies to be sampled during FY04-05 is found in Attachment #1 ("Beneficial Uses and Monitoring Objectives"). Further information regarding specific analytes to be sampled and measured is included in Attachment #2 ("USGS Surface Water Monitoring"). All of the USGS and bioassessment sampling to occur during FY04-05 is being funded using SWAMP funds from FYs 02-03 and 03-04. This is due to the time lag in executing contracts, as discussed above. Sampling utilizing FY04-05 funds will begin during spring or summer of 2005. Therefore, the water bodies to be sampled using FY04-05 funds have not been determined.

How stations will be designated

All sample locations will be designated by recording digital coordinates with a hand-held global positioning system (GPS) device. The latitude/longitude or Universal Transverse Mercator (UTM) coordinates will be recorded at each sampling location, and plotted in the office and checked before the coordinates are entered into the SWAMP database.

Quality assurance procedures

Quality assurance and quality control (QA/QC) procedures will be followed as specified in the SWAMP Quality Assurance Management Plan (QAMP): http://www.swrcb.ca.gov/swamp/qapp.html. The following specific procedures are used by the Lahontan Region's contractors:

The U.S. Geological Survey (USGS) will follow all quality assurance procedures as documented in its "National Field Manual for the Collection of Water Quality Data" (USGS, TWRI Book 9).

Bioassessment and physical habitat data collection by UC-SNARL will follow the protocols and quality assurance procedures detailed in a QAPP prepared specifically for bioassessment in the Lahontan Region, located at:
http://www.swrcb.ca.gov/rwqcb6/files/QAPP/QAPP.htm.

Description of deliverable products

The USGS and UC-SNARL will be required to provide the following deliverables to the Lahontan RWQCB: (1) quarterly progress reports; and (2) final reports that include

the data collected under the contracts described above. Any other contract analytical lab(s) will be required to provide the following: (1) analytical data for water samples, and (2) QA/QC data, and results. Copies of the final USGS and UC-SNARL reports will also be provided to the State Water Resources Control Board by staff of the Lahontan RWQCB.

Anticipated Milestones

Due to the lag time in executing contracts to encumber funds that became available during the first year of SWAMP (i.e., FY00-01), actual sampling under the SWAMP program did not begin until Summer 2001. Lahontan Region staff will strive to prepare an interpretive report by the end of 2005 that summarizes the findings of the first two years of SWAMP data (i.e., data collected Summer 2001 through September 2003). A tentative schedule of sampling and reporting is as follows:

FY 04-05:

- Water sampling by USGS using FY03-04 funds
- Bioassessment sampling by UC-SNARL using FY02-03 and FY03-04 funds
- Synoptic water sampling by RWQCB staff (for nutrients, sulfate) at bioassessment sites, using FY03-04 funds
- Receive all data from USGS through water year (Sept) 2003

FY 05-06:

- Water sampling by USGS (only if FY05-06 funds allow)*
- Bioassessment sampling by UC-SNARL using FY03-04 and FY04-05 funds*
- Synoptic water sampling by RWQCB staff using FY04-05 funds*
- Produce interpretive report on first two years of USGS data (by 12/31/05)*

(Note: * = subject to adequate funding & timely execution of contracts)

Budget

The total amount available to the Lahontan Region for SWAMP contracts during FY04-05 is $316,814. That amount will be distributed among four (4) contracts as depicted in the following table:

Contract Purpose	Contractor	Amount
Surface water sampling	U.S. Geological Survey	$0
Bioassessment	U.C. Santa Barbara (SNARL)	$160,000
Student Assistants	Community College Foundation	$20,000
Data Management & Analyses	Moss Landing Marine Lab	$85,814
Donner Lake bioaccumulation study	Calif. Dept. of Fish & Game	$51,000
	TOTAL	**$316,814**

As discussed in the Specific Study Design (above), a variety of bioassessment methods may be used, depending on the outcome of the "methods comparison study" that is currently underway. The level of effort and cost per sample for bioassessment will vary depending on travel time, collection/analysis method used, number of organisms in the sample, and whether (and what type of) associated physical habitat data is collected.

At this time, the Lahontan RWQCB does not expect to receive significant budget allocation(s) for FY04-05 under any other monitoring programs that are not specifically discussed in this workplan.

Coordination With Other Monitoring Activities & Priorities

This SWAMP workplan is consistent with relevant goals set forth in the 2004 Governor's Action Plan, the California Clean Water Partnership Agreement between the SWRCB and the USEPA, the SWRCB's Strategic Plan, and the Lahontan Regional Board's FY04-05 priorities.

The Governor's Action Plan calls for clean-up of the most endangered watersheds, and seeks to ensure that existing permit fees are targeted toward pollution prevention, wetlands protection, resources management, and establishment of appropriate EPIC indicators. The Lahontan Board's SWAMP monitoring program will help to identify any endangered watersheds in the region by providing monitoring data for areas where little information currently exists. SWAMP data will be used by other RWQCB programs (such as core regulatory programs, TMDLs, etc.) to assist in protection of surface waters from various sources of pollution. SWAMP monitoring will foster wetlands protection by developing indices of biological integrity (IBIs) for streams that are directly linked to riparian wetlands. The IBIs could also be used as an EPIC indicator for the health of surface waters.

The California Clean Water Partnership Agreement between the U.S. Environmental Protection Agency and the State Water Resources Control Board has four main objectives to improve water quality: implement the law, improve efficiency of regulatory programs, target critical problems, and address concerns of the public. This has led to the development of a Five-Year Strategy Agreement (2003-2008) for surface water programs. The Lahontan Region's SWAMP monitoring program is consistent with the goals of this agreement, as identified under Section B, Monitoring and Assessment. The workplan incorporates standard QA/QC methods, provides for monitoring data that may be integrated into a statewide assessment of water quality, develops standardized ambient data formats, tracks water quality improvements, and provides data to a host of intra-agency programs as well as external stakeholders.

The SWRCB's Strategic Plan includes goals for addressing whether surface waters are safe for drinking, fishing, swimming, and support healthy ecosystems and other beneficial uses (Goal #2), and whether water quality is comprehensively measured to evaluate protection and restoration efforts (Goal #6). SWAMP monitoring proposed for FY04-05 will provide information required to address both of these key goals. In addition, the monitoring workplan will foster achievement of the over-arching goals of the Strategic Plan to promote internal and external coordination and collaboration activities, and collection of high-quality scientific data.

The Lahontan Region has identified two regional monitoring priorities for FY04-05: Martis Valley and the Mojave River Basin. The Martis Valley is tributary to the Truckee River and is a rapidly-developing area. SWAMP funds were used during the summer of 2004 to establish baseline data for bioassessment and physical habitat in the Martis Creek watershed. That baseline information will be useful to assess current conditions and to evaluate trends over time. A significant portion of the SWAMP funds is also dedicated to monitoring streams in the Mojave River basin. See Attachment #2 for a list of the streams and analytes being sampled in the Mojave River watershed.

Intra-agency Coordination Activities

The Lahontan RWQCB's SWAMP staff holds routine conversations to coordinate monitoring conducted by its SWAMP program, TMDL program, core regulatory programs, and grant-funded projects. SWAMP staff will also coordinate with any monitoring conducted via waivers issued by the RWQCB, and make every reasonable effort to avoid unnecessary duplication.

For example, a grant-funded (CWA 319) project on the West Walker River paid for bioassessment sampling at sites where grazing BMPs were implemented, and SWAMP paid for bioassessment sampling at nearby reference sites, both to facilitate the evaluation of the project and the development of regional reference conditions.

Table 1. Intra-agency Coordination

Agency Group	Monitoring Program Description	Available Data Format	Using SWAMP QAPP	Data SWAMP compatible	Data used for 303(d) & 305(b)
TSMP	Toxic Substances Monitoring Program has been incorporated into SWAMP. During FY04-05, this will fund a one-time bioaccumulation study at Donner Lake. (See Attachment #3)	Contractor (CDFG) for Donner Lk study will submit data in electronic format (SWAMP compatible).	X	X	X
TMDL	TMDL development (or de-listing) is underway for many waterbodies in the Lahontan Region. SWAMP and TMDL staff meet regularly to coordinate and avoid duplication of effort.	Data funded by SWAMP program is collected by two contractors who utilize the SWAMP QAPP (USGS and UC-SNARL).	X	X	X

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Core Regulatory	Baseline bioassessment & habitat data collected at Martis Valley and Bagley Valley, to (in part) assist regulatory units in evaluating the impacts of new development & restoration projects.	Data funded by SWAMP program was collected by contractor who utilizes the SWAMP QAPP (UC-SNARL).	X	X	X
Nonpoint Source (NPS)	The Lahontan Region's SWAMP and NPS staff meet regularly to coordinate and avoid duplication of effort. Programs collaborate when possible. At the West Walker River, NPS program paid for bioassessment sampling & habitat monitoring at sites where grazing BMPs were installed, and SWAMP program paid for sampling at nearby reference sites. This allowed evaluation of the BMP effectiveness, and also provided info on reference streams for the regional IBI.	Data funded by both SWAMP and NPS programs was collected by contractor who utilizes the SWAMP QAPP (UC-SNARL).	X	X	X
Other Grant Projects	Contractors are required to consult with Region 6 staff to discuss development of the QAPP, Monitoring Plan, and data management.	Data will be submitted in electronic format using SWAMP templates.	?	X	X

Inter-agency Coordination Activities

The Lahontan RWQCB SWAMP staff has queried all RWQCB staff to learn about other monitoring efforts throughout the Region. And SWAMP staff has expended considerable effort to ensure that duplication is not occurring, and also to coordinate with others who are conducting monitoring in the Region.

For example, SWAMP staff coordinated with the U.S. Forest Service (USFS) during the Bagley Valley Watershed Restoration Project, where the USFS paid for bioassessment monitoring at the treated sites, and SWAMP paid for bioassessment monitoring at nearby reference sites, both to facilitate the evaluation of the project and the development of regional reference conditions.

SWAMP staff has also coordinated similar efforts with the National Park Service (Death Valley National Park), the Bureau of Land Management (Amargosa River), and the U.S. Forest Service Lake Tahoe Basin Management Unit (Heavenly Valley Creek).

Table 2. Inter-agency Coordination

Federal	Monitoring Activities	Coordination Status
USDA Forest Service, Lake Tahoe Basin Management Unit (USFS-LTBMU)	Coordinated comparison of two monitoring methods (at Heavenly Valley Creek and nearby reference creeks) to evaluate success of remedial erosion control efforts at Heavenly Valley Ski Area.	Baseline monitoring completed during 2001-2003. Follow-up monitoring to be conducted in 2006-2007

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USDA Forest Service, Toiyabe National Forest (USFS-TNF)	Coordinated sharing of monitoring costs & responsibilities at Bagley Valley Watershed Restoration Project.	Completed. Final report issued by SWAMP contractor (UC-SNARL) September 2004.
USDI National Park Service (USNPS)	Used SWAMP funds to sample site of keen interest to both RWQCB and USNPS (Mesquite Spring).	Completed. Data transmitted to NPS November 2004.
USDI Bureau of Land Management (BLM)	Coordinated sharing of costs for monitoring at Amargosa River (BLM paying for bioassessment by UC-SNARL, SWAMP program is paying for USGS water chemistry)	One round of sampling completed in Spring 2004; follow-up sampling scheduled for Spring 2005
USDA Forest Service, California Regional Office (USFS-RO)	Lahontan Region funds were used to perform field comparison of various bioassessment methods. USFS-RO is contributing to pay contractor (E.Silldorff) for statistical analysis of the data.	Ongoing. Final report expected by Spring 2005.
U.S. Geological Survey (USGS)	USGS is conducting various monitoring activities throughout the Lahontan Region. Coordination with USGS is focused on avoiding duplication of effort, and collaborating to the extent feasible. There is insufficient staff time to track all of USGS's extensive monitoring efforts.	FY03-04 SWAMP funds are being used to develop a method to allow the SWAMP and USGS databases to communicate.
Desert Managers Group (DMG) www.dmg.gov	Multi-agency group dedicated to fostering better management and stewardship of the California deserts. Member agencies conduct numerous monitoring efforts. Member agencies include NPS, BLM, USFWS, CDFG, CA State Parks, Caltrans, and others.	SWAMP funds are insufficient for us to participate as a full member of the DMG, or to obtain DMG-generated data. But we collaborate to the extent possible. We consult with DMG member agencies to avoid duplication, collaborate on monitoring projects, and to develop lists of analytes for SWAMP sampling in the CA deserts. (For examples, see NPS and BLM projects above.)
State	**Monitoring Activities**	**Coordination Status**
California Department of Fish and Game (CDFG)	Lahontan Region SWAMP staff (T.Suk) is current chair of SWAMP Bioassessment Committee, working with CDFG-ABL on methods consistency, bioassessment QA, etc.	Ongoing.
University of California, Santa Barbara, Sierra Nevada Aquatic Research Laboratory	Lahontan Region SWAMP staff (T.Suk) is current chair of SWAMP Bioassessment Committee, working with UC scientists on methods consistency, bioassessment QA, etc.	Ongoing. SNARL has much historic data that would be valuable in the SWAMP database, but insufficient contract funding and staff time to follow up.

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California Office of Environmental Health Hazard Assessment, and CDFG	Worked closely with staff from OEHHA and CDFG to develop study design for bioaccumulation study at Donner Lake (to be funded by SWAMP program FY04-05).	Sampling pending; scheduled for August 2005.
California Department of Water Resources	DWR has conducted historic monitoring and is conducting on-going monitoring at Eagle Lake and other locations in the Lahontan Region.	Some data obtained. Not in SWAMP format. Lots of current and historic data exists at DWR. Better coordination needed, but insufficient funding and staff time to follow up.
California Tahoe Conservancy (CTC)	CTC has conducted and funded monitoring throughout the Lake Tahoe Basin. Coordination with CTC is limited, and focused on avoiding duplication of effort, and collaborating to the extent feasible. There is insufficient staff time to track all of CTC's extensive monitoring efforts.	Have attempted to coordinate SWAMP with CTC bioassessment program, but CTC broke off communications and decided to develop its own methods.
State of Nevada, Division of Environmental Protection (NDEP)	NVDEP conducts monitoring in the Lake Tahoe Basin, and on waterbodies in NV downstream of the California border.	Attend meetings as time allows to coordinate. Have incorporated some analytes into SWAMP sampling (i.e., TSS) at request of NV, to facilitate their downstream data needs.
Local	**Monitoring Activities**	**Coordination Status**
Town of Truckee and Placer County	Used SWAMP funds to establish baseline bioassessment & physical habitat conditions at 4 sites in Martis Cr watershed. Info to be used to assess trends, and potentially by Town and Co. to draft monitoring requirements for new developments	Field sampling completed. Lab work pending. Continue to assist local govt's to develop monitoring requirements for new developments.
City of South Lake Tahoe	City has funded monitoring for watershed restoration projects.	Data not yet acquired.
Miscellaneous	**Monitoring Activities**	**Coordination Status**
Tahoe Regional Planning Agency	TRPA has conducted and funded monitoring throughout the Lake Tahoe Basin. Coordination with TRPA is focused on avoiding duplication of effort, and collaborating to the extent feasible. There is insufficient staff time to track all of TRPA's extensive monitoring efforts.	Data not yet acquired.
Lake Tahoe Interagency Monitoring Program (LTIMP)	Oversight and coordination committee formed to provide consistency in monitoring programs in the Lake Tahoe Basin.	Lahontan Region SWAMP staff (T.Suk) authored LTIMP guidance for bioassessment
Bishop Paiute Tribe	The Bishop Paiute Tribe is conducting a host of monitoring with the goal of establishing water quality standards. The tribe is interested in collaborating with the Lahontan RWQCB on biocriteria for the lower Owens Valley area.	Data not yet acquired. Lahontan Region SWAMP staff has discussed the possibility of collaborating on biocriteria, but to date the RWQCB does not have adequate funds to expand its bioassessment program into this area.

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Volunteer	Monitoring Activities	Coordination Status
Truckee River Aquatic Monitors (TRAM)	TRAM conducts monitoring activities throughout the Truckee River watershed. There is insufficient staff time to track TRAM's monitoring efforts. We do communicate as time allows to assist TRAM and avoid duplication of effort where possible.	Data not yet acquired.

Attachment #1, Lahontan Region SWAMP Workplan (FY 04-05)

Beneficial Uses & Monitoring Objectives (p. 1 of 3)					
Station Name Hydro Unit #	**Beneficial Use(s)**	**Monitoring Objective(s) (1)**	**Frequency**	**Category**	**Indicator(s) (2)**
Mill Creek at Upper Lake (near Lake City) 641.30	MUN, AGR, REC-2, COLD, WILD	2,9,16,20	3 times/year	Contaminant Exposure, Pollutant Exposure	Inorganic Water Chemistry, Nutrients, Sediment
Bidwell Creek 641.30	MUN, AGR, REC-2, COLD, WILD	2,9,16,20	3 times/year	Contaminant Exposure, Pollutant Exposure	Inorganic Water Chemistry, Nutrients, Sediment
Cedar Creek near Cedarville 641.20	MUN, AGR, REC-2, COLD, WILD	2,9,16,20	3 times/year	Contaminant Exposure, Pollutant Exposure	Inorganic Water Chemistry, Nutrients, Sediment
Susan River above confluence w/ Willard Cr 637.20	MUN, AGR, REC-2, COLD, WILD	2,9,16,20	Quarterly	Contaminant Exposure, Pollutant Exposure	Inorganic Water Chemistry, Nutrients, Sediment
Susan River near Litchfield 637.20	MUN, AGR, REC-2, COLD, WILD	2,9,16,20	Quarterly	Contaminant Exposure, Pollutant Exposure	Inorganic Water Chemistry, Nutrients, Sediment
West Fork Carson River at Hope Valley 633.00	MUN, AGR, REC-2, COLD, WILD, RARE	2,9,16,20	Quarterly	Contaminant Exposure, Pollutant Exposure	Inorganic Water Chemistry, Nutrients, Sediment
East Frk Carson River below Markleeville 632.10	MUN, AGR, REC-2, COLD, WILD, RARE	2,9,16,20	Quarterly	Contaminant Exposure, Pollutant Exposure	Inorganic Water Chemistry, Nutrients, Sediment
West Walker River at Coleville 631.10	MUN, AGR, REC-2, COLD, WILD	2,9,16,20	Quarterly	Contaminant Exposure, Pollutant Exposure	Inorganic Water Chemistry, Nutrients, Sediment
East Walker River at CA/NV state line 630.10	MUN, AGR, REC-2, COLD, WILD, RARE	2,9,16,20	Quarterly	Contaminant Exposure, Pollutant Exposure	Inorganic Water Chemistry, Nutrients, Sediment
Mammoth Creek at Twin Lakes 603.10	MUN, AGR, REC-2, COLD, WILD, RARE	2,9,16,20	Quarterly	Contaminant Exposure, Pollutant Exposure	Inorganic Water Chemistry, Nutrients, Sediment

Notes: 1. Monitoring Objectives: From 11/30/00 Report to the Legislature, Section VI (attached)
2. Indicator: From 11/30/00 Report to the Legislature, Section VII, Table 3, Pages 33-35

Beneficial Uses & Monitoring Objectives (p. 2 of 3)					
Station Name Hydro Unit #	**Beneficial Use(s)**	**Monitoring Objective(s) (1)**	**Frequency**	**Category**	**Indicator(s) (2)**
Mammoth Creek at Old Mammoth Road 603.10	MUN, AGR, REC-2, COLD, WILD, RARE	2,9,16,20	One time only	Contaminant Exposure, Pollutant Exposure	Inorganic Water Chemistry, Nutrients, Sediment
Mammoth Creek at Hwy 395 603.10	MUN, AGR, REC-2, COLD, WILD, RARE	2,9,16,20	Quarterly	Contaminant Exposure, Pollutant Exposure	Inorganic Water Chemistry, Nutrients, Sediment
Mammoth Creek tributary 603.10	MUN, AGR, REC-2, COLD, WILD, RARE	2,9,16,20	Quarterly	Contaminant Exposure, Pollutant Exposure	Inorganic Water Chemistry, Nutrients, Sediment
Twin Lakes 603.10	MUN, AGR, REC-2, COLD, WILD, RARE	2,9,16,20	Quarterly	Contaminant Exposure, Pollutant Exposure	Inorganic Water Chemistry, Nutrients, Sediment
Hilton Creek at Hwy 395 603.10	MUN, AGR, REC-2, COLD, WILD,	2,9,16,20	Quarterly	Contaminant Exposure, Pollutant Exposure	Inorganic Water Chemistry, Nutrients, Sediment
Rock Creek above diversion 603.20	MUN, AGR, REC-2, COLD, WILD	2,9,16,20	Quarterly	Contaminant Exposure, Pollutant Exposure	Inorganic Water Chemistry, Nutrients, Sediment
Amargosa River 609.00	MUN, REC-1, REC-2	2, 9, 20	One time only	Contaminant Exposure, Pollutant Exposure	Fecal coliform bacteria, Inorganic Water Chemistry, Nutrients
Mojave River at Upper Narrows 628.20	MUN, AGR, REC-2, WARM, COLD, WILD	2,9,16,20	Quarterly	Contaminant Exposure, Pollutant Exposure	Inorganic Water Chemistry, Organic Water Chemistry, Nutrients
Mojave River at Forks Dam 628.20	MUN, AGR, REC-2, WARM, COLD, WILD	2,9,16,20	Quarterly	Contaminant Exposure, Pollutant Exposure	Inorganic Water Chemistry, Organic Water Chemistry, Nutrients
Deep Creek above Deep Creek Lake 628.20	MUN, AGR, REC-2, COLD, WILD	2,9,16,20	3 times/year	Contaminant Exposure, Pollutant Exposure	Inorganic Water Chemistry, Nutrients
Holcomb Creek at Crabflats Road 628.20	MUN, AGR, REC-2, COLD, WILD	2,9,16,20	3 times/year	Contaminant Exposure, Pollutant Exposure	Inorganic Water Chemistry, Nutrients

Notes: 1. Monitoring Objectives: From 11/30/00 Report to the Legislature, Section VI (attached)
2. Indicator: From 11/30/00 Report to the Legislature, Section VII, Table 3, Pages 33-35

Beneficial Uses & Monitoring Objectives (p. 3 of 3)					
Station Name Hydro Unit #	**Beneficial Use(s)**	**Monitoring Objective(s) (1)**	**Frequency**	**Category**	**Indicator(s) (2)**
Crab Creek at Crab Creek Road 628.20	MUN, AGR, REC-2, COLD, WILD	2,9,16,20	3 times/year	Contaminant Exposure, Pollutant Exposure	Inorganic Water Chemistry, Nutrients
Sheep Creek below Lake Arrowhead Scout Camp 628.20	MUN, AGR, REC-2, WARM, COLD, WILD	2,9,16,20	3 times/year	Contaminant Exposure, Pollutant Exposure	Inorganic Water Chemistry, Nutrients
Sites (to be determined) for bioassessment sampling	COLD, WILD, RARE	9	Once	Biological Response	Macroinvertebrate assemblage, Periphyton, assemblage, Chlorophyll-a

Notes: 1. Monitoring Objectives: From 11/30/00 Report to the Legislature, Section VI (attached)
2. Indicator: From 11/30/00 Report to the Legislature, Section VII, Table 3, Pages 33-35

Excerpts from 11/30/00 Report to Legislature:

SECTION VI. SITE-SPECIFIC MONITORING

The overall goal of this activity of SWAMP is to develop site-specific information on sites that are (1) known or suspected to have water quality problems and (2) known or suspected to be clean. It is intended that this portion of SWAMP will be targeted at specific locations in each region. This portion of SWAMP is focused on collecting information from sites in water bodies of the State that could be potentially listed or delisted under CWA Section 303(d). The RWQCBs are given significant flexibility to select the specific locations to be monitored. The RWQCBs at their discretion may perform monitoring at clean sites to determine baseline conditions (for assessments related to antidegradation requirements) or if this information is needed to place problem sites into perspective with cleaner sites in the Region.

Monitoring Objectives

In developing the SWAMP monitoring objectives, the SWRCB used a modified version of the model for developing clear monitoring objectives proposed by Bernstein et al. (1993). The model makes explicit the assumptions and/or expectations that are often embedded in less detailed statements of objectives (as presented in SWRCB, 2000). This

section is organized by each major question posed in the SWRCB report to the Legislature on comprehensive monitoring (SWRCB, 2000).

Is it safe to swim?

Beneficial Use: Water Contact Recreation

1. At sites influenced by point sources (e.g., storm drains, publicly owned treatment works, etc.) or nonpoint sources of pathogenic contaminants, estimate the concentration of bacteria or pathogens above screening values, health standards, or adopted water quality objectives.

Is it safe to drink the water?

Beneficial Use: Municipal and Domestic Water Supply

2. At specific locations in lakes, rivers and streams that are sources of drinking water and suspected to be contaminated, estimate the concentration of microbial and chemical contaminants above screening values, drinking water standards, or adopted water quality objectives used to protect drinking water quality.

3. At specific locations in lakes, rivers and streams that are sources of drinking water and suspected to be contaminated, verify previous estimates of the concentration of microbial and chemical contaminants above screening values, drinking water standards, or adopted water quality objectives used to protect drinking water quality.

Is it safe to eat fish and other aquatic resources?

Beneficial Uses: Commercial and Sport Fishing, Shellfish Harvesting

4. At specific sites influenced by sources of bacterial contaminants, estimate the concentration of bacterial contaminants above health standards or adopted water quality objectives to protect shellfish harvesting areas.

5. At specific sites influenced by sources of chemical contaminants, estimate the concentration of chemical contaminants in edible aquatic life tissues above advisory levels and critical thresholds of potential human health risk.

6. At frequently fished sites, estimate the concentration of chemical contaminants in commonly consumed fish and shellfish target species above advisory levels and critical thresholds of potential human health risk (Adapted from USEPA, 1995).

7. At frequently fished sites, verify previous estimates of the concentration of chemical contaminants in commonly consumed fish and shellfish target species above advisory levels and critical thresholds of potential human health risk (Adapted from USEPA, 1995).

8. Throughout water bodies (streams, rivers, lakes, nearshore waters, enclosed bays and estuaries), estimate the concentration of chemical contaminants in fish and aquatic resources from year to year using several critical threshold values of potential human impact (advisory or action levels).

Are aquatic populations, communities, and habitats protected?

Beneficial Uses: Cold Freshwater Habitat; Estuarine Habitat; Inland Saline Water Habitats; Marine Habitat; Preservation of Biological Habitats; Rare, Threatened or Endangered Species; Warm Freshwater Habitat; Wildlife Habitat

9. At sites influenced by point sources (e.g., storm drains, publicly owned treatment works, etc.) or nonpoint sources of pollutants, identify specific locations of degraded water or sediments in rivers, lakes, nearshore waters, enclosed bays, or estuaries using several critical threshold values of toxicity, water column or epibenthic community analysis, habitat condition, and chemical concentration.

10. At sites influenced by point sources (e.g., storm drains, publicly owned treatment works, etc.) or nonpoint sources of pollutants, identify specific locations of degraded sediment in rivers, lakes, nearshore waters, enclosed bays, or estuaries using several critical threshold values of toxicity, benthic community analysis, habitat condition, and chemical concentration.

11. Identify the areal extent of degraded sediment locations in rivers, lakes, nearshore waters, enclosed bays, and estuaries using several critical threshold values of toxicity, benthic community analysis, habitat condition, and chemical concentration.

Beneficial Use: Spawning, Reproduction and/or Early Development

12. At sites influenced by point sources (e.g., storm drains, publicly owned treatment works, etc.) or nonpoint sources of pollutants, identify specific locations of degraded water or sediment in rivers, lakes, nearshore waters, enclosed bays, and estuaries using several critical threshold values of early life-stage toxicity, chemical concentration, and physical characteristics.

13. At sites influenced by point sources (e.g., storm drains, publicly owned treatment works, etc.) or nonpoint sources of pollutants, verify previous measurements identifying specific

locations of degraded water or sediment in rivers, lakes, nearshore waters, enclosed bays, and estuaries using several critical threshold values of early life-stage toxicity, chemical concentration, and physical characteristics.

Is water flow sufficient to protect fisheries?

Beneficial Use: Migration of Aquatic Organisms; Rare, Threatened or Endangered Species; Wildlife Habitat

14. At specific sites influenced by pollution, estimate the presence of conditions necessary for the migration and survival of aquatic organisms, such as anadromous fish, using measures of habitat condition including water flow, watercourse geomorphology, sedimentation, temperature, and biological communities.

15. At specific sites influenced by pollution, verify previous estimates of the presence of conditions necessary for the migration and survival of aquatic organisms, such as anadromous fish, using measures of habitat condition including water flow, watercourse geomorphology, sedimentation, temperature, and biological communities.

Is water safe for agricultural use?

Beneficial Use: Agricultural supply

16. At specific locations in lakes, rivers and streams that are used for agricultural purposes, estimate the concentration of chemical pollutants above screening values or adopted water quality objectives used to protect agricultural use.

17. At specific locations in lakes, rivers and streams that are used for agricultural purposes, verify previous estimates of the concentration of chemical pollutants above screening values or adopted water quality objectives used to protect agricultural uses.

Is water safe for industrial use?

Beneficial Use: Industrial Source Supply; Industrial Process Supply

18. At specific locations in coastal waters, enclosed bays, estuaries, lakes, rivers and streams that are used for industrial purposes, estimate the concentration of chemical pollutants above screening values or adopted water quality objectives used to protect industrial use.

19. At specific locations in coastal waters, enclosed bays, estuaries, lakes, rivers and streams that are used for industrial purposes, verify previous estimates of the concentration of chemical pollutants above screening values or adopted water quality objectives used to protect industrial uses.

Are aesthetic conditions of the water protected?

Beneficial Use: Non-Contact Water Recreation

20. At specific locations in coastal waters, enclosed bays, estuaries, lakes, rivers and streams, estimate the aesthetic condition above screening values or adopted water quality objectives used to protect non-contact water recreation.

    At specific locations in coastal waters, enclosed bays, estuaries, lakes, rivers and streams, verify previous estimates of the aesthetic condition above screening values or adopted water quality objectives used to protect non-contact water recreation.

Attachment #2
USGS Surface Water Monitoring (Summer 2004 – Spring 2005)

LOCATION	FREQ	Lab Code	ANALYTES	BOTTLE SETS
Bidwell Creek	3 times		discharge (Q)	500TBY
			suspended sediment (SSC)	250 FU
			fecal coliform bacteria	125 FCC
		27	TDS ("residue on evaporation")	125WCA
		2187	turbidity	HS LAB
		1571	chloride	
		HSWL	nitrite + nitrate (low level)	
		HSWL	TKN (low level)	
		HSWL	total phosphorus (low level)	
Mill Creek at Upper Lake (near Lake City)	3 times		discharge (Q)	500TBY
			suspended sediment (SSC)	250 FU
			fecal coliform bacteria	125 FCC
		27	TDS ("residue on evaporation")	125WCA
		2187	turbidity	HS LAB
		1571	chloride	
		HSWL	nitrite + nitrate (low level)	
		HSWL	TKN (low level)	
		HSWL	total phosphorus (low level)	
Cedar Creek near Cedarville	3 times		discharge (Q)	500TBY
			suspended sediment (SSC)	250 FU
			fecal coliform bacteria	125 FCC
		27	TDS ("residue on evaporation")	125WCA
		2187	turbidity	HS LAB
		1571	chloride	
		HSWL	nitrite + nitrate (low level)	
		HSWL	TKN (low level)	
		HSWL	total phosphorus (low level)	
Susan River above confluence with Willard Creek	4 times		discharge (Q)	500TBY
			suspended sediment (SSC)	250 FU
			fecal coliform bacteria	125 FCC
		27	TDS ("residue on evaporation")	125WCA
		2187	turbidity	HS LAB
		1571	chloride	
		HSWL	nitrite + nitrate (low level)	
		HSWL	TKN (low level)	
		HSWL	total phosphorus (low level)	

Susan River near Litchfield	4 times		discharge (Q)	500TBY
			suspended sediment (SSC)	250 FU
			fecal coliform bacteria	125 FCC
		27	TDS (“residue on evaporation”)	125WCA
		2187	turbidity	HS LAB
		1571	chloride	
		HSWL	nitrite + nitrate (low level)	
		HSWL	TKN (low level)	
		HSWL	total phosphorus (low level)	
West Fork Carson River at Hope Valley	4 times		discharge (Q)	500TBY
			suspended sediment (SSC)	250 FU
			total suspended solids (TSS)	125 FCC
			fecal coliform bacteria	125WCA
		27	TDS (“residue on evaporation”)	250 FA
		2187	turbidity	HS LAB
		1571	chloride	
		1572	sulfate	
		2110	boron	
		HSWL	nitrite (low level)	
		HSWL	nitrite + nitrate (low level)	
		HSWL	TKN (low level)	
		HSWL	total phosphorus (low level)	
East Fork Carson River below Markleeville	4 times		discharge (Q)	500TBY
			suspended sediment (SSC)	250 FU
			total suspended solids (TSS)	125 FCC
			fecal coliform bacteria	125WCA
		27	TDS (“residue on evaporation”)	250 FA
		2187	turbidity	HS LAB
		1571	chloride	
		1572	sulfate	
		2110	boron	
		HSWL	nitrite + nitrate (low level)	
		HSWL	TKN (low level)	
		HSWL	total phosphorus (low level)	
West Walker River at Coleville	4 times		discharge (Q)	500TBY
			suspended sediment (SSC)	250 FU
			fecal coliform bacteria	125 FCC
		27	TDS (“residue on evaporation”)	125WCA
		2187	turbidity	250 FA
		1571	chloride	HS LAB
		1572	sulfate	
		2110	boron	
		HSWL	nitrite + nitrate (low level)	
		HSWL	TKN (low level)	
		HSWL	total phosphorus (low level)	

East Walker River at CA/NV state line	4 times		discharge (Q)	500TBY
			suspended sediment (SSC)	250 FU
			fecal coliform bacteria	1125 FCC
		27	TDS (“residue on evaporation”)	125 WCA
		2187	turbidity	250 FA
		1571	chloride	HS LAB
		2110	boron	
		HSWL	nitrite + nitrate (low level)	
		HSWL	TKN (low level)	
		HSWL	total phosphorus (low level)	
Mammoth Creek at Twin Lakes	4 times		discharge (Q)	250 FU
			suspended sediment (SSC)	125 WCA
			fecal coliform bacteria	125 FCC
		27	TDS (“residue on evaporation”)	500 TBY
		2187	turbidity	250 FA
		1571	chloride	250 RA
		sc1678	dissolved and total metals	250 FAM
		HSWL	nitrite (low level)	250 RAM
		HSWL	nitrite + nitrate (low level)	HS LAB
		HSWL	TKN (low level)	
		HSWL	diss. ortho-phosphate (low level)	
		HSWL	total phosphorus (low level)	
Mammoth Creek at Old Mammoth Road	4 times		discharge (Q)	250 FU
			suspended sediment (SSC)	125 WCA
			fecal coliform bacteria	125 FCC
		27	TDS (“residue on evaporation”)	500 TBY
		2187	turbidity	250 FA
		1571	chloride	250 RA
		sc1678	dissolved and total metals	250 FAM
		HSWL	nitrite (low level)	250 RAM
		HSWL	nitrite + nitrate (low level)	HS LAB
		HSWL	TKN (low level)	
		HSWL	diss. ortho-phosphate (low level)	
		HSWL	total phosphorus (low level)	
Mammoth Creek at Highway 395	4 times		discharge (Q)	250 FU
			suspended sediment (SSC)	125 WCA
			fecal coliform bacteria	125 FCC
		27	TDS (“residue on evaporation”)	500 TBY
		2187	turbidity	250 FA
		1571	chloride	250 RA
		sc1678	dissolved and total metals	250 FAM
		HSWL	nitrite (low level)	250 RAM
		HSWL	nitrite + nitrate (low level)	HS LAB
		HSWL	TKN (low level)	
		HSWL	diss. ortho-phosphate (low level)	
		HSWL	total phosphorus (low level)	

Mammoth Creek Trib	4 times		discharge (Q)	250 FU
			suspended sediment (SSC)	125 WCA
			fecal coliform bacteria	125 FCC
		27	TDS (“residue on evaporation”)	500 TBY
		2187	turbidity	250 FA
		1571	chloride	250 RA
		sc1678	dissolved and total metals	250 FAM
		HSWL	nitrite (low level)	250 RAM
		HSWL	nitrite + nitrate (low level)	HS LAB
		HSWL	TKN (low level)	
		HSWL	diss. ortho-phosphate (low level)	
		HSWL	total phosphorus (low level)	
Twin Lakes	4 times; 3 sites; 3 depths at each site		discharge (Q)	250 FU
			suspended sediment (SSC)	125 WCA
		27	TDS (“residue on evaporation”)	125 FCC
		2187	turbidity	500 TBY
		1571	chloride	250 FA
		HSWL	nitrite (low level)	250 RA
		HSWL	nitrite + nitrate (low level)	250 FAM
		HSWL	TKN (low level)	250 RAM
		HSWL	diss. ortho-phosphate (low level)	HS LAB
		HSWL	total phosphorus (low level)	
Rock Creek above Diversion	4 times		discharge (Q)	500 TBY
			suspended sediment (SSC)	250 FU
			fecal coliform bacteria	125 FCC
		27	TDS (“residue on evaporation”)	125 WCA
		2187	turbidity	HS LAB
		1571	chloride	
		HSWL	nitrite (low level)	
		HSWL	nitrite + nitrate (low level)	
		HSWL	TKN (low level)	
		HSWL	diss. ortho-phosphate (low level)	
		HSWL	total phosphorus (low level)	
Hilton Creek at Highway 395	4 times		discharge (Q)	500 TBY
			suspended sediment (SSC)	250 FU
			fecal coliform bacteria	250 FU
		27	TDS (“residue on evaporation”)	125 FCC
		2187	turbidity	125 WCA
		1571	chloride	HS LAB
		HSWL	nitrite (low level)	
		HSWL	nitrite + nitrate (low level)	
		HSWL	TKN (low level)	
		HSWL	diss. ortho-phosphate (low level)	
		HSWL	total phosphorus (low level)	

Mojave River at Upper Narrows	4 times	 27 1571 1572 sc1307 31 2110 HSWL HSWL HSWL HSWL	discharge (Q) TDS (“residue on evaporation”) chloride sulfate VOCs fluoride boron nitrite (low level) nitrite + nitrate (low level) TKN (low level) total phosphorus (low level)	250 FU 250 FA 125 FCC 125 WCA 3-40 ml GVC
Mojave River at Forks Dam	4 times	 27 1571 1572 sc1307 31 2110 HSWL HSWL HSWL HSWL	discharge (Q) TDS (“residue on evaporation”) chloride sulfate VOCs fluoride boron nitrite (low level) nitrite + nitrate (low level) TKN (low level) total phosphorus (low level)	250 FU 250 FA 125 FCC 125 WCA 3-40 ml GVC
Deep Creek above Deep Creek Lake (at town of Arrowbear Lake)	3 times	 27 1572 1571 31 2110 HSWL HSWL HSWL HSWL HSWL	discharge (Q) TDS (“residue on evaporation”) sulfate chloride fluoride boron nitrite (low level) nitrite + nitrate (low level) TKN (low level) diss. ortho-phosphate (low level) total phosphorus (low level)	250 FU 250 FA 125 FCC 125 WCA
Holcomb Creek at Crabflats Road	3 times	 27 1572 1571 31 2110 HSWL HSWL HSWL HSWL HSWL	discharge (Q) TDS (“residue on evaporation”) sulfate chloride fluoride boron nitrite (low level) nitrite + nitrate (low level) TKN (low level) diss. ortho-phosphate (low level) total phosphorus (low level)	250 FU 250 FA 125 FCC 125 WCA

Crab Creek at Crab Creek Road	3 times	 27 1572 1571 31 2110 HSWL HSWL HSWL HSWL HSWL	discharge (Q) TDS (“residue on evaporation”) sulfate chloride fluoride boron nitrite (low level) nitrite + nitrate (low level) TKN (low level) diss. ortho-phosphate (low level) total phosphorus (low level)	250 FU 250 FA 125 FCC 125 WCA
Sheep Creek below Lake Arrowhead Scout Camp	3 times	 27 1572 1571 31 2504 HSWL HSWL HSWL HSWL HSWL	discharge (Q) TDS (“residue on evaporation”) sulfate chloride fluoride boron, twice (high & low flow); this is low-level analysis for B. nitrite (low level) nitrite + nitrate (low level) TKN (low level) diss. ortho-phosphate (low level) total phosphorus (low level)	250 FU 250 FA 125 FCC 125 WCA
Amargosa River <u>three sites</u>: (1) at USGS gage; (2) at Upper Canyon; (3) below Willow Creek	One time only (March or April 2005)	 2187 27 sc1678 1574 489 1043 2812 2812 2622 HSWL HSWL HSWL HSWL HSWL	discharge (Q) suspended sediment (SSC) fecal coliform bacteria turbidity TDS (“residue on evaporation”) trace metals (total + dissolved) plus major ions (lc2109, 2110, 1571, 31, 54, 56, 675, 1572) deuterium oxygen 18 tritium gross alpha gross beta radium 226 nitrite (low level) nitrite + nitrate (low level) TKN (low level) diss. ortho-phosphate (low level) total phosphorus (low level)	

Attachment #3

Donner Lake "Priority Organics"

Bioaccumulation Concept Proposal, SWAMP FY 04-05

by Tom Suk, Lahontan RWQCB
July 7, 2004

Amount Requested: $51,000

Background

Donner Lake is located in Nevada County between Donner Summit and the Town of Truckee, California. The 960-acre lake is surrounded by urban development and is sandwiched between Interstate Highway 80 on the north, and the trans-Sierra railroad on the south. The lake is extremely popular for sport fishing and other water-contact recreation. Based on limited results from the former Toxic Substances Monitoring Program (TSMP), in the mid-1990s Donner Lake was placed on the Clean Water Act Section 303(d) list as being impaired due to "priority organics." Two organic constituents—polychlorinated biphenyls (PCBs) and chlordane—were identified as exceeding "Maximum Tissue Residue Level" (MTRL) screening criteria that were in use at that time. The levels of PCBs, chlordane, and other potential contaminants present in Donner Lake have not been recently or adequately characterized to determine whether a threat exists to human health or other beneficial uses of water.

Need for Proposal

Because fish caught at Donner Lake are regularly consumed by humans, follow-up modern studies are needed to determine whether fish consumption advisories are warranted, and to determine whether Donner Lake should remain on the 303(d) list of impaired waterbodies, or be removed from it.

Proposal

This proposal was developed with the assistance of staff at the California Department of Fish & Game (CDFG), and the California Office of Environmental Health Hazard Assessment (OEHHA). Staff at OEHHA recommended capturing 12 individuals of all edible species found in the lake, analyzing all 60 individuals for mercury, and then dividing the 12 individuals of each species (e.g., lake trout, rainbow trout, brown trout, brook trout, kokanee salmon) into four composites of three fish each. Each of the 20 composites will then be analyzed for organics (i.e., organochlorine pesticides, including PCBs and chlordane) and trace elements (i.e., metals). This design will allow OEHHA to conduct a human health assessment.

Every effort will be made to capture resident fish of species and sizes that people actually catch and eat (i.e., sampling legal sizes of multiple species). To facilitate human health evaluations, fish will be sampled for skin-off fillets.

The USEPA recommends that fish sampling be conducted during the period when the target species is most frequently harvested. The sampling period should also avoid the spawning period of the target species, including 1 month before and 1 month after spawning. The best time to sample at Donner Lake would therefore be in mid-to-late August, which is a very popular time for fishing, and occurs well after the spring spawns (i.e., lake trout, rainbow trout) and well before the fall spawns (i.e., kokanee salmon, brown trout).

As described above, field personnel will strive to collect 12 individuals of each of the five (5) edible species known to exist in Donner Lake. It is anticipated that the sampling will occur in mid-to-late August of 2005. In addition, CDFG currently possesses remaining tissue from a 5-fish composite of lake trout that was sampled in 2002 for PAHs. That sample will be analyzed for organochlorine pesticides (including PCBs and chlordane) and trace elements (including mercury).

Budget

field labor, first day fish sampling by CDFG @ $2,107 = **$2,107**
field labor, days 2-5, fish sampling by CDFG @ $1,000/day = **$4,000**
fish sample prep. (dissection/homogenization), 60 samples @ $110/ea. = **$6,600**
fish tissue, total mercury by FIMS (cold vapor analysis), all 60 samples @ $120/ea. = **$7,200**
fish tissue, full scan organochlorine pesticides + PCBs, 20 composites @ $988/ea = **$19,760**
fish tissue, analyses for trace elements (i.e., metals), 20 composites @ $461/ea. = **$9,220**
fish tissue, full scan pesticides + PCBs, on existing lake trout composite from 2002 = **$988**
fish tissue, analysis for metals (incl. mercury), on existing lake trout composite from 2002 = **$461**
narrative summary report by CDFG = **$500**

TOTAL = $50,836

Attachment #4, Lahontan Region SWAMP Workplan (FY04-05)

STANDARD OPERATING PROCEDURES (SOPs) FOR SURFACE WATER SAMPLE COLLECTION

SURFACE WATER AMBIENT MONITORING PROGRAM ("SWAMP")

LAHONTAN REGIONAL WATER QUALITY CONTROL BOARD

Approved by: Thomas Suk, Staff Environmental Scientist
Date: 6/15/04

California Regional Water Quality Control Board, Lahontan Region
2501 Lake Tahoe Boulevard
South Lake Tahoe, California 96150
(530) 542-5400

A. Scope and Application

These SOPs apply to the collection of surface water samples from streams as part of the Surface Water Ambient Monitoring Program (SWAMP). It includes procedures for collecting, filtering, and preserving samples for delivery to a laboratory for analysis of nutrients (i.e., species of nitrogen and phosphorus), and ions/minerals (i.e., sulfate, calcium, magnesium, silica, etc.).

B. Objectives

The primary objectives for collecting this data are to assist the Lahontan Regional Water Quality Control Board in assessing the ambient quality of surface waters in the Lahontan Region.

C. Sampling Equipment

Checklist:

- Copy of SOP
- Backpack
- Disposable, powder-free gloves
- Chain-of-Custody (COC) forms in sealed plastic bag
- Field notebook
- Clip board
- Sample bottle labels
- Pencil
- Ball point pen
- Permanent marker
- Mityvac II Hand vacuum pump w/ ¼-inch (inside diameter) autoclavable Nalgene tubing
- Reusable 350 ml polyphenyl sulfone filter apparatus
- 500 ml Nalgene Erlenmeyer flask
- Nylon microbiological filters (47 mm dia., 0.45 μm, Fisher Scientific R04SG04700)
- Metal Tweezers
- New, pre-cleaned HDPE sample bottles (2 x 500 ml; 3 x 250 ml)
- 500 ml HDPE waste bottle
- Distilled Deionized (DDI) water for field method blank (if applicable)
- Ice chest
- Blue ice
- Packing tape
- UPS shipping labels
- Field safety manual
- Field watch

D. Field Information Required At Each Site

The following information shall be recorded on each sample bottle at the time of sampling:

- Sample ID Number (for contract laboratories)
- Sampling Date and Time
- Creek/Site Name
- Sampler's Name
- Analysis Requested
- Whether Sample is Field-Filtered or Raw
- Preservative (if any)

The following information shall be recorded in the field notebook:

At the start of the day:
- Project Name
- Date
- Weather Conditions (precipitation, cloud-cover, approximate temperature, and wind)
- Names of people in sampling crew.

At each site:
- Time of sample collection
- Creek/Site Name
- Sample ID Number
- Information about QC samples collected, if any.
- Comments (any pertinent observations such as cattle in stream, high turbidity, etc.)

E. Sampling Procedures

Collection of water samples will be conducted prior to or upstream from any other sampling activities that could disturb stream sediments and impact water quality (i.e., the collection of flow, sediment, or aquatic invertebrate samples).

1. Select a sampling location in a riffle zone at the upper end of the stream reach to be sampled. Flow rate should be moderate, and creek depth sufficient to submerge the sample bottles at least 3 cm below the water surface without touching or disturbing bottom sediments.

2. Select a work area nearby that is as flat as possible and with minimal vegetation. Remove sampling equipment and supplies from the backpack, minimizing contact with soil, vegetation, etc.

3. Take field notes, label sample bottles, and fill out the chain-of-custody form(s) for the samples.

4. Put on disposable gloves and set up the filter apparatus.

5. Proceed to the sampling location with the 125 ml sample bottle labeled for sulfate analysis. Rinse the surface of the gloves with stream water. Triple-rinse the sample bottle: fill bottle ½ to 1/3 full; shake and rinse all internal surfaces; pour water out without disturbing stream channel; and, shake water droplets out of the bottle. For rinsing and sampling, fill the bottle by submerging the top of the bottle with the cap on 3 to 6 cm below the water surface, unscrewing the cap with the bottle opening facing upstream and tilted slightly up, and screwing the cap back on while still underwater.

6. Triple-rinse the filter apparatus with 250 ml of sample water; fill receiving apparatus with about 80 ml of filtered water; rinse receiving vessel; pump additional sample through filter; rinse the receptacle bottle; discard; repeat twice more.

7. Repeat 5, filter the sample, and triple-rinse the bottle labeled for Nitrate + Nitrite and SRP with a total of 250 ml of filtered sample. Following triple-rinse, pour remaining filtered sample into the bottle, tighten cap, and place in cooler on ice.

8. Repeat 5, tighten cap, and place sample in cooler on ice.

9. Triple-rinse and fill 250 ml bottle labeled for TKN and TP using the same procedure as 5. Tighten bottle cap, and place sample in cooler on ice.

10. Double-check the sample bottle cap seals and arrangement of samples and ice in the cooler.

11. Break down the filter apparatus, removing the filter just used. Rinse with DI water and store in clean plastic bag for next site.

F. Sample Hold Times and Required Reporting Limits

Table 1. Sample Holding Times for Each Analyte.

Analyte	Maximum Hold Time	Storage Conditions
Sulfate	28 Days	@ 4^{o}C
Nitrate+Nitrite, SRP	48 hours to lab	@ 4^{o}C once filtered
TKN and TP	48 hours to lab	@ 4^{o}C

Table 2. Reporting Limits Required to Meet Sampling Objectives

Analyte	Reporting Limit Concentration	Notes/Comments/Source
Sulfate	0.2 mg/L	CLS Labs
Nitrate + Nitrite	1 ug/L	High Sierra Water Lab
SRP	1 ug/L	High Sierra Water Lab
TKN	35 ug/L	High Sierra Water Lab
TP	1 ug/L	High Sierra Water Lab

G. Personnel Qualifications

Sampling crew shall be supervised by at least one person with a B.S. degree (minimum) in biological/environmental sciences, or engineering. Field technicians should take an active part in at least two sampling events under the direction of a qualified staff person before being allowed to sample alone.

H. Quality Control

At least five (5) percent of all samples collected shall be quality control samples.

Duplicates: Duplicate samples shall be collected as determined by the Region's SWAMP project manager. Duplicate samples should be noted in the field notebook, and may be noted as a duplicate on the chain-of-custody.

Field Method Blanks: The procedure for collecting a field method blank (FMP) consists of transporting sufficient DI water into the field and collecting a sample using identical sampling, filtering, and preserving procedures (if applicable) as described under sampling procedures above. The FMB sample should be assigned a fictitious sample location (i.e., Snowpeak Creek) and a unique sample ID, if applicable, so that the laboratory personnel are unaware that they are analyzing a blank.

Travel Blanks: Travel blanks are only needed when sampling for VOCs.

Split samples and spiked samples are not currently part of the SOP.