ANNUAL WATER QUALITY REPORT

Water Year 2001

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January 2002

I. Introduction

A. Requirements - This report follows the requirements of Engineering Regulation 1110-2-8154, entitled "Water Quality and Environmental Management for Corps Civil Works Projects". This USACE's regulation requires a summary of the water quality management programs for the past fiscal year, and requires the following items be addressed in this report:

(1) Describe the goals and objectives of the water quality management program.

(2) Progress made toward meeting these goals and objectives.

(3) Activities that are planned for the out years.

(4) Changes in technical capabilities in the district office.

(5) Relationship between water quality and water control management activities.

(6) Pertinent division regulations.

(7) Laboratory facilities.

(8) Data management system.

(9) Training obtained.

(10) Training needs.

(11) A discussion of research and development needs.

(12) Special studies completed or required.

(13) Water quality coordination with other agencies.

(14) Scheduling for detailed project evaluations.

(15) Problems encountered with contracted work.

(16) Special assistance from other Corps elements or research facilities.

(17) A project-by-project summary of water quality conditions.

(18) Problems encountered and how addressed at each project.

(19) Opportunities identified and how addressed.

(20) Innovative techniques utilized to improve water quality.

(21) Action Items for the Lake Monitoring Report.

B. Goals and Objectives – The goals and objectives of the water quality management program are to ensure that the US Army Corps of Engineers' projects in the planning, design, construction, and operation phases do not degrade water quality and that the beneficial uses of the water near the project site can be maintained. This is achieved by having a water quality engineer participating in the Civil Works Process beginning with the Reconnaissance phase all the way to the Construction phase. Critical involvement is in the middle phases when the feasibility studies and engineering work are being accomplished. A water quality engineer ensures that the Civil Work Process includes the application of monitoring programs, best management practices, the utilization of analytical techniques, and the installation of mitigation devices where needed.

The goals and objectives for the existing 12 lakes in the annual lake monitoring program are to establish the baseline water quality conditions, to ensure that the lakes are protected against the entrance of undesirable nutrient and toxic loads, monitor for any adverse trends, and to ensure that the water quality remains satisfactory to support the beneficial uses assigned to the lake and the downstream water from the lake.

C. Progress Made Toward Meeting The Goals and Objectives - During a typical US Army Corps of Engineers project's planning stage, a water quality engineer must be involved in negotiating or reviewing the state regulatory requirements such as the Waste Discharge Requirements (WDR) issued by the California Regional Water Quality Control Board. If the regulatory requirements have already been established, the water quality engineer would issue a written or verbal report evaluating the regulatory requirements and make recommendations to the Project Manager on specific steps necessary to ensure implementation and compliance. Some of these recommendations may include environmental engineering to ensure water

quality. For example, the Napa River Flood Control Project is a Civil Works project which required the water quality engineer to issue three engineering reports: (1) An Assessment Report of the Waste Discharge Requirments, (2) An Environmental Engineering Report on the use of Turbidity Curtains, and (3) A Report on the Recommended Best Management Practices to be deployed to prevent Storm Water Pollution. Other projects may involve Water Quality monitoring programs conducted by a contractor during actual construction located near or within a protected body of water. All Water Quality data are reviewed by the Water Quality Engineer before being forwarded to the applicable regulatory agencies for proof of compliance. The Water Quality engineer resolves any non-compliance issue and this knowledge is applied on future projects in the planning phase to prevent a non-compliance problem from reoccurring. One important change from 2000 is the increasing dependence on the District's Water Quality engineer in the Civil Works program. In the past, the Water Quality engineer would conduct only a QA review of the contract specifications for environmental protection that are written by the Civil Engineers in the Civil Design section. Recently, project managers have requested the District Water Quality engineer write the contract specifications on environmental protection on several large Civil Works projects because it has been increasingly more difficult for Civil Engineers to keep up with all the regulatory reguirements on environmental protection. Additional work involves the District Water Quality engineer's knowledge of public drinking water systems. For example, the District Water Quality engineer recently identified the drinking water certified operator requirements at Fort Irwin and is now in the process of certifying a drinking water treatment system at Stanislaus Valley Oak Parks. Another important change from 2000 is the fact that ecosystem restoration projects are becoming more common and more important in the future of US Army Corps of Engineers. The South Paciifc Division (SPD) indicates that the US Army Corps of Engineers is now an "environmental organization"

which is a major shift from the original objective of protecting the environment. The new objective is now restoring the environment that has been degraded by normal human activities. This is demonstrated by the fact that the Planning Department has been soliciting the District Water Quality engineer to provide technical oversight on several US Army Corps of Engineers' contractors who are tasked to plan and design ecosystem restoration projects during the reconnaisance and feasibility stages. To provide this technical oversight, formal ecosystem restoration training is required.

For the Lake Monitoring Program, the baseline data has been established so this program is progressing to address more site specific ecosystem problems such as MTBE and mercury that have been found on certain lakes.

D. Activities Planned For The Out-years - All of the current programs are expected to continue. To meet the new objective of environmental restoration, one new activity at Sacramento District is the undertaking of new environmental training in ecosystem restoration. This new activity is described in the "Training Section" of this report. The current planning for the existing annual lake water quality monitoring program is to start tailoring the program to address site-specific conditions. More monitoring may be performed on lakes that are experiencing problems while other lakes with no apparent problems will have a reduced monitoring program. The Lake monitoring Program is now focusing on MTBE and the potential bioaccummulation of mercury in fish tissue. The data collected from the Sacramento Deep Water Ship Channel salinity monitoring program needs to be summarized and archived so that it is available for comparison to post-deepening data. The jet aerators in the Stockton Deep Water Ship Channel are expected to continue to be utilized during the Fall salmon run. Sediment data in the Sacramento and San Joaquin Deep Ship Channel are being monitored to determine if there is

any corrolation between contaminant levels and hydrological data. Preliminary indications seem to imply that a hydrological wet or normal year should result in low contaminant levels while a hydrological dry year may result in elevated levels in the following normal or wet year. If this corrolation is confirmed, this will improve the planning process for maintenance dredging.

E. Changes In Technical Capabilities In The District Office - District knowledge is expanding on ecosystem restoration and methly-mercury issues due to project experience and training. New employees, who are recent college graduates, are demonstrating an increased interest in water quality and therefore technical continuity from employee turnover is expected to be maintained. The Internet is now becoming an important source of new information on water quality issues. The uploading of this Annual Water Quality Report on Sacramento District's Webpage also allows the sharing of water quality information. Several government agencies and private citizens were directed to access these Webpages and were impressed by the availability of water quality data. The Sacramento District webpage is located at http://www.spk.usace.army.mil/cespk-ed/env/. It has been suggested that the Sacramento District should be designated as the Regional Center of Expertise for NPDES issues who will service other districts (San Francisco District) and other federal agencies (National Park Service).

F. Relationship Between Water Quality And Water Control Management Activities - The Water Quality activity is located within Environmental Engineering Branch, while the Water Control Management activity is located within Civil Design Branch. Personnel within the Water Quality activity are also involved in hazardous and toxic waste cleanup activities for DOD, EPA, and other federal agencies. Other Water Quality activity involvement include drinking water and wastewater treatment activities, in acid mine cleanup, and in Brownfield support. There is only

occasional contact between the two activities as regards the Annual Lake Water Report. The Water Control Management activity writes a service contract for the U.S. Bureau of Reclamation to collect the water quality samples at the 12 Corps of Engineer's Lakes. The Water Quality activity writes the contract specifications to the chemistry and biological laboratories, analyzes the laboratory results, and then writes this report.

G. Pertinent Division Regulations - There are no pertinent South Pacific Division Regulations at this time. However, Sacramento District recently published four NPDES guidance documents to address Stormwater Pollution Prevention on Civil Works and Military Projects. The four guidance documents include (1) Work Instructions for USACE personnel, (2) An updated Contract Specifications on Stormwater Pollution Prevention, (3) A sample Stormwater Pollution Prevention Plan (SWPPP) and (4) A sample Stormwater map to identify the location of silt fences, straw wattles, erosion control mulch and other Best Management Practices. The Work Instructions describe the District's procedure to submit the NOI for coverage under the General Permit, describes how to implement the Best Management Practices to prevent soil erosion and sedimentation into a protected body of water, and describe who will be responsible for issuing the SWPPP (Storm Water Pollution Prevention Plan). The District's Water Quality engineer wrote these guidance documents for the District Commander and these guidance documents are now being utilized by both the Sacramento District and the San Francisco District. Since these guidance documents are posted on the Internet at http://www.spk.usace.army.mil/cespk-ed/env/, other agencies have an opportunity to utilize these documents as a guide in setting up their own stormwater protection programs. Other guidance documents are now being developed. This includes identifying all technical requirements on small MS4 systems which will be regulated by

the Phase II NPDES program in 2003. The Phase II NPDES program will require the development of a Stormwater Management Plan for owners of small MS4 systems located in an urban area.

H. Laboratory Facilities - Private commercial laboratories are utilized to perform the lab analyses. The chemistry laboratory selected has to be State-certified in the parameters being analyzed. The current chemcal laboratory is Cal-Test Lab located in Napa, California and this laboratory will be audited in 2002 by USACE personnel. An algalogist at the University of California at Davis does the biological analysis (phytoplankton) analyses. Multiple year laboratory and service contracts are now being set up to reduce the administrative effort involved in contracting.

I. Data Management System - The District does not have a data management system at this time. Important data is simply published on the Internet in electronic form as an adobe pdf file. The District is hopeful that it can start utilizing the EPA's national data storage and retrieval (STORET) system soon for this purpose. The next STORET class on the West Coast is tentatively scheduled in Seattle on or about June 2002. The District will select a candidate to attend this training.

J. Training Obtained by the Water Quality Engineer-

(1) Civil Engineering Professional Engineer's Review Class at UC Berkeley - This class was taken by the Water Quality Engineer to obtain a second PE license to become a double PE in both Mechanical and Civil Engineering. This training provides diversity in expertise and the second PE license was awarded in January 2001.

(2) Construction Site Planning and Management for Water Quality Protection – This class was taken by the Water Quality Engineer to address Stormwater Pollution Protection. This class was presented by the San Francisco Regional Water Quality Control Board and is highly recommended for engineers who are tasked to specify the location of silt fences, straw wattles, and erosion control measures on a typical construction project.

K. Training Needs - The District personnel are obtaining the training as needed. This includes training in the environmental effects of dredging, water quality mathematical modeling of rivers and lakes, chemistry procedures, and funding is provided by either project funds (with project manager's approval) or overhead funds (with branch head's approval). There are several Ecosystem Restoration projects that are now in the reconnaissance and planning phase in Sacramento District and ecosystem restoration is expected to be a growing field. The interconnection of water quality, aquatic life, endangered land species, plant systems, and the general localized ecosystem requires more specialized training beyond water quality in order to ensure that the District's projects will be beneficial and cost effective. Due to the growth in ecosystem restoration projects, planning is now underway for the District Water Quality Engineer to acquire a UC Berkeley Extension Certificate in Ecosystem Restoration. This is a new environmental training program involving formal ecosystem classes such as (1) Ecological Risk Assessment, (2) Case studies of Ecosystem Restoration Projects, (3) Hydrological and Geomorphic Processes, (4) Wetland Creation, (5) Ecology of Lakes and Reservoirs, and the (6) Total Maximum Daily Load Program in California Rivers. Eight classes are normally required to obtain an Environmental Certificate and each class requires approximately $500 in tuition cost and approximately 16 hours of formal classroom training. The District is currently seeking funding sources for this training program since this training is likely to have a high applicability on the

future US Army Corps of Engineers' projects. Due to the current budget constaints, it is likely that this training program will have to be conducted over a 2 or 3 year period to spread out the cost. Other training needs are GIS and STORET, as previously discussed. GIS is also expected to be a growing field and therefore Sacramento District must train key personnel to meet the increased demand.

L. Research and Development Needs - The District currently has three Research and Development Needs: (1) The first need is to determine the wetland design parameters to minimize the potential creation of methyl mercury. A typical wetland is beneficial because it creates habitat and remove certain contaminants from the water column. However, recent studies have discovered that a wetland can also potentially increase the conversion of elemental mercury to the more deadly methyl mercury due to the presence of sulfate reducing bacteria. This transformation process is not well understood by the scientific community but it has been generally recognized that sulfate reducing bacteria plays a major role. Since this bacteria is anaerobic, current wetland design parameter at SPK is to reduce the wetland's detention time and water depth in order to minimize the potential for creating stagnant water. However, the exact criteria or engineering design parameters for wetland design to reduce the potential generation of methly mercury has yet to be determined. For example, what is the optimal water depth?, the optimal detention time?, etc that will maximize habitat and the removal of contaminants while minimizing the potential for methly mercury generation? To the knowledge of Sacramento District, there is no engineering formula to determine these optimal conditions and therefore there is a need to conduct some Research and Development in this specific area to avoid decision making based on empirical concepts. (2) The second need is the development of a possible ecosystem model or the consolidation of a reference database for ecosystem restoration projects. Water quality, soil

contaminants, habitat, vegetation, bacteria, reparian shading, the local food chain are all interconnected in a typical localized ecosystem but there is no acceptable model that can simulate this complex interconnection. For example, recent reconnaissance data obtain by a US Army Corps of Engineers' contractor suggested that a proposed ecosystem restoration site on Lower American River has relatively high lead and copper in the soil at one localized location of the site. This ecosystem restoration project will create a wetland and establish numerous trees and vegetation in order to attract the desirable targeted habitat. The levels of lead and copper are not high enough to justify a clean up but are slightly higher than background levels. In order to properly assess the potential impact of the lead and copper in the soil, a better understanding is needed to determine how these contaminants may potentially impact the food chain of the desired habitat, the water quality, and the overall ecosystem. An ecosystem database identifying all aquatic life and habitat that are sensitive to copper and lead will be useful in this application if this database is developed to includes sufficient bioassay results and toxicology data. This database would be similar to the US EPA's Preliminary Remediation Goals (PRG) published by Region 9 but the application would be focused on ecosystem risk assessment and the identification of habitat that is sensitive to specific ecosystem stress factors. A decision making chart or other tools may be useful in determining the overall environmental risk factor but the first step in achieving this goal is the acquisition of ecosystem training to allow a better understanding of ecosystem issues. (3) The third Research and Development need is the removal of methyl mercury from the environment. Note that the first Research and Development discusses the need to develop the wetland design parameters necessary to avoid generating methyl mercury. However, there is also a separate need to determine how to remove methyl mercury in the environment in a ecosystem where methyl mercury levels are already high. The US EPA has solicited the US Army Corps of Engineers to explore innovative technology to remove methyl mercury from Clear Lake. Clear

Lake has a severe methyl mercury program due to the mercury mine superfund site. One promising idea is the recent discovery in 2000 by the Michigan Health Department that methyl mercury is strongly attracted to sodium ions in the muscular tissue of fish species. It may be possible to develop a large filtration system or ion exchange system using similar sodium ions which will remove methyl mercury from the water column. However, the District has very little R&D funding to explore this type of R&D work and SPK is generally depended on outside agencies such as the US EPA , the Waterway Experiment Station, the scientific community and universities which are better organized for R&D research.

M. Special Studies Completed or Required - The District added the gasolene oxygenate MTBE (methly tertiary butyl ethylene) to its annual lake monitoring program in 2000, as this recently has caused some local concern at one of the lakes. The concern is that jet skies may be putting this substance into the lakes in quantities that may affect the fish and the people who consume the fish. MTBE monitoring will continue and expanded on some of the Lakes which have a higher concentration relative to the other Lakes. For example, Lake Isabella reported relatively high concentration of MTBE near the marina during the spring for two consecutive years. An on-site investigation may be initiated to determine to possible causes for this unusual trend in 2002. Due to mercury levels exceeding the EPA's action level of 0.012 ppm in the water at the bottom of the lakes, a fish tissue analysis program was initiated in Sep 2000. Lab results of the fish tissue program resulted in total mercury levels below the FDA's level of 1 ppm for a fish advisory. However, some of the lakes had fish tissue which exceeded the EPA's action level of 0.3 ppm and therefore this program is expected to expand in future years.

N. Water Quality Coordination With Other Agencies - The District maintained contact with the following agencies on water quality-related projects:

1. CALFED - This is a joint federal-state interagency group dedicated to preserving the environmental health of the San Francisco Bay-Delta system. The Sacramento District participates in some of the Technical Advisory Panels (TAP) involving projects in which CALFED is an active participant. Sacramento District is seeking funding sources to increase participation in CALFED meetings.

2. Bay-Delta Modeling Forum - This is an interagency group dedicated to ensuring that peer reviews are conducted on all mathematical models utilized and scientific studies done in the San Francisco Bay-Delta system. The Sacramento District is a member of the Forum but has not attended any meetings in 2000 due to the high work load assocated with stormwater protection and ecosystem restoration.

3. National Ambient Water Quality Assessment Program - The USGS has been tasked by Congress to select watersheds throughout the United States and perform rigorous analyses of water quality with the purpose of intiating a trend toward obtaining high quality data for 21st Century decisions. Three watersheds have been selected within the Sacrament District boundaries, these being the Sacramento River Basin, the San Joaquin - Tulare Basin, and the Carson River Basin. A liaison committee exists for each of these basin studies.

4. Lake Tahoe Water Quality Restoration Program - The Sacramento District is preparing to become involved in this program, with the Lahonton Regional Water Quality Control Board as a

sponsor. The District is participating along with such agencies such as the Tahoe Regional Planning Agency, the U.S. Geological Survey, the U.S. Forest Service, and the Universities of California and Nevada.

5. National Parks Services (Department of Interior) - The Sacramento District is currently assisting the National Parks Service in setting up a Stormwater Management Plan for their park facilties under the NPDES Phase II program. A NPDES Phase II planning document was developed by the Sacramento District which identifies all the regulatory requirements and provided detailed recommendations for implementation. This planning document has been reviewed by other USACE districts. The National Park Services will be requesting assistance from the Sacramento District during the implementation phase of the NPDES Phase II program in 2002. This will include the development of a Stormwater Management Plan for each park facility that is located within an urban area.

6. San Francisco Bay-Delta Circulation Studies - The USGS is conducting a multi-agency study of circulation within and salinity intrusion into the bays and Delta. The District has loaned the USGS its six underwater S-4 computerized data loggers in support of this study. The resulting data will be of use to all agencies involved in restoring the environmental health to the fragile ecosystem, and to those agencies such as the Corps that have projects in the area.

O. **Scheduling For Detailed Project Evaluations** - Scheduling is currently underway for the water quality work that supports maintenance dredging on the Sacramento River and San Joaquin River Deep Ship Channels. Scheduling on other projects are usually determined by the project manager in PPMD or the ultimate customer such as the National Park Services, the EPA, etc)

P. **Problems Encountered With Contracted Work -** In 2000, a NPDES notice of violation (NOV) was written by EPA Region 9 against the District's Lower American River's levee improvement project because the inspectors noticed that the Best Management Practices for stormwater protection were sub-standard. The District Commander ordered that a committee be organized to determine the reasons for the NOV and provide recommendations for corrective action. The district's water quality engineer is a member of this committee which also consists of representatives from Planning division, PPMD, Civil Design, Construction Operations. It was determined that the current NPDES process was for Sacramento District to submit the NOI to the state board for coverage under the General Construction NPDES permit. Civil Design would then write the contract specifications which requires that the contractor must comply with the permit conditions. It was noted that the selection of the Best Management Practices (BMP's) requiring the installation of tackified straw, silt fences, fabic rolls, etc was delegated to the contractor. Unfortunately, the contractor would select substandard BMPs in order to reduce costs. Since the contract specifications did not specify any explicit BMPs or any guidance document for the contractor, this current process resulted in the installation of substandard BMPs and receiving an NOV from the US EPA. To avoid another NOV, the generic contract specifications were upgraded in 2001 to reference the SF RWQCB's Field Manual for Erosion and Sediment Control (3^{rd} edition, July 1999) as the BMP guidance document. In December 2000, representatives from EPA Region 9 and the Central Valley RWQCB agreed that the SF RWQCB's Field Manual is a good guidance document for the installation of BMPs for stormwater protection. For some projects involving a higher risk of stormwater pollution, the erosion and sedimentation BMPs must be specified by the water quality engineer, rather than depending on the contractor to select the appropriate BMPs from the Field Manual. This has already occurred for the Napa River Flood Control Project, when the District's water quality engineer wrote the SWPPP (Storm Water

Pollution Prevention Plan) and included this SWPPP in the contract specification. Since this new process was invoked District-wide in 2001, no problem occurred in NPDES compliance.

Q. **Special Assistance From Other Corps Elements Or Research Facilities** - Assistance has been obtained from Waterways Experiment Station on dredging activities.

R. **Project-By-Project Summary of Water Quality Conditions** - This is described in Section II which is located later in this report (3 pages after this page).

S. **Problems Encountered And How Addressed At Each Project** - It is becoming more difficult to meet the dredging water quality criteria as the regulatory agencies add more parameters and stricter numerical criteria to their Waste Discharge Requirements. An example is the new Waste Discharge Requirement (WDR) for maintenance dredging in the deep ship channels which will now require that the dredged sediment material deposited in an upland disposal area must meet the average soil contaminants for the State of California. Unfortunately, the US Army Corps of Engineers' historical data indicates that certain contaminants in the background sediments exceed the average soil contaminants for California. This means an environmental and human risk assessment must be performed before this material is deposited upland. In another example, the general NPDES permit for stormwater pollution protection on construction projects has been revised recently to add a monitoring program to determine the effectiveness of the Best Management Practices installed on construction sites near an impaired body of water. The District's water quality engineer must be involved to ensure a water quality program is invoked to maintain compliance with the new permit requirements.

One desire of the District is to put its past sediment core data, modified elutriate test data, and bioassay results into easily read electronic format, so that data on new potential dredging projects can be compared to the existing data as serve as a basis for consideration by the regulatory agency in determining water quality impacts. Having the historic data easily accessible may also reduce the number of samples which need to be collected in the future and thus reduce costs. Planning is now underway to post the historical sediment data on the US Army Corps of Engineers webpage in 2001 next to this water quality report. Due to scanners and new computer programs that can convert data into .pdf files, this can now be easily done.

T. **Opportunities Identified And How Addressed** - An opportunity for marketing the services of the Corps exists with the National Park Services (NPS). The NPS has a smaller technical staff than the Sacramento District and the NPS would gain the services that could be provided by the Corps Waterways Experiment Station and hand-picked District team members. Other OUTREACH programs include the Concord Weapons Facilities. The Facility Commander has requested technical assistance from Sacramento District due to the limited technical staff in Concord. Both organizations benefit because this would expand work at Sacramento District while the smaller federal facilities would avoid hiring and training new employees.

U. **Innovative Techniques Utilized to Improve Water Quality** - Two innovative techniques are currently being utilized by the District, as follows:

1. Jet Aeration System - Sixteen jet aeration nozzles mounted on two underwater manifolds are continuing to be utilized to input 300 pounds per day of dissolved oxygen into the San Joaquin River at the Port of Stockton during the Fall salmon run.

2. Signal Processing - Signal processing utilizing harmonic analysis with digital filtering is being used along with multi-dimensional data to determine how deepening the Sacramento Deep Water Ship Channel will affect the flow and salinity fields. The digital filtering essentially removes the tidal effects from the data and allows net flow and salinity effects to be seen over the vertical depth of the river. This knowledge for before- and after- deepening can be used to determine whether any mitigative effects might be needed for the channel deepening.

V. **Action Items for the Lake Monitoring Program for 2002.**

(1) Feedback from the Park Rangers will be requested to determine if there are any site specific water quality issues that should be addressed in future Lake Monitoring Reports.

(2) The Field Sampling Plan and the Quality Assurance Project Plan needs to be developed. The Quality Assurance Project Plan will address the need for field blind duplicates.

(3) Fish tissue analyses will continue for several lakes, to check for mercury content.

(4) MTBE monitoring will also continue for several lakes.

II. Projects in the Planning, Design, and Construction Phases

A. **Lake Tahoe** - The Tahoe Basin straddles the California and Nevada state line, about 85 miles northeast of Sacramento, California and 15 miles west of Carson City, Nevada. The Basin encompasses over 500 square miles and is comprised of Lake Tahoe and its 63 tributary watersheds. The Tahoe Basin ecosystem has been degraded by past and current human activities such as logging, grazing, stream channelization, road construction, recreational use, and urban development. The exceptional water clarity of Lake Tahoe is decreasing at a rate of about 1 foot

per year due to accelerated inputs of nutrient and sediments. Other water resources and related problems in the Basin include lakeshore erosion, flooding along developed stream channels and lakeshore areas, aging wastewater infrastructure (threatening stream and lake water quality), and lack of public recreational access to the Lake Tahoe shoreline.

In June 1997, three multi-agency workshops were held in the Tahoe Basin focusing attention on water resources, transportation, forest health, and recreation and economic development problems and opportunities within the Basin. The Corps and Environmental Protection Agency (EPA) cohosted one workshop which focused on water quality and other water resource issues. The three workshops culminated in a highly successful visit by the President and Vice-President in July 1997. A key output of the Presidential visit was Executive Order 13057 which directed the EPA, and the Departments of Agriculture, Interior, Transportation, and Army to establish a Lake Tahoe Federal Interagency Partnership. The purpose of the Partnership is to ensure that Federal actions are coordinated and protect the extraordinary natural, recreational, and ecological resources in the Lake Tahoe Basin and the economies that depend on them. Challenges to effective Corps participation in resolving the major resource problems in the Tahoe Basin include:

1. Resolution of Highly Complex Regional Issues - Effectively resolving the environmental problems in the Tahoe Basin involve addressing numerous highly complex physical, economic, social, and institutional issues. The physical problems and potential solutions related to deteriorating stream and lake water quality and fish and wildlife habitat are highly interrelated with regional development and other area socioeconomic and political issues. Successfully addressing the problems will require close coordination with numerous and diverse Federal, State, regional, and local agencies.

2. Application of the Corps Study Process - The traditional Corps Civil Works project process is difficult to implement in the Tahoe Basin. The resources problems are scattered among the numerous sub-watersheds and often involve different non-Federal local interests. In our general investigation process, a logical next step would be a broad basin-wide investigation that could develop into a Federal project sometime in the future. This model is likely not implementable in the Tahoe area because of the numerous sub-watersheds and diverse non-Federal interests. We are working with local agencies in the Upper Truckee River watershed to develop a process where potential site-specific restoration projects can be identified and implemented concurrent with conduction a longer-term comprehensive watershed feasibility study.

B. **Napa River Flood Control Project** - As a result of the Napa River Community Coalition Group the District changed its design to include a set-back levee downstream of the city of Napa. This involves the relocation of 6,000 feet of railroad track. The existing track and surrounding area was inspected to determine whether there were any hazardous and toxic waste sites that might impair water quality. Also, the Waterways Experimental Station finished their water quality modeling work, using the Corps model CE-QUAL-W2. The current emphasis at Napa River Flood Control Project is the cleanup of HTRW contamination and stormwater pollution prevention during construction.

C. **Bank Protection Projects Along the Sacramento and Feather Rivers** - Bank protection work is being done at eight sites along the Sacramento River. Water Quality studies are being done to determine if the construction of toe trenches at the bottom of the river banks or the placement of imported borrow material into the water will cause impaired water quality. If so, then mitigation methods will be decided on.

D. **Stockton Deep Water Ship Channel** - The jet aeration system, installed as a mitigative device for the permanent deepening of the Ship Channel, remains in operation to mitigate for dissolved oxygen in the San Joaquin River for the Fall salmon run. Sediment cores and modified elutriate tests have been run in preparation for the next dredging project.

E. **Brownfield Projects** - Work continues by the District's marketing personnel to relate Corps authorized studies, many of which can improve water quality conditions, to the nationwide Brownfield effort to restore slightly contaminated lands in the inner-cities so that industry and jobs will move there. The Salt Lake City Gateway project is such an example. The District has tied its aquatic restoration project into the Brownfield work there, with the intent to improve water quality in the city creeks, in the stormwater management ponds, and in the Jordan River. The Stockton Brownfield project is another example. Several events are going on in the same area there that can benefit from a coordinated action. The District is planning an aquatic restoration project near Mormon Slough to attract salmon into that area. The District is assisting the EPA in cleaning up an underwater Superfund site in Old Mormon slough that effects water quality. The City of Stockton has a Brownfield project along the river shores adjacent to both the salmon restoration site and the Superfund site. Some coordination has started to ensure that the net result of the actions tends to improve the water quality in the river there.

F. Aquatic Ecosystem Restoration Projects under the Continuing Authority Projects (CAP) 206 and 1135.

The following projects are ongoing in Sacramento District involving Aquatic Ecosystem restoration. While these projects in the planning stage involve mostly habitat restoration, an issue would occasionally arises which would involve the expertise of the District Water Quality Engineer. The project manager in Sacramento District is Mr Charlies Rairdan. The projects are listed by project name, state and CAP.

Basalt	CO	206
Blue River	CO	206
City Creek, Salt Lake City	UT	206
Decker Lake	UT	206
Green River/Ute Indian Tribe	UT	206
Hayden Diversion Project	CO	206
North Fork, Gunnison River	CO	206
Soldier Hollow	UT	206
Uncompahgre River	CO	206
Upper Jordan River	UT	206
West Jordan City (Jordan River)	UT	206
Clear Lake Aquatic Weed Control	CA	206
Penn Mine	CA	206
Clear Lake Watershed Rest	CA	206
Blackwood Creek	CA	206
Edgewood Creek	NV	206
Incline & 3rd Creeks	NV	206
Ward Creek	CA	206
Clover Creek, Redding	CA	206
L. Natoma Rest of Contaminated Backwater	CA	206
Pacific Flyway	CA	206
Turtle Bay	CA	206
Carson River	NV	206
Delta Science Center at Big Break	CA	206
Gleason Creek, White Pine County	NV	206
Lower Truckee River, Pyramid L. Paiute Tribe	NV	206
Steamboat Creek, Washoe County	NV	206
Ashley Creek	UT	1135
Mormon Channel, Stockton	CA	1135
Pine Flat Turbine Bypass	CA	1135
Feather River, North Fork, Chester	CA	1135
Cherokee Canal, Oroville	CA	1135
Colusa Basin Wetlands Restoration	CA	1135
Murphy Slough	CA	1135
Putah Creek, South Fork	CA	1135
Woodson Bridge	CA	1135
Yolo Basins Wetlands, Davis	CA	1135
Lower Truckee River McCarran Ranch	NV	1135
Numana Dam	NV	1135
Prospect Island	CA	1135

G. **Ecosystem Restoration Projects by the Sacramento Area Flood Control Agency**

Sacramento District is also providing technical support to state and local agencies. One such project is the Bushy Lake Ecosystem Restoration Project located by Cal-Expo in Sacramento. Jones & Strokes has issued several technical studies and the Sacramento Area Flood Control Agency has solicited the US Army Corps of Engineers in conducting a technical review.

III. Annual Lake Water Quality Monitoring Program

A. **Parameters Being Monitored** - The District samples the 12 lakes during the Spring and during the Summer. The Spring monitoring reflects the lake condition after it has received the bulk of the incoming nutrients, organic loads, and other contaminants that may have washed off of the watershed, and before thermal stratification sets in. Some Spring blooms of phytoplankton may already have occurred. The Summer monitoring reflects the lake condition during strong thermal stratification, after most of the organic decay has occurred toward the lake's bottom, and most of the Spring and Summer phytoplankton blooms have occurred. The parameters monitored and the locations are shown in the attached figure.

B. **QA/QC Techniques** - The District is in the process of incorporating more QA/QC techniques into the annual lake monitoring program, so that the methodology is comparable to the USGS's NAWQS program. This will then allow a multitude of agencies to share their data in the future with a feeling of confidence in support of better 21st Century decisions affecting water quality. QA/QC techniques are built around a Field Sampling Plan and a Quality Assurance Project Plan. The primary analytical laboratory is Cal Test located in Napa California. A formal audit on this

laboratory will be conducted by US Army Corps personnel in 2002 to verify compliance with the QA/QC requirements of the state of California certification program.

Field Sampling Plan - The U.S. Bureau of Reclamation does the field sampling for the District. In their work they follow several protocols on field sampling, as follows:

(a) USGS Field Guide for Collecting Stream Quality Samples. This consists of a USGS ring binder entitled "Guide for Collection, Treatment, and Analysis of Water Samples, Western Region Field Manual, Sept. 1990.

(b) California DWR, State Water Project Water Quality Field Manual, 1991

(c) USEPA sampling protocols

The District is currently starting work on developing their own field manual which will incorporate the above by references but also take into account special needs of the District's program, such as the phytoplankton sampling program and field calibration techniques.

C. Changes for the Lake Monitoring Report for 2001

A major overhaul on the format to the 2000 Lake Monitoring report occurred to convert the old quattro-pro graphs to microsoft excel format in November 2000. For 2001, very little changes occurred in this year's Lake Monitoring Report. Most of the overall water quality program in Sacramento District during 2001 focused on stormwater pollution protection issues, ecosystem restoration projects and addressing the more stringent regulatory requirements on the US Army Corps of Engineer's maintanance dredging projects.

D. **Lake Annual Water Quality Reports for 2001 -** The following lakes have had reports written for them. These reports only contain the highlights or summaries of the complete report and laboratory analytical results and raw field data. The complete report for each lake is available from the District office and contains such additional information as QA/QC results with their Quality Control Summary Reports (QCSR's). The QA/QC results and QCSR reports were not put into this summary report so as not to add too much bulk to this document.

1. Black Butte Lake
2. Eastman Lake
3. Englebright Lake
4. Hensley Lake
5. Isabella Lake
6. Kaweah Lake
7. Martis Creek Lake
8. Mendocino Lake
9. New Hogan Lake
10. Pine Flat Lake
11. Sonoma Lake
12. Success Lake

These reports are attached